Journal of Agricultural Extension and Rural Development Vol. 2(9), pp. 191-197, November 2010
Available online http:// academicjournals.org/JAERD
ISSN- 2141 -2154 ©2010 Academic Journals

Full Length Research Paper

Effects of farmer's computer abilities and self-efficacy on their learning performance and adoption intention of the farming management information system

Hsiu-Ping Yueh* and Yi-Lin Liu

Department of Bio-Industry Communication and Development, College of Bioresource and Agriculture, National Taiwan University, Taiwan.

Accepted 27 October, 2010

This study explores how farmer's self-efficacy influences their performance to use the farming management information system, FMIS. Six instruments were developed to evaluate computer ability, self-efficacy, performance, acceptance and attitude of 23 farmers who were enrolled in a two-day training workshop on FMIS. The results of this study have shown the training program improved farmer's self-efficacy in the FMIS, and perceived usefulness could increase participants' usage motivation of the FMIS in the future. The results suggested farmer's efficacy has no significant impact on their choices over tasks with different levels of difficulties, and performance of using FMIS. This could be attributed to the planning and limited duration of the training. This study contributes to the field of research by its genuine and systematic implementation of farming information system training. Several suggestions including the involvement of subject-matter experts, experience sharing activities as well as peer modeling strategies were proved to be effective to facilitate farmer's self-efficacy and can be served as references for future practices and studies.

Key words: Farmer, self-efficacy, training, farming management information system (FMIS).

INTRODUCTION

The arrival of knowledge economy era and the impacts of globalization and computerization, all industries are required to adjust their management tactics and directions to grasp the opportunities promptly, improve organization marketing competitiveness, and create financial benefits (Yueh and Chiu, 2001). Due to environment limits, agriculture in Taiwan are facing problems such as less available for land cultivation, low usage of agriculture production resources, low output of individual farm, and no sufficient ability to negotiate price in market by individual farmer. A unique agriculture group, the agricultural production and marketing groups (APMGs) were therefore established in Taiwan. These consisted of farmers who grow the same crops in a neighborhood to work collaboratively for setting up corporatized production and marketing management. In order to improve APMGs management effectiveness and flow of information for upgrading farmer literacy, the Council of Agriculture (COA) of Executive Yuan in Taiwan developed an integrated "Farming Management Information System (FMIS)" in 1997. It comprises ten main functions intended to help APMGs manage their people, production operation, process, materials, products, marketing, finance and accounting. By using FMIS, farmers can collect and integrate information systematically, enhance efficiencies of cooperation and division of labor, allocate resources judiciously and make strategic decision, reduce production costs, as well as improve products quality and increase profits. The changes to the market environment have forced APMGs to compete with global competitors; hence, the need for APMGs to adopt high efficient

*Corresponding author. E-mail: yueh@ntu.edu.tw. Tel. 886-2-33664425.

management information system like FMIS increased, particularly after Taiwan joined WTO in 2002.

However, FMIS was not popular among farmers even after 7 years of promotion by the government since it was first developed in 1997. This failure may be due to FMIS being too complicated to be use because of its unfriendly interface, and farmers seemed to lack confidence in using it (Yueh, 2003). Therefore, the question arises: what factors would influence farmer's learning and performance of system operation as well as their confidence in using the system?

In Bandura's social learning theory, self-efficacy (SE) represents individual confidence in his/her ability to execute tasks, and acts as a self-regulatory mechanism to the level of motivation, performance accomplishments, choices of behaviors and activities, and how much efforts and persistence in the face of difficulties (Bandura, 1982; Wood and Bandura, 1989). SE beliefs are formed from diverse sources of information, which includes performance accomplishments, vicarious experience, verbal persuasion and emotional arousal. An individual therefore invariably assesses different sources to form their own ability evaluation (Bandura, 1977; Murphy et al., 1989; Lane et al., 2004). Besides, SE expectation also varies on magnitude, strength, and generality dimensions which may impact performance outcome (Bandura, 1977).

While the general dimension of SE has been widely adopted in many fields, some researchers extended this concept to specific SE, such as computer SE (CSE), to better describe SE application in certain situation. And many researchers contended training is a useful method to improve CSE since it was found to have effects on enhancing individual skills, influencing their attitude and behaviors to information system use and then increasing productivity (Gist et al., 1989; Compeau and Higgins, 1995; Torkzadeh et al., 2003). However, training has different impacts on individuals with dissimilar degrees of CSE, which means individuals with high CSE usually showed a decrease in their exhaustion when given intensive training, while individuals with low CSE have the opposite results (Salanov et al., 2000).

