Motivating and Sustaining Women's Digital Literacy through ICT Learning

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ABSTRACT

Digital literacy is one of the most important issues that women confront today. Lacking of digital literacy excludes women from lifelong learning and development. Our two-phase, multi-method study attempted to examine how ICT literacy affects women and identifies the key factors that motivate adult females to acquire ICT skills. The first phase identified important theoretical constructs that affect and sustain ICT learning and usage among women, using a qualitative approach based on Social Cognitive and Social Capital Theories. In the second phase, a quantitative study was conducted to validate the research model. Our findings suggest that social capital and learning satisfaction contribute significantly to ICT usage, and that this in turn has a positive impact on the level of well-being.

Keyword: Gender, ICT Literacy, Social Capital, Self-efficacy, Subjective Well-Being

INTRODUCTION

In an information society, digital literacy is an essential skill for professional and career development, lifelong learning and distance education, as well as for social inclusion, and freedom of expression and opinion (Eshet-Alkalai, 2004; Ezziane, 2007; Horton & Unesco, 2008, pp. 1-3). Previous researches revealed that ICT utilization promotes the feeling of acceptance, coherence and identity among a community and increases sense of actualization and well-being (Contarello and Sarrica, 2007; Amichai-Hamburger and Furnham, 2007). Significant investments have been made over the past decade to expand accessibility to computers and the Internet (Dewan & Riggins, 2005). However, of the 771 million adults who are still digitally illiterate, the majority are women (Dighe & Vyasulu, 2006). Indeed, digital illiteracy is the third most important issue that women face globally (Morgan, Heeks, & Arun, 2004), and it is widely reported that women are less likely to use information communication technology (ICT) in their work and social lives (Carpenter & Buday, 2007; Liff & Shepherd, 2004; Shen, Zhang, & Tarmizi, 2009). All of these aforementioned studies point to the importance of investigating how best to involve different groups of women within ICT and how to promote and sustain their ICT learning (Bandias & Warne, 2009; Carpenter & Buday, 2007; Lin, Tang, & Kuo, 2010).

This two-phase, multi-method study sought to understand how ICT literacy affects women and identify the key factors that motivate adult females to acquire ICT competence. It was conducted with the help of Taiwan Women Up (TWU), a project launched by a leading international software company with the aim of training ICT-illiterate women in Taiwan. In 2005, working with 19 non-profit organizations (NPOs) in order to reach potential participants, TWU trained more than 700 volunteer workers. In 2007, it expanded its ICT courses and NPO partners, offering 24-hour free training in computer and Internet skills and holding over 300 classes across the island. By the end of 2009, more than 5,500 female trainees had completed the TWU project. The TWU Program can therefore serve as a lens through which we may understand ICT learning among women. In Phase 1, qualitative research based on Social Cognitive Theory (Bandura 1986, 1997) and Social

Capital Theory (Bourdieu, 1983) gathered materials from 28 TWU participants. This identified important research constructs for developing the theoretical model (Merriam, 2002). In Phase 2, a survey was carried out to collect data to validate this model.

THEORETICAL BACKGROUND

Our research design was guided by Social capital and Social cognitive theories. Social capital refers to interpersonal ties, expectations, trust and recognition in a social community with common context and shared norms (Bourdieu, 1983). Clement and Shade (2000) report that acquiring ICT competence involves a social process and needs a supportive learning environment (e.g., workplace, family, or school). Meanwhile, the Social Cognitive Theory has been widely applied to ICT learning (Beas & Salanova, 2006; Compeau & Higgins, 1995). While Self-efficacy is crucial in mediating people's goal setting, thought patterns, emotional states, and the strategies chosen for the exercise (Bandura, 1997), several studies have shown a significant positive relationship between computer efficacy and ICT usage (Compeau & Higgins, 1995; Compeau, Higgins, & Huff, 1999; Eastin & LaRose, 2000). As females tend to value social connections and relationships (Shen, et al., 2009) and most TWU participants were long-term members of charity groups and learned ICT with their fellows, we believed that the Social capital and Social cognitive theories were suitable for our research.

Phase I: Qualitative Research

Interview Recruitment & Data Analysis

The data in Phase 1 mainly came from in-depth interviews. Out of 700 participants from TWU 2005, we phoned and invited over 50 participants for interview. 28 from 13 NPOs accepted. Most interviewees were housewives over age 50 and knew little about ICT before joining the TWU Project, although all had computers and Internet access at home (see Table 1). Adopting open, axial and selective coding process, interview data was compared, regrouped and examined for determining important themes and codes with reference to the research topic (Webb & Young, 2005).

