MASTER THESIS

MEASURING THE LEVEL OF INTERNET SKILLS AMONG DUTCH SENIORS – A COMPARISON BETWEEN THE COMPUTER AND THE TABLET.

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Abstract

Because the Internet expands to other devices such as the tablet, the Internet skill measures have to revise. In this study the level of Internet skills among Dutch seniors is measured by comparing the level of Internet skills between two devices: the computer and the tablet. The society sees seniors as the sub-population that has a lower level of Internet skills than the younger generation. This thought is reinforced by the fact that seniors have weak self-efficacy beliefs of their own Internet skills and therefore they feel uncomfortable using the Internet. In March and April 2014 performance tests were conducted to measure the level of Internet skills of seniors (N=40). Seniors had to made two assignments on the computer and two assignments on the tablet. On both devices the assignments were used to measure the four Internet skills: 1. the operational Internet skills, 2. the formal Internet skills, 3. the information Internet skills and 4. the strategic Internet skills. After the performance tests the seniors were asked to fill in a short questionnaire, which gathered some background information of the respondents, such as age, Internet experience, and participation in an Internet course. The results of the research showed that the level of Internet skills of seniors is relatively high. Seniors scored a significantly higher level of Internet skills on the computer than on the tablet. On the tablet most problems occurred during the operational Internet skills tasks. The participants explained that they never used proceedings like 'saving a file on the home screen' on the tablet before. On the computer seniors had in particular problems with the information Internet skills assignment. A reason for this was that more sponsored results were shown in Google on the computer than on the tablet. To improve their level of Internet skills seniors have to practice their operational Internet skills and their skills for information searching. If seniors improve their Internet skills, the level of self-efficacy of seniors will grow, they will be less dependent on others, and they will feel less uncertain about their Internet behavior.

Keywords: elderly, digital inequality, digital divide, pc, digital skills.

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1 ■ Introduction

"Move the mouse to the upper right corner" the computer instructor lady said. An older man picked up his mouse and placed it to the upper right corner of the computer screen (LoweDraftFCB, 2009). This is one of the many commercials in which elderly are presented as gawky users of new technologies. Van Deursen, Van Dijk, and Peters (2011) indicate that the public opinion of the society seems to be that the older generation has a lower level of Internet skills than the younger generation. Nevertheless, recent studies showed that when it comes to (e.g., information Internet skills such as searching for relevant search results) seniors even outperform the younger generation on these skills (Litt, 2013; Van Deursen & Van Dijk, 2009a, 2011).

Previous studies on Internet skills focus mainly on the level of Internet skills of the labor force. However, some studies did some research about the level of Internet skills of seniors but these studies always involved a comparison with the level of Internet skills of a younger age group. In other words, these studies do not specify on the level of Internet skills of only the elderly aged above 65 years. It is important to determine how different aspects of Internet skills vary among different sub-populations (i.e., seniors) to assist in training resources and forming policies for a larger group of people (Litt, 2013). Besides age, also other explanatory variables such as: gender, education, Internet usage, Internet experience, social support and participation in an Internet course needed to be investigated. Previous research showed that there are several relationships between the level of Internet skills and some explanatory variables (Litt, 2013). In the current 'Internet skills' literature there are also some gaps between the mobility of Internet access and the fact that the Internet expands to new devices (Litt, 2013). Over the years, most of the Internet skills studies focused on one device: the computer. While, hardly any research has been done on the level of Internet skills of users of other devices such as the tablet. In this study a comparison will be made between the level of Internet skills of seniors on the tablet and the computer. According to Litt (2013) current Internet skill measures have to be revised because of the changes of technology and the fact that the Internet expands to new devices such as the tablet or the smartphone. According to Mossberger, Tolbert, and Hamilton (2012) have smartphones with applications that provide locational or real-time information advantages over home broadband: "Because of their portability, smartphones provide personal Internet access that in some ways affords even greater convenience and more continuous use than home access" (Mossberger et al., 2012,

p. 2497). However, the researchers found that the younger generation (i.e., 18-29 years) more likely to rely on mobile access than to have home broadband, while only 10% of the seniors relies on mobile access instead of home broadband (Mossberger et al., 2012).

Werner, Werner, and Oberzaucher (2012) explain that the tablet is a device that can reduce the lack of confidence of elderly with new technologies. Research of Werner et al. (2012) shows that elderly had a very positive impression of the tablet and that the ease-of-use of the tablet stimulated them to learn more about new features. However, Jayroe and Wolfram (2012) explain that some of the participants in their research had some usability issues with the tablet. According to Mossberger, Tolbert and Stansbury (2003) people need technical competencies (i.e., the skills that are needed to operate hardware and software, such as using a mouse and typing) and information literacy (i.e., skills to recognize when information can solve a problem or fill a need and to effectively employ information resources) to use information technology efficient and effectively. Jayroe and Wolfram (2012) found that elderly had less stable fingers than the younger users, thus typing search terms was not easy for these users. Other disadvantages according to the participants were the 'non-tactile keyboard' (i.e., the unexpected appearance and disappearance of the keyboard) and the ultra-sensitivity touch screen. Although some disadvantages of the tablet, the elderly were overall very positive about the tablet and it's ease-of-use.

Internet skills nowadays are considered as necessary skills in society because people are increasingly dependent on information, and the vast amount of information on the Internet is growing significantly. Moreover Internet skills are necessary for the general population because the population needs them to function well in an online environment (De Haan, 2004; Van Deursen & Van Dijk, 2011). So, for elderly it is necessary to learn about the Internet and to improve their Internet skills in the fast growing 'Internet' society. Research of Lam and Lee (2005) affirms this and explain that it is very important that elderly learn computer skills because it has many benefits (e.g, elderly, who cannot travel as they did before, and who depend on others, can use the Internet to be less dependent). The Internet brings the world to them and provides them with entertainment, information and connection to their families. Secondly, the Internet might give the elderly more choice of spare time activities (i.e., online games). If the elderly develop their abilities and skills they feel good about themselves, they will create the feeling of self-esteem and satisfaction (Lam & Lee, 2005). In the third place elderly can increase their level of activity with the use of the Internet. Elderly can retrieve information on the Internet about local senior activities or information on

health and about community activities (Morrell, Mayhorn, & Bennett, 2000). In other words, a high level of Internet skills will make elderly less dependent on others, they become less isolated, feeling more satisfied and they have more choice of leisure activities (Lam & Lee, 2005). In sum, this research is set up to fill the research gap and aims to broaden the measurement of Internet skills to different devices. Therefore the following research questions have been formulated:

RQ 1: What is the level of Internet skills among Dutch seniors?
RQ 2: Which factors have an influence on the level of Internet skills of seniors?
RQ 3: Do the results of the Internet skills of seniors differ on the computer and the tablet?
RQ 4: Are the Internet skill-related problems different for computer and tablet use?

To answer these four research questions, performance tests are conducted. By analyzing the total results of the performance tests the first research question is answered. The second research question gives insight in the explanatory variables, which can influence the level of Internet skills of seniors. The results of this research question will explain if for example age, gender, or Internet usage has an influence on the level of Internet skills of seniors. The third research question tries to show if the Internet skills of seniors differ if they use different devices: the computer and the tablet. By analyzing the results of the performance tests, the third research question is answered. The fourth research question draws on question three and tries to show if there is a difference in the level of internet skills between both devices, and if so, is it because the level of Internet skills of seniors influence the results, or are the results influenced because of technological limitations of the elderly? (i.e., usability issues with the non-tactile keyboard or the ultra-sensitivity touch screen of the tablet). To answer the last research question the screen actions on both devices will be analyzed. With these screen actions is tried to find the reason why the results do not differ or differ on both devices.

2. Theoretical framework

2.1 The digital divide

The term ‘digital divide’ refers to the gap between those who “have” access to new information communication technologies (ICT) and those who are called the “have-nots”. New information communication technologies are computers and their networks but also digital equipment such as digital television or mobile telephony (Van Dijk, 2006). According to Lam and Lee (2005) the “have-nots” are the socially disadvantaged groups, such as people with lower education attainment, lower economic advantage, people with disabilities or senior citizens aged 55 and above. These socially disadvantaged groups have less access to use ICT (Lam & Lee, 2005). Because of the quickly growing of the Internet, the term ‘digital divide’ shifted to include gaps not only from those who “have” access to the computer and those who do not have access to the computer (i.e., “have-nots”) but also to digital inequality (i.e., inequality among persons with formal access to the Internet but also to differences in Internet access) (DiMaggio & Hargittai, 2001). De Haan (2004) describes that even when people have access to computers and the Internet, this does not mean that they are all equally skilled and have the right skills to use the computer or the Internet.

Recent research of Van Deursen and Van Dijk (2014) shows that the digital divide shifts to differences in usage. In the first three decades of the digital divide research the Internet was dominated by medium and high-educated people who regularly had access to new information communication technologies. However Van Deursen and Van Dijk (2014) found that people with medium and higher education levels use the Internet less hours a day in their spare time than people with low level of education. Furthermore, unemployed people spend more hours a day using the Internet in their spare time than employed people. With these findings people might argue, that after several decades, the digital divide ‘finally’ has closed.

2.2 Internet skills

In the last decennia, a few Internet skill studies were conducted, although these studies fail to explain what ‘internet skills’ mean. This is caused by the facts that there is a lack of theoretical justification and that many interpretations are given to a wide range of digital skill related terms (Van Deursen and Van Dijk, 2009a). In the digital divide research the term

‘digital skills’ is commonly used. ‘Digital skills’ are for example skills to use computers, digital television or mobile telephones. ‘Internet skills’ are a part of the digital skills and are skills related to effective and efficient use of the Internet (Van Deursen et al., 2011). A framework that is widely used in the literature about Internet skills is the framework of Van Deursen and Van Dijk. This framework is essential to stimulate research aimed at the measurement of Internet skills, however the framework is also a powerful tool for understanding the difficulties and complexity of the Internet skills that people employ when they use the Internet (Van Deursen & Van Dijk, 2010). The framework consists of four Internet skills: 1. operational, 2. formal, 3. information, and 4. strategic Internet skills. The four Internet skills can be divided into medium-related and content-related Internet skills. The medium-related skills consist two types of Internet skills: the operational Internet skills and the formal Internet skills. The operational Internet skills indicate a set of basic skills in using the Internet, such as opening websites by entering the URL in the location bar. The formal Internet skills are related to the hypermedia structure on which the Internet is built, this hypermedia structure, requires orientation and navigation skills (Litt, 2013; Van Deursen, 2012). The content-related skills consist the information Internet skills and the strategic Internet skills. The information Internet skills are related to searching, selecting and evaluating information found on the Internet. The strategic Internet skills are related to the ability to use information in order to achieve certain goals and for improving one’s position in society (Litt, 2013; Van Deursen & Van Dijk, 2011).

Framework of Van Deursen and Van Dijk

Observation sessions and performance test provide detailed analyses of the outcomes and processes of people’s Internet skills, however they can be expensive and time-consuming to conduct. Thus, this type of gathering information on large samples is limited. One unique solution is to use instruments such as designed by van Deursen and Van Dijk (2009, 2010, 2011, 2012) or Hargittai (2005, 2009) because they create more valid self-assessment and they can serve as proxies in large-scale surveys (Litt, 2013). The instrument of Van Deursen and Van Dijk is applicable for the general population to function well in a digital environment. The framework includes necessary relevant skills and is based on individual abilities (Van Deursen, Van Dijk & Peters, 2012). So, the framework is a useful tool for research on Internet skills. Litt (2013) confirms this and explains that the framework of van Deursen and van Dijk, “incorporates items that highly correlate with users’ measured performance when comparing the predictive power of several self-report measures” (p. 624). The framework of Van Deursen and Van Dijk is shown in Table 1.

Table 1

Four Internet skill categories (Van Deursen & Van Dijk, 2009, 2010, 2011, 2012)

Operational Skills	**Formal Skills**
Medium-related skills	
• *Operating an Internet browser, meaning:* o Opening websites by entering the URL in the browser's location bar; o Navigating forward and backward between pages using the browser buttons; o Saving files on the hard disk; o Opening various common file formats (e.g., PDF); o Bookmarking websites; o Changing the browser's preferences. • *Operating Internet-based search engines, meaning:* o Entering keywords in the proper field; o Executing the search operation; o Opening search results in the search result lists. • *Operating Internet-based forms, meaning:* o Using the different types of fields and buttons and o Submitting a form.	• *Navigating on the Internet, meaning:* o Using hyperlinks (e.g., menu links, textual links, image links) in different menu and website layouts. • *Maintaining a sense of location while navigating on the Internet, meaning:* o Not becoming disoriented when navigating within a website; o Not becoming disoriented when navigating between websites; o Not becoming disoriented when browsing through, and opening search results.
Information Skills	**Strategic Skills**
Content-related skills	
• *Being able to locate required information, by:* o Choosing a website or a search system to seek information; o Defining search options or queries; o Selecting information (on websites or in search results); o Evaluating information sources.	• *Taking advantage of the Internet, by:* o Developing a plan to achieve a particular goal; o Taking the right action to reach this goal; o Making the right decision to reach this goal; o Benefiting from achieving this goal.

2.3 Seniors and Internet skills

Nowadays some elderly are still unfamiliar with using a mouse and typing on a keyboard. When elderly are more exposed to computers and the Internet they seemed to be more likely to perform online tasks (Lam and Lee, 2005). Young people are considered more skillful than

seniors because they get to know the Internet at an early age. So it is often believed that the younger generation 'the digital generation' has the highest level of Internet skills (Van Deursen & Van Dijk, 2011). This is only partly true because Van Deursen and Van Dijk (2011) showed in their research that the younger generations perform more poorly than seniors with regard to the content-related Internet skills. Results showed that elderly were better in selecting relevant information than the younger generation. So this means that the information Internet skills are not necessarily easier for the younger generations (Litt, 2013; Van Deursen & Van Dijk, 2009a). It also seemed that the strategic Internet skills were better performed by the older subjects. The elderly were less likely to make inappropriate decisions based on information they gathered than the younger subjects (Van Deursen, 2012). For this reason research of Van Deursen et al. (2011) shows that the older generation group scores higher on the content-related Internet skills than the younger generation group. However the researchers discovered that the younger generation still scores higher on performance tests than the older generation. This is because the researchers found that medium-related skills have a major influence on the performance of content-related skills. The older generations perform better on the content-related skills, but when performance tests measure both medium- and content-related skills the younger generation still scores higher (Van Deursen et al., 2011).

Non-use of the Internet

Another explanation for the lower level of Internet skills of the older generation is that elderly use the web less than younger adults do (Morris, Goodman & Brading, 2007). 'Lack of interest' is the most common reason for the elderly to not use the Internet. This reason (i.e., lack of interest) is caused by misunderstandings about computers such as; computers are not useful, too difficult or are not suitable for older people. Other reasons why elderly do not use the computer are; access, costs and skills. In other words, some elderly do not have access to a computer, they cannot afford the costs of a personal computer, or they point out their lack of computer skills (Eynon & Helsper, 2011; Helsper & Reisdorf, 2013). Also weak self-efficacy beliefs of their own Internet skills are a reason for elderly to not use or adopt the Internet and thus influence their level of Internet skills. People with high degrees of self-efficacy are more likely to adopt and use the Internet in the future than those with low levels of self-efficacy. People who are unsatisfied with their Internet skills, have little confidence in their ability to use the Internet, they are uncomfortable using the Internet and have low levels of self-efficacy beliefs (Eastin & LaRose, 2000). After all, if the older generation for example,

has no interest in the Internet, no access to the Internet, or feels uncomfortable with the Internet, the operational and formal Internet skills problems will persist.

2.4 Explanatory variables for the level of Internet skills

Litt (2013) explains in her research that there are different explanatory variables, which can influence the level of Internet skills. Among these variables are variables such as gender, age, education, Internet usage, etc. In this study, a comparison will be made between the level of Internet skills on the computer and the tablet. The explanatory variables for the level of Internet skills and the associated hypotheses formulated in this paragraph are applicable on both devices in this study (i.e., the computer and the tablet).

2.4.1 Gender

Helsper (2010) found that the gender differences in ICT use were smaller among the younger generations (i.e., the digital-natives) then among the older generations (i.e., the seniors). It seemed that young man's familiarity with ICT is similar to that of young women. An explanation for the gender differences in ICT use among the older generation is that older women grew up in an environment that was very different from that of their male peers (e.g., with the thought that computer technology was male-oriented) (Bimber, 2000; Helsper, 2010). Furthermore, it seemed that men do more online activities than women with the exception of health information and leisure activities. These activities were frequently more undertaken by women than by man (Helsper, 2010). In general, gender is a strong predictor of how people rate their own Internet-user skills. Women are more likely to think of themselves as "lower skilled users" than men (Hargittai and Shafer, 2006). In the study of Hargittai and Shafer (2006) not one woman thought of herself as a "high skilled user" or an "expert', while no man thought of himself as a "novice", or "lower skilled user". A consequence of the low self-assessment of women is that women are afraid for searching information on the Internet because they think they would fail. Another result of the low self-assessment is that women do not take the benefits of online content that may improve their life chances, such as accessing government services, or enrollment in online courses (Hargittai & Shafer, 2006). Jones, Ramanau, Cross, and Healing (2010) concur with this and explain that women are more uncertain about their skills in ICT tasks such as dealing with computer security and computer maintenance than man. However, the researchers found no gender differences in other skill levels, such as usage of online library resources or presentation software. According to Van Deursen et al. (2011) gender has no influence on the level of the four Internet skills. Hargittai and Shafer (2006) underline this and found that

there is no significant difference between men's and women's ability to search for information online (content-related information Internet skills). However Van Deursen (2012) shows that gender is a predictor of how Internet users orientate between websites. It seems that men experience less problems related to orientation between websites than women. Looking at the elderly, Helsper (2010) explained that the gender differences in ICT use were higher amongst the older generations than among the younger generations (i.e., men are more familiar with ICT use than women). Therefore the following hypothesis is formulated:

H1: Male seniors have a higher level of Internet skills than female seniors.

