

Subjective computer training: development of a scale

Yaghmaie F. PhD

School of Nursing and Midwifery Shahid Beheshti University of Medical Science and Health Services.

ABSTRACT

There have been many changes to information systems in the last decade. Changes in information systems require users to constantly up-date their computer knowledge and skills. Computer training is a critical issue for any user because it offers great capabilities for the users. This papers discusses the meaning of subjective computer training and its role on computer training. The results of the study show that Subjective Computer Training Scale (SCTS) is reliable and valid. The existence of a reliable and valid scale of computer training makes assessment possible and should have implications in all organization such as community health centers and hospitals.

Keywords: COMPUTER TRAINING, SUBJECTIVE COMPUTER TRAINING, SUBJECTIVE COMPUTER TRAINING SCALE (SCTS).

Journal of Medical Education Summer 2004;5(1): 33-37

Introduction

Studies have shown that computer training has been identified as one of the factors that influence the success of users and computerized systems (Bronsema and Keen, 1983; Lieberg, 1995). Davis and Bostrom (1993) stated that the responsibility given to users is an important issue in organizations, and user training is a key factor for the success of organizations. Thus computer is an important factor that should be considered because it can provide opportunities for users to participate in the process of information system development and successful performance (Grann, 1984; Yaverbaum and Nosek, 1992; kappelman and Guynes, 1995) specially in those areas such as health, which has been largely neglected. The results of the current study would assist community health services, hospitals and health organizations to function more efficient for better service to patients by providing computerized information systems training.

Concepts and measure of computer training

Training is a commonly used term for a wide variety of person's experience. Most people have the benefit of some training to enable them to carry out the requirements of their life. People may learn and change their performance by observation of others behaviours (Robinson, 1990). In the process

of training, human senses and activities are involved. People use their sense and ability differently so their leanings are different from each other.

Studies considered many dimensions of training such as; level (high/low); cognition; affective issues; psychomotor skills; quality; quantity; manner of delivery (direct and indirect);and degree of subjectivity versus objectivity.

Cognitive domain is associated with intellectual changes in learner, while the affective domain is related to feelings, attitude and interest of learners. In addition, behaviour of learner is related to the psychomotor domain (Bedworth and Bedworht, 1992). Quality of training is related to the degree goodness or worth of training in any particular field. On the other hand, quantity of training can be measured by number of courses, hours of training and etc. In many situations "quality" may be more important than "quantity" of training.

Training can also be direct or indirect. If learners learn by doing and practicing, it would be direct training and if training process be by seeing or using any other sense, then it is indirect.

Subjectivity means "personal thought and emotion"(7). Subjective training is available only as the ideas of an individual and is called the world of subjective feelings and it cannot be communicated to others. The inner thoughts of an individual are known only to that person and are not accessible to others.

Another view of training is the reality or objectivity. Oakeshott (1966: 60) argues that objectivity is a characteristic of reality that is unavoidable. The author also discusses that "the objectivity is what cannot be denied, what is absolute and consequently what is real". An alternative definition is that "not influenced by personal feeling or opinions; unbiased; fair" (7). Thus, objective means what exists in real world. Objective training refers to what is real and separate from the feelings and ideas of persons. Therefore, perception of computer users about the computer training can be called subjective, and this can be positive or negative. Whereas, the real training of the user is called objective computer training.

Definition of training and computer training

There is no explicit definition in the literature of computer training. There are however many definitions of training. For example, oxford dictionary (1993) explained training is "a process of preparing for a job". An alternative definition is that "training is used or misused to do a variety of things from informing, motivating, rewarding to changing behaviour and improving performance" (Rummler, 1987: 218). Pepper (10) defined training as "organized process concerned with the acquisition of capability, or the maintenance of existing capability". In a parallel perspective, Robinson (5); Buckley and Caple (11); Burns (12) defined training as a planned effort to develop knowledge, skill and attitude in order to achieve a desired standard or level of performance.

Since job training could increase the ability of people to do their work satisfactory, computer training improves capability of users to perform computers that is arranged by doing an idea. A person's computer training depends on instruction, learning and practice because training comes through these processes.

By reviewing the literature and examining the different perspective, subjective computer training is defined by the researcher as;

- 1- "Sensations and judgement of users regarding the process and product of a particular computer training activity"
- 2- "The internal feeling of users that is reflected from computer teaching and practice."
- 3- "Thought, perception and emotions of users about the process of obtaining computer knowledge and skills".

Subjective computer training is the perception of users in relation to their computer training that only they can explain. The subjective training of individuals differs according to whether the training is successful or not and it can provide different perceptions of users. Some of these, such as positive and favourable perception toward computer training, can make user confident (5), and lead to more successful task accomplishment and they may also make them more enthusiastic about interacting with computer. A person who is able to achieve success may be able to follow with further success (13). Others with negative perception toward computer training may avoid going for learning skills needed to use computer.