Area	City	Informant	Year of Birth	Occupation	Continue ICT Usage
North	Taipei	A1	1944	Housewife	Yes
		A2	1943	Housewife	Yes
		A3	1941	Housewife	Yes
		A4	1960	Housewife	Yes
		A5	1943	Housewife	Yes
North	Tao-Yuan	B1	1966	Housewife	Yes
		B2	1961	Housewife	Yes
		B3	1961	Housewife	Yes
North	Taipei	C1	1956	Housewife	Yes
		C2	1961	Housewife	*No*
North	Taipei	D1	1951	Housewife	Yes
North	Taipei	E1	1954	Housewife	Yes
		E2	1961	Housewife	Yes
North	Taipei	F1	1947	Housewife	Yes
		F2	1956	Housewife	Yes
		F3	1951	Housewife	Yes
		F4	1954	Housewife	Yes
North	Taipei	G1	1946	Housewife	Yes
North	Taipei	H1	1956	Charity Worker	*No*
Central	Tai-Chung	I1	1967	Housewife	*No*
South	Tainan	J1	1953	Housewife	Yes
		J2	1953	Housewife	Yes
		J3	1951	Housewife	Yes
South	Tainan	K1	1954	Housewife	Yes
		K2	1961	Charity Worker	Yes
South	Kaohsiung	L1	1951	Housewife	Yes
		L2	1966	Housewife	Yes
South	Kaohsiung	M1	1947	Housewife	Yes

Table 1. Demographic information of the interviewees from TWU participants

Findings

During the interviews, all informants expressed their satisfaction with the TWU project and their confidence in using ICT. We identified five factors for second phase study: Social capital; Learning satisfaction; Computer Self-efficacy; ICT usage; and Subjective well-being.

Social Capital Our interviews revealed that TWU participants demonstrated a high level of Social capital. Most had been members of their groups for a long time and had developed a strong sense of belonging. They shared similar thoughts and beliefs with other group members and trusted them. One interviewee stated:

> *Not every group has this kind of atmosphere. I have my team with me. We are on the same side. Our group members share the same goals and built up the learning environment together. (A3)*

The development of Social capital binds community members and enables them to act collectively and effectively to achieve shared objectives (Borgida, Sullivan, Oxendine, Jackson, & Riedel, 2002), especially for women who value social connections and tend to attach more importance to affective conceptions when learning ICT and tend to use ICT more for social reasons than men (Price, 2006).

Learning Satisfaction The TWU participants indicated a high level of satisfaction with their learning process and outcomes. Learning with team members whom they knew and worked with, made the learning experience a pleasant one. Some interviewees had had unhappy experiences when learning ICT individually and had eventually given up. One informant shared her experience:

> *Prior to the TWU project, I once enrolled on a computer course offered by my child's school. It was designed for people who knew nothing about computers, so I thought I would give it a try. But, the course moved too fast for me because I knew nothing. If I made mistakes or fell behind with the class notes, I didn't know what to do. I was too embarrassed to ask questions in front of people I didn't know. All I could do was just sit there. (C1)*

In contrast, the TWU project offered our interviewees a safe and comfortable learning environment. The high level of social bonding and trust allowed them to discuss issues, exchange help without anxiety, and encourage them to persist with ICT learning.

> *We help and ask each other all the time. When we find out that someone is stuck and doesn't know what to do, we will tell her what to do or where her mouse should point and click. We teach each other and help each other. (J3)*

Positive interactions among fellow students leads to satisfaction with ICT learning programs (Lee & Lee, 2008), while local and community-based learning support can also improve ICT capabilities (Clement & Shade, 2000). This is consistent with Social capital theory, which states that the connections among group members in a learning program affect the participants' obligations to give, and expectations of receiving, appropriate resources and support – both instrumental and emotional. Thus, we propose the following hypothesis:

H1: The participants' Social capital is positively associated with their level of learning satisfaction with the ICT training program.

Computer Self-Efficacy Self-efficacy refers to one's judgment of one's ability to execute and accomplish a given task (Bandura, 1986). Prior to joining the TWU project, most of the participants were afraid of ICT. Lack of computer Self-efficacy was the main barrier to ICT use at home. They were nervous about using the computer and feared that they would "*make files disappear or break the computer accidentally and then would be in big trouble."* One explained:

> *It is not only because our children don't let us use computer. It is because we don't dare. How can a mother use her children's computers? If you do, and everything goes ok, then you are ok. But, once something goes wrong with the computer after you use it, then, you are in trouble. (F3)*

After taking TWU courses, the participants increased their level of Self-efficacy. They not only felt free to raise questions during the class but also felt comfortable discussing problems and sharing answers with their classmates. Their level of Self-efficacy was boosted while feelings of embarrassment and stress were eased.

