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Abstract
This article reports a study of how middle-age and elder women adopt ICT through the social intervention and support from the non-profit organizations (NPOs) which they are associated with. By interviewing 30 participants of the Taiwan Women Up project, we reveal the barriers that may hinder women from learning ICT and the forces which can facilitate women in their adoption of ICT at three levels: individual, family and social group. Our findings show that, for our participants who are middle-class housewives over 40, their bonding with the NPOs serves as the main force for them to join the Taiwan Women Up project and adopt ICT. When ICT related difficulty occurs, they approach to the members of the NPOs and receive support from them while their families turn them down initially. After this project, the participants develop confidence and, accordingly, the digital divide is narrowed. Yet, there is little sign that any change of the traditional gender role has occurred.

Keywords: Digital Divide, Gender role, Socio-Cultural, Case study

Introduction

Many of us presume that information and communications technology (ICT) would bring the higher living standards and improve social welfare globally (Dewan, Riggins 2005). However, digital divide also comes along with the use of ICT. In order to close this gap, numerous resources were invested heavily to increase the accessibility of computers and the Internet. Meanwhile, researchers have tried to view it from different perspectives. Yet, the result shows that a certain percentage of people would likely remain non-users, regardless of the ICT availability or affordability. (NTIA, 2004)

Past researches from many countries have revealed that age and gender can be the factors for digital divide. Taiwan, a digitalized country, also faces the same problem of digital divide. While the penetration rates of computer and Internet usage reach more than 80%, the rates of elder group slump and the gap between male and female enlarged. The older people are, the less of they know ICT. The computer penetration rate and the Internet usage rate for Taiwanese female group over 60 and elder are only 8.6% and 5.3% (Taiwan National Report of Digital Divide, 2006). In other words, more than 90% of Taiwanese women aged over 60 don't use computer and 95% of them don't go online. This critical low penetration rate shows the female group deserves more attention.

The goal of this paper is to report a study of how middle-age and elder women adopt ICT and the related phenomena in Taiwan. By interviewing our interviewees who participated in an ICT-learning project, we are able to explain why they didn't adopt ICT until now. We depict how women's identity develops in the social-cultural environment. In the following, we review

related literature, data collection and methodology, and present the research result. The discussion and conclusion are presented in the final section.

Literature Review
Digital Divide
The term, "digital divide" was first appealed in 1995 and defined as the inequality of ICT accessibility and use by NTIA. From then on, to narrow the digital divide has been an important part of national IT policy worldwide. Researchers have mainly focused on the accessibility of ICT within different levels, such as the individual level, organizational level and the global level. For the individual level, researchers believe that age, gender, income, education, and geographical area can be the factors for digital divide.

Age and gender are 2 of the factors for digital divide. In the United States, only 34% of people whose ages are over 65% go online (Pew Internet & American Life Project, 2006). Gender differences also show here. In EU, for people who are over 55 years old, only 20% of them are Internet users and the gap between male and female increases along with the age of the Internet users. Males that are over 55 years old, 27% of them go online, compared to only 16% for females at the same age surf the net(Eurostat, 2006). In Japan and South Korea, there are about 10% difference between males and females and less than 30% of Japanese housewives are Internet users (MPHPT, 2004; MIC, 2005).

From "Taiwan National Report of Digital Divide of 2006", researchers noticed some Taiwanese people remain unconnected while both ICT penetration and accessibility have grown sharply. Today, 99.58% of the country has broadband infrastructure and 80% of households hold computers. However, Figures 1 and 2 depict that, for groups over 40s', both computer and Internet penetration rates slump and the gap between males and females widens as the age become older. For the group of 60 and older, the rates for both males and females are rather low, and the rates of females are even lower, only 8.6% and 5.3%.
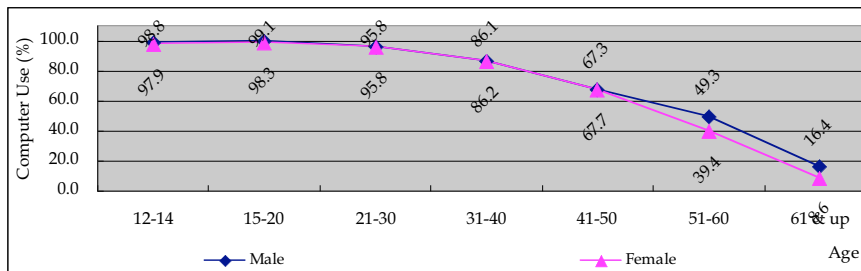

