
Personalisation and Tutoring in e-Learning – The Key for Success in Learning in Later Life

*Sónia Hetzner, Eline A. E. Leen, Innovation in Learning Institute,
University of Erlangen-Nuremberg, Germany*

Abstract

The number of older adults willing to engage in learning activities after retirement is increasing substantially; along with this development the need for innovative learning concepts responding to the specific requirements of older adults is obvious. Aspects such as socio-economic variances, diverge learning tradition and capability as well as mobility constrains characterize older learners. E-learning is very suitable to cope with the high heterogeneity of older learners. Learners can learn according to the own learning pace and interests. E-learning is effective and motivating for learning in later life, if key-principles of guidance and support are fulfilled. In this article, the evaluation results of an e-learning course for older adults ('eLSe' courses) are presented. The main focus of the research was to investigate if a high level of personalization possibilities in a course can help to balance heterogeneous characteristics such as age, gender and pre-knowledge within a learner group. The key factor is the satisfaction with the course in different settings. In total, questionnaire data of 17 courses with 157 course participants was evaluated. Findings suggest that satisfaction with the courses was equally high for all age groups and for men and women.

Keywords: E-learning, older learners, learners' support, personalization, learning in later life

Introduction

The number of people aged 65 and above in the EU will almost double until 2060 (EC, 2009). ‘Third age’ is becoming markedly longer and technological and societal progress is accelerating; more and more older adults can potentially enter educational programs at universities or other educational institutions (Bubolz-Lutz, 2000). Though, the number of adequate course offers especially dedicated for older adults greatly underperforms the numbers of potential participants. For example in Germany 12-14 % of the older populations actually engage in educational programs (Kohli & Künemund, 2000; Friebe, 2009). For other countries the numbers are even lower (Gatzke, 2007). The situation can be seen as precarious if we consider recent research circumstantiating, that learning is a very supportive way for preventing mental and physical decay, and supporting a self-determined life. Numerous psycho-gerontologist studies have proven the positive effects of learning in later life for the maintenance of physical and mental health, for instances the WHO (2004) model of healthy live identifies activity and education as core factors of prevention from age related handicap. Learning in later life means also to support the intergenerational dialogue and to promote knowledge transfer across generations (Kolland, 2000). The most prominent question is how to promote learning in later life and which concepts to develop in relation to individual learning motives and capabilities are favored. Thus, it is important to research on:

- **Learning concepts for Learning in Later Life:** the European learning landscapes showcase a good number of isolated good practices, but there is still crucial to promote discussion, analyse a systematic and procedural way, and promote knowledge transfer.
- **Learning motives & process:** organisational, cognitive and affective processes are of equal importance for understanding the motivation and effects of learning for personal development and subsequently for the society.
- **Identify the role of Technology-enhanced Learning:** for overcoming personal as well as spatial learning barriers, and support seniors to engage in learning programs according to their specific needs.

In this paper we present research outcomes of the project ‘eLSe- eLearning for Seniors’, a project especially developed for satisfying concrete learning needs of seniors while respecting their very individual learning motive (the trigger), preconditions (the starting point) and assistance needs (the support demand) (Hetzner & Held, 2009). Two main research questions are discussed in this paper. Firstly, how individual

characteristics like age, gender and previous ICT experiences impact the learning process in an e-learning environment. Secondly, different support approaches based on learner satisfaction within the learning experience are compared in order to identify the best support method for the heterogenic group of older adults.