> *I didn't fear losing face in front of my colleagues. We know each other very; we are close. If I had problems, I checked with my colleague next to me. If she knew, she would help me. Otherwise, we would ask the instructor. In our class, I felt no embarrassment asking questions because many of my colleagues asked questions, too. We helped each other all the time. (L1)*

People's motivation, aspirations, actions, and performance are usually influenced by the consideration and assistance of their peers. Verbal persuasion and social influences facilitate an individual's appraisal of his/her capabilities (Bandura, 1997). By receiving support and feedback within the referent group, they are encouraged to improve their abilities to accomplish their tasks as well as to meet expectations (Compeau & Higgins, 1995). Thus, the following hypothesis is proposed:

H2: The participants' Social capital is positively associated with their level of computer Self-efficacy beliefs.

Our interviewees felt pleased and satisfied that they had learned how to use a computer and the Internet. They also gained more self-confidence in ICT learning. One informant shared her experience:

> *I now feel I am pretty good at the computer. Before, I didn't know the "enter"or "Ctrl buttons". But, now I understand and I know how to use them. After TWU, I am totally different now. (C1)*

Past research has indicated that user satisfaction elevates an individual's perceptions of ICT, influence their judgement of Self-efficacy and intention to adopt technological innovation (Palvia, 1996). Therefore, we propose the following hypothesis:

H3: The participants' satisfaction with the ICT learning program is positively associated with their level of computer Self-efficacy beliefs.

ICT Usage The TWU participants retained their confidence and interest in using ICT after the program ended. Several explained that they were no longer afraid of ICT, and included it in their everyday routine.

> *After finishing my chores at home, I always turn on my computer. Sometimes, I surf and search for information; sometimes, I check and reply to emails. I can' t believe that I am able to use the computer now. I feel happy that I can use the computer to do things. (F3)*

According to Social Cognitive Theory, a high level of Self-efficacy enables individuals to cope with stressful situations with confidence (Bandura, 1997). Both computer and Internet Self-efficacy are essential indicators of a user's confidence in his/her ability to adopt ICT, to use communication networking hardware/software, search online resources and participate in online activities (Bandura, 2002; Eastin & LaRose, 2000). Thus, we propose the following hypothesis:

H4: The participants' computer Self-efficacy is positively associated with their ICT usage.

TWU participants believed that they had learned a lot from the TWU project and expressed their interests in using ICT. One informant shared her thoughts:

> *Before TWU, I really knew very little about computers. The TWU course was my first ICT course and I really learned a lot from it. I learned how to check and send emails first. Then, I sent free e-cards, and text messages. I also use MSN now....; our instructor taught us well and clearly. Most importantly, he was very patient. I think that I will enroll in more ICT courses, whether they are free or not. (L1)*

Alavi, Wheeler and Valacich (1995) show that satisfaction is a useful indicator to evaluate learning effectiveness. Students were satisfied with the help they received from their instructor and fellow students on an ICT program and learned how to operate ICT properly in their daily lives. Subsequently, their perceptions of ICT were positive and efficacious, and they evaluated the program highly in terms of its pedagogical content, teacher interaction and the expected future usefulness of the ICT skills learned (Lee & Lee, 2008). Thus, we propose the following hypothesis:

H5: The participants' satisfaction with ICT learning programs is positively associated with their ICT usage.

Subjective Well-Being Our interview data revealed that through the TWU project, ICT became a new way for the participants to communicate and share information. Knowing how to use ICT enriched their lives and made them happier. One interviewee commented:

> *Now, I use the computer almost everyday. I really think that ICT is very interesting and I have lots fun from using ICT. I love to read information from my friends. The animations, short stories and photos they send me are all very funny. (D1)*

Contarello and Sarrica (2007), and Amichai-Hamburger and Furnham (2007), have examined the relationship between ICT utilization and w-being and shown that a feeling of acceptance, coherence and identity within a group/community leads to a higher contribution to other members and an increasing sense of actualization. Thus, we propose the following hypothesis:

H6: The participants' ICT usage is positively associated with their perception of Subjective Well-Being.

