Teaching information technology for elder participation: A qualitative analysis of Taiwan retirees

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Abstract: - The present inquiry considers the nature and meaning of elder participation in information technology and the degree to which computer-mediated communication increases in the social capital of elder adults. This study compares 27 elder computer participants and 27 nonparticipants by means of open-ended interviews. Three primary themes emerged from the interviews. The first concerns the different conceptions of old age held by the computer-participants and the nonparticipants, and in particular, differing views on learning capacity in later life. The second concerns their intentions of applying information technology. The third concerns the learning problems of operating computers. The findings from the current study also show that older persons are able to study and to use computers if a good training program exists that encourages them to do so. On the other hand, it cannot be dismissed that those who chose to participate and to study computer use may have done so because they had a stronger prior desire and/or ability to engage in this particular undertaking. It might be that the elderly information technology participants had a positive approach to the computer, a priori, and perhaps a better capability for learning new things as well.

Key-Words: - Elder participation, information technology, qualitative analysis, Taiwan retirees

1 Introduction

The major concern of this study involves the participation of elderly persons in the world of information technology. This information world sometime also called as cyberspace. Information world relied upon users applying computer technology to access information. Participation in information world may range from solitary use of a personal computer, as in computer games, through asynchronous communication and information searches, like sending e-mails, to synchronic exchange, such as multiuser chats on the Internet [1,2]. Entry into the cyber-realm requires access to and knowledge of computer technology [3, 4].

In information society, people of all ages can seek new information and disseminate their own ideas to others, they can acquire new social ties and discard old ones at will, and they can enhance an existing identity or establish a new one [5]. Information society is multidimensional and simulated, and constitutes the penultimate expression of ''virtual reality.'' At the same time, it is the very realm of modern society in which social capital is increasingly exchanged [6]. Thus, participation in information society may well become a major means and a primary measure of community belonging and involvement in the 21st century [7].

Participation of elder adults in the current ''information technology revolution'' is an important topic for analysis. On the one hand, elderly people have much to gain from computer-based communication.
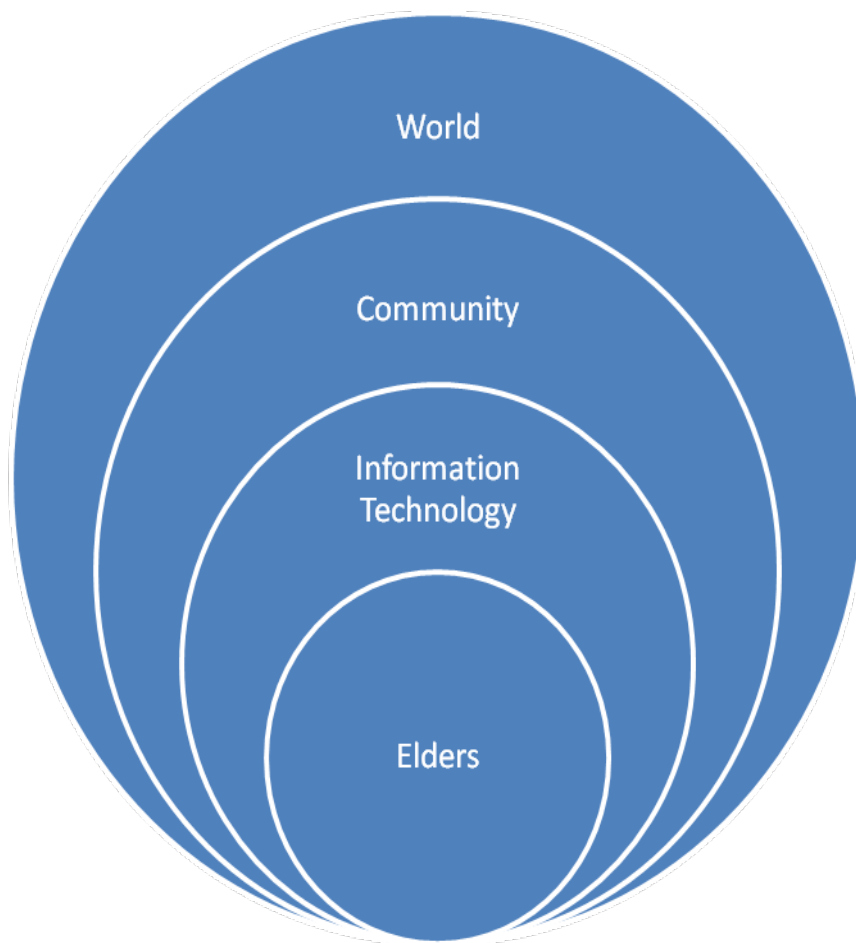
Fig. 1Communication function of information technology for elders