2.4.2 Age

Lee, Chen, and Hewitt (2011) divided seniors into three different stages: pre-seniors, who were 50-64 years old, young-old adults, who where 65-74, and older-old adults, who were 75 and beyond. The researchers found that older-old adults were faced with a higher level of challenge to start using and learning computer-mediated information technology than the pre-seniors. Secondly, the pre-senior group had significantly fewer issues with computer-mediated information technology than the young-old and the older-old adults did. In the third place the researchers found that 4,9% of the pre-seniors never used a computer before while 18,4% of the young-old and 26,1% of the older-old never used a computer before (Lee et al., 2011). In sum, it seems that young-old adults have less problems related to the use of new technologies than older-old adults do and therefore they have a higher level of Internet skills than the older-old adults. This leads to the following hypothesis:

H2: Age has a negative influence on seniors' level of Internet skills.

2.4.3.Education

The variable educational level is the most consistent global predictor for the use of computers and the Internet. In general, the higher people are educated the higher the level of computer ownership is (Van Deursen et al., 2011). Elderly with low educational background have problems with using ICT. The language and many services used in computers (i.e., computer terms) are English (Lam and Lee, 2005). This can be a reason for seniors from non English-speaking countries to not use the Internet. However, recent research of Van Deursen and Van Dijk (2014) shows that people with a low level of education use the Internet for more hours a day and more frequently than people with medium and high level of education. Lower educated people use the Internet less for personal development, or for information than

higher educated people. Although, the people with the lower level of education use the internet more for social interaction and gaming, which are both time-consuming activities. So, it might be that in the last decennia lower educated people are spending more time on the Internet then higher educated people and thus have a higher level of Internet skills on particular activities (i.e., gaming and social interaction) than higher educated people. However, research of Selwyn, Gorard, Furlong and Madden (2003) that is focused on ICT use of seniors makes clear that male seniors, aged 70 years or less, who are higher educated and married, use the computer and the Internet more, and thus might be higher skilled than (e.g., female seniors, seniors who are lower educated and seniors who are aged above 70) (Selwyn, et al., 2003; Selwyn, 2004). This leads to the following hypothesis:

H3: Education has a positive influence on seniors' level of Internet skills.

2.4.4 Internet experience and Internet usage

Technology and Internet experience have an influence on the level of Internet skills. These variables are measured by how much time people spend on the Internet and how long individuals have been using the Internet (Litt, 2013). Those who recently started using the Internet (i.e., significantly older adults) have lower online skills than those who have been online for a longer time (i.e., significantly the younger generation) (Hargittai, 2002). According to Hargittai and Hinnant (2008) younger adults are more online, and younger adults use the Internet more than older adults do. People who spend more time online will likely have better online skills and more knowledge about the Internet than people who spend less time online. Furthermore, people who use the Internet for a longer period are expected to be better at finding information online because they have more experiences to draw on (Hargittai, 2002). Van Dijk and Van Deursen (2010) conclude that the amount of hours spent online weekly and the years of Internet experience have a weak relation with the level of Internet skills. It seemed that the content-related skills did not grow with years of Internet experience and the time Individuals spent online weekly. Only the operational and the formal Internet skills had a positive correlation with Internet experience, because these skills are easier to learn with practice (Van Deursen & Van Dijk, 2009b; Van Deursen et al., 2011; Van Deursen, Courtois, & Van Dijk, 2014). According to Hargittai (2002) are those who use the Internet 1-7 hours per week or those who spend even more time on the Internet able to find more information and spend less time on tasks than those who spend less than an hour each week on the Internet. Moreover, the results of the research suggest that the efficiency in finding information on the Internet is affected by the amount of time people spend online but is most of concern for

those who use the Internet minimally (i.e., especially older adults) (Hargittai, 2002). This leads to the following hypotheses:

H4: Internet experience (years online) has a positive influence on seniors' level of Internet skills.

H5: Internet usage time (hours online) has a positive influence on seniors' level of Internet skills.

2.4.5. Social support and Internet courses

One of the reasons why seniors use the Internet is because friends, adult children, spouses and grand children, had motived them to learn computer skills. Seniors are encouraged by family members and stay connected because of access to friends and family (Gatto & Tak, 2008). Furthermore, it seemed that seniors who are married or those who are living with someone else are more likely to use ICT than seniors who are living alone (White, McConnell, Clipp, Branch, Sloane, Pieper & Box, 2002). Van Deursen et al. (2014) describe two forms of social support; 1. self-directed learning and 2. social support by addressing others. Self-directed learning is a form of support where people do not need to rely on a specific source for assistance. This form of support includes learning by doing, through trial and error (e.g., by books or with an online search query). With the second form of social support assistance is needed from others (e.g. family, friends, etc.). Those people help to discover the possibilities of the Internet and help when things go wrong (DiMaggio & Hargittai, 2001; Robinson, DiMaggio & Hargittai; 2003; Van Deursen et al., 2014). Lam and Lee (2005) found that self-efficacy and Internet performances could be influenced by the encouragement of others (i.e., family and friends). Once the seniors are motivated to learn about the Internet and computers, many seniors seek assistance of family or friends, or seek for formal computer classes. Seniors see these classes as interesting, challenging, fun and very helpful. These computer classes led to an increased self-esteem, self-confidence and a sense of accomplishment (Gatto & Tak, 2008). Lam and Lee (2005) confirm this and explain that computer trainings boost the psychological state of mind of the elderly. Elderly feel better about themselves because they can communicate with other groups in sharing their knowledge about the computer and the Internet. The self-confidence of seniors is boosted during computer trainings, because they gain a developed sense of achievement. This leads to the following hypotheses:

H6: The more sources of support the higher the level of Internet skills of seniors.

H7: Participation in an Internet course has a positive influence on seniors' level of Internet skills.

2.5. Seniors and tablets

Tablets and smartphones have been rapidly proliferating. Powerful processors, rich array of sensors, and multi-touch interaction make these devices an attractive service platform for elderly (Harada, Sato, Takagi, & Asakawa, 2013). According to Jayroe and Wolfram (2012) there is a responsibility to provide usable and useful technological devices for seniors. A large segment of the global population ages and many people of the older generation did not grew up with the online activities of today's information society and have become somewhat disconnected in comparison with the younger generation. Werner et al. (2012) explain in their research that the digital divide exists because of social, economical and technical barriers. Tablets have the potential to minimize these existing barriers. Seniors show high satisfaction and high acceptance rates after using tablets instead of their personal computer. All participants from their study stated that the tablet was in general very easy to use, and that the device is a positive attribute and not intimidating because it does not look like a complex technological machine (Werner et al., 2012). Because the virtual keypad is situated on the screen display the elderly do not have to divide their attention between the screen content and the device. This is a benefit for the elderly because there is an age-related decline in divided attention. Also the use of virtual buttons on the screen is an addition, because this means that elderly do not have to require as much strength to select a target as on devices such as television remote controls (Caprani, O'Connor & Gurrin, 2012). Furthermore, Werner and Werner (2012) explain that tablets can lead to a better information distribution among seniors because the easy availability of functionalities such as applications in Apple's "Appstore" which holds for example categories such as "travelling" and "navigation" that provide users with functionalities such as car parking aids, ticketing for public transport and city travel guides, etc. Jayroe and Wolfram (2012) concur with this and explain that participants in their research stated the main advantages of the tablet were its ease-of-use, efficiency, portability, and its speediness. These advantages of the tablet lower the barriers for seniors to use the Internet and to use online services independently (Werner & Werner, 2012).

Technical barriers and usability issues

While the tablet has many benefits it also has a number of potential challenges, such as unexpected sensitivity of the touch surface, non-intuitive multi-finger gestures, and a model that differs from the traditional desktop computer (Harada et al., 2013). Werner et al. (2012) explain that some participants had problems when tapping on the screen. For example some participants remain too long at the same screen position, which triggers secondary functions on the tablet such as selecting, copy or paste text. Also slightly swiping with the finger can give some problems. Tapping often makes the gesture unrecognizable for the tablet, which can be a problem for people with tremor. Furthermore, some participants did not understand how they had to activate the virtual keyboard. Harada et al. (2013) affirm with this unexpected sensitivity of the touch screen and explain that some participants did not intent to touch the screen but the system registered a touch event (i.e., unintentional touches). Or a participant was intended to touch the screen but the system did not register the touch (i.e., unregistered touches). Such unexpected responses seemed to be a major cause for confusion and frustration by the participants. However, scrolling and turning pages by swiping the finger worked out very well for the seniors. Likewise, minimizing and enlarging the screen using the pincer gesture. Seniors rated these gestures as intuitive and very easy (seniors who had motor disabilities in one hand just used both hands to perform this gesture) (Werner et al., 2012). Besides the problems with the touchscreen of the tablet, seniors also noted some other usability issues. According to Jayroe and Wolfram (2012) some seniors were confused because they could not find search boxes on websites in their research. Some search fields on websites are hard to see on the tablet because they blend in with the content of websites. Therefore, some seniors used the browser's address bar to search information, instead of a search box; seniors get frustrated because the keyboard that appears (i.e., in the address bar) does not contain a spacebar. Second, the default settings of the iPad tablets do not underline hyperlinks in a search result set. Therefore, it is difficult for seniors to identify links on the displayed page. Third, some keyboard issues were observed. (e.g., the unexpected and sudden disappearance and appearance of the keyboard and its features). Furthermore, seniors commented that the tablet forced them to the system of "hunt and peck" typing (Jayroe and Wolfram, 2012).

In sum, the main disadvantages of the tablet were the 'non-tactile keyboard' and the touch screen's ultra-sensitivity according to participants. Although all the participants explained that they had a very positive impression of the tablet. They explained the ease-of-use of the tablet stimulated them to learn new features and by some of the participants this caused the feeling

of confidence in using technical solutions in general (Jayroe and Wolfram, 2012; Werner et al., 2012). In other words, the tablet is an effective, efficient, and enjoyable way for seniors to access and check Information on the Internet, but searching for the right information remains to be a challenge (Jayroe & Wolfram, 2012). This leads to the following hypotheses:

H8: Seniors have a higher level of medium-related Internet skills on the tablet than on the computer.

H9: Seniors have a higher level of content-related Internet skills on the computer than on the tablet.

2.6. Conceptual research model

Based on the posed hypotheses in this study a conceptual model is created. The model presented in Figure 1 shows the expected relationship between the seven independent variables (gender, age, education, Internet experience, Internet usage, social support and Internet courses) and the dependent variable (Internet skills) for both devices (i.e., the computer and the tablet). Furthermore, the expected relationship of both devices with the different levels of Internet skills (i.e., medium-related and content-related) is shown.

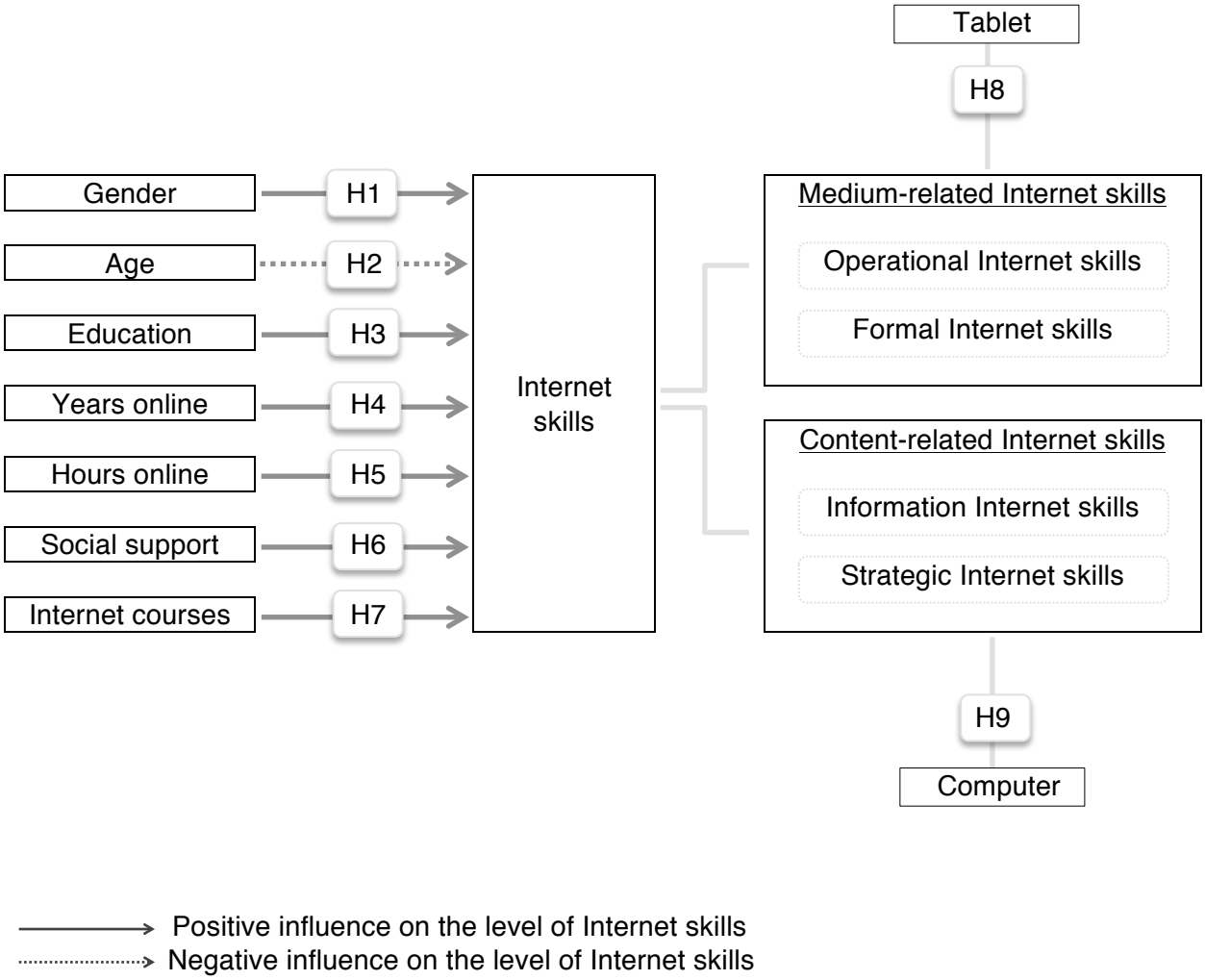

Figure 1. Conceptual model of influencing factors for the level of Internet skills.

3. Methodology

Central in this chapter is the research method that has been used to conduct this study. A complete and valid measurement of Internet skills is to let respondents make performance tests (Van Deursen & Van Dijk, 2009b). Hargittai (2002) was one of the first researchers who conducted Internet skills measurement with the method of performance tests. She measured Internet skills in two different ways: the binary success/failure rate of tasks and the time to complete each task. The first way shows how many respondents were able to complete a certain task on the basis of success/failure rate and the second way shows how much time it takes for respondents to find certain information on the web, measured in seconds (Hargittai, 2002). Litt (2013) explains that performance tests provide robust accounts of human behavior and have a very high validity. So in this study the method of performance test will be used to measure the level of the four Internet skills of seniors. For the data collecting of background information of the respondents (i.e., age, educational level, Internet experience, etc.) a questionnaire will be used.

3.1 Sample

In line with procedures applied in prior research (i.e., Hargittai, 2002; Van Deursen & Van Dijk, 2009, 2010, 2011, 2012) one of the conditions to participate in the study was that the participants had to use the Internet at least once every month for more than just e-mail on both devices (i.e., the computer and the tablet). Next to this condition there were two other conditions stated to participate in the research. In the first place, the participants had to use both devices for a minimum time of one month. In the second place, the participants had to be 65 years or older. After recruiting the subjects, a total of 40 respondents participated in this study. All participants were aged between 65 and 83 years (M = 70.85, SD = 4.82) of which 52,5% male and 47,5% female. The average number of years of Internet experience on the computer was 15.22 (SD = 7.21), the average number of years of Internet experience on the tablet was 1.49 (SD = 0.85). In addition, the average amount of Internet use in hours per week on the computer was 7.89 (SD = 6.62), the average amount of Internet use in hours per week on the tablet was 6.54 (SD = 6.23).

In addition, 82,5% of the participants stated that they have access to social support when they encounter problems using the devices or the Internet. Some participants explained they got assistance from more people instead of one person (e.g., from their partner, their children and friends). Most of the participants got assistance from their children (40%), their partner (25%), or their friends (17,5%). Only 15% of the seniors said they got assistance from their grandchildren, 12,5% from companions, and 10% from personnel of the computer course. Nobody said to get social support from other family (e.g., brothers, sisters, nephews or nieces). Finally, 25% of the seniors stated that they got social support from 'others', like colleagues or neighbors. Looking at the participation in an Internet course, 75% of the seniors explained that they participated in an Internet course. Most of the seniors (35%) participated in an Internet course three or more years ago, 5% two years ago, 7,5% one year ago, 5% 6-9 months ago, and 15% 0-3 months ago. More characteristics of the participants are included in Table 2.

Table 2

Characteristics of the participants including: gender, age, education, marital status, social support, and participation in an Internet course.

	n	(%)
Gender		
Male	21	52
Female	19	48
Age		
65-70	21	52
71-75	13	32
76-80	3	8
81-85	3	8
Education		
Low (e.g. primary school)	9	23
Middle (e.g. high school)	14	35
High (e.g. college and university)	17	42
Marital status		
Single	2	5
Separated/Divorced	0	0
Married or cohabiting (living together)	32	80
Widowed	6	15
Number of sources to social support		
0	7	17
1	15	38
2	11	28
3 >	7	17
Participation in an Internet course		
No	10	25
Yes	30	75

3.2 Procedure

To select subjects, Seniorweb Meppel was contacted. They were asked to cooperate with this study because they have access to many seniors who are using the computer and the tablet. Seniorweb Meppel provides many courses to seniors (e.g., computer courses, tablet courses for iPad users and to users of tablets with android as operating system, Photoshop courses, etc.). Before seniors enroll in the tablet course they must meet certain conditions: first, they must have some basic knowledge of the computer, and secondly they have to possess their own tablet. With the cooperation of Seniorweb Meppel and their permission an Information letter was send to all senior students who follow or followed a tablet course. The subjects were told that with performance tests on the computer and the tablet the level of Internet skills of seniors would be measured. The information letter was send to 90 subjects, however the response rate on the information letter was very low. To recruit more subjects open sessions (i.e., where seniors can ask questions about their computer or tablet) of Seniorweb Meppel were visited. The researcher approached seniors personally. To drive away fear by some of the seniors, the researcher explained the method of the study, because many seniors had performance anxiety. Next to senior students also teachers (N = 11) of Seniorweb Meppel were asked to contribute in the study. Some seniors were very enthusiastic and asked the researcher if their friends or neighbors also could participate in the research. One subject suggested another organization; 'Computer café Zwartsluis' to recruit more respondents. So, to select more subjects Computer café Zwartsluis was contacted. When subjects were willing to participate in the research they had to send an e-mail to the researcher with some background information (i.e., if they had their own tablet and if so what type of model (e.g., iPad, Samsung, etc)). If the subjects did not have a tablet of their own, seniors had to send the type of tablet they were used to work on. Also, the dates on which the subjects could not participate in the study were asked to send. Participants received a confirmation e-mail with the date and time they could participate in the research.