The interviewees expressed their confidence in using ICT. Being able to complete their tasks using ICT was a positive experience and brought them a feeling of happiness. It also raised their Self-efficacy, work satisfaction and sense of achievement, which in turn increased their well-being. One interviewee stated:

> *Although I am not proficient at editing photos, I am very good at both word processing and using PowerPoint. I can do it really well. Recently, I helped to edit the 30th-anniversary journal and the computer helped me a lot. I even searched and downloaded information from the Internet and re-organized it… By learning ICT, I know how good it is and I can do it well. Now, I am better than my husband at using ICT. (M1)*

Individuals with strong computer Self-efficacy usually have a higher level of Subjective well-being, are in a better emotional state, have better health, greater job satisfaction and higher job productivity (Bandura, 2002; Beas & Salanova, 2006). Eastin and LaRose (2000) pointed out that an individual's anticipated performance and outcomes, including entertainment, information acquisition, interpersonal communication and social reputation, are more likely to be attained if he/she has stronger Self-efficacy in Internet surfing. Thus, we consider computer Self-efficacy an essential predictor of Subjective well-being:

H7: The participants' computer Self-efficacy beliefs are positively associated with their perception of Subjective Well-Being.

After completing the TWU course, our interviewees felt more comfortable and pleased with their family lives and with their friends and group members. One pointed out that the TWU project had become a new opportunity to help other community members:

> *The TWU project is really good as it gives us a space to learn ICT together, ask partners questions and practice without pressure. Because we know each other well, we always call each other for help when we encounter problems. For our community, learning the computer is a great undertaking. All the participants gained a lot from it and will be of great help to our community work in the future. (E1)*

Social capital is thus viewed as a critical determinant of ICT utilization, with a positive influence on users' Subjective well-being. The accessibility and mobilization of network resources has a positive effect on wealth, power, health, and life satisfaction. Accordingly, we propose the following hypothesis:

H8: Participants' Social capital is positively associated with their perception of Subjective Well-Being.

Our research model is shown in Figure 1.

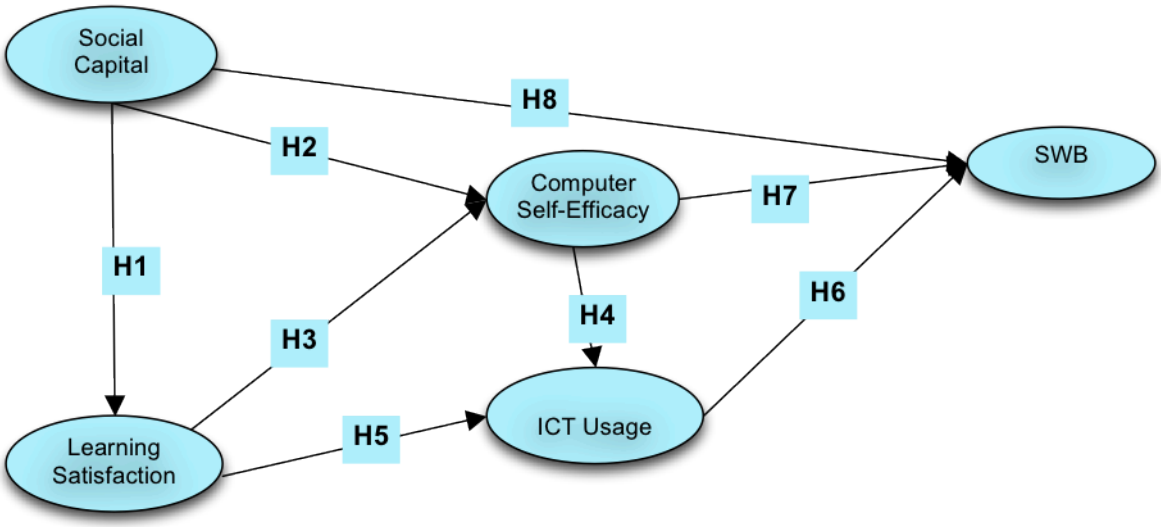

Figure 1. Research Model

Phase II: Validation of Theoretical Model

Sampling and Procedure

In Phase 2, data were collected by survey and the partial least squares (PLS) method was used to examine the hypotheses. The participants in the TWU Project of 2007 were chosen as the target group. Of the 320 classes in that group, 270 classes which had lasted six weeks or less, were excluded. More than 30 of the remaining classes were contacted and nine responses were received. At the last class meeting of the course, 181 surveys were distributed, of which 156 were returned. Of these, 133 were valid (a net response rate of 73%). Consistent with the composition of the class, the sample was all female, with a

mean age of 45 (SD 9.08). The majority of respondents were married (83%) with ICT access at home (80%), but had not attended ICT courses before (65%).

Measurement Items

The constructs were measured using multi-item scales that have been adopted by previous studies (see Table 2). All items were measured on a seven-point Likert-type scale, ranging from "strongly disagree" to "strongly agree". Five experts, including three scholars, a gender expert, and a TWU project manager, reviewed the questionnaire and some minor adjustments were made.

