

FOSTERING COMMUNICATION BETWEEN THE ELDERLY AND THE YOUTH WITH SOCIAL GAMES

Hai T.T. Nguyen, University of Turku, School of Economics, Turku, Finland,
tngu2407@yahoo.com

Tommi Tapanainen, Hanyang University, Business School, Seoul, Korea, tojuta@gmail.com

Yin-Leng Theng, Wee Kim Wee School of Communication and Information, Nanyang Technological University, Singapore, tyltheng@ntu.edu.sg

Stefan Lundberg, School of Technology and Health, KTH Royal Institute of Technology, Stockholm, Sweden, stefan.lundberg@sth.kth.se

Mika Luimula, Faculty of Telecommunication and e-Business, Turku University of Applied Science, Turku, Finland, mika.luimula@turkuamk.fi

Abstract

In today's aging societies, elderly people often have difficulties to find people to communicate with. To address this loneliness of the elderly, it has been suggested to create more opportunities for children and elderly people to engage in various shared activities together. In this ongoing research, we investigate that social offline games can facilitate communication between the generations by creating a mutually enjoyable environment where elderly and young persons can interact with each other. A longitudinal approach is used to investigate whether intergenerational communication actually is enhanced by utilizing social offline games as the medium. Prior research has been conducted in related topics, such as the perceptions of the young and elderly participants towards each other in a game setting, as well as the impacts to communication behaviours among players of the same generation. We aim to build a model that connects game enjoyment, intergenerational perceptions and communication, and ultimately contribute to improving the well-being and relieving the loneliness experienced by many elderly people.

Keywords: Social games, Game Enjoyment, Intergeneration Communication, Elderly People.

1 Introduction

Population ageing is now recognized as an important global issue, as the numbers of the elderly (above 60 years old) are continuously growing. According to a United Nations report (2009), the proportion of the elderly in developed countries is projected to increase from 22% to 33% by the year 2050. In addition, the old age dependency ratio (population aged 65 or over in relation to that aged 20-64) is estimated to increase from 28.4 % in 2010 to 58.5% in 2060 (European Commission, 2012). This greying of society will come with significant challenges to institutions. First, changes in the society are contributing to the fact that many elderly people live relatively isolated lives after their retirement from active working life. They also live longer than ever and often many years after their spouses have passed away. These years of retirement can thus be a lonely and depressing experience for the elderly, who also need to combat several aged-related diseases and ailments. These ailments unfortunately include ones that immobilize elderly people or make it difficult for them to conduct meaningful leisure-time activities.

Elderly people often have interest in interacting with young people and children. This can provide a therapeutic influence for elderly people and a way for them to enjoy life in their twilight years. Therefore, increasing the communication and interaction opportunities between elderly and young people (termed here as the “intergeneration approach”) can be an important objective for building a society more attuned to elderly people (Chua et al. 2013; Nguyen et al. 2014). However, prior research has indicated that there are barriers in intergenerational communication. Young people do not feel satisfied when talking with the elderly (Hummer 2010), while elderly people are annoyed when young people patronize them (Giles and Gasiorok 2010; Giles et al. 2008). Efforts to bridge this perceptual gap between the two age groups are needed to facilitate mutual communication. This kind of communication and interaction could be promoted by shared leisure time activities, such as playing cards or watching TV together. While such traditional activities can still hold interest for many elderly people and their grandchildren, new activities, in particular the playing of computer games, has come to the fore.

Computer/video games have long been known as a favourite past-time for the young generations, but recently, they have become popular also among certain elderly people (De Schutter 2011; Pearce 2008). Computer/video games can be an effective way to promote young people to play with elderly people so that both parties enjoy the interaction. Prior research on computer games for elderly people has addressed game-design elements (Gerling et al. 2011; Khoo et al. 2009; Ijsselsteijn et al. 2007; Mahmud et al. 2010; Mubin et al. 2008), game playing in family contexts (Aarsand 2007; Khoo et al. 2009; Vaida and Greenberg 2012), and the perceptions between the young and the elderly when playing game together (Chua et al. 2013). It has been found that video games can reduce intergroup anxiety and improve intergroup attitudes among young and elderly participants regarding their mutual perceptions (Chua et al. *ibid.*). As there are different kinds of computer/video games, however, it could be expected that the effects for intergenerational communication differ depending on the type of game. The so-called social games, which promote communication between the players, can fit the objectives of this research. They can be subdivided into social online and social offline games, which refer to playing the game together with other people over networks, and playing the game together with others on the same game device, respectively. (Kowert et al. 2014)

In this paper, the scope of research is limited to study the effect of social offline games on communication behaviours. Therefore, the purposes of our study are to investigate: (1) the link between age and different enjoyment types of social games; and (2) the link between social game enjoyment, intergenerational perceptions and communication.