E-learning for older adults

Aside of the project eLSe, which has been continuously evaluated, some further research can be found about how older adults use e-learning to develop ICT skills. According to a recent study in Germany, already 16% of older adults use e-learning in its broadest sense for supporting self-directed learning, e.g. using online dictionaries or CD-ROMS (Bitkom, 2013) or even enroll in e-learning courses. However, the great majority of older adults still learn ICT skills in face-to-face courses, as these are widely offered in Germany (Reichart & Huntemann, 2008). In other countries like the United Kingdom, e-learning courses for older adults are more common (Kimpeler et al., 2007). Studies about the effectiveness of e-learning for older adults have shown that this can be a very good method of learning also in older age (Chu, 2010; Stoltz-Loike et al., 2005; Hetzner & Held, 2009). Though, effective e-learning courses for older adults must be designed very carefully. The learner experiences many degrees of freedom: learning in their own pace, time, place and the possibility to decide which learning contents to learn. Therefore guidance by means of a clear course concept with a good structure and manageable learning blocks is needed (Bates & Poole, 2003). Stoltz-Loike et al. (2005) emphasize the need of training tasks and tests as part of the material and Hetzner and Held (2009) stress the point that especially for older adults, communication possibilities like chat, forum and e-mail between the participants and with the tutor are extremely important. These tools support social learning, and learning in the group is essential also in e-learning environments, learners need to feel at all times that they are not alone. Additionally, support is seen as the key for success in the eLSe project (Hetzner & Held, 2009).

In the eLSe project senior citizens with none or few or basic ICT skills and competences have access to an e-learning environment fully conceived and tested to match their needs in terms of knowledge, flexibility, diversity and support. The eLSe-project supports a large number of older adults to become involved in and benefit from the information and knowledge society. The eLSe program includes two courses: basic, for older adults with no or almost no ICT knowledge, and advanced courses for those with basic ICT knowledge and interested in specific online activities and contents.

Learning takes place online in a special adapted e-learning environment. The approach was chosen due to numerous reasons. Already in 08/2006 (Held et al., 2007) and on behalf of the German Parliament, the Innovation in Learning Institute at the University of Erlangen-Nurnberg realized a systematic analysis of e-learning offers and concepts in Germany and in other European countries. The researchers at ILI have come to the conclusion that e-learning can support the very specific learning and personalization requirements and that older people are among the target groups that qualify most for technology-enhanced learning. They came up with seven key reasons for the suitability of e-learning environments for learning in later life:

1. eLearning comes to people and not vice-versa. This aspect addresses seniors' frequent mobility constraints due to physical impairments, domestic responsibilities (e.g. taking care of relatives) or living outside urban areas, where ICT- training offers are not available;
2. e-learning works best for those with variable free timeslots. The Post-professional life is often characterized by free variable daily rhythm and plenty of leisure activities. In these cases, asynchronous e-learning offers are extremely adjustable;
3. furthermore, it is a fact that, due to their life experience, many seniors are experienced in self-management and motivated to try something new, a fact that well supports the demands of e-learning;
4. e-learning enables people to choose their own learning speed, as they are not driven by others, and it enables them to repeat things as often as they wish. These aspects effectively support the changes in memory processing that occur as we get older. For example, older adults have difficulties in novel situations in which they must respond flexibly to memorize things;
5. in addition, it should be emphasized that mentoring and tutoring can be done much more individually in e-learning. A factor that again adapts to the individual needs of older adults is that
6. competitiveness and pressure to perform amongst course participants, which often is seen as rather a problem in face-to-face offers, is almost non-existent. The pressure of having to be as fast as the other participants declines extremely in virtual learning environments. This aspect is of major importance since third agers tend to have less self-confidence and are more afraid to make mistakes. In learning processes, fear leads to increased activity in the amygdaloidal nucleus, which decreases cognitive processes;

7. mutual support amongst participants in virtual learning communities is one further positive aspect. Community building is supported by personal and technical assistance. Learners are engaged in the whole learning and teaching process and gain self-confidence.

These seven key reasons for e-learning for seniors have been continuously analyzed in the course of the eLSe Project. The e-learning project runs since 2004, meanwhile over 1000 learners had access to the eLSe online-courses. All course have been continuously evaluated, thus an impressive database of evaluation results could be build up, which allows us to scrutinize the above enlisted key factors and check their validity under different circumstances.