Construct	Item	Source
Social Capital		
SC_1	My classmates of ICT course are concerned how I feel.	(Mayer, Davis, & Schoorman, 1995; Ridings, Gefen, & Arinze, 2002)
SC_2	My classmates of ICT course will help me to cope with my problems.	
SC_3	The encouragement and support from my classmates of ICT course is trustworthy.	
	When learning computer,	
SC_4	…my friends are concerned how I feel.	
SC_5	…my friends will help me to cope with my problems.	
SC_6	… the encouragement and support from my friends is trustworthy.	
Learning Satisfaction		
SA_1	After attending this ICT course, I am satisfied.	(McKinney & Yoon, 2002)
SA_2	After attending this ICT course, I will recommend it to my friends.	
SA_3	After attending this ICT course, I am contented.	
SA_4	On the whole, this ICT course meets my expectation.	
Computer Self-Efficacy		
	I feel confident in using computer if…	(Compeau & Higgins, 1995)
SE_1	…I can call someone else for help if I got stuck	
SE_2	…I have a lot of time	
SE_3	…there is no one around to tell me what to do	
	I feel confident in using E-mail if ……	
SE_4	…I can call someone else for help if I got stuck	
SE_5	…I have a lot of time	
SE_6	…there is no one around to tell me what to do	
Usage		
USE_C1	I use computer frequently.	(Verplanken & Orbell, 2003)
USE_C2	Using computer belongs to my routine.	
USE_C3	I have no need to think about using computer.	
USE_E1	I use E-mail frequently.	
USE_E2	Using E-mail belongs to my routine.	
USE_E3	I have no need to think about using E-mail.	
USE_S1	I search information online frequently.	
USE_S2	Searching information online belongs to my routine.	
USE_S3	I have no need to think about using searching information online.	
Subjective Well-Being		
SWB_1	On the whole, I am pleased with the quality of my family life.	(Diener, Emmons, Larsen, & Griffin, 1985)
SWB_2	In most ways my life is close to my ideal	
SWB_3	The conditions of my life are excellent	
SWB_4	I am satisfied with my life	
SWB_5	So far I have gotten the important things I want in life	
SWB_6	If I could live my life over, I would change almost nothing.	

Table 2. Measurement items incorporting with interview data, the social capital and social cognitive theories

Data Analysis & Results

First, the psychometric properties of all variables were examined via item loadings, internal consistency and discriminant validity (Forsythe, Liu, Shannon, & Gardner, 2006). Table 3 presents the factor loading of each item on its intended construct and the cross-loadings with all other constructs. Boldface item loadings are those which are greater than 0.5 and greater than cross-loadings.

Component	Social Capital	Satisfaction	Self-Efficacy	Usage-Computer	Usage-Email	Usage-Search	Subject Well-Being
SC_1	0.548	0.058	-0.258	0.173	0.195	-0.338	0.117
SC_2	0.788	0.190	0.182	0.020	0.042	0.018	0.037
SC_3	0.774	0.245	0.180	-0.072	0.091	0.084	0.164
SC_4	0.811	0.046	-0.022	0.065	-0.067	0.019	0.142
SC_5	0.784	0.181	0.196	-0.102	0.004	0.133	0.252
SC_6	0.688	0.254	0.253	-0.019	-0.057	0.116	0.113
SAT_1	0.215	0.831	0.311	0.095	0.024	-0.048	0.104
SAT_2	0.351	0.789	0.300	0.084	0.085	0.030	0.042
SAT_3	0.280	0.829	0.234	0.087	-0.012	0.136	0.078
SAT_4	0.116	0.806	0.162	0.061	0.157	0.061	0.073
SE_1	0.206	0.182	0.697	0.292	0.298	0.048	0.033
SE_2	0.194	0.305	0.753	0.210	0.058	-0.111	0.220
SE_3	0.133	0.370	0.764	0.129	0.092	0.084	0.167
SE_4	0.188	0.172	0.698	0.136	0.442	0.125	0.056
SE_5	0.137	0.193	0.785	-0.005	0.117	-0.008	0.215
SE_6	-0.005	0.134	0.841	0.009	0.160	0.142	0.176
USE_C1	0.002	0.106	0.272	0.777	0.144	0.235	0.180
USE_C2	0.045	0.036	0.135	0.776	0.203	0.221	0.072
USE_C3	-0.075	0.143	0.052	0.815	0.144	0.204	0.246
USE_E1	-0.012	0.078	0.298	0.114	0.816	0.247	0.084
USE_E2	0.040	0.012	0.276	0.149	0.794	0.197	0.112
USE_E3	-0.007	0.147	0.125	0.270	0.806	0.215	0.191
USE_S1	0.074	0.121	0.091	0.217	0.261	0.772	0.188
USE_S2	0.114	-0.041	0.079	0.257	0.296	0.775	0.145
USE_S3	0.045	0.114	-0.020	0.369	0.210	0.764	0.237
SWB-1	0.028	0.148	0.377	0.216	-0.132	0.100	0.691
SWB-2	0.176	0.052	0.278	0.042	0.059	0.186	0.753
SWB-3	0.215	0.041	0.159	0.143	0.039	-0.006	0.849
SWB-4	0.231	0.024	0.208	0.118	0.010	-0.023	0.856
SWB-5	0.128	0.103	-0.060	0.095	0.182	0.185	0.826
SWB-6	0.026	0.037	-0.003	0.043	0.293	0.166	0.699