Besides, the level of performance does not equate with the level of SE, since SE is a cognitive process which individuals will take environmental factors and personal abilities into consideration before they act. In practice, while some view abilities as natural-born others think they are acquirable skills and these preconceptions may influence the way performance information is processed. When individuals think abilities are acquirable, they not only spend more time diagnosing the task, but also maintain higher levels of SE.

On the contrary, individuals attribute failures to lack of intelligence capacity when they perceive abilities as natural-born, which result in anxiety, lower learning outcome and SE, which subsequently decrease their overall performance (Stajkovi and Luthans, 1998). Pajares and Kranzler (1995) found that ability and SE have direct and significant influence on performance, as well as ability on SE. Especially under training circumstance, CSE was found to have positive relationship with performance and could be used to predict individual final accomplishment (Gist et al., 1989; Webster and Martocchio, 1992; Wang and Newlin, 2002).

Since an individual who has the acquired skills and is confident to use these skills effectively will be more inclined to adopt technology (Kurbanoglu, 2003), SE can be viewed as a good predictor of user's technology adoption behavior (Hill et al., 1987; Torkzadeh and Dwyer, 1994; Brosnan, 1998). Davis et al. (1989) presented technology acceptance model (TAM) to evaluate user's acceptance to technology, and aimed through this model to understand user's internal belief, attitude, and intention which may influence their choice of whether to use technology or not. Perceived usefulness and perceived ease of use were TAM's two most important concepts. Perceived usefulness means individual's subjective expectation that use specific system would enhance their performance in organization; and perceived ease of use means user's expectation of whether the system is easy to use. Results of previous studies indicated both perceived usefulness and perceived ease of use were positively related to user's intention to use computer system (Chang and Tung, 2008; Tung, et al., 2009).

Up to the present, many studies have been done to explore the effects of SE on performance accomplishment, behavior change, and behavior sustaining power in different educational situations (Multon et al., 1991; Schunk, 1991; Pajares and Miller, 1994; Pajares and Kranzler, 1995; Margolis and McCabe, 2003; Roberts et al., 2006).

However, little information is available on farmers or agricultural information system use. Therefore, this study was set to gain a better understanding of the relationship between perception of farmers' SE and performance of FMIS, which is expected to contribute to the fields of agricultural extension education.

RESEARCH METHODOLOGY

The target population for this study was farmer trainees who came from 12 different counties in Taiwan that enrolled in the FMIS training program before. They were informed about this training course and those who were interested filled in a pre-training questionnaire and send it to the researcher. At this time, an initial check was conducted to ensure that subjects met the pre-requisite computer abilities in the study.

After the selection procedure, 23 trainees (22 males and 1 female) were invited to attend this two-day training workshop held by National Taiwan University. The trainees came from varied Counties, including Taipei, Yilan, Hsinchu, Taoyuan, Miaoli, Taichung, Changhua, Chiayi, Tainan, Pingtung, and Hualie, which located at northern, middle, southern, and eastern Taiwan. Prior to the start of the training, all trainees were asked to fill in FMIS SE questionnaire. Following the lectures and practices, trainees had to complete test 1 immediately. On the second day, trainees completed test 2 after the course, and post-training questionnaires were delivered at the end of the day as well.

This study developed six instruments to examine trainee's computer abilities, self-efficacy (SE), computer self-efficacy (CSE), performance, and perception of FMIS. Five of them were researcher-developed instruments, only the CSE scale was modified from Torkzadeh and Kouftero's scale (1994) which included beginning skills, mainframe skills, advanced skills, and file and software skills. The detailed information of all instruments was described in Table 1.

Descriptive statistics were generated on the variables. Pearson correlation, t-test and regression analyses were used to test hypotheses. An alpha level of 0.05 was established *a priori*.

RESULTS

Ages of subjects ranged between 32 and 69, with a mean of 44.2 years old. The internal consistency reliability (Cronbach's alpha coefficient) estimates for the instruments were all above 0.900 (Table 2) which demonstrated the instruments attained high reliability. Correlations among computer ability, CSE, and FMIS SE coupled with means and standard deviations showed there are moderate to high correlations among these variables (Table 3). Linear regression analysis showed that CSE can significantly predict changes in FMIS SE (F=33.096, p<.001).