In the Fig. 1, elders would contact the whole world and community through information technology. Because travel through information society does not require physical movement, elder persons can maintain virtual social networks from their homes. Moreover, computer-based communication is ageless, in that participants are not typecast according to physical appearance [8]. Elderly internetwork participants can choose to identify themselves by age as a means to recruit new social ties, or not, as they wish. They can even maintain multiple selves [9]. Lastly, internet-communication is not bound by time or place [10,11,12]. Participants can engage in computer games, information searches, and chats at any hour of the day or night. Retirees with an increase in unobligated time can exploit the temporal flexibility of the internet-mechanism for their unique benefit.

Inconsistently, however, the elderly cohort is the very group least likely to be willing to information society participation. The advent of computer technology in day-to-day life occurred after many elder people had already retired from their place of work [13, 14]. For many of them, computers are still an unknown entity. On the other hand, elder workers who remain employed frequently find themselves outside of computer-generated tasks. In terms of cyber-proficiency, the elderly cohort may be a lost generation.

Most of the time, technology education always put their focus on the younger learners or work force and not dealing with the elder retiree. There is also a need of technology education for the elderly cohort, so can not be a lost generation.

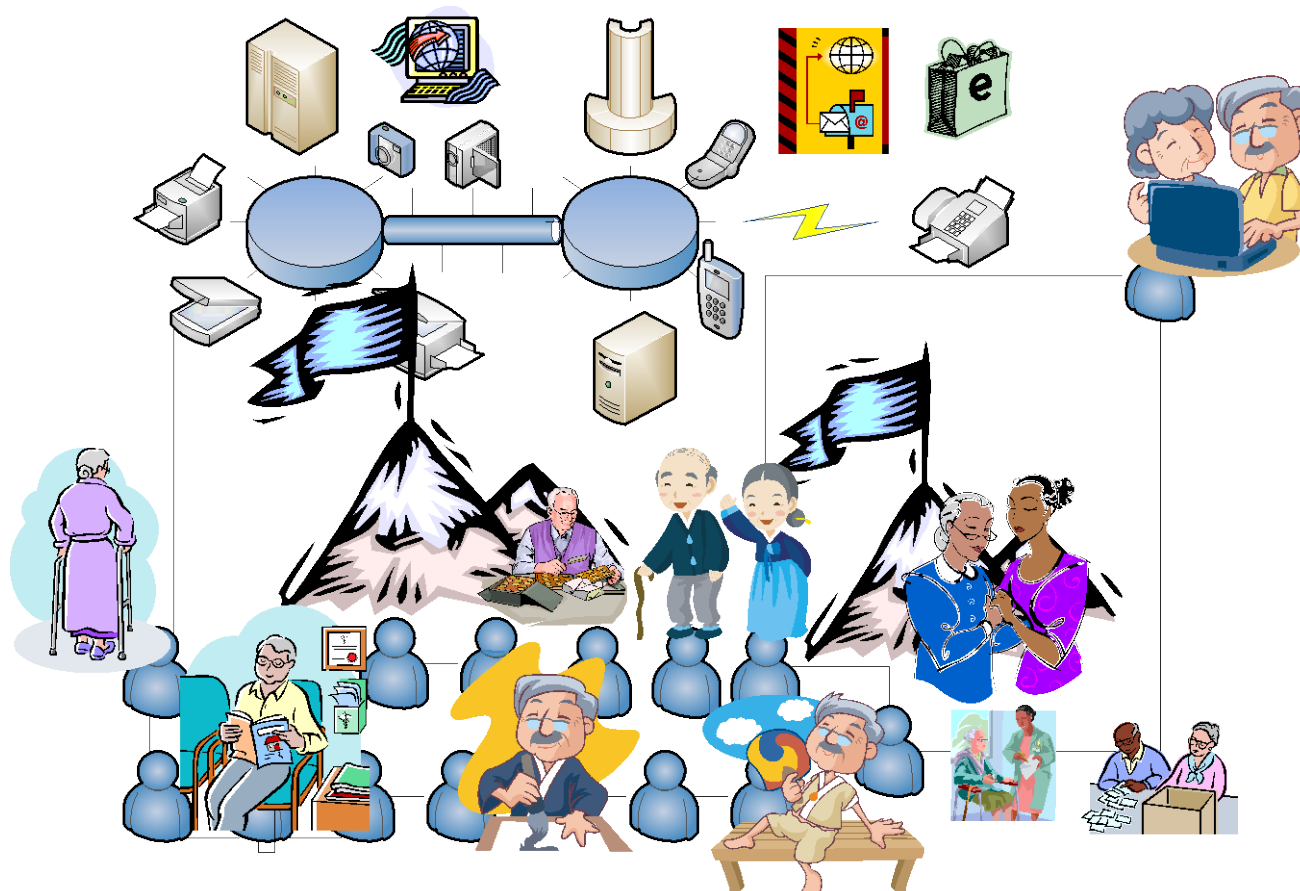In the Fig. 2, the virtual world for elders were illustrated.