1. Extraction Method: Principal Component Analysis.
2. Rotation Method: Varimax with Kaiser Normalization.

Table 3. Factor component matrix

The estimation of hierarchical construct models was conducted to reduce model complexity through PLS analysis (MacKenzie, Podsakoff, & Jarvis, 2005). Figure 2 shows that the measurement of ICT usage is an aggregate of three dimensions: computer usage (standardized coefficient = 0.815, $p < 0.001$); (2) Email usage (standardized coefficient = 0.817, $p < 0.001$); and (3) On-line search usage (standardized coefficient = 0.855, $p < 0.001$). The resulting measurement is a 9-item instrument that can be operationalized as a second-order factor model, in which a latent factor (i.e., ICT usage) governs the correlations among computer usage, Email usage, and on-line search usage (Wetzels, Odekerken-Schroder, & van Oppen, 2009).

We further examined the construct validity to see if each manifest item referred appropriately to its latent variable. Table 4 demonstrates that, while most factor loadings met the recommended significance threshold value of 0.50 (Hair, Anderson, Tatham, & Black, 1998), SC_1 failed to meet this requirement and was eliminated.

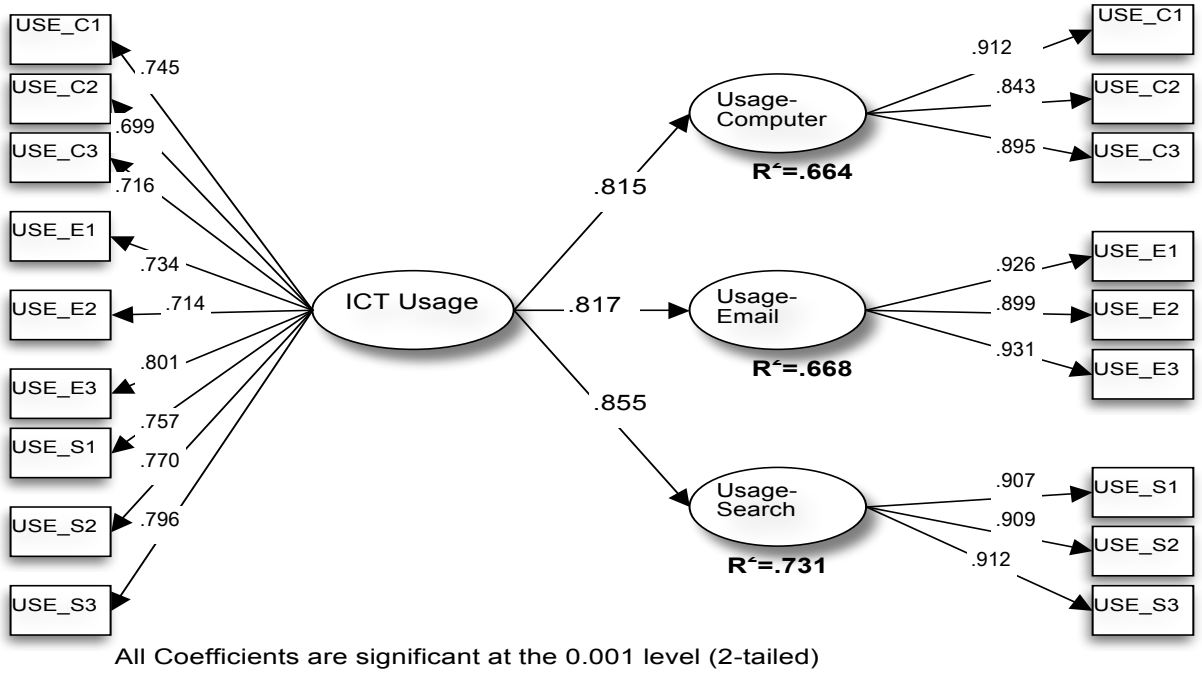

Figure 2: Second-Order Model of ICT Usage from PLS analysis

Construct/ Item	Mean	Standard Deviation	Standardized Factor Loading	T-Value	AVE	CR
Social Capital						
SC_1	4.850	1.555	0.411	3.391		
SC_2	5.820	0.928	0.821	11.745		
SC_3	5.782	0.972	0.880	19.446	0.603	0.897
SC_4	5.323	1.300	0.745	11.679		
SC_5	5.699	1.015	0.886	30.880		
SC_6	5.820	0.991	0.815	13.338		
Learning Satisfaction						
SA_1	4.211	0.697	0.925	42.692		
SA_2	4.271	0.629	0.929	47.477	0.810	0.945
SA_3	4.180	0.716	0.917	20.913		
SA_4	4.105	0.721	0.824	13.701		
Computer Self-Efficacy						
SE_1	4.812	1.355	0.839	26.484		
SE_2	5.429	1.214	0.876	29.445		
SE_3	5.383	1.185	0.893	34.771	0.734	0.943
SE_4	4.880	1.420	0.842	27.045		
SE_5	5.436	1.144	0.832	21.481		
SE_6	5.376	1.139	0.857	23.993		