3.2.1 Study flow

The performance tests took place between March 2014 and April 2014 in the computer rooms of Seniorweb Meppel and 'computer café Zwartsluis' where the setting was known for all the participants. In some cases when the seniors were prevented, the performance tests took place at their home. When the seniors arrived at the computer rooms or the researcher arrived at their homes, they were given verbal instructions about the procedure. Subjects were told that they could decide for themselves when they were finished and when they want to go on with the next assignment. In addition, the subjects were told when they did not

understand an assignment, or when they could not find the answer of a question, they could skip the question. After some time a deadline had passed, the researcher asked the subjects to move on to the next assignment. Beforehand the research, the seniors were equally divided into two groups. The first group consisted of 20 seniors who started their performance tests on the computer. The second group consisted of 20 seniors who started their performance tests on the tablet. This was done in order to avoid bias, because the performance tests assignments on the computer and the tablet were almost the same. During the performance tests two seniors took part in the research at the same time. So, one senior started on the computer and the other started on the tablet. After finishing their performance tests on one device, they switched to the other device. After performing the assignments the seniors were asked to fill out a short questionnaire, which gathered personal data of the participants such as: age, educational level, marital status, Internet experience (in years), Internet usage (in hours), access to social support, etc.

3.2.2. Technical specifications

Performance tests on the computer

During the performance tests on the computer, participants were asked which operating system they used at home (i.e., Windows 7 or Windows 8). On the computers of SeniorWeb Meppel and Computer café Zwartsluis both operating systems were installed. Participants used computers with a keyboard, a mouse, and an operating system of their own choice. The computers were programmed with two popular Internet browsers (Internet Explorer, and Google Chrome). Participants who participated in the research at their homes used their own computer or the laptop of the researcher. Both operating systems (Windows 7 or Windows 8) and Internet browsers (Internet Explorer and Google Chrome) were also installed on the laptop. This allowed subjects to feel comfortable with their usual Internet behavior. To ensure that participants were not influenced by previous user's actions, the browser of the computers and the laptop was reset after each session by removing the history, downloaded files, temporary files, cookies, and favorites. The computers were connected with the Internet connection of Seniorweb Meppel and Computer café Zwartsluis. Seniors who participated in the research at home used their own Internet connection. Hypercam 3.0 was used to record the performance tests on the computer. When seniors used their own computer their screen actions were recorded with an external camera.

Performance tests on the tablet

In the performance tests on the tablet, participants used their own tablet if they had one; otherwise they used the tablet of the researcher, which was an iPad 2. Beforehand the research participants were divided into two groups: group 1: seniors who had experience on an iPad (*N* = 27), group 2: seniors who had experience on a Samsung tablet or other tablets with Android as operating system (*N* = 13). This was done because the screen actions for the iPad users and the Android tablet users had different ways of recording. The screen actions of the Android tablet users were recorded via an external camera. The iPads were connected with AirPlay (i.e., a wireless streaming network of Apple) to a Macbook Pro. The screens of the iPads were connected to the MacBook Pro and visible on the screen of the MacBook Pro via the program Reflector, that allows you to mirror your iPad to your Mac. When the iPad users started their performance tests, the screen of the MacBook Pro was recorded with Mac's built-in screen recorder (see Figure 2). During the study one senior of group 1 (i.e., iPad user) and one senior of group 2 (i.e., Android tablet user) were scheduled at the same time. This was done because there was only one MacBook Pro and only one external camera. Thus tablet users could only be recorded once at the same time. If for example one senior finished the performance tests assignments on the computer, the participant could directly start with the performance tests assignments on the tablet, because he or she had another tablet than the other participant who participated in the research at the same time. However, the majority of the seniors used an iPad. On the contrary, these seniors were recorded at the same time, because iPad users could be recorded with the external camera and the MacBook Pro at once.

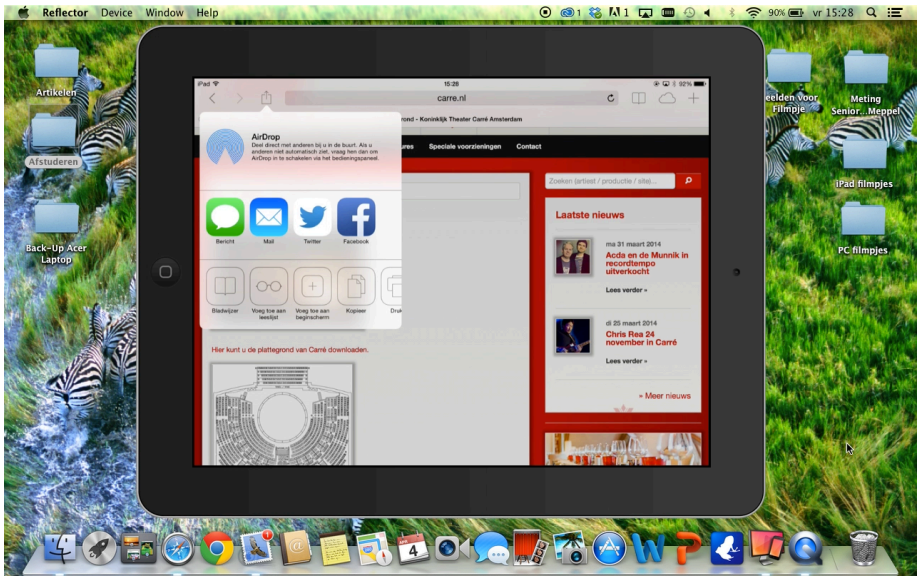

Figure 2. Reflector allows you to mirror your iPad to your Mac

On the iPad of the researcher the Internet browsers (Safari, Google Chrome), and the Google app were installed. This allowed participants to feel comfortable with the iPad and use their own way of accessing the Internet. The home screen of the iPad was cleaned, and only apps that could be useful for the research were installed (e.g., the Google app). To ensure that participants were not influenced by previous users' actions, the browser of the iPad was reset after each session by removing the history, downloaded files, temporary files, cookies, and favorites.

3.3 Measures

3.3.1 Performance tests

The performance tests on the computer and the tablet consisted of four different assignments. Respondents had to make two assignments on the computer and two assignments on the tablet. On both devices the first assignments (consisting of nine tasks) were used to measure the operational Internet skills and the formal Internet skills (see Table 3). The first eight tasks measured the operational Internet skills and the ninth task measured the formal Internet skills. The second assignment of both devices consisted of three tasks each. These tasks were used to measure the information Internet skills and the strategic Internet skills (see Table 4). The first two tasks measured the Information Internet skills and the third task measured the strategic Internet skills. At first sight the assignments for both devices look different, however the assignments had the same structure. In the assignments seniors were asked to do the same tasks on the computer and on the tablet, the only difference between the assignments of both devices was that another website or topic was used (see Table 3 & Table 4). In the operational Internet skills assignments, respondents were for example asked to open various common file formats or to bookmark a website. The formal Internet skills assignments included for example navigating through a website design and using different hyperlinks in different menu and website layouts. In the information Internet skills assignments respondents were asked to search for information about health-related topics (i.e., respondents were asked to find information about the flu-vaccine and about cataract). Finally, to complete the strategic Internet skill assignments respondents had to develop an orientation toward a particular goal and had to make the right decision to reach this goal. Respondents were, for example, asked if they should be vaccinated with the flu-vaccine if they had a chicken protein allergy, or if they can drive home safely after a cataract surgery (see Appendix A for the performance tests assignments and Appendix C for the computer and tablet tasks and their corresponding Internet skills).

Table 3

Performance tests assignment of the operational and formal Internet skills for both devices.

Assignment 1 – Operational Internet skills	
Computer	Tablet
1. Go to the website of the zoo Artis (www.artis.nl)	1. Go to the website of the Koninklijk Theater Carré (www.carre.nl).
2. Click on the link **'bezoekersinfo'** at the top of the homepage. Then click on the link **'plattegrond'**.	2. Click on the link **'informatie'** on the homepage. Then click on the link **'plattegrond'**.
3.Click on 'download en print de **plattegrond**' and open the map.	3. Click on **'plattegrond van Carré downloaden'** and open the map.
4. Look at the map of the zoo Artis and save the map on the desktop of the computer.	4. Look at the map the **'circus plattegrond van Carré'** and save the map on the home screen.
5. After you save the plan of the zoo Artis on the desktop, you can go back to the homepage of the zoo Artis. Use the 'back button' to go back to the homepage of the zoo Artis.	5. After you save the map on the home screen you can close the map and go back to the homepage of the theater Carré. Use the 'back button' to go back to the homepage of the Carré website.
6. Add the homepage of the zoo Artis to the favorites (or bookmarks).	6. Add the homepage of the theater Carré to the Favorites (bookmarks).
After adding the homepage to the favorites. You go back to the homepage of the zoo Artis.	After adding the homepage of the theater Carré to the favorites. You can go back to the homepage of the theater Carré.
7. Go to the search bar at the upper right corner of the homepage. Type in the search bar **'olifant'**.	7. Go to the search bar at the upper right corner of the homepage. Type in the search bar **'informatie'**.
8. Open the second search result.	8. Open the third search result.
Assignment 1 – Formal Internet skills	
Computer	Tablet
9. Finally, you search the **entrance fee for an adult** on the homepage of the zoo Artis.	9. Finally, you search the **address** on the website of the theater Carré.

Table 4

Performance tests assignment of the information and strategic Internet skills for both devices.

Assignment 2 – Information Internet skills	
Computer	Tablet
1. What are the symptoms of cataract? (name two symptoms). 2. What possible effects can you have after a cataract surgery? (name two effects).	1. What are the side effects of the flu vaccine? (name two side effects). 2. When do you belong to the risk group of the flu vaccine? (name two risk groups).
Assignment 2 – Strategic Internet skills	
Computer	Tablet
Imagine, your friend is having a cataract surgery. He went to the hospital with his own car. Can he drive home safely after the cataract surgery?	Imagine, you have a chicken protein allergy. Should you be vaccinated with the flu vaccine?

Before the performance tests were conducted, five subjects participated in a pilot-test in which the assignments were tested for comprehensibility and difficulty. After the pilot-tests, some questions were deleted or formulations in the assignments were adjusted. It was tried to link the assignments to the daily life of seniors. The operational and formal Internet skills assignments were leisure-related, while the information and strategic Internet skills assignments were health-related. Answers that were self-invented by subjects, fault answers given by subjects, subjects who could not find the correct answer, or tasks that were not tried at all were coded as incorrect. Tasks that were completed correctly were coded as correct. The Internet skills total outcome was measured on the number of tasks solved successfully and the maximum time spent on these tasks. During the task completion users might have experienced different Internet skill-related problems. For example, the information Internet skill definition: 'defining search options or queries' has more related problems such as, spelling or using to broad search queries. These Internet skill-related problems are based on the four Internet skills. (Van Deursen & Van Dijk, 2009a; Van Deursen, 2012). Therefore a coding scheme for all Internet skill-related problems was made (see Appendix D).

3.3.2 Explanatory variables

In this section the data collection of the explanatory variables by a questionnaire will be explained. The questionnaire that was used in this research consisted of ten different questions to collect more background information about the subjects. The questionnaire covered questions about gender, age, educational level, marital status, the average years of

Internet experience and the average amount of Internet use in hours per week on both devices. Furthermore, participants were asked about their use of social media, their participation in an Internet course, if they have access to social support and if so, how many sources of support they have access to (see Appendix B for the complete questionnaire).

The first explanatory variable 'gender' was included as a dichotomous variable (male/female) while age was included as a continuous variable. Education was measured by asking seniors their highest degree (e.g., primary school, pre-university, university education). These were divided into three different groups (low-middle-high education) (Van Deursen & Van Dijk, 2011). Data on Internet experience were collected by the number of years seniors have been using the Internet while the data on Internet usage were collected by asking the seniors the number of hours they spend weekly on the Internet (Van Deursen & Van Dijk, 2011). In addition, social support was measured by asking the seniors if they have access to social support (i.e., no/yes), and by asking their marital status which was divided into four categories: 1. single, 2. separated/divorced, 3. married/living together, 4. widowed. Additionally, the number of sources to social support, whom they can ask for help, was asked. The sources of social support were divided into nine different groups (i.e., partner, children, grandchildren, other family, friends, companions, staff of the elderly center, mentor of the computer/Internet course, others). Finally, participation in an Internet course was measured by asking participants if they followed an Internet course in the past, and if not, if they follow an Internet course at the moment.

3.4 Data analysis

The results of this study were analyzed with the software Statistical Package for Social Studies (SPSS) version 22.0. The data collected by the performance tests (rated by binary success/failure) and the questionnaires were processed into a SPSS database. The normality of the data was tested with the Kolmogorov-Smirnov test, the Shapiro-Wilk test and by screening histograms with a plotted normality curve. Because, the assumptions of a normal distribution were not always met, non-parametric tests such as the Wilcoxon Signed rank test and McNemar test were used. To see if there is a difference in the total level of Internet skills between both devices a Paired sample t-test was used. Furthermore, a one-way between subjects (ANOVA) and the Kruskal-Wallis test were applied to compare the effects of some explanatory variables (e.g., educational level) on the level of Internet skills on both devices. In addition, linear regressions were conducted, to identify factors that influence the level of Internet skills on the computer and the tablet. For the task completion of the

formal and strategic Internet skills, which consisted of one task on each device, logistic regressions were performed. Finally, the differences of the Internet skill-related problems between the two devices were measured with the McNemar test. In this research the significant levels of .05, .01 and .001 were used.

3.4.1 Missing values

While coding the questionnaires and the screen actions some missing values were observed. Missing values in the questionnaire were only missing values because the values were inapplicable for the situation of some seniors. For example if questionnaire question 9a 'Do you follow an Internet/computer course at this moment' was answered with 'yes'. Question 9b 'Did you follow an Internet/computer course in the past' was not applicable for some seniors because they were following an Internet/computer course for the first time. The number of missing values in the questionnaires were coded with '999 = inapplicable'. During the screen actions some missing values were observed because some participants did not try or overlooked some assignments. When coding 'the number of tasks completed successfully', answers were always coded as correct (i.e., 1) or incorrect (i.e., 0). In contrary, when coding the 'Internet skills-related problems' missing values were left open.

4. Results

4.1 General results

Looking at the general results of the computer the respondents successfully completed 69% of the operational Internet skills tasks, 80% of the formal Internet skills task, 66% of the information Internet skills tasks and 62% of the strategic Internet skills task. The general results of the tablet show that respondents successfully completed 52% of the operational Internet skills tasks, 40% of the formal Internet skills task, 88% of the Information Internet skills tasks and 65% of the strategic Internet skills task (see Table 5). It must be mentioned that these analyses were performed with the individual tasks within the Internet skills. Looking, at the entire assignments on the computer 12,5% of the subjects (5/40) were able to complete all the operational Internet skills tasks, 80% (32/40) completed the formal Internet skills task, 40% (16/40) completed both of the information Internet skills tasks, and 62,5% (25/40) completed the strategic Internet skills task successfully. Only 5% of the respondents (2/40) completed all the tasks on the computer successfully. The lowest score was of one respondent, which completed only three tasks of all the Internet skills tasks on the computer successfully.

As mentioned before also the analysis of the tablet was performed with the individual tasks within the Internet skills. Looking, at the entire assignments on the tablet not one of the subjects was able to complete all the operational Internet skills tasks. However 7,5% of the respondents (3/40) were able to complete seven of the eight operational Internet skills tasks, 40% (16/40) completed the formal Internet skills task, 82,5% (33/40) completed both of the information Internet skills tasks, and 65% (26/40) completed the strategic Internet skills task successfully. In contrast with the computer not one of the respondents completed all the tasks successfully while using the tablet, although one respondent completed 11 of the 12 tasks on the tablet. The lowest score was of one respondent, which completed only two tasks of all the tablet tasks successfully. The time that was spent on all the computer and tablet assignments varies considerably (see Table 6).

Table 5

Overview of average successful tasks completed on the computer and the tablet with the results of the Wilcoxon Signed-ranks test, McNemar test, and Paired Samples t-test.

Internet skills (number of tasks)	Task completion (Computer)		Task completion (Tablet)			
	Mean (SD)	%	Mean (SD)	%	*p*-value	
Operational tasks (8)	5.53 (1.74)	69	4.13 (1.68)	52	.001***	-4.05 (*Z*-value)
Formal task (1)	0.80 (0.41)	80	0.40 (0.50)	40	.001***	McNemar
Information tasks (2)	1.32 (0.62)	66	1.75 (0.59)	88	.001***	-2.76 (*Z*-Value)
Strategic task (1)	0.62 (0.49)	62	0.65 (0.48)	65	.50	McNemar
	Mean (SD)	%	Mean (SD)	%	*p*-value	*t*
Total (12)	8.27 (2.32)	69	6.93 (2.29)	58	.001***	3.60

*** $p < .001$.

Table 6

Overview of average time spent on the computer and the tablet with the results of the Wilcoxon Signed-ranks test.