In the present research, we wanted to find out evidences for the following hypotheses:

1. The high level of personalization within an e-learning course compensates possible age-and gender-related as well as pre-knowledge differences in the learning experience
2. The way support is provided – face-to-face, by senior tutors, by non-seniors tutor- affects the learner-satisfaction within the learning experience

Study Method

Participants

Between 2008 and 2011, 11 basic and 6 advanced e-learning courses for seniors (in the scope of the eLSe program) took place coordinated and supervised by the Innovation in Learning Institute at the University of Erlangen-Nuremberg. During this period a total of 310 persons took part in these 17 courses. All participants were asked to fill in a questionnaire at the end of the course. 51 % filled in that questionnaire, which is a reasonable proportion for a voluntary questionnaire. The final sample size is 157 persons with a mean age of 67.8 (SD = 7.12). 99 persons were women. The courses differed in the approach to support, i.e. the form tutorial support was offered to the participants in the course. Four courses were supported by tutors, who worked at the university and were also engaged in the development of the courses and learning material. The other 11 courses were supported by senior tutors who were trained by the university and supported the course on a voluntarily basis. In two courses a blended learning approach was chosen, in which the participants were supported face-to-face during a few meetings followed by a self-directed e-learning phase. Table 1 gives an overview of these sample characteristics.

Table 1: Overview of percentages of sample characteristics for learners of the basic course and the advanced course

	Basic course (n=105)	Advanced course (n=52)	Sig (chi²; df)
Gender			
Male	40.0 %	30.8 %	X ² = 1.27, df=1, p= .259
Female	60.0 %	69.2 %	
Age			
<60 years	12.4 %	3.8 %	X ² = 5.88, df=3, p = .118
60-69 years	46.7 %	48.1 %	
70-79 years	40.0 %	42.3 %	
>79	1.0 %	5.8 %	
Type of support			
By university	21.0 %	50.0 %	X ² = 14.69, df=2, p = .001
By senior tutor (e-learning)	66.7 %	46.2 %	
By senior tutor (face-to-face)	12.4 %	3.8 %	

Measures

The measures are based on a final course questionnaire (summative approach), developed by the Innovation in Learning Institute at the University of Erlangen-Nuremberg aiming at evaluating the existing e-learning courses for seniors. The questionnaire consists out of 24 questions about the satisfaction with the course, the utility, the usability and support during the course, the learning time and approach participants used during the course. In total 5 open questions and 19 multiple choice questions were presented to the course participants. Also demographic measures (age, gender) and the experience with e-learning were collected. For this paper only multiple choice measures concerning the satisfaction and usability with the course are evaluated and differences regarding these measures between the different ways of supporting participants are analyzed. The questions analyzed in this paper had answering options with a 4 point-Likert scale, except for the question about the design of the learning platform, which was a 3 point scale. For all questions, a low rating means a very good rating for a question, a high rate (4 or 3) indicates an insufficient rating.

Procedure

After completing a basic or an advanced course, all participants were asked in the communication forum of the course to fill in a questionnaire to rate their satisfaction with the course. The tutors emphasized the importance of evaluating the courses by highlighting the necessity to continuously improve the courses according to the feedback of the learners. They also plead for sincere answers to the questionnaire. The

questionnaire could be filled in right on the learning platform and was submitted anonymously. Filling in the questionnaire took round about 10 minutes. Filled in questionnaires were downloaded from the platform in an excel sheet and analyzed with PAWS Statistics.

Results

Differences in satisfaction, utility and usability

In a first analysis all questions regarding satisfaction with the course, the platform and the support were analyzed and differences between the basic and the advanced course as well as gender differences were tested. As a general satisfaction rating, a total measure out of the questions about satisfaction with the answering of questions and the speed of answering, the satisfaction with the support in general and the support by the tutor was set up. This overall satisfaction rate is also displayed here. See Table 2 for all means and standard deviations for both advanced and basic course and for both genders.