Besides, the linear regression analysis also showed that computer ability will predict changes in SE with explanation power of 68.2% (Adj. R^2=0.667, p<0.001) of the variance in CSE and 26.6% (Adj. R^2=0.231, p<0.05) of the variance in FMIS SE by computer ability, respectively.

With respect to the influence of CSE and FMIS SE on choices of task difficulties, the results showed that most of the trainees chose medium (43.5%) and advanced task (26.1%) in Test 1. And, it was noteworthy that more trainees chose advanced tasks in Test 2 (medium 43.5% and advanced 52.2%) which meant that trainees tried to take challenges and set higher goals for themselves.

Moreover, observation from the multiple discriminant analysis shows there are no significant effect of both CSE and FMIS SE on discriminating trainee's choices of task difficulties in Tests 1 and 2 (Table 4). The multiple regression analysis suggest there are no significant bases for SE on predicting the changes of performance scores, neither for computer abilities and SE on predicting the changes in performance scores (Table 5).

To further examine whether trainees would demonstrate different levels of FMIS SE before and after the training program, the pre and post FMIS SE were analyzed and significant difference produced a t-value of -2.291 (p<0.05).

Finally, to examine the influence of trainee's perceived usefulness and perceived ease of use on their intention of future system adoption. Linear regression analysis was conducted and results showed that perceived ease of use could not explain trainee's intention to use FMIS in the future (F=0.296, p>0.05); however, perceived usefulness could explain it (F=4.397, p<0.05).

DISCUSSIONS

Based on the objectives and results of the study, several issues can be discussed as follows. The relationship between CSE and FMIS SE is positive, and this finding corresponds to Bandura (1977) that when individual repeats successful experience in related tasks, their SE could be extended to other tasks, as was the generality feature of SE. Besides, the impact of computer abilities on SE was supported, while a strong relationship was found between computer abilities and CSE. The reason may be that trainees in this study not only had to possess the basic computer skills to operate FMIS, but also needed to integrate other business management concepts simultaneously to perform the system well. As a result, these unfamiliar professional knowledge exerted higher degree of influence on trainee's confidence in using FMIS and therefore reduced the relationship between computer abilities and FMIS SE.

Secondly, this study found that SE will not predict the choices of task difficulty. This result may be related to the issue of abilities. In this study, the researcher observed some trainees with excessive level of confidence to their actual abilities to operate computers or FMIS, and resulted in choosing the task which was too hard for them. Moreover, although trainees chose the inappropriate level of tasks and did not perform well in Test 1, they still wanted to challenge themselves and even selected the harder tasks in Test 2. The reason may correspond to Pajares (2002) contention that individuals with stronger perceptions of their ability may approach tougher tasks as challenges to breakthrough rather than as threats to escape from. The strong intrinsic motivation therefore allows them to set challenging goals and sustain efforts to accomplish them.

Furthermore, the findings, with respect to performance, were not consistent with the hypothesized relationships. No difference in trainee's performance solely based upon SE or the combination of computer abilities and SE were found. Some possible explanations for these unexpected results were considered. Firstly, Pajares (2002) pointed out that no matter how confident an individual feel, he could not produce success when requisite skills and knowledge were absent. However, SE was individual beliefs about personal ability to perform a task and not real ability (Bandura, 1997). In the current study, trainees needed to have the abilities to operate FMIS as well as possess sufficient specialized knowledge, such as farming management, to solve complicated tasks. The researchers observed that some trainees chose inappropriate tasks due to their incorrect understanding of their actual abilities and were unable to make good use of diverse concepts. Thus, the result supported the conclusion of Schunk (1991) that individual with high SE would not produce acceptable performance when requisite skills were lacking.

Secondly, SE was not the solitary indicator that could

Table 1. Information of instruments used in the present study.