Usage						
USE_Computer	4.203	1.416	0.826	19.861		
USE_Email	4.418	1.426	0.828	24.340	0.686	0.867
USE_Search	4.892	1.350	0.830	21.340		
Subjective Well-Being						
SWB_1	5.692	1.024	0.840	24.627		
SWB_2	5.481	1.063	0.875	28.326		
SWB_3	5.571	1.130	0.892	36.242	0.690	0.930
SWB_4	5.602	1.080	0.844	26.519		
SWB_5	5.165	1.404	0.831	20.032		
SWB_6	5.391	1.290	0.857	25.463		

Table 4. Descriptive statistics & reliability for the study variables

Discriminant validity is verified as all indicator items load more highly on their theoretically assigned construct than on other constructs in the research model and the diagonal scores of the square root of AVE are all greater than the correlations between pairs of constructs (Chin, 1998; Gefen & Straub, 2005). Tables 4 and 5 show this to be the case for all items.

Constructs	Social Capital	Learning Satisfaction	Computer Self-Efficacy	ICT Usage	Subjective Well-Being
Social Capital	**.777**				
Learning Satisfaction	.525***	**.900**			
Computer Self-Efficacy	.407***	.580***	**.857**		
ICT Usage	.165	.293***	.480***	**.828**	
Subjective Well-Being	.380	.279***	.425***	.436***	**.831**

1. ***Correlation is significant at the 0.01 level (2-tailed).
2. Note. Diagonal elements are the square root of average variance extracted (AVE). For discriminant validity, the square root of AVE should be larger than inter-construct correlations (off-diagonal elements).

Table 5. Correlations between constructs

Figure 3 shows the results of PLS analysis. All significant paths are indicated with asterisk(s). While Social capital significantly influences both learning satisfaction and Subjective well-being, it does not significantly predict computer Self-efficacy. Learning satisfaction significantly predicts computer Self-efficacy, which in turn exhibits a significant relationship with ICT usage. Social capital and ICT usage are thus significant predictors of Subjective well-being, collectively explaining 30.5% of the variance.