Internet skills (number of tasks)	Seconds spent on the computer			Seconds spent on the tablet				
	Mean (SD)	Min.	Max.	Mean (SD)	Min.	Max.	*p*-value	*Z*-value
Operational tasks (8)	374 (174)	120	845	389 (148)	160	690	.28	-.585
Formal tasks (1)	35 (35)	6	190	61 (42)	15	171	.001***	-3.51
Information tasks (2)	332 (159)	125	750	320 (125)	70	554	.44	-.154
Strategic tasks (1)	93 (75)	10	320	163 (105)	10	460	.001***	-3.30
Total (12)	826 (320)	415	1926	911 (268)	325	1341	.07	-1.80

*** $p < .001$.

Differences between the two devices

To measure a difference between the total level of Internet skills on the computer and the total level of Internet skills on the tablet a Paired Samples t-test and the Wilcoxon Signed-ranks test were conducted. The Shapiro-Wilk test showed non-significant results for the total task completion scores of the Internet skills on both devices, which indicated that the variables are normally distributed. The Paired Samples t-test showed that the total task completion on the computer was significantly higher (M = 8.27, SD = 2.32) than on the tablet (M = 6.93, SD = 2.29), $t(39) = 3.60$, $p < .001$. However, the Shapiro-Wilk test showed significant results for the total time spent on the computer. This indicates that the variables are non-normal distributed and therefore a non-parametric test (i.e., the Wilcoxon Signed rank test) will be used. The Wilcoxon Signed-ranks test showed that there was no significant difference between the total time spent on the tablet (Mdn = 960) and on the total time spent on the computer (Mdn = 741), $Z = -1.80$, $p = .07$.

To see if there is a difference between the different Internet skills on both devices, the Wilcoxon Signed-ranks test and McNemar test were used. These tests were used because the data of every individual Internet skill on the computer and the tablet was non-normal distributed. The McNemar test was only used for the results of the task completion of the formal and the strategic Internet skills, because the formal and strategic Internet skills are paired nominal variables. The Wilcoxon Signed-ranks test showed that the task completion of the operational Internet skills was higher on the computer (Mdn = 6) than on the tablet (Mdn = 4), $Z = -4.05$, $p < .001$. While there was no significant difference between the time spent on the operational Internet skill tasks on the computer (Mdn = 338) and the tablet (Mdn = 367), $Z = -.585$, $p = .28$. The results of the McNemar test for the level of formal Internet skills showed that there was a statistically significant difference in the task completion of the formal Internet skills on the computer (80%) and on the tablet (40%), $p < .001$. Similarly, the results of the Wilcoxon Signed-ranks test showed that seniors needed less time to complete the formal Internet skills tasks on the computer (Mdn = 25) than on the tablet (Mdn = 45), $Z = -3.51$, $p < .001$. However, the results of the Wilcoxon Signed-ranks test for the level of information Internet skills made clear that the task completion of the information Internet skills was lower on the computer (Mdn = 1) than on the tablet (Mdn = 2), $Z = -2.76$, $p < .001$. While there was no significant difference between the time spent on the information Internet skills tasks on the computer (Mdn = 316) and the tablet (Mdn = 333), $Z = -.154$, $p = .44$. Likewise, the results of the McNemar test for the level of the strategic Internet skills showed that there was no statistically significant difference in the task completion of the strategic

Internet skills on the computer (62%) and on the tablet (65%), p = .50. Nevertheless, the results of the Wilcoxon Signed-ranks test of time spent on the strategic Internet skills tasks showed that seniors needed less time to complete the strategic Internet skills tasks on the computer (*Mdn* = 65) than on the tablet (*Mdn* = 136), Z = -3.30, p <.001.

Effects of the multiple groups of the explanatory variables

To measure a statistically significant difference between the multiple groups of explanatory variables (i.e., educational level (low, middle, high), the number of sources to social support (0 till 9 sources), and marital status (single, married, widowed)) on the level of Internet skills of both devices, the Kruskal-Wallis test and multiple ANOVA's were conducted. The data of educational level on both devices was normally distributed for each group and showed no outliers, as assessed by boxplot and the Shapiro-Wilk test (p <.05). Furthermore Levene's test for homogeneity of variances showed non-significant results. So, a one-way between subjects ANOVA was conducted to compare the effect of education on the level of Internet skills on the computer in low education, middle education, and high education conditions. There was not a significant effect of educational level on the level of Internet skills on the computer at the p <.05 level for the three conditions (F(2,37)=.55, *ns*). In addition, a one-way between subjects ANOVA was conducted to compare the effect of education on the level of Internet skills on the tablet in low education, middle education, and high education conditions. Likewise, there was not a significant effect of educational level on the level of Internet skills on the tablet at the p <.05 level for the three conditions (F(2, 37)=.76, *ns*).

To see if the number of sources to social support has an effect on the level of Internet skills on both devices a one-way between subjects ANOVA and Kruskal-Wallis test were conducted. The data of the number of sources to social support for the level of Internet skills on the computer was normally distributed for each group and showed no outliers, as assessed by boxplot and the Shapiro-Wilk test (p <.05). In addition, Levene's test for homogeneity of variances showed non-significant results. So, a one-way between subjects ANOVA was conducted to compare the effect of number of sources to social support on the level of Internet skills on the computer in 0 sources, 1 source, 2 sources, 3 or more sources conditions. There was not a significant effect of number of sources to social support on the level of Internet skills on the computer at the p <.05 level for the four conditions (F(2,36)=2.74, *ns*). The data of the number of sources to social support for the level of Internet skills on the tablet was normally distributed for each group. However, the data showed some outliers, therefore the Kruskal-Wallis test was applied. The Kruskal-Wallis test

showed that there was not a significant difference in the level of Internet skills on the tablet between the number of sources to social support, χ^2 (3) = 3.13, p = .37, with a mean rank Internet skills on the tablet of 21.43 for 0 sources, 21.63 for 1 source, 22.77, for 2 sources, and 13.57 for 3 sources or more.

To see if marital status has an effect on the level of Internet skills on both devices Kruskal-Wallis tests were conducted. The data of marital status for the level of Internet skills on the computer was non-normally distributed for some groups. However, the data showed no outliers. Because the data was non-normally distributed the Kruskal-Wallis test was applied. The Kruskal-Wallis test showed that there was not a significant difference in the level of Internet skills on the computer between marital status, χ^2 (2) = 2.52, p = .28, with a mean rank Internet skills on the computer of 32.25 for single, 20.36 for married/cohabiting, and 17.33 for widowed. The data of marital status for the level of Internet skills on the tablet was normally distributed for each group. However, the data showed some outliers, therefore the Kruskal-Wallis test was applied. The Kruskal-Wallis test showed that there was not a significant difference in the level of Internet skills on the tablet between marital status, χ^2 (2) = 4.13, p = .13, with a mean rank Internet skills on the tablet of 34.50 for single, 20.59 for married/cohabiting, and 15.33 for widowed.

4.2 Factors of influence on the level of Internet skills

4.2.1 Factors of influence on the operational Internet skills

To identify factors that influence the level of the operational Internet skills linear regressions were conducted for both devices. According to Table 7 age is a predictor for the number of operational tasks completed on the computer. So, the younger the participants were, the more operational tasks they completed on the computer. Also two sources to social support are significant for the task completion of the operational skills on the computer. Seniors who had access to two sources of social support completed less operational tasks successfully than seniors who had access to less sources of social support. Next to, age and the number of sources to social support also participation in an Internet course is significant for the task completion of the operational skills on the computer. Seniors who did not participate in an Internet course completed more operational task successfully on the computer, than seniors who participated in an Internet course. Furthermore, Table 7 shows that gender, age, and participation in an Internet course are significant predictors for the number of operational tasks completed successfully on the tablet. As shown in table 7 it seemed that men completed more tasks successfully on the tablet than women and that younger seniors completed more tasks successfully than older seniors. In comparison with the computer, seniors who did not participate in an Internet course completed more operational tasks successfully on the tablet than seniors who participated in an Internet course.

Table 8 shows the linear regression results of the time spent on the operational Internet skills tasks on the computer and the tablet. It should be mentioned that the data of the time spent on the operational Internet skills tasks on the computer had some deviations. However, the linear regressions were still conducted. According to Table 8, age is a predictor for the time spent on the tablet. The older the seniors, the more time they needed to complete the operational tasks. However, there were no significant results for the other predictors. Similarly, there were no significant results for the time spent on the operational Internet skills on the computer.

Table 7
Linear regression results of the number of operational Internet skills tasks completed successfully on the computer and the tablet

Independent variables	Number of tasks completed (computer)		Number of tasks completed (tablet)	
	t	*β*	*t*	*β*
Gender (male/female)	.24	.04	-2.57	-.43*
Age (in years)	-2.10	-.33*	-3.13	-.50**
Educational level *(reference: low educational level)*				
Medium educational level	-.21	-.04	.35	.06
High educational level	-.81	-.17	.17	.03
Internet experience (in years)	.50	.09	-.59	-.10
Internet usage (in hours)	.89	.16	1.28	.20
Number of sources to social support (*reference: no sources)*				
1 source	-.60	-.14	1.55	.35
2 sources	-2.78	-.57*	.34	.07
3 sources or more	-.42	-.09	-.31	-.06
Marital status *(reference: single)*				
Married	-1.17	-.31	-1.42	-.38
Widowed	-.77	-.22	-.76	-.21
Participation in an Internet course (no/yes)	-2.54	-.39*	-2.14	-.31*
R^2	.58		.62	
F	2.75*		3.10**	

* $p < .05$, ** $p < .01$.

Table 8
Linear regression results of the time spent on the operational Internet skills tasks on the computer and the tablet

Independent variables	Time spent (computer)		Time spent (tablet)	
	t	*β*	*t*	*β*
Gender (male/female)	1.48	.29	.84	.17
Age (in years)	1.56	.30	2.54	.50*
Educational level *(reference: low educational level)*				
Medium educational level	.06	.01	-.67	-.15
High educational level	-.50	-.13	-1.86	-.45
Internet experience (in years)	.44	.09	1.02	.22
Internet usage (in hours)	-.61	-.13	.11	.02
Number of sources to social support (*reference: no sources)*				
1 source	.54	.15	.87	.24
2 sources	-.50	-.13	.38	.10
3 sources or more	.91	.23	.70	.18
Marital status *(reference: single)*				
Married	1.58	.51	-1.26	-.42
Widowed	.75	.26	-1.91	-.66
Participation in an Internet course (no/yes)	-.63	-.12	-.55	-.10
R^2	.38		.41	
F	1.20		1.33	

* $p < .05$.

4.2.2 Factors of influence on the formal Internet skills

To identify factors that influence the level of formal Internet skills on the computer and the tablet logistic- and linear regressions were conducted. The logistic regression results for both devices reported in Table 9 shows that Internet experience and marital status (i.e., widowed) are the only significant predictors for the formal task completion on the tablet. Internet experience is a positive contributor, which means that seniors with more Internet experience completed the formal tasks more successful on the tablet, than seniors with less Internet experience. On the contrary, marital status (i.e., widowed) is a negative contributor. This means that when seniors are not widowed they completed the formal Internet skills task more successful on the tablet than seniors who are widowed. However, there were no significant results for the completion of the formal Internet skills task on the computer.

Table 10 shows the linear regression results of the time spent on the formal Internet skills tasks on the computer and the tablet. It should be mentioned that the data of the time spent on the formal Internet skills task on the computer had some deviations. However, the linear regressions were still conducted. The linear regression results for the computer and the tablet reported in Table 10 show that there are no significant predictors for the time spent on the formal Internet skills tasks on both devices.

Table 9
Logistic regression analysis of the number of formal Internet skills tasks completed successfully on both devices.

	Successful task completion on the computer.		Successful task completion on the tablet.	
	Exp(*B*)	*P*	Exp(*B*)	*P*
Gender (male/female)	3.08	.46	1.20	.87
Age (in years)	1.02	.90	1.11	.37
Educational level *(reference: low educational level)*				
Medium educational level	0.00	.10	1.43	.78
High educational level	0.00	.10	0.13	.20
Internet experience (in years)	1.28	.15	5.98	.04*
Internet usage (in hours)	0.79	.22	0.99	.90
Number of sources to social support (*reference: no sources)*				
1 source	0.00	.10	0.52	.65
2 sources	0.00	.10	10.81	.14
3 sources or more	0.00	.10	4.38	.41
Marital status *(reference: single)*				
Married	0.00	.10	0.02	.10
Widowed	0.00	.10	0.00	.05*
Participation in an Internet course (no/yes)	0.00	.10	0.15	.21
Nagelkerke R^2	.66		.50	
Chi-square	19.60		16.81	

* $p < .05$.

Table 10
Linear regression results of the time spent on the formal Internet skills tasks on the computer and the tablet

Independent variables	Time spent (computer)		Time spent (tablet)	
	t	*β*	*t*	*β*
Gender (male/female)	1.51	.29	-.56	-.14
Age (in years)	-1.06	-.20	.06	.01
Educational level *(reference: low educational level)*				
Medium educational level	.99	.21	-.04	-.01
High educational level	1.50	.38	-.74	-.22
Internet experience (in years)	.88	.19	-.28	-.07
Internet usage (in hours)	-.04	-.01	-.34	-.07
Number of sources to social support (*reference: no sources)*				
1 source	-.16	-.04	1.28	.46
2 sources	.65	.16	1.16	.39
3 sources or more	1.81	.44	2.05	.67
Marital status *(reference: single)*				
Married	.92	.29	.69	.25
Widowed	.89	.30	.54	.21
Participation in an Internet course (no/yes)	.44	.08	-1.81	-.37
R^2	.41		.36	
F	1.38		.97	

4.2.3 Factors of influence on the information Internet skills

To identify factors that influence the level of information Internet skills linear regressions were conducted for both devices. According to Table 11 age is a predictor for the number of information tasks completed on the tablet. So, the younger the participants were, the more information tasks they completed successfully on the tablet. Next to age also Internet usage is a significant predictor for the number of information tasks completed successfully on the tablet. Table 11 indicated that participants who spend less hours on the tablet completed more information tasks successfully than participants who spend more hours on the tablet. However, there were no significant results for the completion of the information Internet skills tasks on the computer.

Table 12 shows the linear regression results of the time spent on the information Internet skills tasks on the computer and the tablet. The linear regression results for both devices reported in Table 12 show that there are no significant predictors for the time spent on the information Internet skills tasks on the computer and the tablet.

Table 11
Linear regression results of the number of information Internet skills tasks completed successfully on the computer and the tablet

Independent variables	Number of tasks completed (computer)		Number of tasks completed (tablet)	
	t	*β*	*t*	*β*
Gender (male/female)	.46	.11	.75	.14
Age (in years)	.01	.00	-2.34	-.42*
Educational level *(reference: low educational level)*				
Medium educational level	-.94	-.24	-.95	-.20
High educational level	-.35	-.11	-.57	-.12
Internet experience (in years)	.49	.13	-.37	-.07
Internet usage (in hours)	-.19	-.05	-3.06	-.54**
Number of sources to social support (*reference: no sources)*				
1 source	-.47	-.15	.62	.16
2 sources	.02	.01	.64	.15
3 sources or more	.03	.01	-.26	-.06
Marital status *(reference: single)*				
Married	-.33	-.13	.65	.20
Widowed	-.24	-.10	-.28	-.09
Participation in an Internet course (no/yes)	.80	.18	-.04	-.01
R^2	.12		.51	
F	.27		2.03	

* $p < .05$, ** $p < .01$.

Table 12
Linear regression results of the time spent on the information Internet skills tasks on the computer and the tablet

Independent variables	Time spent (computer)		Time spent (tablet)	
	t	*β*	*t*	*β*
Gender (male/female)	1.46	.29	-.23	-.05
Age (in years)	.82	.16	1.44	.32
Educational level *(reference: low educational level)*				
Medium educational level	.31	.07	1.10	.28
High educational level	-.54	-.14	-.36	-.10
Internet experience (in years)	-.77	-.17	.83	20
Internet usage (in hours)	.63	.14	.68	.15
Number of sources to social support (*reference: no sources)*				
1 source	-.78	-.22	-.22	-.07
2 sources	.59	.15	-.61	-.18
3 sources or more	-.68	-.17	.39	.11
Marital status *(reference: single)*				
Married	.59	.19	-.65	-.24
Widowed	-.31	-.11	-.03	-.01
Participation in an Internet course (no/yes)	-.29	-.06	.26	.05
R^2	.35		.27	
F	1.10		.70	

4.2.4 Factors of influence on the strategic Internet skills

To identify factors that influence the level of strategic Internet skills on the computer and the tablet logistic- and linear regressions were conducted. The logistic regression results for both devices reported in Table 13 show that age is the only predictor for successful task completion of the strategic task on the computer. Age is a negative contributor, which means that younger seniors completed the strategic task more successful than older seniors on the computer. On the tablet, only Internet experience shows a significant result. Table 13 shows that Internet experience is a negative contributor which means that seniors with less Internet experience completed the strategic task more successful on the tablet than seniors with more Internet experience. However, there were no significant results for the other predictors of both devices.

Table 14 shows the linear regression results of the time spent on the strategic Internet skills tasks on the computer and the tablet. According to Table 14, age is a predictor for the time spent on the tablet. Age is a positive contributor, which means that how older the seniors were, the more time they needed to complete the strategic task on the tablet. However, there were no significant results for the other predictors. Similarly, there were no significant results for the time spent on the strategic Internet skills task on the computer.

Table 13
Logistic regression analysis of the number of strategic Internet skills tasks completed successfully on both devices.

	Successful task completion on the computer.		Successful task completion on the tablet.	
	Exp(*B*)	*P*	Exp(*B*)	*P*
Gender (male/female)	0.13	.16	214.97	.09
Age (in years)	0.73	.02*	0.47	.07
Educational level *(reference: low educational level)*				
Medium educational level	0.04	.17	0.05	.25
High educational level	0.04	.21	11.47	.32
Internet experience (in years)	0.10	.10	0.00	.05*
Internet usage (in hours)	1.05	.73	0.50	.09
Number of sources to social support (*reference: no sources)*				
1 source	5.01	.45	0.01	.28
2 sources	0.40	.61	445.68	.31
3 sources or more	0.07	.37	0.00	.15
Marital status *(reference: single)*				
Married	0.00	.10	0.00	.10
Widowed	0.00	.10	0.00	1.00
Participation in an Internet course (no/yes)	1.01	.99	0.00	.07
Nagelkerke R^2	.62		.75	
Chi-square	22.23*		28.26**	

* $p < .05$, ** $p < .01$.