2 Literature review

2.1 Intergenerational perceptions

In general, the study of intergenerational issues includes two broad perspectives: the intergroup perspective and the family perspective (Williams and Harwood, 2004). Researchers in the former perspective have found that there are often patronizing and stereotypical perceptions on both sides: the youth and the elderly, towards each other (Coupland et al. 1991; Hummert 2010; Williams and Giles 1996; Giles et al. 2003, 2008; Giles and Gasiorek 2010). This barrier among the generations leads the young people to avoid communicating with the elderly (Ryan et al. 1992). It has also been found that this barrier is not specific to the western culture, but is found also in other cultures in the world (Giles et al. 2002; McCann et al. 2003). Researchers in the family perspective contend that the role of the grandparent can mitigate the negative stereotypes young people associate with the elderly (Harwood and Lin 2000). For example, increasing the contact children have with their grandparents could improve their perceptions about the elderly in general (Harwood et al. 2005). It has been also found that positive experiences during joint participation in leisure activities can facilitate relationship-building in peer and family relationships (Orthner and Mancini 1990; Zabriskie and McCormick 2003). As stated by Barker et al. (2004), contexts, where elderly and young participants can relate to each other without the burden of stereotypes and prejudices toward each other, may be useful in improving the communications between the generations.

2.2 Changing intergenerational perceptions

Research about the change of attitudes by one group of people regarding another group of people has indicated that a variety of situational factors are at play as suggested in Intergroup Contact Theory (Allport 1954; Pettigrew 1998). Not only the experiences, personalities, status and shared goals of the communicating parties but also general intergroup cooperation are important. The Intergroup Contact Theory stated that negative attitudes can gradually be improved as a result of constant and long-term positive communication experiences between the groups. Chua et al. (2013) also suggested that the groups should be provided with the possibilities to participate in shared activities on a regular basis. In addition, changing intergenerational perceptions via education has been studied previously by Aday et al. (1991a, 1991b).

Playing social games can also be a solution to improve the relationship between the elderly and youth. Playing games together can increase the sustainability of social interactions (Aarsand 2007), and increase social capital and social support for the participants (Trepte et al. 2012; Huvila et al. 2010). Games have the potential to provide developmental benefits for both the young and the old in a family environment (Voids and Greenberg 2011). If these different generations play games together, the games can facilitate these persons to change their generation perceptions to more positive (Chua et al. 2013). However, some limitations of prior investigations have been that the specific characteristics of selected games were not purposefully created for such an intergenerational context, and the effects of game contents on intergenerational perceptions and then intergeneration communication were not examined.

2.3 Communication behaviour

The Theory of Reasoned Action (TRA) (Fishbein and Ajzen 1975, Ajzen and Fishbein 1980) explains how people's attitudes and their perceptions regarding the views of other people toward the action affect their choices in taking the action in question. It includes the concepts of behavioural intention, attitude, and subjective norm, where the two latter variables predict the behavioural intention, which in turn predicts behaviour itself. In other words, if the person believes that other people, who are important to him/her, would view the action positively, and exhibits positive attitudes toward the action him/herself, then these two things contribute to him/her having a behavioural intention toward taking the action. The Theory of Reasoned action has been applied to the study of communication behaviour. For example, Roberto et al. (2011) found that paediatricians' communication with parents regarding the Human Papill-

lomalavirus vaccine was consistent with the theory of reasoned action. Also, according to Roberto et al. (2014), the communication by substance abuse treatment providers toward their clients regarding the treatment was likewise consistent with the theory of reasoned action.

3 Research model

Even though prior studies carefully selected games, which were suitable for the elderly (i.e. simple and easy-to-play) and for shared activities, the selected games were not particularly applicable to foster intra-player communication. Thus, this research focuses on the social games, which are specifically designed to facilitate intergenerational interactions and communication. The “virtual stories co-creation” games (Trogermann and Pelt, 2006) and other kinds of communication games, where the elderly people can create stories and communicate with young generation or children are selected. It is expected that such a game promotes the interactions between the participating elderly and young people and leads to the positive intergenerational perceptions.