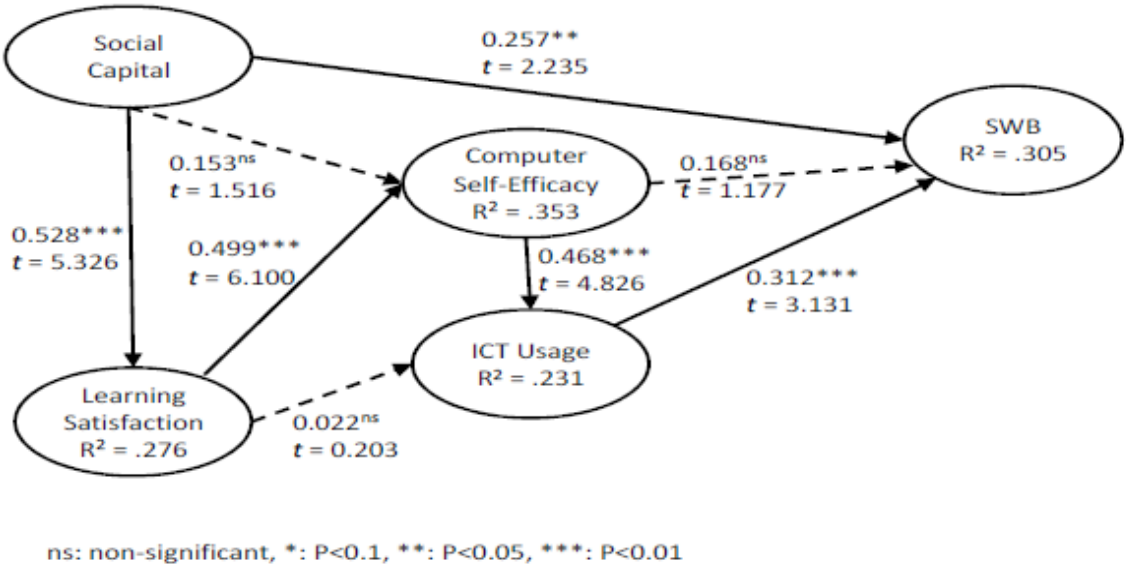

Figure 3. Result of Model Test

DISCUSSION

This study examined which factors help to sustain female's ICT learning and how digital literacy affects them. After identifying key constructs through a qualitative study, we tested the model in second phase, relating Social capital, Social cognitive and ICT usage variables to Subjective well-being. The results demonstrate that, with sufficient social support, the computer Self-efficacy of female beginners was seen to increase, encouraging them to persevere with their ICT learning and usage. Further, their Subjective well-being is also raised through ICT usage.

Social Capital, Computer Self-efficacy, ICT Usage and Subjective Well-Being

The present study adds to previous literature that ICT usage has significant impact on female's Subjective well-being. Subjects of our study are female learners who have been socially active and participated in their charity groups for many years. The high perceived social capital contributes to their learning satisfaction and Subjective well-being. In addition, ICT usage also plays an important role in this model. For TWU participants, the ability to use ICT confidently contributes to their well-being by exercising their skills, expanding their experiences and stimulating their psychological states of happiness, satisfaction, and group involvement. Addressing the gender reality embedded in their environment, it is clear, however, that having ICT at home and receiving ICT training do not necessarily promote well-being although their Self-efficacy is raised (Lin et al., 2010). Unless females can use and experience ICT, their well-being will not be enhanced.

Social Support, Learning Satisfaction and Computer Self-Efficacy

One interesting finding was that Social capital did not directly predict computer Self-efficacy but relied on the mediating effect of learning satisfaction. Previous research showed that social influence and peer support are critical for improving the skills needed to accomplish tasks and meet expectations (Bandura, 1997; Compeau & Higgins, 1995). However, from the TWU experience, it is obvious that to raise participants' computer Self-efficacy requires more than Social capital and support. TWU participants who were socially active and already had high Social capital, nevertheless felt frustrated on their previous ICT training. However, on the TWU group program, the Social capital among participants became an aid to ICT learning, creating a learning community, and promoting learning satisfaction. Therefore, participants established their ICT Self-efficacy. This study shows the importance of converting Social capital into support for ICT learning. Unless participants develop a sense of satisfaction in class learning, a high level of Social capital on its own may not lead to higher levels of computer Self-efficacy.

Learning Satisfaction, Computer Self-Efficacy and ICT Usage

Similarly, learning satisfaction did not directly predict ICT usage, but relied on the mediating effect of computer Self-efficacy, which is necessary for achieving the sustainability of ICT usage. As significant resources have been invested in helping ICT non-users become proficient (Dewan & Riggins, 2005), the sustainability of usage becomes a major concern. This study provides a possible explanation of why some participants do not continue their ICT usage despite being satisfied with their training course and agreeing that it had met their expectations. For female beginners, who possess a lower self-assessment of their ICT skills and feel greater discomfort using it (Durndell & Haag, 2002; Trauth, Nielsen, & von Hellens, 2003), learning satisfaction alone was not enough to motivate their continued usage of ICT. Instead, building up their Self-efficacy became even more important. Only when the female learners gained in confidence and believed that they had become capable users, they will keep using ICT.

CONCLUSION

In the information age, digital literacy is essential. Yet, many females remain digitally illiterate. It is important to identify the reasons behind this illiteracy and the methods required to foster and encourage female ICT learning. This study shows that once women can use ICT competently, their well-being is raised. This confirms that ICT literacy is important. More important, we identify a mechanism for helping women become competent with and sustain their ICT usage. As our study was limited to Taiwan and the results may not be applicable to other nations and cultures, further research can investigate ICT learning and usage within other under-privileged groups, such as the economically-deprived and aboriginal groups.

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