Fig. 2 The virtual world for elders.

Acquisition of computer skills by elder people requires new learning of an unfamiliar mechanism. Finding and gaining access to appropriate opportunities in the community for learning computer skills can be a major difficulty. Another obstacle to the acquisition of computer proficiency stems from the possible learning barriers attributed to later life [15]. Elder people are sometimes seen as slow in adoption of new technologies.

These stumbling blocks to participation in internet may distance elder adults from computer technology and, inadvertently, may further marginalize them from the mainstream of modern society.

As participation in information technology becomes an increasingly important aspect of modern society, it is crucial to consider the accessibility of elder adults to this phenomenon. In particular, it is important to understand how elder persons view the information-revolution, and how they relate to its impact on their own lives. The study that is spelled out in the following sections attempts to provide new insights into this emerging area of interest

2 Literature review

The way to describe elder participating information society is always important to both the information technology development and communication technology. This kind knowledge would be serving as a guidance of information technology implementation. Even further, the technology literacy of elders should be put into the technology education agenda if we looking forward a technology literal society. To further establishing research foundation, the topic of technology literacy, social capital, and internet for elders would be reviewed.

2.1 Information technology and social capital

A major debate in current social science literature

involves the capacity of computer-mediated communication to enhance the social capital of people of all ages. Social capital refers to the institutions, relationships, and norms that shape the quality and the quantity of a society's social interactions. The term includes warm feelings and a wide variety of benefits that flow from the trust, reciprocity, information, and cooperation that characterize social networks. Social capital creates a sense of belonging for people who are connected [16].

Wellman et al. identified two major forms of social capital: (1) network capital, or relations with friends, neighbors, relatives, and workmates that provide companionship, emotional aid, goods and services, information, and a sense of belonging; and (2) participatory capital, or involvement in organizations that afford opportunities for people to bond. They also cite a third related aspect of social capital, namely, community commitment, or a responsible sense of belonging that mobilizes one's social capital effectively [17,18].