Instrument	Purpose	Item	Measurement
CSE scale	rate trainee's confidence level of how well their computer skills are	28	6-point Likert-type scale (1= not at all, 6=excellent)
FMIS SE scale	rate trainee's confidence level of how well they can operate FMIS	10	6-point Likert-type scale (1= not at all, 6=excellent)
Computer ability scale	rate how proficient trainee's computer operation skills are	10	11-point Likert-type scale (0=not proficient at all, 10= very proficient)
Usefulness scale	examine trainee's perceptions of usefulness of FMIS	10	11-point Likert-type scale (0=not helpful at all, 10=very helpful)
Ease of use scale	examine trainee's perceptions of ease of use of FMIS	10	11-point Likert-type scale (0=very difficult, 10=very easy)
Technology adoption intention	examine the degree to which trainee's intend to use FMIS in the future	1	6-point Likert-type scale (1=not at all agree, 6=highly agree)
2 tests	assess trainee's knowledge and operation skills of FMIS	varied	basic, medium, and difficult levels

Table 2. Internal consistency reliability of instruments.

Instrument	Reliability	Instrument	Reliability
Computer ability	0.910	Test 1	0.986
CSE	0.975	Test 2	0.936
Pre-FMIS SE	0.937	Ease of use	0.916
Post-FMIS SE	0.910	Usefulness	0.918

Table 3. Means, standard deviations, and correlations among variables studied.

			Correlation matrix							
Variable	**Mean**	**SD**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1.CSE	134.39	20.01	1.0							
2.Pre-FMIS SE	46.00	7.33	0.78**	1.0						
3.Post-FMIS SE	48.43	5.53	0.51*	0.72**	1.0					
4.Computer ability	75.43	14.22	0.83**	0.52*	0.32	1.0				
5.Performance	71.96	23.33	-0.71	-0.11	-0.14	-0.12	1.0			
6.Usefulness	86.48	12.08	0.39	0.53*	0.64**	0.14	0.27	1.0		
7.Ease of use	78.09	11.14	0.54**	0.73**	0.81**	0.37	0.05	0.57**	1.0	
8.Technologyadoptionintention	5.43	0.66	0.20	0.39	0.32	0.15	-0.38	0.42*	0.11	1.0

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

Table 4. Results of multiple discriminant analysis predicting task difficulty from SE.

	Test 1			Test 2		
Variable	Wilk's Lambda	F	Significant	Wilk's Lambda	F	Significant
CSE	0.766	3.048	0.070	0.691	4.473	0.063
Pre-FMIS SE	0.764	3.083	0.068	0.818	2.223	0.134

Table 5. Results of multiple regression analysis predicting performance from SE and computer ability.

	Performance				
Independent variable	**B**	**SE B**	**Beta**	**t**	**tolerance**
CSE	0.040	0.416	0.035	0.097	0.388
Pre-FMIS SE	-0.428	1.135	-0.135	-0.377	0.388
	R^2=0.012			F=0.122	
Computer ability	-0.453	0.706	-0.276	-0.642	0.275
CSE	0.391	0.690	0.335	0.566	0.145
Pre-FMIS SE	-0.723	1.240	-0.227	-0.583	0.335
	R^2=0.033			F=0.216	

predict individual performance. SE beliefs usually affect cognitive functioning through both motivational and information-processing processes (Bandura, 1989). Therefore, cognitive factors, such as whether training content could apply to work immediately and assist trainees solve real-world problems, may also influence the relationship between SE and performance. Thirdly, test contents and the implementation procedure could also influence the performance outcome. Performance accomplishments, one kind of self-efficacy information sources, mainly come from personal mastery experiences that played an important role in performing successfully (Bandura, 1977). Since the tests were implemented right after the class finished, trainees were forced to reflect, review and practice what they have learned within a limited period of time. Consequently, the lack of mastery experiences might affect their performance and accomplishments. Besides, adults were usually in anxious and contradiction state in learning activities (Smith, 1982), it is possible that the test arrangement and the time constraints in this study may bring pressures that made trainees feel uneasy and eventually influenced their performance.

Although no differences were found in trainee's performance based upon SE, however, the CSE and performance was highly correlated but with negative relationship. This particular finding could be illustrated with "face-keeping" concept in most Chinese society. There are two types of faces: social face and moral face. Social face is gained through the status achieved by one's talent, behaviors, or ability; moral face represents the social evaluation of one's moral character. And face may impact individual's emotional state, or urge a person to take actions to restore face (Hwang, 2006). In this study, most trainees came from AMPGs which had excellent performances and maybe possessed high extent of the feeling of having face arising from the career performance (social face) of themselves. Therefore, they may overrate their CSE in order not to lose face, even though they did not have the actual abilities to perform the computer-related tasks well.