Table 2: Satisfaction, utility and usability rating for basic and advanced courses and for man and women (N=143)

	Basic course (n=93)		Advanced course (n=50)		Male (n=53)		Female (n=90)	
	M	SD	M	SD	M	SD	M	SD
Quality of answering questions	1.46	.58	1.42	.54	1.36	.48	1.50	.60
Speed of answering questions	1.67	.61	1.54	.65	1.53	.50	1.68	.70
Quality of support in general	1.46	.58	1.22	.41	1.32	.47	1.41	.47
Quality of support by tutor	1.42	.58	1.20	.40	1.26	.45	1.39	.58
Utility of course	1.63	.76	1.32	.62	1.47	.61	1.56	.80
Quality of design of platform	1.34	.48	1.28	.50	1.26	.45	1.36	.50
Usability of platform	1.78	.59	1.50	.54	1.68	.51	1.69	.63
Overall satisfaction with the course	1.50	.53	1.35	.43	1.37	.38	1.49	.55

Note: For some participants not all questions were filled in, which explains the N of 143 for this analysis.

For all measures, no significant differences between female and male course participants were found; males and females were equally satisfied with the courses. Participants of the advanced course rated the course on some dimensions a little better than users of the basic course. Advanced users were more content with the support in general ($t = 2.61$, $df = 141$, $p = .010$) and with the support by their tutor ($t = 2.39$, $df = 141$, $p = .018$). Also the usability of the advanced course was rated higher ($t = 2.50$, $df = 141$, $p = .014$) and the usability of the platform ($t = 2.84$, $df = 141$, $p = .005$). In a second

step, it was analyzed if the courses were significantly rated better than average. As the mean for the questions was 2.50 (on a four point scale) and 2.0 (on a three point scale) for the question about the design of the platform, one-sample *t*-tests were performed. All questions differed significantly from the mean with $p < .001$, which means that the satisfaction with the course was on all domains better than average. Also age differences on satisfaction, utility and usability were tested with using a MANOVA to find out if the courses were rated better for one age group and might be more suitable for one of the groups. Due to the small *n* of the age group >79, the four persons in this group were analyzed together with the age group 70-79, which creates a new age group of participants older than 70. Means and standard deviations can be found in Table 3.

No differences between the age groups were found, which means that participants in all age groups are equally content with the e-learning courses.

Table 3: Satisfaction, utility and usability rating for different age groups (N=143)

	< 60 years (n=12)		60-69 years (n=69)		> 70 years (n=62)	
	M	SD	M	SD	M	SD
Quality of answering questions	1.25	.45	1.54	.53	1.39	.61
Speed of answering questions	1.50	.52	1.67	.61	1.60	.69
Quality of support in general	1.33	.49	1.42	.50	1.34	.60
Quality of support by tutor	1.33	.49	1.38	.49	1.31	.59
Utility of course	1.58	.67	1.52	.70	1.52	.78
Quality of design of platform	1.58	.52	1.26	.44	1.34	.51
Usability of platform	1.75	.75	1.67	.56	1.69	.59
Overall satisfaction with the course	1.35	.45	1.50	.46	1.41	.55

Note: For some participants not all questions were filled in, which explains the N of 143 for this analysis

Differences between different support forms

As a last hypothesis, it is tested if the offered support (by tutors of the university, senior tutors or senior tutors in face-to-face meetings) is differently rated by the participants. We suppose and previous experiences prove (Hetzner & Held, 2009) that it is important to give the participants continuous support and feedback as well as promote online communication between the participants for developing a sense of group and integrating social learning aspects. As the senior tutors supervised their courses on a voluntarily basis, the level of time invested in providing support was different and in some cases possibly the necessary (push) and pro-active support (pull) could not be offered. Therefore we expected that the courses supervised by university members – well trained in tutoring activities and with a strong commitment to the tutoring task – were rated a little better than the other course. A MANOVA was used

to test the differences between the support forms. Descriptive statistics are listed in Table 4.