In an influential book, Putnam [16] has detailed the progressive decline in community participation in modern American society and the concomitant reduction of available social capital. Lin [19] and Wellman [20, 21] suggest an alternative explanation to this same phenomenon. That is, rather than seeing the observed decline in community participation as evidence for reduced social capital, they view it as indicating a changing focus. In their opinion, community is becoming embedded in personal social networks rather than in communal organizational structures. Social capital is not decreasing, in their opinion, but diversifying.

Computer-mediated communication, and particularly the Internet, enters into the discussion of social capital as a significant potential intervener. The direction of its presumed influence, however, is not clear.

There are those who maintain that cyberspace opens up positive possibilities to expand and to diversify one's social ties. Virtual networks and virtual communities created through cyber-communication are seen as the antidotes to declining community participation and to decreasing social capital [10, 12, 20, 22]. Opponents of this view contend, on the other hand, that Internet utilization negatively impacts upon the frequency of face-to-face connections and comes at the expense of meaningful social ties [23, 24]. They hold,

moreover, that virtual networks may yield less valuable interchanges than those they replace in the real world [25]. As a result, computer mediated communication networks reduce social capital.

The empirical resolution of this debate is far from reaching closure. A recent survey by Wellman et al. [17] of over 39,000 visitors of all ages to the National Geographic Society Website found that the Internet supplements and increases organizational involvement. The results of their study indicated a positive relationship between Internet use and organizational participation. The effect was stronger for asynchronous activities than for synchronous activities. Although these cross-sectional results do not show causation, Wellman et al. suggest that the Internet is increasing interpersonal connectivity and organizational involvement. As such, they see the Internet as a tool for building and maintaining social capital.

Nie [23] compared four different studies of Internet use in the general population and came to quite different conclusions. Despite contradictory findings across the four studies reviewed, the key interpretation of his comparative analysis suggests that users of computer-mediated communication did not become more socially connected as a result of their Internet links. Rather, their relatively greater social connectivity was due to their having the very characteristics that are instrumental for the production of social capital in the first place. These included being better educated, having higher incomes, and being less likely to be over the age of 65. This last point regarding the relative estrangement of elders from the world of cyberspace requires greater scrutiny.

2.2 Technology Literacy

Technology literacy is the ability of an individual, working independently and with others, to responsibly, appropriately and effectively use technology tools to access, manage, integrate, evaluate, create and communicate information.

The International Technology Education Association (ITEA) proposes this definition: "Technological literacy is far more than the ability to use technological tools. Technologically literate citizens employ systems-oriented thinking as they interact with the technological world, cognizant of how such interaction affects individuals, our society, and the environment. Technological literacy is the ability to use, manage, assess, and understand

technology. It involves knowledge, abilities, and the application of both knowledge and abilities to real-world situations. Citizens of all ages benefit from technological literacy, whether it is obtained through formal or informal educational environments."

2.3 Internet and old age

Relatively few studies have been conducted to date regarding the participation of elder people in the virtual world of computer-mediated communication. Furlong (1989) wrote that computer technology can provide elderly people with useful information on a range of subjects, including retirement homes, questions and answers on financial matters, health rights, and legislation. Moreover, participation in a virtual community is likely to reduce the level of isolation, particularly for an elder person with limited mobility. Active participation in the virtual world provides elderly individuals with an opportunity to find people with similar problems or questions, and to share not only information, but also age-relevant social and emotional issues. Involvement in the virtual world, according to Furlong, is likely to strengthen the self-image and self-confidence of elderly people and to provide them with support.

In a study of internet utilization by elder people, Wright [7], distinguished between a support network, that is, individuals to whom the elder can turn when he or she is tense or under pressure, and a friendship network—people to whom one turns in order to enjoy oneself and to pass time pleasantly. The findings of his study demonstrated that through the Internet network, elderly people developed friendships rather than support relationships. Moreover, those who invested more time on a weekly basis in communicating through the Internet indicated more satisfaction with the virtual community that they created than those who spent less time communicating through the Internet. On the other hand, respondents who communicated less in the virtual world expressed relatively more satisfaction with their actual support networks in the material world than with their virtual ties in cyberspace.