Figure 1 Penetration Rate of Computer Usage by Gender

2.2 Gender and ICT
That the female group has the lower penetration rate of computer and Internet use was revealed by the reports of digital divide from different countries. Actually, research points out that gender has a very weak, effect on access to Internet. It argued that the ICT gap is result of socioeconomic and combination of underlying gender-specific phenomena (Bimber, 2000). On the other hand, researches suggest that gender role influences how males and females interact with ICT. Gender role, in terms of care-giving for children at home limits mothers more than

fathers in the use they make of the Internet. Men and women 's Internet usages are different;
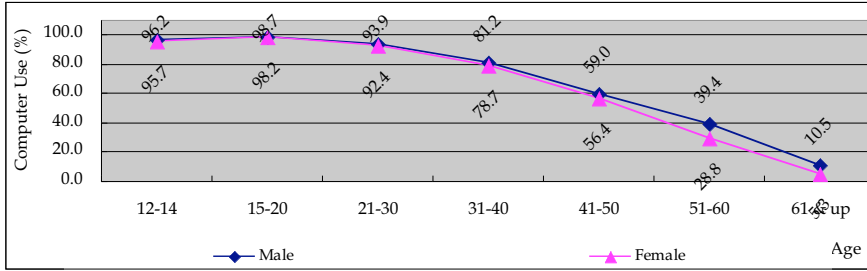

Figure 2. Penetration Rate of Internet Usage by Gender

for example, women use the Internet more for social reasons, while men use it more for instrumental and recreational reasons (Kennedy, Wellman and Klement, 2003). Hargittai (2006)found that women and men differ significantly in their attitudes toward their technological abilities. However, researchers believe that positive interventions can be applied across underrepresented groups so that ICT does not become simply the latest mechanism for stratifying society (Kvasny and Trauth, 2004). Some supports, such as formal technical assistance, technical and emotional assistance from friends and family can be examined (DiMaggio and Hargittai, 2001). Researchers, therefore, attempt to focus on individual differences among women and find the causes of gender under representation in the socio-cultural environment. (Trauth, Quesenberry, Morgan, 2004)

1. Research Methodology
How do middle-age and elder women, the underrepresented group, cope with the challenges from adopting ICT in socio-cultural structure? The researchers spent 8 months in the field. The case study method was employed to interview those non-profit social welfare organizations' female members who participated in this ICT learning project.

Sample Data Set
In 2005, a leading software company (the M Company) launched the Taiwan Women UP project by investing software, donating PC and offering curriculum to help Taiwanese information-underserved women. It cooperated with 19 non-profit organizations (NPOs) and trained their volunteer members with 18-hours course of basic computer and Internet skills. About 700 volunteers were trained from 19 different NPOs. Thirty people related with this project were interviewed, included 26 volunteers from 13 NPOs and 4 people from project team. By interviewing the project team, we gathered better understanding of this project. About the sample of volunteers, the project team phoned and invited more than 50 trained volunteers for interviews and 26 of them responded.

Table 1: Age of Interviewees

Age	# of interviewees
40~49	9
50~59	10
61 & up	7
Total	26

The age of the 26 volunteers we interviewed were from 40 to 66 years old. (Table. 1). 24 of them were married housewives, only one was divorced and one was single. Their husbands'

occupations were respectable. All of our interviewees had computers and Internet access at home, but mainly for their children. To summarize, our interviewees were middle-aged to elder, middle-class in their economic status and had computer and Internet access at home. Most of them were also highly educated. With such background, they belonged to the social groups that were typically supposed to be computer and Internet literate. Yet, most of them didn't know ICT before this project. They were therefore considered to be appropriate candidates for our study, which tried to understand why middle-age women didn't learn ICT before and how they adopt ICT.

Data collection and analysis

To gather materials and investigate contemporary phenomenon within its real-life context, qualitative data collection method is used in this research. While in-depth interviews are the major source of data, participant observations are also conducted for more materials. Interviewees were encouraged to share their learning experience about ICT. Interviews were audio taped and transcribed to preserve details of language use.