Table 4: Satisfaction, utility and usability rating for different support forms (N=143)

	Support by university (n=46)		Support by senior tutors e-learning (n=83)		Support by senior tutors face-to-face (n=14)	
	M	SD	M	SD	M	SD
Quality of answering questions	1.35	.53	1.51	.59	1.43	.51
Speed of answering questions	1.52	.62	1.67	.65	1.64	.63
Quality of support in general	1.22	.42	1.46	.59	1.43	.51
Quality of support by tutor	1.17	.38	1.46	.59	1.36	.50
Utility of course	1.37	.61	1.63	.79	1.43	.65
Quality of design of platform	1.15	.36	1.42	.52	1.32	.47
Usability of platform	1.59	.54	1.76	.62	1.57	.51
Overall satisfaction with the course	1.32	.41	1.52	.54	1.46	.45

Note: For some participants not all questions were filled in, which explains the N of 143 for this analysis

Between the support forms, three significant effects were found. The overall support provided in the university courses was rated better as the support in courses managed by senior organizations with $F_{(2,140)} = 3.07, p = .049$. The support by the tutor in charge was rated better for university tutors than for senior e-learning tutors with $F_{(2,140)} = 3.67, p = .028$. Also the design of the platform was rated better by the participants of courses with university tutors than by participants of courses with a senior e-learning tutor ($F_{(2,140)} = 4.90, p = .009$.) Although not all ratings reached significant levels, the hypothesis that the courses with university tutors were rated a little better can be accepted for some questions. These outcomes go in-line with the previous analysis by Hetzner and Held (2009) that mentioned effective and professional support as one essential key factor for successful e-learning. And above all the quality of support is highly perceived by the participants and can be well stated.

Discussion

In general the eLSe basic and advance courses are rated very positively by all participants independently from gender or previous experiences. Also no differences between the age groups were found, which means that participants in all age groups are equally satisfied with the e-learning courses. This is especially astonishing if we recall that senior citizens build an extremely heterogeneous group regarding their life and learning experience, socio-economic background, learning needs, age related-handicaps or available time slots for learning. Therefore our initial hypothesis that the high level of possible personalization within an e-learning course compensates possible

age-and gender-related as well as pre-knowledge differences in the learning experience can be partially confirmed. However, some dimensions were rated better by advanced course user, which indicates that pre-knowledge might help participants to work with the course on some dimensions. This also goes in-line with the study of Held et al (2007) presented in the first part of this paper.

The second hypothesis regarding the differences due to quality differences of the tutoring can be also partially confirmed. We can clearly state that if we assume- and we have clear evidences for it – that the tutor support provided by university staff members is more intensive and of higher quality regarding continuity, amount of pro-active feedback and quality of the feedback in general, we can again confirm the key role that supports has within an e-learning environment and most particularly in case of a very heterogeneous target group. These outcomes go in-line with the previous analysis by Hetzner and Held (2009) that mentioned effective and professional support as one essential key factor for successful e-learning.

However, these findings are only preliminary. To confirm these results, bigger samples for all age groups are needed. As the eLSe courses are still offered in Germany, new data will be constantly available to evaluate the courses more thoroughly. As also a ceiling effect on some ratings might be possible, we will in the future enlarge the questionnaire scale to diminish these effects and to get a more differentiated picture of satisfaction ratings.

In sum, it can be said that e-learning with its high level of independency levels with a very high personalization of the learning experience is a very suitable form of teaching older adults. A high level of personalization makes it possible to overcome gender and age-related

To reach high personalization and learner satisfaction basic design principles like a clear structure and organization, feedback and self-tests (Baltes & Poole, 2003; Stolz-Loike et al., 2007) have to be followed. Additionally the role of communication opportunities via different channels for promoting social learning is crucial (Held & Hetzner, 2009). But, and above all this the key factor for successful e-learning courses is tutoring. The quality of the tutoring influences very significantly the quality of the e-learning experience and consequently its success. A very pro-active support of a tutor is influences positively the learning experience. This is especially true for highly heterogeneous peer groups as older adults built.

These findings along with previous ones will further be used for the development of recommendations for the conceptualization, design and implementation of e-learning courses for older adults.