The implication of this finding is that to the extent that elderly individuals develop expertise in communicating through the computer, they prefer to make use of it. In addition, Wright [7] maintains that friendship on the Internet network enables elder people to bond with different kinds of groups. They

thereby create and develop relationships not only with other elderly people, but with members of different backgrounds and different generations as well. The expansion of elderly persons' interpersonal environment by means of virtual communities enables them to feel more integrated into society.

Nahm and Resnick [26] noted that use of the Internet and e-mail can improve the quality of elderly people's lives by providing a new connection to the outside world. As they grow old, elder people may become less socially active and may be separated by great distance from their family members. The Internet has the capability of creating virtual social networks that cross generations and include family members, friends, or other persons. In addition, elder adults need a wide variety of helpful information (health, travel, and hobbies) that they can get through the Internet. These characteristics of the net can lead to enhanced social and well-being of elder adults.

Climo [27] reported the results of an ethnographic study of American Jewish migrants in Israel and their elderly parents in the United States. He found that many affective functions were retained by respondents through e-mail communications, despite the great geographic distance between them. Climo concluded that computer-mediated communication has the capacity to maintain family bonds over vast distances for many years.

Cody et al. [22] examined several aspects of Internet use among close to 300 elderly residents of assisted and independent living facilities in California. Study respondents had attended a weekly training program designed for elder learners. Those who obtained the necessary skills to utilize the Internet reported having higher levels of social connectivity, higher levels of perceived social support, and generally more positive attitudes toward aging. A positive association was also found between time spent online, on the one hand, and computer efficacy and positive attitudes toward aging, on the other hand.

Given the wide range of findings regarding the role of cyberspace in enhancing or restraining social capital, on the one hand, and the limited participation of the elderly cohort in the world of information technology, on the other hand, we sought to better comprehend the antecedents and the consequences of elder participation in cyberspace.

In particular, we wished to clarify whether access to computers and to computer networks furthered the inclusion of elderly people as an active segment of society.

Correspondingly, we sought to elucidate whether information technology participation by elder adults increased their social capital. We addressed these questions in a qualitative inquiry.

Other on-line activities are also becoming impact to elders, such on-line PBL, mobile device for learning and integrated information providing. [28, 29, 30]

3 Methodology

The methodology would be illustrated according to the research problem, data collection, portfolio structure and data convert flow.

3.1 Research problem

The purpose of this study was to inquiry considers the nature and meaning of elder participation in information technology and the degree to which computer-mediated communication increases in the social capital of elder adults.

3.2 Data Collection

Field research for the current study was carried out among the majority segment of the elderly Taiwan cohort, namely, low to moderate income Taiwan adults. Data collection was executed within the framework of Veterans Home that sponsor training programs for computer skills for elder adults.

The Veterans Home will approximate the number of monthly changes in the number of currently 381 people, the number of nursing homes 261 people (living to take care of themselves), and there are nine participants (average age 79.89). There are 89 persons in conservation (paralyzed, or disabled, who cannot take care of themselves), and are three participants joining class. Their average age 57 and are all disabled and relatively young, can use a wheelchair to get around. There are 11 elders out of 31 couples joined the class and their average age is 79.

There are 4 elder participants from neighbor community, with an average age of 76, so total number of observations for 381 participants and a total of 27 people joined the class

This setting therefore allowed the recruitment of a comparative sample of computer participants and nonparticipants whose feelings and perceptions about the potential globalization of their social worlds could be explored in depth.

The principal stage of this qualitative inquiry consisted of semi-structured open-ended interviews that were carried out by one of the author during the course of the year 2010. The approach was both exploratory and inductive, and allowed the researcher to gather the respondents' unique views and experiences in relation to the research topic. Various probes were included in the semi-structured interview in order to elicit information about the different computer uses that were employed by the participants, the reasons that brought them to use or to resist computer usage and the meanings they ascribed to the experience.