The data analysis process started with assembling the raw materials and getting an overview of the entire process. We reviewed materials from each transcript and extracted patterns and phenomena. Through comparing patterns and phenomena from different interviewees, we found similarities and categorized them by giving the same theme words. The process was continued until all transcripts were reviewed and the themes were presented with consistency.

Result

Our study reveals the rationales for middle-age and elder women to learn computers and their interactions with families and groups during the learning process. Following a depiction of the study participants' feeling toward ICT and their families, we categorize into four themes in the following: "ICT and my family", "Because of "my group", "Face-losing and team support", and "Well-deserved, but late recognition".

ICT and My Family

Before this project, most of our study participants had realized that ICT was important and knowing how to use ICT was the trend. However, they didn't learn ICT since they thought it is for the youth and they were afraid of exposing themselves to this fashionable technology. Moreover, when their families talked about ICT, they were not expected to join that topic. Even though they wanted to, they didn't know how. In other words, our participants were excluded from ICT. They were not supported in the use of ICT or join the related conversations. Therefore, they became less confident and felt ICT was boring. Although they agreed ICT was important, they didn't have enough motivation to learn it. Some informants said:

> Yes, we have a computer at home. But, it is used by my children. I never use it. I am afraid that I will make files disappeared or break the computer. If the screen goes out of my control, then I am in big trouble. I will be yelled. (C3)
> I can't understand what they talk about those computer games. They laughed loudly and got my attention. I stood behind them and watched for a while, then, I returned to my seat since I really couldn't get it and felt boring of it. (A1)

Talking about the women situation in their family, women are constrained and have no voice. They think for their family before themselves and they try hard to support their family. Taiwanese women, in term of care-giving children at home, devote themselves to take care of family, finish all chores and spend money carefully. On the other hand, they are sometimes

blamed or ignored, especially when the computers do not work properly.   Worse yet, they were not considered suitable to join the technical talk about computer.   One informant said:

> Before I go to NPO, I will make sure everything at home is ok. All the chores all done. This is our
> principle. (I2)

> *We don't spend money for ourselves. We feel grudging to ourselves. The priority is children, then family. We bought computers for our children but we were reluctant to spend money in learning computers. (A1)*

Because of "my group"

Responding to our beginning question of "why did you join this project," our informants explain that they join it for the good of the NPOs with which they are associated.   Our interviewees have a strong sense of belonging with their groups.   They share similar thoughts and beliefs with group members.   Therefore, when the Women Up project, which offers free course and computers comes, some believe their NPOs will benefit from it and they join this project and encourage others to join them as well.   One informant said:

> *Free PCs are the inducements. I knew our church needed PCs but didn't have budget for it. Once I knew this project with free PCs, I invited others to join it with me. (A1)*

In addition, some join this project because they feel that the act of attending the course is a way to support their NPO.   In a way, it is like "No matter what my NPO offers, I must join."   In fact, our interviewee thinks this is a good opportunity for them.   One informant said:

> *I am the volunteer here and they work this project with my NPO. We are told all volunteers who don't know computer are free to join. As my NPO may computerize our workflow, almost all our volunteers who don't know computer join it. (D1)*

One informant tells us she joins this project because she trusts her NPO.   She thinks there may be a lot of frauds if the NPO is not involved.   She is concerned that once joining those outside courses, she will be asked to pay more or buy something she doesn't want.   But, such frauds will not happen to the NPO project.   Some of our interviewees points out that they feel comfortable when learning with their group members.   Most of them have participated in volunteer works for years.   They know each other well and become friends. They feel secure in this surrounding.   One informant said:

> *We meet every week. This is not the first time we have class together. We may have different topics, different classrooms, but same people. We feel secure here because we have been here together every week for many years. (E2)*

Face-losing and team support

Although our interviewees all agreed that ICT is important, they didn't make their move to learn computers.   Many of them told us learning computer was important in the modern world.   Many of them realized they had communication gap with their children because children knew about computers but they didn't.   Some of them even tried to take computer courses by themselves; however, without the support from NPO members, they felt frustrated and gave it up.   The support from group members in the course and after the course is really helpful to these middle-aged and elder women in learning ICT.   One informant said:

> *I didn't feel face-losing with my partners. We all know each other; we are close. Once I had problems, I checked with my partner next to me. If she knew, she taught me; otherwise, we asked it to the instructor. In our class, we felt no embarrassment of asking questions because many partners asked questions. Moreover, we helped each other all the time. (H1)*

One of our researchers once joined the course as the teacher assistant.   All the students in that class were over 50s'.   The oldest one was already 70 years old.   The instructor taught her

lecture step by step. Students were asking questions either to the classmate next to them, to the instructor, or to teacher assistant. They didn't hesitate to ask questions or tell others how to do. The class was just like an old school reunion. When students practiced at home after class and had problems, they turned to the other members who knew computer in their NPOs. Those members could be the employees in NPOs, their group leaders or other volunteers who were good at computer. As they know where to ask for help and received help in time, they don't feel frustrated and are willing to keep learning. Both in-class assistance from partners and help from other members after class are important. One informant said:

> Co-workers in our group are very nice and kind. When I have problem, I can ask them and they teach me right away. Then, I practice to make sure I have got it. They teach me a lot. Sometimes we talk to each other through MSN and make sure what I learn is right. (C2)

Well-deserved, but late recognition

After this course, our informants gain confidence about themselves and are recognized by their families. They can now help their husbands to type, search information and setup Skype talking through Internet. Their husbands recognized those benefits from their newly-learned skills. Their children know that their elder mothers can use computer to surf the net and think they keep up with the trend. By learning computer and getting to know ICT, our informants finally understand what their children talk about. One informant said:

> I don't like my handwriting, so I type most of handouts. Then, my son sees it. He says to me: "Mom, not bad, I didn't know you are so smart." I am proud of myself in front of my son and I answered: As you are so smart, being your Mom must be smart, too. (B2)

Here, we see recognition from family members to our interviewees after our interviewees learn how to use computer. Note that when our interviewees tried to learn computer earlier, most of their families didn't support them. Some of our interviewees are even prevented from using computer at home. This explains why they turn to NPOs members instead family members when they have computer problems. Moreover, our informants tell us that they rather ask help from group members instead their impatient families. Some informants said:

> I couldn't turn on the computer. I tried to use my sons' computers, but I couldn't. They set up the password to prevent me log in. Every time I wanted to use computer, they always said to me:" Just tell me what you want to do and I will do for you. You don't need to use our computers." However, I needed no one to do it for me; I needed to practice. (I1)
> When I asked my child questions, he said to me:" Mom, you are so stupid. I have told you many times and you still can't get it." This happens a lot. I don't like to ask him. (C2)

Discussion and Conclusion

Based on what we gather from interviews, we find that the bonding from the NPO group members makes our interviewees join this project and decide to learn computer. The support and understanding from their NPO partners and friends are the key factors for them to overcome the fear of face-losing and to keep them continuing to use ICT. After this project, most of interviewees feel confident in using ICT and are recognized by their families, whom they received little help from during the early process of learning ICT.

For bridging the gap of using the computers and Internet, our study reveals that the accessibility of computer and Internet cannot narrow digital divide. Even though our participants, who are middle-class and over 40s, realized ICT was important and had computer and Internet access at home, they didn't adopt ICT. In the other words, the causes of digital divide are beyond have or have-not ICT. Through the cooperation with NPOs, the Women Up project in Taiwan induces successfully the women over 40 to adopt ICT. To women who value social connection and relationship, this positive intervention with social support really help them to make their moves and overcome their fears. Learning with group members and caring for each other, our

informants adopt ICT for the purpose of supporting their NPO. At the end, they have learned ICT and become confident of themselves. As they are empowered by this social support project, the digital divide of women is narrowed.

On the other hand, it is hard to say that the women's family status is improved after this project. Our interviewees receive late recognition from their families and finally earn the opportunity to be part of technical talk. However, the tradition gender role remains. Our interviewees are still in the role of offering help to their families, not only traditional house chores but also computer chores. What really catches our attention is how helpless those middle-aged housewives. No matter they ever try to learn ICT or not, they receive almost no help from families. They seem to be left outside of the ICT without no one cares how they feel or what they want. This explains why they turn to their groups when they need help.

The digital divide can be caused by many reasons. Taking socio-cultural perspective gives us a comprehensive picture to deal with it. With our study participants who are over 40 and mainly middle-class housewives, we conclude that the support from close members of their social group is the key for middle-age women to adopt ICT.

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