Games would be pointless if they were not enjoyable (Peter et al. 2003; Sweetser and Wyeth 2005; Vorderer et al. 2004; Vorderer and Bryant 2006). Even for serious games, enjoyment is also crucial because it can encourage the players to continue their playing over long periods of time (Cohen 2014; Klimmt 2009). Scholars in psychology, neuroscience and communication have adopted various conceptualizations of enjoyment (Cohen 2014; Feng et al. 2010) and most of these definitions recognize it broadly as pleasurable reactions toward objects and events. Fang et al. 2010 measured game enjoyment via the affective, behavioural and cognitive reactions of the players. While Klimmt et al. (2007) found the impact of effectance and the degree of control on the game enjoyment. For the elderly, the experience of playing games with young people could be satisfying and enjoyable. However, they might not always enjoy game tasks, i.e. activities taking place in games. In contrast, while the game tasks can attract the young people, they may not always experience similar enjoyment in playing together with the elderly as elderly people feel.

The research of Chua et al. (2013) showed a significant association of game enjoyment with attraction and intergroup anxiety, which are constructs of intergenerational perceptions, for the elderly participants, but not for the young participants. However, their research has not isolated the impact of task enjoyment and experience enjoyment on different participant groups. Thus, we assume that experience enjoyment plays more important role in facilitating the changes in intergenerational perceptions for the elderly while task enjoyment plays more important role in facilitating the changes in intergenerational perceptions for young participants. In addition, previous studies (e.g., Cohen 2014) examined how several player characteristics, including enjoyment, affect intentions to share information regarding the game, and actual game sharing behaviour of players. Therefore, similarly like hedonic motivation in the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) (Venkatesh et al. 2012), the task enjoyment and game enjoyment are predicted to have the impact on the communication intention of the participants. Thus, we hypothesize:

H1(a): Age will moderate the effect of experience enjoyment on intergenerational perceptions, such that the effect will be stronger for elderly participants.

H1(b): Age will moderate the effect of experience enjoyment on communication intention, such that the effect will be stronger for elderly participants.

And

H2(a): Age will moderate the effect of task enjoyment on intergenerational perceptions, such that the effect will be stronger for young participants.

H2(b): Age will moderate the effect of task enjoyment on communication intention, such that the effect will be stronger for young participants.

The games have the potential in developing positive intergenerational perceptions as a means of shared leisure activities when the young and old participants play together (Chua et al., 2013). However, further research is needed to understand what impact these positive changes in intergenerational perceptions can have on the behavioural objectives of players from both age groups. Therefore, combining with the reasoned action approach, in this research, we will investigate whether the positive changes in intergenerational perception can lead to higher communication intention. Hence, we propose the following hypothesis:

H3. The changes in intergenerational perception will positively predict the communication intention of participants when the youth and elderly participant play games together.

TRA argues that intention to communicate and actual communication can be linked. However, prior research in serious games (Cohen 2014) has found that game enjoyment and actual communication were not linked directly, and the link of these variables through the intention to communicate was also tenuous. Therefore, Cohen (2014) comes to suggest the verification of the link between intention and action in future game-related research. As a result, we have this hypothesis:

H4. The communication intention will positively predict whether the players communicate with others when the youth and elderly participant play games together.

To summarize, we have the research model as below in Figure 1.