Table 14
Linear regression results of the time spent on the strategic Internet skills tasks on the computer and the tablet

Independent variables	Time spent (computer)		Time spent (tablet)	
	t	*β*	*t*	*β*
Gender (male/female)	1.47	.33	.12	.02
Age (in years)	-.07	-.02	2.50	.48*
Educational level *(reference: low educational level)*				
Medium educational level	1.51	.39	.76	.17
High educational level	1.03	.31	-.08	-.02
Internet experience (in years)	-.33	-.08	.73	.16
Internet usage (in hours)	-.95	-.23	-.35	-.07
Number of sources to social support (*reference: no sources)*				
1 source	.50	.15	1.17	.32
2 sources	1.04	.27	1.65	.43
3 sources or more	-.50	-.14	.87	.22
Marital status *(reference: single)*				
Married	.63	.20	-.79	-.26
Widowed	.26	.09	-1.25	-.43
Participation in an Internet course (no/yes)	-.12	-.03	-1.99	-.35
R^2	.44		.43	
F	1.10		1.46	

* $p < .05$.

4.3 Hypotheses

Hypothesis H1: that male seniors have a higher level of Internet skills than female seniors – is only supported for the task completion of the operational Internet skills on the tablet. Men completed more operational tasks successfully on the tablet than women. Gender was not a significant predictor for the other three Internet skills on the tablet and the four Internet skills on the computer. Furthermore, the results showed that gender was not a significant predictor for the time spent on any of the four Internet skills on both devices.

Hypothesis H2: that age has a negative influence on seniors' level of Internet skills – is partly supported for the computer and the tablet. On the computer age was a significant predictor for the task completion of the operational and strategic assignments. The results showed that younger seniors completed more operational and strategic tasks on the computer successfully than older seniors. However, age was not a significant predictor for the task completion of the formal and information Internet skills tasks or for the time spent on the four Internet skills task on the computer. On the tablet age was a significant predictor for the operational and information assignments. The results showed that younger seniors completed more operational and information tasks on the tablet successfully than older seniors. Furthermore, the results showed that older seniors needed more time to complete the operational and strategic tasks on the tablet than the younger seniors. Age was not a significant predictor for the completion of the formal and strategic Internet skills tasks or for the time spent on the formal and information Internet skills task on the tablet.

Hypothesis H3: that education has a positive influence on seniors' level of Internet skills – is rejected. Education did not appear as a significant predictor for any of the four Internet skills on both devices.

Hypothesis H4: that Internet experience has a positive influence on seniors' level of Internet skills – is only supported for the task completion of the formal Internet skills on the tablet. Seniors with more Internet experience completed the formal task more successful than seniors with less Internet experience on the tablet. Next to the formal Internet skills, Internet experience was also a significant predictor for the task completion of the strategic Internet skills on the tablet. However, the results showed that Internet experience was a negative contributor, which means that seniors with less Internet experience completed the strategic task more successful on the tablet than seniors with more Internet experience. Internet experience was not a significant predictor for the other two Internet skills on the tablet or for

the four Internet skills on the computer. Furthermore, the results showed that Internet experience was not a significant predictor for the time spent on any of the four Internet skills on both devices.

Hypothesis H5: that Internet usage time has a positive influence on seniors' level of Internet skills – is rejected. Internet usage was a significant predictor for the number of Information tasks completed successfully on the tablet. However, the results showed that Internet usage has a negative influence on the level of Internet skills of seniors. Seniors who spend more hours a week on the Internet completed less information tasks successfully on the tablet than seniors who spend less hours a week on the Internet. Internet usage did not appear as a significant predictor for any of the four Internet skills on the computer or the other three skills on the tablet. Furthermore, the results showed that Internet usage was not a significant predictor for the time spent on any of the four Internet skills on both devices.

Hypothesis H6: that the more sources of support the higher the level of Internet skills of seniors – is rejected. The number of sources to social support was a significant predictor for the number of operational tasks completed successfully on the computer. However, the results showed that seniors who had access to two sources of social support completed less operational tasks successfully than seniors who had access to less sources of social support. The number of sources to social support was not a significant predictor for the other three Internet skills on the computer or for the four Internet skills on the tablet. On the contrary, marital status (i.e., widowed) was a significant predictor for the task completion of the formal Internet skills on the tablet. Marital status (i.e. widowed) was a negative contributor, which means that seniors who are not widowed completed the formal Internet skills task more successful on the tablet than seniors who are widowed. Furthermore, the results showed that the number of sources to social support and marital status were no significant predictors for the time spent on any of the four Internet skills on both devices.

Hypothesis H7: that participation in an Internet course has a positive influence on seniors' level of Internet skills – is rejected. Participation in an Internet course was only a significant predictor for the number of operational tasks completed successfully on both devices. However, the results showed that seniors who did not participate in an Internet course completed more operational tasks successfully on the computer and the tablet, than seniors who participated in an Internet course. Participation in an Internet course was not a significant predictor for the other three Internet skills on the computer and the tablet.

Furthermore, the results showed that participation in an Internet course was not a significant predictor for the time spent on any of the four Internet skills on both devices.

Hypothesis H8: that seniors have a higher level of medium-related Internet skills on the tablet than on the computer – is rejected. Results showed that seniors scored significantly higher on the medium-related skills on the computer. Furthermore, on the computer seniors needed significantly less time to complete the formal task than on the tablet.

Hypothesis H9: that seniors have a higher level of content-related Internet skills on the computer than on the tablet – is partly supported. Results showed that seniors scored significantly higher on the information Internet skills on the tablet than on the computer. However, there were no significant results for the strategic Internet skills. Although, the results indicated that on the tablet seniors needed significantly more time to complete the strategic task than on the computer.

An overview of the supported and rejected hypotheses is shown in Table 15.

Table 15
Overview of the supported and rejected hypotheses

	Computer (the number of tasks completed successfully)				Tablet (the number of tasks completed successfully)			
Hypotheses	Operational	Formal	Information	Strategic	Operational	Formal	Information	Strategic
H1: Gender	✗	✗	✗	✗	✓	✗	✗	✗
H2: Age	✓	✗	✗	✓	✓	✗	✓	✗
H3: Education	✗	✗	✗	✗	✗	✗	✗	✗
H4: Years online	✗	✗	✗	✗	✗	✓	✗	✗
H5: Hours online	✗	✗	✗	✗	✗	✗	✗	✗
H6: Social support	✗	✗	✗	✗	✗	✗	✗	✗
H7: Internet courses	✗	✗	✗	✗	✗	✗	✗	✗
H8: Medium-related skills	-	-	-	-	✗	✗	✗	✗
H9: Content-related skills	✗	✗	✗	✗	-	-	-	-

	Computer (time spent)				Tablet (time spent)			
Hypotheses	Operational	Formal	Information	Strategic	Operational	Formal	Information	Strategic
H1: Gender	✗	✗	✗	✗	✗	✗	✗	✗
H2: Age	✗	✗	✗	✗	✓	✗	✗	✓
H3: Education	✗	✗	✗	✗	✗	✗	✗	✗
H4: Years online	✗	✗	✗	✗	✗	✗	✗	✗
H5: Hours online	✗	✗	✗	✗	✗	✗	✗	✗
H6: Social support	✗	✗	✗	✗	✗	✗	✗	✗
H7: Internet courses	✗	✗	✗	✗	✗	✗	✗	✗
H8: Medium-related skills	-	-	-	-	✗	✗	✗	✗
H9: Content-related skills	✗	✗	✗	✓	-	-	-	-

✓ Hypothesis is supported
✗ Hypothesis is rejected

4.4 Internet skill-related problems

4.4.1 Operational Internet skill-related problems

To identify operational Internet skill-related problems on both devices, participants were asked to complete one assignment on the computer and one assignment on the tablet. Both assignments consisted of eight different tasks and were leisure-related. In the assignment on the computer the website of the zoo 'Artis' was used, while on the tablet the website of Koninklijk Theater Carré was used. The *use of the address bar* was a problem for many seniors while they were using the computer. Most of the subjects did not recognize the address bar and thought that the Google search bar was the address bar. Participants typed in the Google search bar www.artis.nl or artis.nl, 35% of the subjects (14/40) used the address bar correctly. On the tablet participants scored higher on the operational task 'using the address bar', this was because on the tablet the address bar was right in front of them when they opened the browser (e.g., Safari or Google Chrome). Nevertheless, many subjects did not now the difference between the address bar and the search bar. For example, when participants used the Google app they typed in the search bar of the Google app www.carre.nl or carre.nl. Even one subject tried to type www.carre.nl in the search bar of the App Store because he thought that the App Store was Safari. After all, 63% of the subjects (25/40) used the address bar correctly on the tablet.

Table 16

Operational Internet skill-related problems

	Computer %	Tablet %	McNemar *p*-value
1. Using the address bar correctly.	35	63	.00**
2. Using text or images with hyperlinks.	93	90	1.00
3. Opening various common file formats.	78	83	.79
4. Saving files on the hard disk.	73	25	.00***
5. Navigating forward and backward between pages using the browser buttons.	90	63	.01**
6. Bookmarking websites.	68	33	.00**
7. Recognizing the search engine or input field.	85	40	.00***
8. Using search queries correctly.	83	40	.00***

** $p < .01$. *** $p < .001$

Using text or images with hyperlinks was not a problem for many seniors on both devices. Most of the seniors directly recognized different hyperlinks, only a few seniors did not use hyperlinks and typed for example 'plattegrond Carré' in Google. Some seniors saw 'plattegrond Carré' in the Google results and went directly to the page of the map of Carré without using hyperlinks. Seniors who used Google to go to the page of the map of Artis or

Carré, thus without using hyperlinks, were coded as incorrect. 93% of the subjects (37/40) used text or images with hyperlinks on the computer correctly and 90% (36/40) used hyperlinks on the tablet correctly.

Opening various common file formats was measured by asking the participants to open the map of Artis on the computer and to open the map of Carré on the tablet. On the computer seniors did not always open the PDF file of the map of Artis because they saw an image of the map on the website and they thought they already opened the map. They had to double click on the image of the map or they had to click the hyperlink 'download and print the map' to open the file. For this reason some seniors thought they had to print the map and therefore some seniors actually printed the map. 78% of the subjects (31/40) opened the map correctly on the computer. On the tablet participants had to click on the image of the map of Carré to open the file. Seniors who did not complete the task were mainly users of a Samsung tablet or other tablets with Android as operating system. The reason for this was that the iPad users only had to click on the image of the map and the map opened in a second tab. Seniors who used a Samsung or another tablet had to click on the image of the map but it did not open automatically in a new tab as on the iPad. These users had to click on 'downloads' at the upper left corner of the tablet to open the map which most of the users did not know. 83% of the subjects, (33/40) opened the map correctly on the tablet.

Saving files on the hard disk was measured by asking the participants to save the map of Artis on the desktop of the computer, and to save the map of Carré on the home screen of the tablet. 73% of the subjects (29/40) saved the map correctly on the hard disk of the computer. Some participants saved an image of the map in 'My Documents' or on the desktop of the computer, others saved the whole page of the map of Artis on the hard disk while other seniors double-checked if they performed the task correctly or even gave the file a name. When seniors were able to save a file (i.e., the map of Artis or an image of the map of Artis) on the hard disk (i.e., on the desktop or in My documents) the operational task of 'saving files on the hard disk' was coded as correct. In contrast only 25% of the subjects (10/40) saved the map correctly on the home screen of the tablet. The most common reason for this is that many participants did not know how to perform this task. They explained that they never used proceedings like this on the tablet and used the tablet mainly for games, information searching and social media.

Navigating forward and backward between pages using the browser buttons did not lead to many problems for computer users. 90% of the subjects (36/40) used the forward and backward browser buttons correctly. On the tablet 63% of the subjects (25/40) used the browser buttons correctly. Some seniors did not use the forward and backward browser buttons on the tablet. Instead of these buttons they clicked on hyperlinks like 'home' to get back to the homepage or they typed the URL again in the address bar to get back to the homepage of Carré. When seniors did not use the forward and backward browser buttons but for example the hyperlink 'home', the operational task of 'navigating forward and backward between pages using the browser buttons' was coded as incorrect.

Bookmarking websites was measured by asking the participants to add the homepages of Artis and Carré to the favorites. 68% of the subjects (27/40), added the homepage of Artis correctly to the favorites on the computer. The most of these 27 subjects did not add the homepage of Artis to the favorites but added other pages like the page with the map of Artis, or the ticket page. However, they performed the operational task correctly. On the tablet seniors found it difficult to add the homepage of Carré to the favorites. Participants explained that they never used proceedings like this such as the operational task of 'saving files on the hard disk'. Only 33% of the subjects (13/40) added the homepage of Carré correctly to the favorites on the tablet.

Search engine - results showed that when seniors were using the computer they had less problems with the search engine than when they were using the tablet. *Recognizing the search engine or input field* was not a problem for seniors while using the computer. 85% of the subjects (34/40) recognized the search engine on the computer. Seniors who did not recognize the search engine used the address bar as a search engine on the computer. On the tablet only 40% of the subjects (16/40) recognized the search engine. Similar to the computer, some seniors did not know what the search engine was and thought that the address bar was the search engine. Participants who were using the iPad during the research got for example confused because in the address bar on the iPad the following text is stated: 'type search term or site name'. For this reason seniors confused the search engine with the address bar on the tablet. In addition, seniors got confused because in the assignment participants were asked to go to the search bar at the upper right corner of the homepage. Because the search engine sometimes blended in with the content of the website, the search bar was not at the upper right corner as mentioned in the assignment. That led to frustrations by the seniors.

Using search queries was measured by asking the participants to fill in the Dutch search queries like 'olifant' (i.e., elephant) on the computer and 'informatie' (i.e., information) on the tablet. 83% of the subjects (33/40) used the search term correctly on the computer. Some seniors who did not completed the task made a spelling mistake and typed for example 'oliefant' or 'oliefand'. On the tablet 40% of the subjects (16/40) used the search term correctly. Seniors who did not complete the task correctly were seniors who also did not recognize the search engine in the first place.

4.4.2 Formal Internet skill-related problems

To identify formal Internet skill-related problems on both devices, participants were asked to complete one task on the computer and one task on the tablet. Both tasks were leisure-related and were a continuation of the operational Internet skills assignments. In the assignment on the computer the website of 'Artis' was used, while on the tablet the website of Koninklijk Theater Carré was used. On the computer participants were asked to find the entrance fee of an adult on the website of Artis while on the tablet participants were asked to find the post address of Koninklijk Theater Carré on the website of Carré. While participants were searching for the entrance fee of Artis and the post address of Carré, they had to use different hyperlinks in different website layouts and they had to navigate through both websites without becoming disoriented.

Using hyperlinks embedded in different formats did not lead to any problems for the seniors while using both devices. 88% of the subjects (30/34) used the hyperlinks correctly on the computer. Some participants did not try the formal task because they overlooked the assignment, used Google instead of hyperlinks, or were still confused about the operational assignment of 'recognizing the search engine or input field' and already started with the information Internet skills assignments. On the tablet 94% of the subjects (31/33) used the hyperlinks correctly. The other participants did not try or overlooked the formal task, or they completed the task by using Google instead of navigating through the website of Carré.

Another problem that some seniors encountered during the formal task assignment was that they found the wrong address of Carré. The task was to find the 'postadres' of Carré, however, many seniors found the 'bezoekersadres', which was another address than was asked for. The 'postadres' was harder to find than the 'bezoekersadres', which led to the low formal Internet skills task completion on the tablet.

Table 17

Formal Internet skill-related problems

	Computer %	Tablet %	McNemar *p*-value
1. Using hyperlinks embedded in different formats such as text images, or menus correctly.	88	94	.63
2. Not becoming disoriented when navigating within a website.	91	88	1.00

Not becoming disoriented when navigating within a website was not a problem for the participants. 91% of the subjects (31/34) did not become disoriented when navigating through the website of Artis on the computer. Similarly, 88% of the subjects (29/33) did not become disoriented when navigating through the website of Carré on the tablet.

4.4.3 Information Internet skill-related problems

To identify Information Internet skill-related problems on both devices, participants were asked to complete one assignment on the computer and one assignment on the tablet. Both assignments consisted of two different tasks and were health-related. Participants were free to choose their own search engine. *Choosing a proper website or search system to seek information* was not a problem for the participants. Almost all the seniors chose Google to search for information. So, 93% of the subjects (37/40) chose a proper website or search system while using the computer. It should be noted that 'Google' was the homepage when subjects opened Internet Explorer or Google Chrome. However, one respondent started in Bing.com and many other respondents started in Google but after using search queries some started to search in Ask.com. On the tablet 100% of the subjects (39/39) chose a proper website or search system to seek for information. A reason for this is that the respondents only had to open Safari and type in some search queries and the webpage goes automatically to Google, or respondents used Google Chrome, or the Google app. One respondent did not try the Information Internet skills tasks and one respondent started in the App store to search for information. Later on he saw that he had to go to Safari because he had confused the icons of the App store and Safari.

Defining proper search queries based on the search task was measured by asking the participants on the computer to name two symptoms of cataract and two possible effects somebody can have after a cataract surgery. On the tablet participants had to name two side effects of the flu vaccine and to two risk groups of the flu vaccine. 58% of the subjects (23/40) on the computer defined proper search queries. However, many seniors did not know

how to define proper search queries. For example, some seniors only used the word 'cataract' as search term and tried to do both tasks with this search term, while other seniors made spelling mistakes and typed for example 'simptomen staar', 'klaychen na staar' or 'lachten na staar'. On the tablet the same problems occurred. Many seniors only used the word 'flu' or 'flu vaccine' or 'side effects flu vaccine' and tried to answer both questions with these search terms. So they tried to find an answer on the question 'When do you belong to the risk groups of the flu vaccine?' with search terms such as 'side effects flu vaccine' or 'flu'. However, 51% of the subjects (20/39) used proper search queries based on the search tasks on the tablet, even one subject used the voice function to search for information.