After the stage of interview, all response was documented, analyzed and concluded. The rest co-authors were asked to reviewed and check the researchers' reliability. Based upon the reliability, a final conclusion were reached via panel discussions.

As Groger [31] notes, the aim of such inquiry ''is not to achieve representativeness but to capture as much variation as possible.'' This method seeks to yield insights and explanations that were not readily available beforehand. Following her guidance for this type of analysis, the sample of 54 informants recruited for this effort (27 participants and 27 nonparticipants) was considered small enough to be practical and yet sufficiently large to provide the needed data.

The open-ended interviews were carried out at the veterans' home or in the respondent's home, according to their preference. Interviews lasted from 1 to 2 h each. They were audio and video recorded and transcribed. The resultant texts were analyzed through two parallel techniques: the technique of examining the central themes that stood out in the interviews, and the technique of ''open encoding.''

Inductive analysis of the qualitative data compiled from interview transcriptions revealed three major themes, two of which distinguish between the information technology participants and the nonparticipants, and one that provides unique insights into the participants' inner worlds. They are spelled out in the following sections and illustrated through the words of the respondents, whose names were changed for the presentation of the data.

As will be seen, respondents spoke simply and within the bounds of their limited experience. Their level of expression reflects that of the majority of the current aged cohort in Taiwan, people whose education was cut short due to years of war and

migration. While their verbalization might be considered somewhat shallow, it nevertheless represents the character of the population of interest, and reflects the challenge inherent in inviting their participation in information technology hosted communication networks.

4. Findings and Conclusions

Aging causes problem accessing information around. Some participants with severe hearing loss are hard of hear. Their classes are required individual guidance approach. The interviews before and after the first engagement, said those participants that "I could not hear clearly, but if teacher talk closely providing individual guidance, I learn more of it and there is no obstacle."

Second, for the learning motivation, they learn information technology for functional reasons of communication and well citizenship. In order to communicate relatives out abroad like mainland, they willing to learn how to use computer as a communication tools to link receiver with video and audio. For better fit into our society, they want to understand what information technology could provide, so they would not be left behind. "I want kill leisure time in the new ways" participant E12 said. "I like to copy The Bible.", "I want do business through internet." which is 50 years old physical disability caused a car accident. "I need to know how to operate computer to be a volunteer" said by several participants.

Life- long learning is another reason for them to think of learn computer. "Without knowledge of computer is the symbol of out of date" did be mentioned by several participants. Apply technology to overcome physical disabilities play an important role to motivate participants.

Third, overconfident, most of them mentioned that they had similar experience of learning information technology. Their previous learning experiences, such as the studied Chinese typing, mathematical interest and other reasons to support their learning computer, are not really fit into learning information technology and using internet communication.

Fourth, some of the students are mental disability. Their learning mood is no always stable. In hand-on practice session, some of them just can not put their focus on the learning target.

4.1 Intended usage of information technology

Based upon participants' interview, the following intentions were listed according to the frequency.
1. Personal communication
2. Literature development
3. Information surfing
4. Information storage
5. Information sharing
6. Business communication
7. Information creating
8. Playing internet game

Relations with friends, relatives, workmates and neighbors could be initialed, established, maintain, and organized by some of these eight intentions. It was found a strong intension based of network capital could be developed via learning information technology.

4.2 Discussions and Conclusions

This study was focused on social capital to understand elders behavior in participate information technology. The social capital was treated as a process of an investment for maintains productions or social capital. Those who provided information technology, who provided learning opportunities, and who designed courses of information technology are all significant investment behavior. The technology learning environment was established to waiting and preparing people with believe, intention, and behavior.

The social capital would be increased whenever elders show their learning intension based upon their needs. The intentions of elders are the hidden investment. The technology behavior or technology learning behavior is the major component that we are looking for. Before using technology, during using technology, and after using technology are three stages of this study. The observation and analysis would be focus participate intention and obstacles for the first stage. The arrangement of computer equipment, learning environment usage, courses, promotion activities, strategy, pedagogy, attitude, leaning disability and networking would be focus at the second stage.