Besides, results of this study showed that there is significant difference in trainee's pre and post FMIS SE, which corresponded to Torkzadeh and Dyke (2002) that computer training was a good way to improve SE. Some previous research also provides some explanations for this finding. Bandura (1986) pointed out seeing similar others performing threatening tasks without adverse consequence could generate expectations in observers that they could do as well as models and increase their SE.

Torkzadeh et al. (1999) considered SE as dynamic construct which changed over time while new information and experiences were acquired. And Ann (2001) also found out that it was helpful to increase individual SE if they had the chance to employ what they have learned. In this current study, the instructor arranged trainees with similar features sitting nearby to allow them observe peer models. And the training also provided sufficient new FMIS operation knowledge in class, which may have guided trainee's behaviors and as well improved their FMIS SE.

Finally, results of this study showed that perceived usefulness was a good predicator; however, perceived ease of use did not explain trainee's system adoption intention in the future. While adults had divergent learning features from young learners, they usually possessed varied learning needs depending on their roles and tasks, and hoped that the learning outcomes could be put in use in work or daily life (Knowles, 1976; Hwang, 2000). The trainees in the study mainly came from APMGs with excellent farming experience and marketing performance, they also possessed higher motivation and would actively demand to learn new information and updated techniques to apply in their real work. Therefore, whether the system was useful to benefit them should influence trainee's expectation and intention to use FMIS in the future.

CONCLUSION AND RECOMMENDATIONS

The present study aims to examine the relationship between perception of farmer's SE and performance of FMIS under the training circumstance. From the analysis and examination of 23 trainees, the results show that CSE can significantly predict changes in FMIS SE, computer ability will predict changes in both CSE and FMIS SE, training will improve FMIS SE, and perceived usefulness can explain the FMIS usage intention in the future. However, there is no significant effect of both CSE and FMIS SE on discriminating trainee's choices of task difficulties, and computer abilities and SE cannot predict the changes in performance scores.

According to the results of the study, recommendations for better design of farming information system training to enhance trainee's SE and performance were provided. First of all, trainee's characteristics must be taken into consideration when conducting training design. From the researcher's observation, farmers generally would not actively participate in learning activities, but would possess work-oriented learning goals, and need longer time to absorb knowledge and apply what have been learnt.

Therefore, instructors should consult with other subject-matter experts who have the requisite backgrounds and computer or specific system teaching experience in advance to help revising design of instruction, learning tasks, content and avoid improper ability judgment of trainees.

Besides, the researchers of this study also argue that verbal persuasion, vicarious experiences and mastery experience could be efficient sources of efficacy information. Instructors can provide opportunities for trainees to share successful experiences, offer encouragements and feedbacks to learners, and utilize the peer modeling strategy to facilitate learning. Through using different efficacy information sources, instructor can help trainees to strengthen their confidence, reassess self competency, and thus can lead to successful performance and achievement.

ACKNOWLEDGEMENTS

The authors would like to thank the Council of Agriculture (COA) of Executive Yuan in Taiwan and National Taiwan University for their grants in support of this study.

REFERENCES

Ann MV (2001). Ripple effect training: Multiplying extension's resources with veteran master gardeners as MG trainers. J. Ext. 39(3). Retrieved June 1, 2006, from http://www.joe.org/joe/2001june/rb1.html.

Bandura A (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychol. Rev., 84(2): 191-215.

Bandura A (1982). Self-efficacy mechanism in human agency. Am. Psychol., 37(2): 122-147.

Bandura A (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, N. J.: Prentice-Hall.

Bandura A (1989). Human agency in social cognitive theory. Am. Psychol., 44(9): 1175-1184.

Bandura A (1997). Self-efficacy: the exercise of control. New York: W. H. Freeman.

Brosnan MJ (1998). The impact of computer anxiety and self-efficacy upon performance. J. Comput. Assist. Learn., 14(3): 223-234.

Chang SC, Tung FC (2008). An empirical investigation of students' behavioural intentions to use the online learning course websites. Br. J. Educ. Technol., 39(1): 71-83.

Compeau DR, Higgins CA (1995). Computer self-efficacy: Development of a measure and initial test. MIS Quart., 19(2): 189-211.

Davis FD, Bagozzi RP, Warshaw PR (1989). User acceptance of computer technology: A comparison of two theoretical models. Manag. Sci. 35(8): 982-1003.

Gist ME, Schwoerer C, Rosen B (1989). Effects of alternative training methods on self-efficacy and performance on computing software training. J. Appl. Psychol., 74(6): 884-891.