Table 18

Information Internet skill-related problems

	Computer %	Tablet %	McNemar *p*-value
1. Choosing a proper website or search system to seek information.	93	100	.25
2. Defining proper search queries based on the search task.	58	51	.80
3. Using Booleans to limit search results.	0	0	1.00
4. Searching within search results.	85	69	.18
5. Using search engines correctly.	70	92	.02*
6. Not choosing sponsored or commercial results.	25	82	.00***
7. Checking more than the first three search results.	38	41	1.00
8. Checking more than the first page of search results.	3	5	1.00
9. Choosing relevant search results.	75	87	.27
10. Using information that is applicable to the situation.	43	82	.00***
11. Using information from a reliable website.	73	95	.01*
12. Using information that is not outdated.	95	100	.50
13. Checking information on another website.	0	5	.50

* $p < .05$, *** $p < .001$

Searching within search results was not a problem the seniors. 85% of the subjects (34/40) searched within the search results on the computer, while other respondents only searched in one particular website hoping to find the right answer. Similarly, on the tablet 69% of the subjects (27/39) searched within the search results, while other participants only searched in one website (i.e. rivm.nl or rijksoverheid.nl) and read over the whole webpage about the flu vaccine hoping to find the right answer. A reason for this difference between the two devices is that the answers of the information assignment on the tablet could be found on one website and therefore seniors stayed on one website, instead of searching within the search results.

The usage of search engines was not a problem for the participants. However, some seniors went directly to websites like Ask.com after they typed some search terms in the Google search bar. When seniors went to search engines like Ask.com they got confused of the many ads and got distracted by for example banners. Another mistake that some seniors made was that they only typed search terms in the Google search bar without pressing the enter button. Even one senior did not know how to use the search engines and wrote down all the links she found on Aks.com on the paper. Afterwards she typed the links in Google, hoping to find the right answer. After all, 70% of the subjects (28/40) used the search engines correctly on the computer. On the tablet 92% of the subjects (36/39) used the search engines correctly. The different results between the devices could be explained by the fact that websites like Ask.com were almost never shown in the search results of Google on the tablets while on the computer the website was always shown. A reason for this could be that the Ask.com toolbar is installed with Java, and the iPad does not support Java.

Choosing sponsored or commercial results seemed especially to be a problem for the participants when they used the computer. Only 25% of the seniors (10/40) did not choose sponsored or commercial results. The other 75% used sponsored or commercial results for searching information. On the tablet 82% of the seniors (32/39) did not choose sponsored or commercial results for information searching. An explanation for the enormous difference between the two devices is the same as by 'the usage of search engines'. When participants used Google on the computer more ads were shown than when participants used Google on the tablet.

When the seniors searched for information the most of them just chose the first search result in Google without checking the other search results. Only 38% of the subjects (15/40) was *checking more than the first three search results* while using the computer and only one participant (1/40) *checked information from more than only the first page of search results.* On the tablet 40% of the subjects (16/39) checked more than *the first three search results* while only 5% of the subjects (2/39) were *checking more than the first page of the search results*.

Choosing relevant search results was not a problem for the participants. However, some seniors used results of websites like Ask.com and got confused. They clicked on almost every link on Ask.com, which mostly led them to non-relevant results. Nevertheless, 75% of

the subjects (30/40) used relevant search results while using the computer and 87% of the subjects (34/39) used relevant search results using the tablet.

Using information that is applicable to the situation was especially a problem for the seniors while using the computer. Many seniors used information without 'really' checking where the information was about. For example, some seniors used information of websites like www.oogartsen.nl and saw a headline 'cataract surgery'. When they saw this headline they just wrote down some keywords as an answer without reading the text. Many times the text was not about the 'possible effects somebody can have after a cataract surgery', but about doctors explaining how the surgery works. So, while using the computer only 43% of the subjects (17/40) used information that was applicable to the situation. However, while using the tablet, 82% of the seniors (32/39) used information that was applicable to the situation. Nevertheless, one senior looked on the website of the RIVM on the page of 'heat risk groups', and answered the question 'When do you belong to the risk groups of the flu vaccine?' with information found on this webpage. The different results between the two devices could be explained by the fact that the information assignment on the computer was experienced as more difficult than on the tablet.

Using information from a reliable website was not a problem for the seniors. 73% of the subjects (29/40) used information from a reliable website (i.e., not old forums, outdated websites, or websites with articles written by inexpert) on the computer. On the tablet 95% of the subjects (37/39) used information from a reliable website. *Using information that is not outdated* was also not a problem for the participants. While using the computer 95% of the subjects (38/40) used information that was not outdated, while on the tablet 100% of the subjects (39/39) used information that was not outdated. Remarkably was the fact that none of the participants *used Booleans or parentheses to limit search results*. The same applied for *checking information on another website* because none of the computer users checked the information that was found on another website. On the tablet only 5% the subjects (2/39) checked the information that was found on another website.

4.4.4 Strategic Internet skill-related problems

To identify the strategic Internet skill-related problems on both devices, participants were asked to complete one task on the computer and one task on the tablet. Both tasks were health-related and were a continuation of the information Internet skills assignments. On the computer participants were asked to find an answer on the following question: "*Imagine, your*

friend is having a cataract surgery. He went to the hospital with his own car. Can he drive home safely after the cataract surgery?" On the tablet participants were asked to find an answer on the question "*Imagine, you have a chicken protein allergy. Should you be vaccinated with the flu vaccine?"* To answer these questions, participants had to develop an orientation towards a particular goal and take the right action to reach this goal.

Table 19

Strategic Internet skill-related problems

	Computer %	Tablet %	McNemar *p*-value
1. Not being distracted by irrelevant stimuli.	94	98	1.00
2. Knowing how or where to start with the assignment.	73	83	.22
3. Not being misled.	52	60	.30
4. Using information from more than only one website.	3	15	.22
5. Working towards the final answer in a structured way.	42	73	.00***
6. Using correctly websites that support the decision making process.	58	63	.42
7. Making a right decision based on the information acquired.	73	63	1.00
8. Making a decision based on complete information.	36	33	1.00

*** $p < .001$

Not being distracted by irrelevant stimuli was not a problem for the seniors. On the computer 94% of the subjects (31/33) was not distracted by irrelevant stimuli. However, seven respondents did not try or overlooked the strategic Internet skills assignment, or they just filled in the answer without trying the assignment. On the tablet 98% of the subjects (39/40) was not distracted by irrelevant stimuli.

Knowing how or where to start with the assignment was neither a problem for the participants. However, some participants did not know how to start with the assignments. Some seniors for example had problems with defining proper search queries or with choosing relevant search results. Although, 73% of the subjects (24/33) knew how and where to start with the assignment while using the computer and on the tablet 83% of the subjects (33/40) knew how to start.

Not being misled was especially a problem for computer users. On the computer 52% of the subjects (17/33) was not misled. However, 48% worked towards a goal that does not deliver personal benefits. Many seniors used websites like Ask.com or vinden.nl and got confused. For example, these seniors clicked via Ask.com on websites of car driving schools and were

hoping to find an answer on the question '*if you can drive home safely after an cataract surgery'*. On the tablet 60% of the subjects (24/40) was not misled. Actually when seniors were misled they used for example wrong search terms and ended up on forum sites and based their decision on opinions on these forums. In addition, some seniors stayed on the website they used before in the information Internet skills assignment hoping to find the right answer on this website.

Remarkably is that almost none of the participants *used information from more than only one website.* On the computer 3% of the subjects (1/33) used information from more than one website and on the tablet only 15% of the subjects (6/40) used information from more than one website.

Working towards the final answer in a structured way was especially a problem for computer users. On the computer only 43% of the subjects (14/33) worked in a structured way to the final answer while on the tablet 73% of the subjects (29/40) worked in a structured way to the final answer. The different results between the two devices could be explained by the fact that computer users used more sponsored and irrelevant results, (i.e., Ask.com). Seniors who were using these results searched for a long time in an unstructured way to find the right answer. These seniors read whole pages, clicked link after link and many times they found the right answer on coincidence. Furthermore, some seniors could not define proper search queries and were still searching with the search queries they used before in the information Internet skills assignment, such as 'side effects flu vaccine' or 'flu'.

Using correctly websites that support the decision making process did not lead to many problems. However, some seniors used forum websites such as viva.nl for their decision making process, while other seniors only used the information given in the Google results, thus without clicking on a link. On the computer 58% of the subjects (19/33) used correct websites that support the decision making process and on the tablet 63% of the subjects (25/40) used correct websites that support the decision making process.

Making a right decision based on the information acquired was not a problem for the seniors. On the computer 73% of the subjects (24/33) made the right decision based on the information that was found, while on the tablet 63% of the subjects (25/40) made the right decision based on the information that was found. When seniors did not make the right

decision it was because they did not read the information well, they did not even know how to start with the assignment in the first place, or they just made up an answer.

Making a decision based on complete information was a problem for the seniors. On the computer only 36% of the subjects (12/33) made a decision based on complete information. Many seniors just typed in Google 'driving back after cataract surgery' and saw the answer in the Google results. They based their answer on the results in Google without even clicking the link, while other seniors based their answer on opinions of forums. The same applied to the tablet users, only 33% of the subjects (13/40) made a decision based on complete information.

Technical barriers and usability issues

Looking at the technical barriers and usability issues of the tablet, the results of the screen actions showed that usability issues or technical problems did not influence the level of Internet skills. Some seniors had problems with the unexpected sensitivity of the touch screen. For example, some seniors stayed too long at the same position and triggered secondary functions such as copy, selecting or paste text instead of clicking links. However, it confused and frustrated the seniors, they did not give up on the assignments. After trying many times almost all the participants who had problems with the sensitivity of the screen clicked the links correctly after a while. Next to triggering secondary functions also unintentional touches were a problem for some seniors. One senior, for example was searching for the address of Carré during the formal Internet skills assignment on the tablet. While she thought that she clicked on the hyperlink 'contact', she clicked unintentional a hyperlink of a concert in Carré. The respondent did not notice that she clicked the wrong link and scrolled down the website (on the page of the concert) and found the wrong address on the end of the page. Nevertheless, finger gestures such as turning pages, scrolling, and minimizing and enlarging the screen using two fingers was not a problem for the seniors. Actually, many seniors used these finger gestures correctly. In sum, seniors had some problems with the unexpected sensitivity of the touch screen of the tablet. However, technical barriers or usability issues did not have an influence on the level of Internet skills of seniors.

5. Discussion

5.1 Main findings

The purpose of this study was to discover what the level of Internet skills was among Dutch seniors and if there is a difference between the level of Internet skills of seniors while using the computer and the tablet. Using the framework of van Deursen and van Dijk (2009, 2010, 2011, 2012) the level of Internet skills of seniors was measured. Results showed that the overall level of Internet skills of seniors is relatively high. This is in contrast with the stereotype thought that seniors are clumsy users of new technologies. An explanation for this result is that present-day older generations increasingly adopt Internet activities such as music, video, gaming and social media (Van Deursen & Van Dijk, 2014). Therefore the level of Internet skills of the present-day seniors will grow. Another result of this research was that there was a difference in the level of Internet skills between the both devices. Seniors scored a significantly higher level of Internet skills on the computer than on the tablet. This could be explained by the fact that seniors have more experience with the computer. The average use of the computer was 15.22 years, while the average use of the tablet was only 1.49 years. Besides the difference in the level of Internet skills between the computer and the tablet the results also show a difference between the medium-related Internet skills and the content-related Internet skills between both devices. The results indicated that the seniors had a higher level of medium-related Internet skills (*the operational Internet skills and the formal Internet skills*) while using the computer. On the contrary, seniors had a higher level of information Internet skills (content-related Internet skills) on the tablet. For the strategic Internet skills no significant difference could be found between the two devices. A reason for the lower scores on the medium-related Internet skills while using the tablet could be that some of the operational Internet skills tasks (e.g., save a file to the hard disk, open different file formats, bookmarking websites, or using the search engine/input field) are proceedings that seniors never use on the tablet. Seniors explained that they use the tablet especially for games, information searching and social media. Research of Mossberger et al. (2012) concur with this and explain that social networking and online entertainment remain the domain of mobile access. Furthermore, seniors stated that tasks like ‘save a file on the home screen of the tablet’ they never did before. In addition, it was hard for seniors to recognize the search engine/input field because they confused the search engine with the address bar and the fact that sometimes the search engine blended in with the content of the site. This

underlines research of Jayroe and Wolfram (2012), which explained that seniors were confused because they could not find search boxes on websites because some search fields blended with the content of websites in their research. Therefore, seniors used the browser's address bar to search for information, instead of a search box or input field. Another reason for the lower scores on the medium-related Internet skills while using the tablet could be that seniors encountered problems during the completion of the formal task assignment. The task was to find the 'postadres' of Carré, however, many seniors found the 'bezoekersadres', which was another address than was asked for. The 'postadres' was harder to find than the 'bezoekersadres', which led to the low formal Internet skills task completion on the tablet. If seniors had read the assignment properly this mistake could probably be avoided.

On the contrary, the results showed that the seniors scored higher on the information Internet skills on the tablet than on the computer. A reason for the lower scores on the Information Internet skills (i.e., content-related Internet skills) while using the computer could be explained by the fact that tablets could lead to better information distribution among seniors because the easy availability of functionalities such as applications in Apple's "Appstore" which holds for example categories such as 'navigation' and 'travelling' that provide users with functionalities such as city travel guides and car parking aids (Werner & Werner, 2012). Moreover, choosing a proper search system was not a problem for the seniors while using the tablet. The reason for this was that the respondents only had to open Safari and type in some search queries and the webpage goes automatically to Google, or respondents only had to use Google Chrome, or the Google app. In other words, for seniors it is a lot easier to search for information on the tablet. Another explanation for this higher level of Information Internet skills on the tablet could be explained by the fact that the tablet was less susceptible for sponsored results like Ask.com (i.e., Java is not supported on the iPad). Many seniors made the mistake to use search engines like Ask.com and got confused. Most of these search engines are not good organized (i.e., to many search results are given on one page) which frustrated the seniors. Subsequently seniors clicked almost every link, which mostly led them to non-relevant results. As a result of their frustration for not being able to find the right answer seniors' made-up answers or skipped the question. Besides the fact that the computer shows many sponsored results in the Google results it should be noted that it turned out that the answers for the information assignment on the computer were harder to find for the seniors than the answers for the information assignment on the tablet. Seniors found it very difficult to find an answer on the question 'what possible effects can you have after a cataract surgery?' Many seniors used information of websites like www.oogartsen.nl,

which consisted a lot of information. When seniors saw for example a headline 'cataract surgery', they just wrote down some keywords as an answer without reading the text. When seniors searched for the answers on the questions of the information assignment on the tablet, they often could find both answers on one website (e.g. www.rivm.nl). Furthermore, the website of the RIVM was most of the time the first link in the Google results which made it a lot easier for the seniors because the screen actions showed that almost all the seniors clicked the first link in the Google results without even checking other results. Besides the fact that the computer shows many sponsored results and the assignment on the computer was more difficult, it should be noted that the tablet is a very easy device to use for searching information. Jayroe and Wolfram (2012) affirm this and explain that the tablet is an enjoyable, efficient, and effective way for seniors to access and check information on the Internet. However, searching for the right information remains to be a challenge.

Factors of influence on the level of Internet skills

In this study, from the seven factors included in the conceptual research model only four factors proved to be of influence on the level of Internet skills: gender, age, internet experience and marital status. The results showed that *gender* was a significant predictor for the task completion of the operational Internet skills on the tablet (i.e., men completed more operational tasks successfully on the tablet than women). And that *age* was a significant predictor for the task completion of the operational and strategic assignments on the computer and a significant predictor for the task completion of the operational and information assignments on the tablet. It seemed that younger seniors completed more operational and strategic tasks successfully on the computer than older seniors, and younger seniors completed more operational and information tasks successfully on the tablet than older seniors. Furthermore, the results indicated that older seniors needed more time to complete the operational and strategic tasks on the tablet than the younger seniors. Surprisingly, *Educational level* had no influence on the level of Internet skills. This is in contrast with the literature because Van Deursen et al. (2011) explained that educational level is the most consistent global predictor for the use of computers and Internet. A reason for this non-significant result of educational level could be that people with medium and higher education levels use the Internet less hours a day in their spare time than people with low level of education. People with lower levels of education use the Internet more for time-consuming activities such as social interaction and gaming than higher educated people (Van Deursen and van Dijk, 2014). So, it might be that in the last decennia lower educated people are spending more time on the Internet then higher educated people and therefore, the gap

between the level of Internet skills between the lower educated and the higher educated people could be closed. The next factor: *Internet experience (in years)* was a significant predictor for the formal and the strategic Internet skill tasks on the tablet (i.e., seniors with more Internet experience completed the formal task more successful than seniors with less Internet experience on the tablet). However, the results showed that Internet experience was a negative contributor for the strategic Internet skills on the tablet. This means that seniors with less Internet experience completed the strategic task more successful on the tablet than seniors with more Internet experience. Besides *Internet experience*, *Internet usage (in hours)* had a negative influence on the level of information Internet skills of seniors on the tablet. It seemed that seniors who used the Internet more hours a week completed less information tasks successfully on the tablet than seniors who spend less hours a week on the tablet. An explanation for the negative influence of Internet experience and Internet usage on the level of Information and strategic Internet skills on the tablet could be that users do not need a lot of experience to use the tablet. According to Werner et al. (2012) novice users stated that it takes little time to get used to the handling of the tablet. The tablet was according to the seniors faster and easier than they expected because of the manageable functional range and logical workflow. *The number of sources to social support* had a negative influence on task completion of operational Internet skills on the computer. The results showed that seniors who had access to two sources of social support completed less operational tasks successfully than seniors who had access to less sources of social support. However, marital status (in this case widowed) was a significant predictor for the formal task completions on the tablet. Seniors who are not widowed completed the formal Internet skills task more successful on the tablet than seniors who are widowed. Nevertheless, marital status was not a significant predictor for the other three Internet skills on the tablet or the other four Internet skills on the computer. The same applies for the number of sources to social support (i.e., sources to social support was not a significant predictor for the other three Internet skills on the computer and the four Internet skills on the tablet). In other words, access to social support has no influence on the level of Internet skills of seniors. An explanation for this could be that there are two types of social support: 1. self-directed learning and 2. social support by addressing others. Recent research of Van Deursen et al. (2014) shows that Internet users who are self-directed learning scored the highest on all the Internet skills, while the Internet users who rely on friends and family have the lowest score on their level of Internet skills. In this research only the second type of social support (i.e., social support by addressing others) was measured. So, this might be a reason that social support had no influence on the level of Internet skills of seniors. Finally, *Participation in an Internet course* was only a

significant predictor for the number of operational tasks completed successfully on both devices. Results showed that seniors who did not participate in an Internet course completed the operational tasks more successful than seniors who participated in an Internet course. These results are in contrast with the literature because Lam and Lee (2005) explain that computer trainings boost psychological state of mind of the elderly. The self-confidence of seniors is boosted during computer trainings, because they gain a developed sense of achievement. Seniors feel better about themselves when following a computer course because they can communicate with other groups in sharing their knowledge about the computer and the Internet, which can lead to a higher level of Internet skills. An explanation for these contrary results is that the effectiveness of trainings can vary significantly. This depends on the instructional strategies employed (Cahoon, 1998; Van Deursen et al., 2014). Furthermore, the results of the questionnaire showed that many seniors participated in an Internet course more than 3 years ago and therefore the gained knowledge could be outdated.