Mouse operation of the elder participants was not easy to control and learning, including hand-eye co-ordinate problem (to being watching the screen, and noticing the mouse at the same time).

Those functions of co-ordinate more than one operation are even worse. Move cursor and left button click, right button click and pick up from pull-down menu, push down left button and drag,

and double click on left button are difficult for elder participants.

Vision problem is another type of obstacle. Computer character font is too small to see. Words on the handout, textbook, and reference material are too small to read.

Learning speed of each individual is quite different. This made highly difficult to teach as a class. The learning pace moderation is necessary.

Hearing problem is a general phenomenon. It is required close speak to communicate.

Bad Memory is another problem for elder participants. Forgotten whatever they had learned is a common phenomenon. Especially as long as the previous demonstration of the situation a little bit different, elder participants would become not knowing how to deal with, even if the same situation. Although with operating practice several times, they could still let it go if they don't think it is important.

Environment: It was found the environment is not so critical for learning. Classroom is located at the center of the hallway on both sides of evergreen living room. It is not a closed space, not related people will come and go, and is next to the pool table and table tennis table. On the other side, it is a room of karaoke. From time to time, someone sings.

Although a lots of interrupts could be happened. The learning activities and practicing activities are still worked fine. Putting computers in an easy accessing space for publics would be more important than a quite learning classroom.

Input and computer operation problems:

Chinese character input, mouse operating and keyboarding are difficult for elder participants. There are two major ways to input. The first one is operating keyboard and the second one is operating handwriting board. By using keyboard, user should familiar with either the phonetic symbol system or the partial character system. There exists several different partial character systems based upon special program settings.

After demonstration, elder participants choose mouse hand writing for partial character input and Microsoft new phonetic input for those who familiar with Chinese phonetics. Special input device would be the last consideration because of the computer device transformation problem.

For the promotion strategy, elder participants are required encouragement. Whenever a well done practice, the reinforcement would be necessary to ensure their motivation. It was also found that encouragement would help participants to overcome the fear of uncertainty.

Table 1. Elder participants' learning problems

Learning Problem Categories	Descriptions
Personal	Hearing problem
	Bad Memory
Environmental	Noise
	Other activities
Hardware	Mouse operation
	Hand-eye coordinate
	Chinese character input

The findings from the current study also show that older persons are able to study and to use computers if a good training program exists that encourages them to do so. On the other hand, it cannot be dismissed that those who chose to participate and to study computer use may have done so because they had a stronger prior desire and/or ability to engage in this particular undertaking. It might be that the elderly information technology participants had a positive approach to the computer, a priori, and perhaps a better capability for learning new things as well.

Reference:
[1] Weinberg, N. (1996). Compassion by computer: Contrasting the supportiveness of computer-mediated and face-to-face interactions. Computers in Human Services, 13, 51–63.
[2] Wellman, B., & Gulia, M. (1999). Net surfers don't ride alone: Virtual communities as communities. In P. Kollok, & M. Smith (Eds.), Communities in cyberspace (pp. 167–194). London: Routledge.

[3] Benedikt, M. (1991). Cyberspace: Some proposals. In M. Benedikt (Ed.), Cyberspace: First steps (pp. 119–224). Cambridge, MA: The MIT Press.

[4] Turkle, S. (1997). Life on the screen. Rockefeller Center, USA: Touchstone.

[5] Rheingold, H. (1993). A slice of life in my virtual community. In L. M. Harasim (Ed.), Global networks: Computers and international communication (pp. 57–80). Cambridge, MA: The MIT Press.

[6] Talmud, I., & Mesch, G. S., (2003). Virtual social capital and network density among Israeli adolescents. Paper presented at the international conference on computer networks as social networks, Haifa, Israel.

[7] Wright, K. (2000). Computer-mediated social support, elder adults, and coping. Journal of Communication, 100–118.