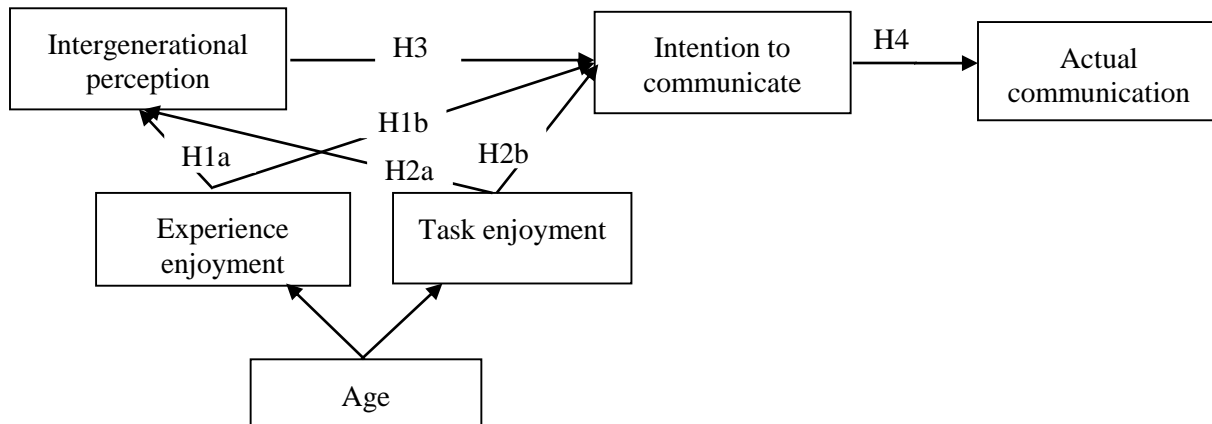


Figure 1. The research model of social games and intergenerational communication

4 Research method

It should be noted that this paper reports research in progress, the data collection of which is planned to be completed using the method described hereafter.

4.1 Participants

Volunteer elderly and youth participants are initially recruited for the period of three months. The project is advertised via Internet websites, newspapers, social media channels, and TV and radio announcements to recruit the participants. In addition, the association of elderly people and the schools are contacted to assist the researchers in recruiting the participants. The geographical areas, where these elderly people come from, may have an effect on the results, and thus different locations are chosen to collect data for this project. The recruited elderly members can also come from different socio-economic status groups such as those who typically live alone, or those who live in nursing houses. As the gameplay takes place together with young children, the background of elderly people is checked before being selected as partic-

ipants. Volunteer youth participants aged from 10 to 17 years old are recruited from primary and secondary schools or junior colleges.

4.2 Procedures

It is planned that the project holds the regular weekly interaction sessions over three months in the community college or senior-activity centre which provides a convenient meeting point for the elderly to socialize. An elderly person is randomly assigned to make a team with one young person. Once paired, the two participants remain in their team for 12 interaction sessions and 30 minutes per each session. In the first interaction session the briefing introduction on the game is organized to teach the elderly people and children how to play the game. In this first session, the researchers with their experience in creative jobs will play together with participants to help the participants to play the game. This is to allow the elderly to familiarize themselves at a comfortable pace with the game. After that, every week the researchers, the elderly people and children meet in the community colleague or senior activity centre; however, the elderly and their children are asked to play the games without the help of researchers.

All participants complete three questionnaires for this longitudinal study. In the first session, after being briefed about the project, participants complete the pre-survey. Then, during these three months another survey is conducted. Finally, at the end of the 12th session, the participants are asked to complete the same survey for pre and post comparisons. For the “virtual stories co-creation” and communication games, we select the game which has the advantage of relatively easy control interface and therefore requires only a short time for players to master. We use partial least squares (PLS) to test our model as PLS is capable of testing these relationships (Chin et al. 2003). The regression and zero-order correlations are also used to analyse the changes in intergenerational perceptions, communication intention and actual communication. In addition, the observation and interview are implemented to deepen the understanding of the researchers regarding how the elderly people express their enjoyment or lack of it when playing the game, and how the elderly people and children communicate when playing the game.

4.3 Measures

Our research model consists of age, intergenerational perception, game enjoyment, intention to communicate and actual communication variables. Age is measured in years. Changes in intergenerational perception are measured with three commonly used concepts (i.e. intergroup anxiety, general attitudes and interpersonal attraction) (Chua et al. 2013). We use an instrument defined by Fang et al. 2010 and Klimmt et al. 2007 to measure task enjoyment and experience enjoyment. Finally, while we adopt existing measurement tools for the three former variables, we design our own measurement tools for the two latter variables. The guidelines of Straub and Carlson (1989), and Straub et al. (2004) about the content validity will be used to design the research. It proceeds by extracting the questionnaire items from a literature review, pilot testing the first version of the questionnaire, and creating the final version with the help of an expert panel.

5 Discussion

This study contributes to our understanding on the linkages between communication and social games. It also sheds light on the potential of games and the intergeneration approach to overcome the obstacles of the aging society. Regarding theoretical implication, the research model suggested in this paper explores whether task enjoyment and experience enjoyment of social games can foster the elderly and young to participate in game play involving communication. Prior research (e.g., Chua et al., 2013) has suggested that the long-term play of video games improve the perceptions among the generations toward each other. For example, the negative stereotypes that these generations hold of each other may be gradually eliminated. In this research, we expect similar results for social games that especially emphasize intergenerational interaction and communication between the young and the elderly. Such games give far more op-

portunities for intergenerational interaction, and thus the effects on intergenerational perceptions are expected to be greater, which then increases the communication motivation among participants.