References

1. Bates, A. and Poole, G. (2003). *Effective training with technology in higher education*. San Francisco: John Wiley.
2. Bitkom (2013). *Presseinformation: Jeder zweite 14 – bis 44-Jährige nutzt E-learning*. http://www.bitkom.org/de/presse/8477_74875.aspx
3. Bubolz-Lutz, E. (2000). Bildung im Alter – Ansätze, Erfahrungen, Herausforderung. In *BAGSO-Nachrichten, 02(2000)*, (pp. 6-11). <http://www.bagso.de/publikationen/bagsonachrichten/archiv/022000/bildung-im-alter-eine-chance-zu-persoenerlicher-sozialer-und-gesellschaftlicher-entwicklung.html>
4. Chu, J. R. (2010). How family support and internet self-efficacy influence the effects of e-learning among higher aged adults – Analysis of gender and age differences. In *Computers & Education, 55(1)*, (pp. 255-264). Doi: 10.1016/j.compedu.2010.01.011.
5. European Commission (2002). *Resolution on lifelong learning*. Brussels: European Union.
6. European Commission (2009). *2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008-2060)*. European Economy, 2.
7. Friebe, J. (2009). *Bildung bis ins hohe Alter? Anspruch und Wirklichkeit des Weiterbildungsverhaltens älterer Menschen in Deutschland*. Dokument aus der Reihe „DIE FAKTEN“ des Deutschen Instituts für Erwachsenenbildung. <http://www.die-bonn.de/doks/friebe0901.pdf>. Accessed on 7 August 2013.
8. Gatzke, N. (2007). *Lebenslanges Lernen in einer alternden Gesellschaft*. Berlin: Friedrich-Ebert-Stiftung.
9. Held, P.; Hahner, R.; Heid, S.; Hetzner, S.; Hetzner, U. and Paulmann, E. (2007). *Gutachten zur institutionellen Verankerung von Angeboten und zur Bereitstellung entsprechender Bildungsorte und Zielgruppenorientiertes eLearning für Kinder und ältere Menschen, Sachstandsbericht zum Monitoring eLearning*. TAB, Arbeitsbericht Nr. 115 Lernwelten für eLearning im Alter.

10. Hetzner, S. and Held, P. (2009). E-learning for Senior Citizens. In U. Bernath, A. Szűcs, A. Tait & M. Vidal (eds.), *Distance and e-learning in transition. Learning Innovation, Technology and Social Challenges*, (pp. 335-349). London: ISTE. Willey.
11. Kimpler, S.; Geogrieff, P. and Revermann, Ch. (2007). *Zielgruppenorientiertes eLearning für Kinder und ältere Menschen*. Arbeitsbericht Nr. 15; Berlin: Büro für Technikfolgen-Abschätzung beim deutschen Bundestag (TAB).
12. Kohli, M. and Kühnemund, H. (2000). Alter und gesellschaftliche Partizipation als Thema der Soziologie. In S. Becker, L. Veelken & K.P. Wallraven (eds.), *Handbuch Altenbildung. Theorien und Konzepte für Gegenwart und Zukunft*, (pp. 94-106). Opladen: VS Verlag.
13. Kolland, F. (2000). *Studieren im mittleren und höheren Alter. Eine empirische Studie zu Wirkungen und Bedingungen wissenschaftlicher Weiterbildung*. Frankfurt am Main: Brandes & Apsel.
14. Reichart, E. and Huntemann, H. (2008). *Volkshochschul-Statistik 2008*. Bonn: Deutsches Institut für Erwachsenenbildung. <http://www.die-bonn.de/doks/reichart0902.pdf>. Accessed on 7 August 2013.
15. Stoltz-Loike, M.; Morrell, R.W. and Loike, J.D. (2005). Can e-learning be used as an effective training method of people over age 50? A pilot study. In *Gerontechnology Journal*, 4(2), (pp. 101-113). <http://dx.doi.org/10.4017/gt.2005.04.02.005.00>
16. WHO (2004). *Promoting mental health: concepts, emerging evidence, practice*. Summary report / a report from the World Health Organization, Department of Mental Health and Substance Abuse in collaboration with the Victorian Health Promotion Foundation (VicHealth) and the University of Melbourne. http://www.who.int/mental_health/evidence/en/promoting_mhh.pdf. Accessed on 7 August 2013.