Hill T, Smith ND, Mann MF (1987). Role of efficacy expectations in predicting the decision to use advanced technologies: The case of computers. J. Appl. Psychol., 72(2): 307-313.

Hwang F (2000). Introduction to Adult Education. Taipei: Wu-Nan culture enterprise.

Hwang KK (2006). Moral face and social face: Contingent self-esteem in Confucian society. Int. J. Psychol. 41(4): 276-281.

Knowles MS (1976). The modern practice of adult education. New York: Association Press.

Kurbanoglu SS (2003). Self-efficacy: A concept closed linked to information literacy and lifelong learning. J. Doc. 59(6): 635-646.

Lane J, Lane AM, Kyprianou A (2004). Self-efficacy, self-esteem and their impact on academic performance. Soc. Behav. Pers., 32(3): 247-256.

Margolis H, McCabe PP (2003). Self-efficacy: A key to improving the motivation of struggling learners. Preventing School Failure 47(4): 162-169.

Multon KD, Brown SD, Lent RW (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. J. Counsel. Psychol., 38(1): 30-38.

Murphy CA, Coover D, Owen SV (1989). Development and validation of the computer self-efficacy scale. Educ. Psychol. Meas. 49: 893-899.

Pajares F (2002). Overview of social cognitive theory and of self-efficacy. Retrieved August 8, 2004, from http://www.emory.edu/EDUCATION/mfp.html

Pajares F, Kranzler J (1995). Self-efficacy beliefs and general mental ability in mathematical problem-solving. Contemp. Educ. Psychol., 20(4): 426-443.

Pajares F, Miller MD (1994). Role of self-efficacy and self-concept beliefs in mathematical problem solving: A path analysis. J. Educ. Psychol., 86(2): 193-203.

Roberts TG, Harlin JF, Ricketts JC (2006). A longitudinal examination of teaching efficacy of agricultural science students teachers. J. Agr. Educ., 47(2): 81-92.

Salanova M, Grau, RM, Cifre E, Llorens, S (2000). Computer training,

frequency of usage and burnout: The moderating role of computer self-efficacy. Comput. Hum. Behav., 16: 575-590.
Schunk DH (1991). Self-efficacy and academic motivation. Educ. Psychol., 26(3/4): 207-231.
Smith RM (1982). Learning how to learn: Applied theory for adults. Chicago: Follett Publishing Company.
Stajkovi AD, Luthans CF (1998). Social cognitive theory and self-efficacy: Going beyond traditional motivational and behavioral approaches. Organ. Dynam., 26(4): 62-74.
Torkzadeh G, Dwyer DJ (1994). A path analytic study of determinants of information system usage. Omega, 22(4): 339-348.
Torkzadeh G, Dyke TP (2002). Effects of training on internet self-efficacy and computer user attitudes. Comput. Hum. Behav., 18(5): 479-494.
Torkzadeh G, Koufteros X (1994). Factorial validity of a computer self-efficacy scale and the impact of computer training. Educ. Psychol. Meas., 54(3): 813-821.
Torkzadeh G, Koufteros X, Pflughoeft K (2003). Confirmatory analysis of computer self-efficacy. Struct. Equ. Modeling 10(2): 263-275.
Torkzadeh R, Pflughoeft K, Hall L (1999). Computer self-efficacy, training effectiveness and user attitudes: An empirical study. Behav. Inform. Tech., 18(4): 299-309.
Tung FC, Lee MS, Chen CC, Hsu YS (2009). An extension of financial cost and TAM model with IDT for exploring users' behavioral intentions to use the CRM information system. Soc. Behav. Pers., 37(5): 621-626.
Wang AY, Newlin MH (2002). Predictors of web-student performance: The role of self-efficacy and reasons for taking an on-line class. Comput. Hum. Behav., 18: 151-163.
Webster J, Martocchio JJ (1992). Microcomputer playfulness: Development of a measure with workplace implications. MIS Quart., 16(2): 201-226.
Wood R, Bandura A (1989). Social cognitive theory of organizational management. Acad. Manag. Rev., 14(3): 361-384.
Yueh H (2003). Training Manual of Farming Management Information System Ver4.0. Taipei: Department of Agricultural Extension of National Taiwan University.
Yueh H, Chiu I (2001). Introduction to the Extension and Training of “Farming Management Information System”. National Taiwan University Agricultural Extension News Di