Another point is the impact of collaborative social gaming on the young and the elderly can be different. When the elderly plays this kind of game with a young person, it is far more satisfying and enjoyable for the elderly than playing games just by themselves, and therefore, it can be expected that they change their attitudes regarding games and then change their communication intentions. This can create a positive feedback loop for the elderly. The impact on young people is less certain. If with only experience enjoyment, they are not as likely to improve their attitudes and communication intention as much as the attitude of elderly people in this interaction. However, task enjoyment may keep them in the games and being more open to communicate with the elderly, particularly on guiding the elderly to play.

The implication would be that the involvement of elderly people more widely in social game settings and virtual worlds can be beneficial for not only improving the physical and mental health problems (Jung et al. 2009; Shubert, 2010; Theng et al. 2012), but can possibly mitigate a host of other problems, such as intergenerational stereotyping and misunderstandings, and the digital divide for the elderly. Further, in designing these social games, besides the principles reviewed by Ijsselsteijn et al. (2007), special emphasis must be given on the balance between experience enjoyment and task enjoyment so that it has the capacity to fully utilize the capabilities of social games from the perspective of all participants, and to attract the young generation to communicate with elderly people. In terms of limitations of this research, the project needs to be empirically tested which is a future objective of this study.

6 Conclusion

In an aging society, the support ratio of working persons versus retired persons becomes very low, and then the burden for these working persons to provide tax revenue for the pensions and healthcare of the elderly becomes excessive. This could aggravate the relationships between the young and elderly generations. Thus, increase the understanding and interaction among generations via communication is necessary. Different stakeholders of the society e.g. government organizations, private firms, non-profit organizations and research institutes have attempted to find solutions for the challenges of the aging society. For example, government organizations often use two main approaches in crossing over the digital generation gap. One is the training program, where the elderly people are taught on how to use ICT in order to follow the mainstream society in the use of ICT, and the other is encouraging the firms to design and provide ICT products for elderly people. However, both of them have limitations as there are no clear motivations for elderly people to join in the ICT training program, and there are insufficient business opportunities for the firms to provide the ICT products for elderly people. The new approach in which the elderly people use the ICT tools together with children is expected to motivate the elderly people to be interested in ICT and enhance the intergeneration relationships. However, lack of research on intergenerational issues and ICT for aging society limits the ability of ICT experts to offer solutions for these issues. Our study is a good starting point to investigate the social games, as cost-effective tools, in facilitating positive changes in intergenerational perceptions and then improving intergenerational communication and digital divide.

Acknowledgement: We would like to thank the Japan Foundation in helping to make this research possible.

References

- Aarsand, P. A. (2007). "Computer and video games in family life: The digital divide as a resource in intergenerational interactions". *Childhood*, 14, 235–256.
- Allport, G. W. (1954). *The nature of prejudice*. Reading, MA: Addison-Wesley.