[8] Featherstone, M. (1995). Post-bodies, aging and virtual reality. In M. Featherstone, & A. Wernick (Eds.), Images of aging: Cultural representations of later life (pp. 227–244). London: Routledge.

[9] Turkle, S. (1997). Life on the screen. Rockefeller Center, USA: Touchstone.

[10] Foster, D. (1996). Community and identity in the electronic village. In D. Porter (Ed.), Internet culture (pp. 23–37). New York: Routledge.

[11] Harasim, L. (1993). Global networks: Computers and international communication. Cambridge, MA: The MIT Press.

[12] Jones, S. (1997). Virtual culture: Identity and communication in cyber-society. London: Sage.

[13] Czaja, S., & Sharit, J. (1998). Age differences in attitudes toward computers. Journals of Gerontology. Psychological Sciences, 53B, P329–P340.

[14] Temple, L., & Gavillet, M. (1990). The development of computer confidence in seniors: An assessment of changes in computer anxiety and computer literacy. Activities, Adaptation & Aging, 14, 63–75.

[15] Hummert, M., Nussbaum, J., & Wiemann, J. (1992). Communication and the elderly. Communication Research, 19, 413–422.

[16] Putnam, R. D. (2000). Bowling alone: The collapse and revival of American community. New York: Simon and Schuster.

[17] Wellman, B., Haase, A. Q., Witte, J., & Hampton, K. (2001). Does the internet increase, decrease or supplement social capital? Social networks, participation and community commitment. American Behavioral Scientist, 45, 436–455.

[18] Wellman, B., & Frank, K. (2001). Network capital in a multi-level world: Getting support from personal communities. In N. Lin, K. Cook, & R. Burt (Eds.), Social capital: Theory and research (pp. 233–273). Hawthorne, NY: Aldine de Gruyter.

[19] Lin, N. (2001). Social capital: A theory of social structure and action. Cambridge, UK: Cambridge University Press.

[20] Wellman, B. (1999). The network community: An introduction. In B.Wellman (Ed.), Networks in the global village (pp. 1–48). Boulder, CO: Westview.

[21] Wellman, B. (2001). Physical place and cyber place: The rise of personalized networking. International Journal of Urban and Regional Research, 25, 227–252.

[22] Cody, M. J., Dunn, D., Hoppin, S., & Wendt, P. (1999). Silver surfers: Training and evaluating Internet use among older adult learners. Communication Education, 48, 269–286.

[23] Nie, N. H., & Erbring, L. (2000). Internet and society: A preliminary report. Stanford, CA: Stanford Institute for the Quantitative Study of Society.

[24] Walther, J. B., Anderson, J. F., & Park, D. W. (1994). Interpersonal antisocial communication. Communication Research, 21, 460–487.

[25] Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? American Psychologist, 53, 1017–1031.

[26] Nahm, E., & Resnick, B. (2001). Homebound older adults' experiences with the Internet and e-mail. Computers in Nursing, 19, 257–263.

[27] Climo, J. (2001). Images of aging in virtual reality: The Internet and the community of affect. Generations, 25, 64–68.

[28] Yang, H.H., Kuo, L.H., Yang, H.J., Yu, J.C., & Chen, L.M. (2009). On-line PBL System Flows and User's Motivation. WSEAS Transactions on Communications, 8(4), 394-404. (EI)

[29] Yang, H.H., Yu, J.C., Kuo, L.H., Chen, L.M., & Yang, H.J. (2009). A Study of Mobile E-learning-portfolios. WSEAS Transactions on Computers, 8(7), 1083-1092. (EI)

[30] Kuo, L.H., Yang, H.J., Yang, H.H., Yu, J.C., & Chen, L.M. (2009). Integration of Heterogeneous In-service Training Data into a

Nationwide Database. WSEAS Transactions on Information Science and Applications, 6(6), 976-987. (EI)

[31] Groger, L. (1995). A nursing home can be a home. Journal of Aging Studies, 9, 137–153.