Internet skill-related problems

Looking at the operational Internet skill-related problems, a mistake that frequently was made by the seniors was that they confused different input fields with each other. For example, 'using the address bar correctly' was difficult for seniors when they were using the computer. Many seniors did not know the difference between the address bar and the search bar and typed for example www.artis.nl in the Google search bar. On the tablet participants scored higher on the operational task 'using the address bar'. A reason for this is that the respondents only had to open Safari and type in some search queries and the webpage goes automatically to Google, or respondents used Google Chrome, or the Google app**.** Besides the difference of the address bar and the Google search bar, seniors had also some trouble with the difference between the search engine and the address bar. The operational task 'saving a file on the hard disk' was more difficult for seniors using the tablet. A reason for this is that seniors stated that never used proceedings like 'saving files' before on the tablet. Looking at the Internet skill-related problems for the formal Internet skills. It seemed that the seniors did not encounter many formal Internet skills-related problems at all. Using hyperlinks in different website formats was not a problem for seniors. When seniors failed to 'use the hyperlinks in different website format' it was because they overlooked the assignment or because they did not use the websites of Artis.nl or Carre.nl with hyperlinks but instead used Google for searching the information. However, not reading the assignments properly led to a low number of tasks completion on these skills while using the tablet. Many seniors wrote

down the wrong address, if they had read the assignment properly this mistake could probably be avoided.

Looking at the Internet skill-related problems for the Information Internet skills, results showed that seniors used more sponsored or commercial results while using the computer. The difference between the two devices could be explained by the fact that more sponsored results were shown in the Google results on the computer than on the tablet. Furthermore, the results showed that seniors were better in using information that was applicable to the situation on the tablet than on the computer. An explanation for this difference is that the seniors experienced the information assignment on the computer as more difficult than on the tablet, and seniors did not read their information (i.e., what they found on the Internet) properly. In the information Internet skills assignments it was remarkably how quickly seniors trusted the Internet. Only (15/40) seniors checked more than the first three search results while using the computer and only one participant checked information from more than only the first page of the search results. On the tablet (16/39) checked more than the first three search results while only two seniors were checking information from more than the first page of the search results. The screen action results showed that almost all the seniors clicked the first link they saw without checking other results. On the computer the first links were always sponsored results, which sometimes led to confusion by the seniors because these sponsored results mostly led them to non-relevant results. Therefore, seniors encountered more problems during the information Internet skills task 'using information that was applicable to the situation' on the computer than on the tablet. Next to these problems also the way some seniors were searching for information was remarkably. For example, some seniors only used one word like 'flu' or 'cataract' and were hoping to find the right answer on all the questions. Seniors read entire websites because they could not define proper search queries, or they did not push the enter button after typing in some search queries. Other seniors found an answer on one particular website and stayed on this website hoping to find the answers on all the other questions too. Looking at the Internet skill-related problems for the strategic Internet skills, the fact that seniors quickly trust information on the Internet was affirmed. Results showed that only a few seniors made a decision based on complete information while using both devices. Many seniors just typed in Google for example 'driving back after cataract surgery' and saw the answer in the Google results. They based their answer on the results in Google without even clicking the link, while other seniors based their answer on opinions of forums.

However, looking at the Internet skill-related problems for every Internet skill, the difference between the computer and the tablet can be explained by the fact that seniors could not perform every Internet skill successfully on both of the devices. The results showed that the operational Internet skills tasks were a problem on the tablet (i.e., seniors never used some proceedings on the tablet) while on the computer the information Internet skills tasks were experienced as difficult by participants. Problems by the information tasks occurred for example by not using the right search terms, not reading the information properly that was found, or using sponsored results. Looking at the technical barriers and usability issues of the tablet, results showed that usability issues and technical problems did not influence the level of Internet skills of seniors. Some seniors had some problems wit the unexpected sensitivity of the touch screen (i.e., triggering secondary functions like copy and paste, or unintentional touches) (Harada et al., 2013). However, finger gestures such as turning pages, scrolling, and minimizing and enlarging the screen using two fingers were not experienced as a problem for the seniors. This is in line with research of Werner et al. (2012) in which seniors rated these finger gestures as intuitive and very easy. In sum, most of the seniors used these finger gestures correctly and did not encounter problems with the usability issues of the tablet at all.

The tablet: a replacement or a complement

The result of this study made clear that the seniors scored a significantly higher level of Internet skills on the computer than on the tablet. These results indicate that the tablet is still not a replacement for the computer but a complement to the computer. As mentioned before, seniors explained that they used the tablet especially for games, social media and for information searching. Thus, seniors never practice their operational skills on the tablet. For this reason seniors could not perform the operational proceedings like for example, ‘bookmarking a website’ or ’saving a file on the hard disk’. For seniors it would be useful to practice different operational skills on the tablet so they could create a higher level of Internet skills. Improving their level of Internet skills on the tablet is useful for seniors because the multi-touch interaction, rich array of sensors, powerful processers make the tablet an attractive service platform for elderly (Harada et al., 2013). Besides the operational skills seniors also have to learn how to deal with the sensitivity of the touch screen of the tablet (i.e., knowing how to remove the keyboard, and clicking in hyperlinks correctly). Werner et al. (2012) explain that the tablet is a device that can reduce the lack of confidence of elderly with new technologies because of the ease-of-use of the tablet. So, for elderly it could be very attractive to improve their Internet skills because if seniors improve their Internet skills their

level of self-efficacy will grow, it will lead to less frustrations and confusions, it will be less time-consuming, seniors will be less dependent on others and after all the seniors will be feeling more satisfied.

5.2 Limitations and future research

Several limitations can be pointed out in this study. First of all it should be noted that performance tests are a complete and valid way to measure the level of Internet skills (Van Deursen & Van Dijk, 2009b). However, this method is also very time-consuming, which can influence the level of Internet skills. The participants were free to decide when they were finished and when they wanted to go on with the next assignment. Most of the seniors knew beforehand that the performance tests would take about 30 minutes, though some of the seniors bungled the assignments or just did not try assignments because they were done with the tests. In particular the last assignment on both devices (i.e., the strategic assignment) was sometimes not tried, or seniors just filled in an answer without even trying. Besides that performance tests are time-consuming, some seniors got nervous about the fact that they were tested. The low response rate of the seniors was partly because they were afraid to fail. Seniors said things like 'I'm not good enough for the test', 'I've not enough experience to participate in the research' or after the test they said 'I think you can't do anything with my results'. So the seniors were very uncertain about their Internet skills and maybe made more mistakes in the assignments because they were nervous. If the seniors were in their comfort zone, thus without researcher and at home they might make less mistakes.

Another limitation of the study was that the wireless Internet at Seniorweb Meppel was sometimes very slow which frustrated the seniors. If for example the seniors had to open a file format on the tablet it took a long time to download and open the file. Some seniors got frustrated and tapped the hyperlinks many times, which made the gesture unrecognizable for the tablet and so the seniors got more frustrated. As a result of the frustration some seniors skipped some of the tasks. Next to this limitation another limitation of the study was the level and structure of the assignments. During the performance tests it turned out that the answers for the information assignment on the computer were harder to find for the seniors than the answers for the information assignment on the tablet. So, there was a difference in the level of the assignments, which might have an influence on the reliability of the results of the research. It would be better if both assignments were tested on both devices. Next to the difference in the level of the assignments also the structure of the assignments had some

limitations. Beforehand the research it was decided to make the assignments short, otherwise the performance tests would be too time-consuming for the participants because the Internet skills had to be measured on two devices. The operational tasks consisted of eight tasks, the formal tasks of one, the information tasks of two, and the strategic tasks of one. Therefore, the formal and strategic tasks consisted of only one closed question for each assignment. Participants had to answer 'yes' or 'no' and that is risky because some participants did not even bother to try the assignment and just filled in an answer. In addition, participants were not really challenged to develop a plan to achieve the goal in the strategic tasks; they just had to find an answer on the closed question.

Additionally, the sample size of the study was a limitation; about 40 seniors participated in this study. These seniors consisted of senior students and teachers of Seniorweb Meppel, senior students of computer café Zwartsluis, and friends and family of the researcher. It should be noted that the level of Internet skills varied between the different respondents. For example, the teachers of Seniorweb Meppel did not always have a higher level of Internet skills than for example the students of Seniorweb Meppel. Actually, sometimes it was even contrary. However, the sample size was relatively small and that affects the external validity of the research. Besides the affection of the external validity also the reliability of the results should be noted. As mentioned in the results section, the data showed some deviations. However, still linear regressions were performed but it must be mentioned that this affects the reliability of the results. It would be better if for example more seniors participated in the research. That would improve the reliability of the research and in addition stronger analyzes could be done about the significance level of factors that might be of influence on the level of Internet skills. In other words, if more seniors participated in the research, probably fewer deviations were noted in the data, conclusions would be more certain in connection with the significance level and the data was more generalizable.

Suggestions for future research are investigations in the factors that could have an influence on the level of Internet skills on both devices. As explained before the reliability of the results was sometimes affected by deviations in the data. More research could be done on the explanatory variables and their influence on the level of Internet skills. In particular these factors should be investigated on the tablet because hardly any research has done about the level of Internet skills on the tablet and which factors might be of influence on the level of Internet skills. It is interesting to know if for example, age, gender, education, Internet experience or social support influence the level of Internet skills while using the tablet.

Moreover, the results showed that there was a difference between the medium related-Internet skills and the content related-Internet skills between the two devices. As explained before the seniors scored higher on the information Internet skills on the tablet than on the computer. A reason for this difference was that more sponsored results were shown in Google on the computer than on the tablet. A recommendation for Google is to do more research about the effects of sponsored results on particular Internet users. Results of the screen actions showed that seniors did not know the difference between sponsored results and non-sponsored results. For this reason seniors got confused and frustrated when they clicked links of sponsored results as for example, Ask.com. Google could improve their sponsored results by for example making the icon of the sponsored results more clearly for seniors because many seniors did not even notice the icon or they did not even knew what the icon meant.

Because the results showed that there was a difference between the medium related-Internet skills and the content related-Internet skills between the two devices, future research should use more respondents to do stronger analyzes about the results and investigate if the difference still exist with a larger sample size. Thereby, it is interesting to do more research about the level of Internet skills on other devices. For example, a comparison could be made between the smartphone and the tablet. As explained by Litt (2013) Internet skills measures have to be revised because of the changes of technology and the fact that the Internet expands to new devices.

In addition, it could be useful to add more Internet skills to the framework of Van Deursen & Van Dijk. As explained by Litt (2013) the Internet is rapidly changing and ever evolving, and so are the needed skills to use the Internet. Everyday social interactions have shifted to the Internet and the usage of social media is growing. Everyday users now need socio-emotional and communication skills, such as the ability to communicate with others on social networking sites, knowledge of the privacy settings, or to determine the credibility of other users to use the 'social media' effective and efficient. So, adding a communication skill to the framework seemed to be necessary because the seniors in the research indicated that they used the tablet especially for games, information searching, and social media. Finally, it is important to do more research about the sub-population of seniors so computer courses can be improved by adjusting for example some assignments to the courses. A recommendation for Seniorweb Meppel or Computer café Zwartsluis could be to add more operational Internet skills tasks to their tablet courses to improve the level of Internet skills of seniors on the

tablet. Furthermore, they could also lay more emphasis on the Information Internet skills. It would be useful for seniors to learn how to define proper search queries, learning the difference between sponsored and non-sponsored results, or learn how to select the right information. If seniors learn more about the information Internet skills they could retrieve more information easily on the Internet for example about health problems, or local senior activities. Seniors will feel less alone, and independent because the Internet brings the world to them.

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Appendix A – Performance tests assignments

Performance tests assignments – measuring the four Internet skills (English version)

Assignments PC

Respondent number:

……

Assignment 1: Daytrip to Artis

Imagine, you and your friends are planning a daytrip to the zoo. You and your friends decided to go to the zoo 'Artis' in Amsterdam. Beforehand you would like to have some information about the zoo (e.g., what are the entrance fees, or which animals can be seen in the zoo). Therefore, you go to the website of the zoo Artis to do some research about the zoo.

1. Go to the website of the zoo Artis (www.artis.nl).

2. Click on the link **'bezoekersinfo'** at the top of the homepage. Then click on the link **'plattegrond'**.

3. Click on 'download en print de **plattegrond'** and open the map.

4. Look at the map of the zoo Artis and save the map on the desktop of the computer.

5. After you save the plan of the zoo Artis on the desktop, you can go back to the homepage of the zoo Artis. Use the 'back button' to go back to the homepage of the zoo Artis.

6. Add the homepage of the zoo Artis to the favorites (or bookmarks).

After adding the homepage to the favorites. You go back to the homepage of the zoo Artis.

7. Go to the search bar at the upper right corner of the homepage. Type in the search bar '**olifant**'

8. Open the second search result.

9. Finally, you search the **entrance fee for an adult** on the homepage of the zoo Artis. After this you can close the website.

Entrance fee for an adult: €……

You are now done with this assignment!

Assignment 2: Searching for information

Imagine, one of your friends is complaining about seeing things fuzzier lately. Your friend has cataract. You are curious about the effects of cataract. Therefore you are going to search for more information about the side effects of cataract on the Internet.

Answer the following questions using a search engine (e.g., Google or the website you use at home).

1. What are the symptoms of cataract? (name two symptoms)

Symptom 1: …….

Symptom 2**: ……..**

2. What possible effects can you have after a cataract surgery? (name two effects)

Effect 1: …….

Effect 2: …….

Imagine, your friend is having a cataract surgery. He went to the hospital with his own car. Can he drive home safely after the cataract surgery?

Answer the following questions using the Internet!

☐ Yes ☐ No

You are now done with this assignment!

Assignments Tablet

Respondent number:

……

Assignment 1: The Koninklijk Theater Carré

Imagine, you would like to go to the theater Carré in Amsterdam. You would like to see a show in the theater, but first you would like to provide some information about the theater. Therefore you take a look at the website of Carré to find out how the theater looks like (e.g., you use the plan of the theater) and you are willing to find out what the best seats are. You take al look on the website to gather more information about the theater.

1. Go to the website of the Koninklijk Theater Carré (www.carre.nl).

2. Click on the link '**Informatie'** on the homepage. Then click on the link **'Plattegrond'**.

3. Click on 'circus plattegrond van Carré downloaden' and open the map.

4. Look at the map the **'circus plattegrond van Carré'** and save the map on the home screen.

5. After you save the map on the homescreen you can close the map and go back to homepage of the theater Carré. Use the 'back button' to go back to the homepage of the Carré website.

6. Add the website of the theater Carré to the Favorites (bookmarks).

After adding the website of the theater Carré to the Favorites. You can go back to the homepage of the theater Carré.

7.) Go to the search bar at the upper right corner of the homepage. Type in the search bar **'informatie'**.

8.) Open the third search result.

9.) Finally, you search the **address** on the website of the theater Carré.

You are now done with this assignment!

Assignment 2: Searching for information

Imagine, you have got the flu! Some friends of yours who are visiting you are talking about the flu vaccine. You are thinking about getting vaccinated for the flu with the flu vaccine. Although, you would like get some information about the side effects of the flu vaccine.

Answer the following questions using a search engine (e.g., Google or the website you use at home)

1.What are the side effects of the flu vaccine? (name two side effects)

Side effect 1: …….

Side effect 2: …….

2. When do you belong to the risk group of the flu vaccine? (name two risk groups)

Risk group 1: …….

Risk group 2: …….

Imagine, you have a chicken protein allergy. Should you be vaccinated with the flu vaccine?

Answer the following questions using the Internet!

☐ Yes ☐ No

<u>You are now done with this assignment!</u>

Performance tests assignments - measuring the four Internet skills (Dutch version)

Opdrachten PC

Respondent nummer:

……

Opdracht 1: Dagje Artis

Stelt u zich eens voor, u bent van plan om samen met wat vrienden een dagje naar de dierentuin te gaan. U keuze is gevallen op de dierentuin 'Artis' te Amsterdam. U zou graag wat meer informatie over de dierentuin willen hebben. U bent bijvoorbeeld benieuwd naar de prijs van een toegangskaartje. Ook vraagt u zich af welke dieren u kunt zien in de dierentuin Artis. Daarom neemt u van tevoren alvast een kijkje op de website van Artis om meer informatie te vergaren over de Dierentuin.

1. Ga naar de website van de dierentuin Artis (www.artis.nl).

2. Klik op de link '**bezoekersinfo'** op de homepagina. Klik vervolgens op de link '**plattegrond**'.

3. Klik op 'download en print de **plattegrond**' en open de plattegrond.

4. Bekijk de plattegrond van Artis en sla de plattegrond op. De plattegrond moet worden opgeslagen op het bureaublad van de computer.

5. Nadat u de plattegrond van Artis op het bureaublad heeft opgeslagen kunt teruggaan naar homepagina van de website van Artis. Gebruik daarvoor de 'vorige knop'.