- Aday, R. H., Sims, C. R., & Evan, E. (1991a). "Intergenerational partners project: A model linking elementary students with senior center volunteers". *The Gerontologist*, 31, 263–266.
- Aday, R. H., Sims, C. R., & Evan, E. (1991b). "Youths' attitudes toward the elderly: The impact of intergenerational partners". *Journal of Applied Gerontology*, 10, 372–384.
- Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Barker, V., Giles, H., & Harwood, J. (2004). "Inter- and intragroup perspectives in intergenerational communication". In: *Handbook of communication and aging research (2nd ed., pp. 139–165)*. Ed. by J. F. Nussbaum & J. Coupland, Mahwah, NJ: Lawrence Erlbaum Associates.
- Chaffin, A.J. and Harlow, S.D. (2005). "Cognitive learning applied to older adult learners and technology". *Educational Gerontology*, 31 (4), 301-329.
- Chin, W. W., Marcolin, B. L., and Newsted, P. R. 2003. "A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/Adoption Study," *Information Systems Research* (14:2), pp. 189-217.
- Chua, Puay-Hoe, Jung, Younbo, O. Lwin, May, Theng, Yin-Leng. (2013). "Let's play together: Effects of video-game play on intergenerational perceptions among youth and elderly participants". *Computers in Human Behavior*, 29, pp. 2303–2311
- Cotton, Shelia R., Ford, George, Ford, Sherry, Hale, Timothy M. (2012). "Internet use and depression among older adults". *Computers in Human Behavior*, 28, 496–499
- Cohen, Elizabeth L. (2014). "What makes good games go viral? The role of technology use, efficacy, emotion and enjoyment in players' decision to share a prosocial digital game". *Computers in Human Behavior*, 33, 321–329
- Coupland, J., Nussbaum, J. F., & Coupland, N. (1991). "The reproduction of aging and ageism in intergenerational talk". In: *Miscommunication and problematic talk* (pp. 85–102). Ed. by N. Coupland, H. Giles, & J. M. Wiemann. London: Sage.
- De Schutter, B. (2011). "Never too old to play: the appeal of digital games to an older audience". *Games and Culture*, 6, 155–170.
- European Commission. (2012). *Demography report 2010: Older, more numerous and diverse Europeans*. URL: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KE-ET-10-001/EN/KE-ET-10-001-EN.PDF (visited 13/05/2014)
- Fang, Xiaowen, Chan, Susy, Brzezinski, Jacek, and Nair, Chitra. (2010). "Development of an Instrument to Measure Enjoyment of Computer Game Play". *International Journal of Human-Computer Interaction*, 26(9), pp.868–886
- Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley
- Gerling, Kathrin M., Schulte, Frank P., Masuch, Maic. (2011). Designing and Evaluating Digital Games for Frail Elderly Persons. In: *Proceedings of the 8th International Conference on Advances in Computer Entertainment Technology*, Article No. 62, ACE'2011 - Lisbon, Portugal
- Giles, H., & Gasiorok, J. (2010). "Intergenerational communication practices". In: *Handbook of the psychology of aging*. Ed. by K. W. Schaie & S. L. Willis. US: Academic Press.
- Giles, H., McCann, R. M., Ota, H., & Noels, K. A. (2002). "Challenging intergenerational stereotypes: Across eastern and western cultures". In: *Linking lifetimes: A global view of intergenerational exchange* (pp. 13–28). Ed. by M. S. Kaplan, N. Z. Henkin, & A. T. Kusano. Honolulu: University Press of America, Inc.
- Giles, H., Noels, K. A., Williams, A., Ota, H., Lim, T. S., Ng, S. H., et al. (2003). "Intergenerational communication across cultures: Young people's perceptions of conversations with family elders, non-family elders and same-agepeers". *Journal of Cross-Cultural Gerontology*, 18(1), 1–32.
- Giles, H., Ryan, E. B., & Anas, A. P. (2008). "Perceptions of intergenerational communication by young, middle-aged, and older Canadian adults". *Canadian Journal of Behavioral Science*, 40, 121–130.

- Harwood, J., Hewstone, M., Paolini, S., & Voci, A. (2005). "Grandparent–grandchild contact and attitudes toward older adults: Moderator and mediator effects". *Personality and Social Psychology Bulletin*, 31(3), 393–406.
- Hawkins, M. J. (1996). "College students' attitude towards elderly persons". *Educational Gerontology*, 22, 271–279.
- Hummert, M. L. (2010). "Age group identities, stereotypes, and communication". In: *The dynamics of intergroup communication* (pp. 42–52). Ed. by H. Giles, S. A. Reid, & J. Harwood. New York: Lang.
- Harwood, J., & Lin, M.-C. (2000). "Affiliation, pride, exchange and distance in grandparents' accounts of relationships with their college-age grandchildren". *Journal of Communication*, 50(3), 31–47.
- Huvila, K. H., Ek, S., & Widen-Wulff, W. (2010). "Social capital in second life". *Online Information Review*, 34, 295–316
- IJsselsteijn, Wijnand, Nap, Henk Herman, Kort, Yvonne de, Poels, Karolien. (2007). "Digital Game Design for Elderly Users". In: *Proceedings of the 2007 conference on Future Play*, pp. 17-22, November 15-17, 2007, Toronto, Canada.
- Jung, Y., Koay, J. L., Ng, J. S., Wong, G. L. C., & Lee, K. M. (2009). "Games for a better life: Effects of playing Wii games on the well-being of seniors in a long-term care facility". In: *Proceeding of the Sixth Australasian Conference on Interactive Entertainment*, Sydney, Australia.
- Karavidas, M., Lim, N.K. and Katsikas, S.L. (2005). "The effects of computers on older adult users". *Computers in Human Behavior*, 21 (5), 697- 711.
- Khoo, E., Merritt, T., & Cheok, A. (2009). "Designing physical and social intergenerational family entertainment". *Interacting with computers*, 21, 76–87.
- Klimmt, C. (2009). "Serious games and social change: Why they (should) work". In: *Serious games: Mechanisms and effects* (pp. 248–270). Ed. by U. Ritterfeld, M. Cody, & P. Vorderer. New York, NY: Routledge.
- Klimmt, Christoph, Hartmann, Tilo, Frey, Andreas. "Effectance and Control as Determinants of Video Game Enjoyment". *CyberPsychology & Behavior*, Vol.10, N.6, pp.845-847, 2007
- Kowert, Rachel, Domahidi, Emese, Festl, Ruth, Quandt, Thorsten. "Social gaming, lonely life? The impact of digital game play on adolescents' social circles". *Computers in Human Behavior* Vol. 36, pp. 385-390, 2014
- Mahmud, A. A., Mubin, O., Shahid, D., & Martens, J. B. (2010). "Designing social games for children and older adults: Two related case studies". *Entertainment Computing*, 1, 233–247.
- McCann, R. M., Ota, H., Giles, H., & Caraker, R. (2003). "Accommodation and non-accommodation across the lifespan: Perspectives from Thailand, Japan, and the United States of America". *Communication Reports*, 16(2), 69–91.
- McCroskey, L. L., McCroskey, J. C., & Richmond, V. P. (2006). "Analysis and improvement of the measurement of interpersonal attraction and homophily". *Communication Quarterly*, 54(1), 1–31.
- Naumanen, Minnamari and Tukiainen, Markku. (2008). "K-60 Access to ICT granted but not taken for granted". In: *Proceedings of E-Learn 2008, World conference on E-Learning in corporate, government, healthcare, & higher education* (pp. 2241-2250) Ed. by C.J. Bonk, M.M. Lee, & T. Reynolds.
- Mubin, Omar, Shahid, Suleman, Al Mahmud, Abdullah. (2008). "Walk 2 Win: Towards Designing a Mobile Game for Elderly's Social Engagement". In: *Proceedings of the 22nd British HCI Group Annual Conference on People and Computers: Culture, Creativity, Interaction - Volume 2*, Pages 11-14, British Computer Society Swinton, UK
- Nguyen, H., Tapanainen, T. and Obi, T. (2014). "A Review of Information Communication Technology (ICT) Training for Elderly People – Toward Recommendations for Developing Countries". In: *Proceedings of the Pacific Asia Conference on Information Systems (PACIS 2014)*, Chengdu, China.
- Orthner, D. K., & Mancini, J. A. (1990). "Leisure impacts on family interaction and cohesion". *Journal of Leisure Research*, 22(2), 125–137.
- Osman, Z., Poulson, D. & Nicolle, C. (2005). "Introducing computers and the Internet to older users: findings from the Care OnLine project". *University Access Information Society*, 16-23.