6. Sla de homepagina van de website van Artis op in de favorieten

Na het opslaan van de pagina in de favorieten. Gaat u terug naar de homepagina van Artis. *(Als het goed is staat de homepagina nog open)*

7. Ga rechts boven op de site naar de zoekbalk. Type in de zoekbalk '**olifant**'

8. Open het tweede zoekresultat.

9. Zoek tot slot op de website van Artis **toegangsprijs voor een volwassene** op.

Toegangsprijs voor een volwassene: €……..

U bent nu klaar met deze opdracht!

Opdracht 2: Informatie zoeken

Stelt u zich eens voor, u hoort een vriend van u klagen dat hij de laatste tijd dingen wat waziger ziet. Uw vriend heeft last van ‘staar’. U bent nieuwsgierig naar de klachten die horen bij staar, en gaat op internet op zoek naar meer informatie.

Beantwoord de volgende vragen met behulp van een zoekmachine *(bijv. Google of de zoekmachine die u thuis gebruikt).*

1.Wat zijn de symptomen van ‘staar’ (benoem twee symptomen)

Symptoom 1: …….

Symptoom 2: …….

2. Wat kunnen mogelijke klachten zijn na een staaroperatie? (benoem twee klachten)

Klacht 1: …….

Klacht 2: …….

Stelt u zich eens voor, uw vriend ondergaat een staaroperatie. Hij is zelf met zijn eigen auto naar het ziekenhuis toegereden. Mag hij na de operatie zelf terugrijden?

Beantwoord deze vraag met behulp van het internet!

☐ Ja ☐ Nee

U bent nu klaar met deze opdracht!

Opdrachten Tablet

Respondent nummer:

……

Opdracht 1: Het Koninklijk Theater Carré

Stelt u zich eens voor, het lijkt u ontzettend leuk om een keer naar het Koninklijk Theater Carré in Amsterdam te gaan. U zou graag naar een voorstelling in Carré toe willen gaan maar dan wilt u natuurlijk wel wat meer informatie over het theater verzamelen, zoals bijvoorbeeld over de zitplaatsen van de theaterzaal . Daarom neemt u van tevoren alvast een kijkje op de website van Carré om meer informatie te vergaren.

1. Ga naar de website van het Koninklijk Theater Carré (www.carre.nl).

2. Klik op de link '**informatie'** op de homepagina. Klik vervolgens op de link **'plattegrond'**.

3. Klik op '**plattegrond van Carré downloaden'** en open de plattegrond.

4. Bekijkd de plattegrond '**circus plattegrond van Carré**' en sla de plattegrond op. De plattegrond moet worden opgeslagen op het beginscherm van de tablet.

5. Nadat u de plattegrond op het op beginscherm van de tablet heeft opgeslagen kunt u het tabblad met de plattegrond sluiten en terug gaan naar de homepagina van de website van Carré, Gebruik hiervoor de 'vorige knop'

6. Sla de homepagina van de website van Carré op in de favorieten (bladwijzer).

Na het opslaan van de pagina in de favorieten. Gaat u terug naar de homepagina van Carré. *(Als het goed is staat de homepagina nog open)*

7. Ga rechts boven op de site naar de zoekbalk. Type in de zoekbalk '**informatie**'

8. Open het derde zoekresultaat.

9. Zoek tot slot het **postadres** van het Koninklijk Theater Carré op de website van Carré.

U bent nu klaar met deze opdracht!

Opdracht 2: Informatie zoeken

Stelt u zich eens voor, u hebt de griep! U hoort een aantal vrienden die bij u op bezoek zijn praten over de griepprik en u zit eraan te denken om deze ook te halen. Toch wilt u eerst wat meer informatie over de griepprik en bent u met name benieuwd naar de bijwerkingen die bij de griepprik horen.

Beantwoord de volgende vragen met behulp van een zoekmachine *(bijv. Google of de zoekmachine die u thuis gebruikt).*

1.Wat zijn de bijwerkingen van de griepprik? (benoem twee bijwerkingen)

Bijwerking 1: ……

Bijwerking 2:……

2. Wanneer behoort u tot de risicogroep van de griepprik? (benoem twee risicogroepen)

Risicogroep 1:……..

Risicogroep 2:……..

Stelt u zich eens voor, u hebt een kippeneiwit allergie. Zou u de griepprik dan halen?

Beantwoord deze vraag met behulp van het internet!

☐ Ja ☐ Nee

<u>U bent nu klaar met deze opdracht!</u>

Appendix B – Questionnaires

Questionnaire about Internet and computer usage (English version)

General information

1.) Respondent number:

……

2.) Gender:

☐ Male ☐ Female

3.) What is your year of birth?

……..

4.) What is your highest level of education?

☐ Primary school
☐ Pre-vocational education
☐ Junior general secondary education
☐ Senior general secondary education
☐ Pre-university education
☐ Secondary vocational education
☐ Higher Vocational colleges
☐ University education

5a.) What is your marital status?

☐ Single
☐ Separated/Divorced
☐ Married or cohabiting (living together)
☐ Widowed

If you answered that you are separated, divorced, or widowed. Can you answer question **5b**?

5b.) Are you currently in a long-term relationship?

☐ Yes ☐ No

Internet questions

6.) How many years are you using or did you use the Internet on the following devices. (*you may tick more than one box, tick only the boxes with the devices you use*).

☐ Computer ……. year

☐ Tablet …..... year

☐ Smartphone …..... year

☐ Other devices,

…… …..... year

…… …..... year

7.) How many hours per week do you spend or did you spend on the Internet using the following devices? (*you may tick more than one box, tick only the boxes with the devices you use*).

☐ Computer ……. hours an week

☐ Tablet …..... hours an week

☐ Smartphone …..... hours an week

☐ Other devices,

…… …..... hours an week

…… …..... hours an week

8b.) Which Social Media do you use (*you may tick more than one box to answer this question*).

☐ Facebook
☐ Twitter
☐ LinkedIn
☐ YouTube
☐ Pinterest
☐ Skype
☐ Others, ……...
☐ I do not use social media

9a.) Do you follow an Internet/computer course at this moment?

☐ Yes ☐ No

If you answered 'No', can you answer question **9b**?

9b.) Did you follow an Internet/computer course in the past?

☐ Yes ☐ No

9c.) How long ago did you follow an Internet/computer course?

☐ 0-3 months ago
☐ 3-6 months ago
☐ 6-9 months ago
☐ 1 year ago
☐ 2 years ago
☐ 3 years ago or longer than 3 years

10a.) Do you have access to social support (e.i. family, friends, or mentor of the computer/internet course) when you for example, encounter problems using the computer/ the Internet.

☐ Yes ☐ No

If you answered 'Yes', can you answer question 10b & 10c?

10b.) Whom can you ask for social support? (You may tick more than one box to answer this question)

☐ Partner
☐ Children
☐ Grandchildren
☐ Other family (e.g., nephews, nieces, brothers, sisters, etc.)
☐ Friends
☐ Companions
☐ Staff of the elderly center
☐ Mentor of the computer/Internet course
☐ Others, ……....

10c.) Has this social support the desired effect?

☐ Yes, always
☐ Usually
☐ Often
☐ Sometmes
☐ Rarely
☐ Almost never
☐ Never

Explain why or why not:

……....

……....

……....

Thank you for your cooperation!

Questionnaire about Internet and computer usage (Dutch version)

Algemene informatie

1.) Respondent nummer:

……

2.) Geslacht:

☐ Man ☐ Vrouw

3.) Wat is uw geboortejaar?

……..

4.) Wat is uw hoogst genoten opleiding?

☐ Basisonderwijs
☐ LBO
☐ LTS
☐ VMBO
☐ ULO
☐ MULO
☐ Mavo
☐ MMS
☐ Havo
☐ VWO
☐ MBO
☐ HBO
☐ WO
☐ Anders, namelijk……

5a.) Wat is uw burgerlijke staat?

☐ Single
☐ Gescheiden/uit elkaar
☐ Gehuwd/samenwonend
☐ Weduwnaar/Weduwe

Wanneer u **uit elkaar**, **gescheiden**, **weduwnaar** of **weduwe** hebt in gevuld. Kunt u dan ook vraag **5b** invullen?

5b.) Bent u op dit moment in een langdurige relatie?

☐ Ja ☐ Nee

Internet vragen

6.) Hoeveel jaar gebruikt u of heeft u het internet gebruikt via de volgende apparaten? (*kruis de apparaten aan die voor u van toepassing zijn*).

☐ Computer …… jaar

☐ Tablet …..... jaar

☐ Smartphone …..... jaar

☐ Overige apparaten, namelijk

…… …..... jaar

…… …..... jaar

7.) Hoeveel uur per week spendeert u op het internet of heeft u gespendeerd via de volgende apparaten? (*kruis de apparaten aan die voor u van toepassing zijn*).

☐ Computer …… uur per week

☐ Tablet …..... uur per week

☐ Smartphone …..... uur per week

☐ Overige apparaten, namelijk

…… …..... uur per week

…… …..... uur per week

8) Van welke sociale media maakt u gebruik? (*U mag bij deze vraag meerdere antwoorden aankruisen)*

☐ Facebook
☐ Twitter
☐ LinkedIn
☐ YouTube
☐ Pinterest
☐ Skype
☐ Overige, namelijk: ……...
☐ Ik maak geen gebruik van sociale media

9a.) Volgt u op dit moment een computer/internet cursus?

☐ Ja ☐ Nee

Wanneer u **'Nee'** hebt ingevuld. Kunt u dan ook vraag **9b** invullen?

9b.) Heeft u een computer/internet cursus in het verleden gevolgd?

☐ Ja ☐ Nee

9c.) Hoelang is het geleden dat u een computer/internet cursus hebt gevolgd?

☐ 0-3 maanden geleden
☐ 3-6 maanden geleden
☐ 6-9 maanden geleden
☐ 1 jaar geleden
☐ 2 jaar geleden
☐ 3 jaar geleden of langer

10a.) Krijgt u hulp van iemand uit uw omgeving als u bijvoorbeeld problemen ondervindt bij het gebruik van uw computer/het internet?

☐ Ja ☐ Nee

Wanneer u **'Ja'** hebt ingevuld. Kunt u dan ook vraag **10b** & **10c** invullen?

10b.) Wie kunt u vragen voor hulp wanneer u bijvoorbeeld problemen ondervindt bij het gebruik van uw computer/het internet? (*U mag bij deze vraag meerdere antwoorden aankruisen*)

☐ Partner
☐ Kinderen
☐ Kleinkinderen
☐ Overige familie (bijv. Neven, nichten, broers, zussen, etc.)
☐ Vrienden
☐ Een goede kennis
☐ Personeel van het bejaardentehuis
☐ Begeleider van de computer/internet cursus
☐ Anderen, namelijk:

……...

10c.) Heeft deze hulp het gewenste effect?

☐ Ja, altijd
☐ Meestal wel
☐ Vaak
☐ Soms
☐ Zelden
☐ Bijna nooit
☐ Nooit

Leg uit waarom wel of niet:

……....

……....

……....

Bedankt voor uw medewerking!

Appendix C – Tasks and their corresponding Internet skills

Table 20
Computer tasks and their corresponding Internet skills

Assignment 1	Operational Internet skills
	Operating an Internet browser:
1. Go to the website of the zoo Artis (www.artis.nl)	1. Opening websites by entering the URL in the browser's location bar.
2. Click on the link **'bezoekersinfo'** at the top of the homepage. Then click on the link **'plattegrond'**.	2. Using text or images with hyperlinks;
3.Click on 'download en print de **plattegrond**' and open the map.	3. Opening various common file formats (e.g., PDFs).
4. Look at the map of the zoo Artis and save the map on the desktop of the computer.	4. Saving files on the hard disk.
5. After you save the plan of the zoo Artis on the desktop, you can go back to the homepage of the zoo Artis. Use the 'back button' to go back to the homepage of the zoo Artis.	5. Navigating forward and backward between pages using the browser buttons.
6. Add the homepage of the zoo Artis to the favorites (or bookmarks).	6. Bookmarking websites.
After adding the homepage to the favorites. You go back to the homepage of the zoo Artis.	*Operating Internet-based search engines:*
7. Go to the search bar at the upper right corner of the homepage. Type in the search bar **'olifant'**.	7. Entering keywords in the proper field; Executing the search operation;
8. Open the second search result.	8. Opening search results in the search results lists.
Assignment 1	Formal Internet skills
	Navigating on the internet by:
9. Finally, you search **the entrance fee for an adult** on the homepage of the zoo Artis.	Using hyperlinks embedded in different formats such as texts, images, or menus.
	Maintaining a sense of location while navigating on the Internet, meaning: - Not becoming disoriented when navigating within a website; - Not becoming disoriented when navigating between websites; - Not becoming disoriented when opening and browsing through search results.

Assignment 2	Information Internet skills
1. What are the symptoms of cataract? (name two symptoms). 2. What possible effects can you have after a cataract surgery? (name two effects).	Locating required information by: Choosing a website or a search system to seek information; -Defining search options or queries; - Selecting information (on websites or in search results); - Evaluating information sources.
Assignment 2	Strategic Internet skills
Imagine, your friend is having a cataract surgery. He went to the hospital with his own car. Can he drive home safely after the cataract surgery?	Taking advantage of the Internet by: -Developing an orientation toward a particular goal; -Taking the right action to reach this goal; - Making the right decision to reach this goal; - Gaining the benefits resulting from this goal.

Table 21
Tablet tasks and their corresponding Internet skills

Assignment 1	Operational Internet skills
1. Go to the website of the Koninklijk Theater Carré (www.carre.nl). 2. Click on the link **'informatie'** on the homepage. Then click on the link **'plattegrond'**. 3. Click on **'plattegrond van Carré downloaden'** and open the map. 4. Look at the map the **'circus plattegrond van Carré'** and save the map on the home screen. 5. After you save the map on the home screen you can close the map and go back to the homepage of the theater Carré. Use the 'back button' to go back to the homepage of the Carré website. 6. Add the homepage of the theater Carré to the Favorites (bookmarks). After adding the homepage of the theater Carré to the favorites. You can go back to the homepage of the theater Carré. 7. Go to the search bar at the upper right corner of the homepage. Type in the search bar **'informatie'**. 8. Open the third search result.	*Operating an Internet browser:* 1. Opening websites by entering the URL in the browser's location bar. 2. Using text or images with hyperlinks. 3. Opening various common file formats (e.g., PDFs). 4. Saving files on the hard disk. 5. Navigating forward and backward between pages using the browser buttons. 6. Bookmarking websites. *Operating Internet-based search engines:* 7. Entering keywords in the proper field; Executing the search operation; 8. Opening search results in the search results lists.
Assignment 1	Formal Internet skills
9. Finally, you search the **address** on the website of the theater Carré.	*Navigating on the internet by:* Using hyperlinks embedded in different formats such as texts, images, or menus. *Maintaining a sense of location while navigating on the Internet, meaning:* - Not becoming disoriented when navigating within a website; - Not becoming disoriented when navigating between websites; - Not becoming disoriented when opening and browsing through search results.

Assignment 2	Information Internet skills
1. What are the side effects of the flu vaccine? (name two side effects). 2. When do you belong to the risk group of the flu vaccine? (name two risk groups).	Locating required information by: Choosing a website or a search system to seek information; -Defining search options or queries; - Selecting information (on websites or in search results); - Evaluating information sources.
Assignment 2	Strategic Internet skills
Imagine, you have a chicken protein allergy. Should you be vaccinated with the flu vaccine?	Taking advantage of the Internet by: -Developing an orientation toward a particular goal; -Taking the right action to reach this goal; - Making the right decision to reach this goal; - Gaining the benefits resulting from this goal.

Appendix D – Coding scheme individual Internet skill-related problems

Table 22
Individual Internet skill-related problems

Individual operational Internet skill problems	
	Operating an Internet browser:
1. OpProb1	1. Using the address bar correctly (e.g., not entering keywords, not confusing the address bar with the Google search bar).
2. OpProb2	2. Using text or images with hyperlinks.
3. OpProb3	3. Opening various common file formats (e.g., opening PDF files).
4. OpProb4	4. Saving files on the hard disk.
5. OpProb5	5. Navigating forward and backward between pages using the browser buttons.
6. OpProb6	6. Bookmarking websites (i.e., being able to bookmark a website).
	Operating Internet-based search engines:
7. OpProb7	7. Recognizing the search engine or input field.
8. OpProb8	8. Using search queries correctly (e.g., spelling or using the right keywords)
Individual formal Internet skill problems	
	Navigating on the internet by:
1. ForProb1	1. Using hyperlinks embedded in different formats such as text images, or menus correctly.
	Maintaining a sense of location while navigating on the Internet:
2. ForProb2	2. Not becoming disoriented when navigating within a website.
Individual information Internet skill problems	
	Locating required information by:
1. InfProb1	1. Choosing a proper website or search system to seek information (e.g, Google)
2. InfProb2	2. Defining proper search queries based on the search task (e.g., not using one keyword).
3. InfProb3	3. Using Booleans to limit search results (e.g., parentheses).
4. InfProb4	4. Searching within search results.
5. InfProb5	5. Using search engines correctly (e.g. not becoming disoriented when searching for information, knowing how to use search engines).
6. InfProb6	6. Not choosing sponsored or commercial results.
7. InfProb7	7. Checking more than the first three search results.
8. InfProb8	8. Checking more than the first page of search results.
9. InfProb9	9. Choosing relevant search results (e.g., not using results of Ask.com)
10. InfProb10	10. Using information that is applicable to the situation (e.g., not using information about other topics like the Mexican flu vaccine instead of the flu vaccine)
11. InfProb11	11. Using information from a reliable website (e.g., not using old forums, outdated websites, commercial results)

12. InfProb12 13. InfProb13	12. Using information that is not outdated. 13. Checking information on another website.
Individual strategic Internet skill problems	
1. StraProb1 2. StraProb2 3. StraProb3 4. StraProb4 5. StraProb5 6. StraProb6 7. StraProb7 8. StraProb8	1. Not being distracted by irrelevant stimuli (e.g., banners). 2. Knowing how or where to start with the assignment. 3. Not being misled (e.g., working towards a goal that does not deliver personal benefits). 4. Using information from more than only one website. 5. Working towards the final answer in a structured way. 6. Using correctly websites that support the decision making process (e.g., not forums or irrelevant websites) 7. Making a right decision based on the information acquired. 8. Making a decision based on complete information.