- Pearce, C. (2008). "The truth about baby boomer gamers: A study of over-forty computer game players". *Games and Culture*, 3(2), 142–174.
- Peter, V., Tilo, H., & Christoph, K. (2003). "Explaining the enjoyment of playing video games: The role of competition". In: *Proceedings of the Second International Conference on Entertainment Computing*. pp. 1–9.
- Pettigrew, T. F. (1998). "Intergroup contact theory". *Annual Review of Psychology*, 49, 65–85.
- Roberto, Anthony J., Shafer, Michael S., Marmo, Jennifer. (2014). "Predicting substance-abuse treatment providers' communication with clients about medication assisted treatment: A test of the theories of reasoned action and planned behaviour". *Journal of Substance Abuse Treatment*, 47, pp. 307–313
- Roberto, Anthony J., Krieger, Janice L., Katz, Mira L., Goei, Ryan, Jain, Parul. (2011). "Predicting Pediatricians' Communication with Parents about the Human Papillomavirus (HPV) Vaccine: An Application of the Theory of Reasoned Action". *Health Communication*, 26, pp. 303–312
- Ryan, E. B., Kwong See, S., Meneer, W. B., & Trovato, D. (1992). "Age-based perceptions of language performance among young and older adults". *Communication Research*, 19, pp. 423–443.
- Salovaara, Antti, Lehmuskallio, Asko, Hedman, Leif, Valkonen, Paula & Näsänen, Jaana. (2010). "Information technologies and transitions in the lives of 55–65-year-olds: The case of colliding life interests". *International Journal of Human-Computer Studies*, 68 (11), 803–821
- Şar, Ali Haydar, Göktürk, Gamze Yeşim, Tura, Gülşah, Kazaz, Nalan. (2012). "Is The Internet Use An Effective Method To Cope With Elderly Loneliness And Decrease Loneliness Symptom?" *Procedia, Social and Behavioral Sciences*, 55, 1053 – 1059
- Shubert, T. E. (2010). "The use of commercial health video games to promote physical activity in older adults". *Annals of Long-Term Care: Clinical Care and Aging*, 18(5), 27–32.
- Stephan, W. G., & Stephan, C. W. (1985). "Intergroup anxiety". *Journal of Social Issues*, 41, 157–175.
- Stokes, B., Seggerman, S., & Rejeski, D. (2006). *For a better world: Digital games and the social change sector* (White paper). URL: <http://gamesforchange.org/g4cwhitepaper.pdf> (visited 10/10/2014).
- Straub, Detmar, W. and Carlson, Curtis, L., "Validating Instruments in MIS Research", *MIS Quarterly*, 13, 2, 1989, pp.147-169
- Straub, Detmar, W., Boudreau, Marie-Claude, and Gefen, David, "Validation Guidelines for IS Positivist Research", *Communications of the AIS*, 13, 2004, pp.380-427.
- Swain, C. (2007). "Designing games to effect social change (2007). Paper presented at the Authors and Digital Games Research Conference". In: *Proceedings of DiGRA 2007 Conference*. URL: <http://lmc.gatech.edu/~cpearce3/DiGRA07/Proceedings/107.pdf> (visited 10/28/2014)
- Sweetser, P., & Wyeth, P. (2005). "Game Flow: A model for evaluating player enjoyment in games". *ACM Computers in Entertainment*, 3, 1–24.
- Theng, Y. L., Chua, P. H., & Pham, T. P. (2012). "Wii as Entertainment and Socialisation Aid for the Mental and Social Health of the Elderly". In: *Proceeding ACM CHI Conference on Human Factors in Computer Systems*, pp. 691-702
- Trepte, S., Reinecke, L., & Juechems, K. (2012). "The social side of gaming: How playing online computer games creates online and offline social support". *Computers in Human Behavior*, 28, 832–839.
- Trogemann, G. and Pelt, M. (2006). "CITIZEN MEDIA – Technological and Social Challenges of User Driven Media". In: *Proceedings of the BroadBand Europe 2006*, Geneve, Switzerland
- United Nations. (2009). *World Population to Exceed 9 Billion by 2050*. URL: www.un.org/esa/population/publications/wpp2008/pressrelease.pdf (visited 10/01/2014)
- Venkatesh, Viswanath, Thong, James Y. L., Xu, Xin. "Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology". *MIS Quarterly*, Vol. 36, No.1, pp. 157-178, 2012
- Voida, A., & Greenberg, S. (2012). "Console gaming across generations: Exploring intergenerational interactions in collocated console gaming". *Universal Access in the Information Society*. Vol. 11, 1, pp. 45-56

- Vorderer, P., & Bryant, J. (2006). *Playing video games: Motives, responses, and consequences*. Mahwah, NJ: Erlbaum.
- Vorderer, P., Klimmt, C., & Ritterfeld, U. (2004). "Enjoyment: At the heart of media entertainment". *Communication Theory*, 14, 388–408.
- Wagner, Nicole, Hassanein, Khaled and Head, Milena. (2010). "Computer use by older adults: A multi-disciplinary review". *Computers in Human Behavior*, 26, 870–882
- Wen, Jing, Kow , Yong Ming, and Chen, Yunan.(2011). "Online Games and Family Ties: Influences of Social Networking Game on Family Relationship". In: *Proceedings (Part III) of Human-Computer Interaction-INTERACT 2011, 13th IFIP TC 13 International Conference*. Ed. by Campos, Pedro, Graham, Nicholas, Jorge, Joaquim, Nunes, Nuno, Palanque, Philippe, Winckler, Marco. Lisbon, Portugal
- Williams, A., & Giles, H. (1996). "Retrospecting intergenerational conversations: The perspective of young adults". *Human Communication Research*, 23, 220–250.
- Williams, A., & Harwood, J. (2004). "Intergenerational communication: Intergroup, accommodation, and family Perspectives". In: *Handbook of communication and aging research* (2nd ed., pp. 115–137). Ed. by J. F. Nussbaum & J. Coupland. Mahwah, NJ: Lawrence Erlbaum Associates.
- Zabriskie, R. B., & McCormick, B. P. (2003). "Parent and child perspectives of family leisure involvement and satisfaction with family life". *Journal of Leisure Research*, 35(2), 163–18