Subjective feeling of users toward computer training can provide useful information about the success or failure of computerized systems. Since subjective computer training is an important issue that affects system usage, the need of an adequate instrument to evaluate subjective computer training is evident. In order to increase the understanding of users' computer training, development of a reliable and valid multi-item instrument for measuring subjective computer training is becoming increasingly important to researchers and is a critical research priority.

Critical Review of instruments for measuring computer training

Researchers in management information system (MIS) used different questions to measure the level of computer training on their studies. For example, Yaverbaum (1988) measured computer training according to the courses of programming, introduction to information systems or data processing. In another study, Schiffman et al. (1992) measured users' computer training by the number of classes that the respondents had

completed, the training materials (computer aided instruction and software documentation) and the number of material sources that they used. The majorities of instruments were used to assess the quantity of objective computer training and did not measure the other dimensions of computer training such as subjective satisfaction or quality.

Regarding computer training, Igarbia and chakrabarti (1990); Igarbia (1992); Igarbia (1993); Igarbia (1994); igbaria et al. (1995); Vandenbosch and Higgins (1995); Igarbia et al. (196) measured computer training by asking their subjects on a 5-point Likert type scale whether they had computer training from any of the following sources; college courses, vendor training, in-house training, and self-training. These items can determine only the type of provider for computer training.

Mawhinney and Lederer (22) measured user computer training by asking 4 questions. The researcher designed the items that cover; 1) number of computer courses, 2) the number of different languages in computer that have been written, 3) the number of hours of computer training in the previous six months and 4) satisfaction with the availability of training. The review of literature showed that the majority of studies have measured computer training objectively. Thus, computer training was measured by number and content of courses. Robinson (5) argued that "unfortunately, training is too often equated of instruction, which may be either internal or external of the organization". The author discussed that there are many other factors rather than formal training which can assist achievement of learning. One of the factors can be feeling of learner that should be considered (23).

Subjective computer training scale (SCTS)

Since organizations use computers for different purposes, it is important to determine the factors that affect their use for information systems. The use of information technology is a criterion for determining the success and effectiveness of systems (24). The lack of computer training may become a significant barrier to success for the users and the effectiveness of the programs. Successful computerized programs are dependent

on the computer training to use systems. Moreover, users' training with information systems is a factor that can facilitate the further development of computer acceptance and the degree of training is closely related to performance and productivity of the organization (25).

By reviewing the related literature, it seems that computer training is an important variable in the management information systems (MIS) and future study in this area is needed to provide more insight (15). Measuring computer training requires a reliable and valid instrument and by developing such an instrument, measuring this important variable would be possible.

Item construction and item selection

To generate a representative sample of items of computer training, the researcher implements a variety of procedures such as, a literature review, focus groups and interviews. Participants of focus group and interview were nurses and health workers from hospitals and community health centers that had computer experience in their work situation for using / teaching. From all above approaches (literature review, focus groups and interviews), Subjective Computer Training Scale (SCTS) was developed with a 5-point Likert type scale training from "strongly agree" to "strongly disagree", the items measure subjective perspective of users in four dimension; quantity, knowledge, skills and satisfaction.

Content Validity

To test the content validity of the SCTS, the researcher selected ten nurses and health workers as computer experts from the community health centers and hospitals. The experts were then asked to rate each item based on relevance, clarity, simplicity and ambiguity on a four-point scale. Based on the suggestions of the experts, the items were modified.

Discriminant Validity

Discriminant validity of a measure is the ability to differentiate the constructs that measured with

other similar constructs (26) and it express the degree of a concept that differ from the other concepts (27). Thus, this validity can determine the degree that items differentiate their constructs with other similar constructs.

To assess discriminant validity in this study, the SCTS and Nurse's computer Attitude Inventory (NCATT) (28), were mailed to all nurses and health workers who employed in community health centers in a local area in NSW of Australia and was requested that the questionnaire should be completed by every staff member. The response rate for completed questionnaires was 70% of the total numbers.

Reliability

In this study, internal consistency reliability of subjective computer training Scale (SCTS) was measured. The internal consistency refers to a "measure of how well all the items in the instrument related to each other and to the total instrument" (Wilson 1989: 358). The measure of coefficient alpha was calculated for the 5 item of the SCTS. The analysis of data showed that the Cronbach's alpha was 0.85 that was exceeded the recommended values in Nunnally's (1978) guidelines.

Based on the finding, this study shows that SCTS as a valid and reliable scale can help researchers in health area to measure the value of computer training course. The dimensions of computer training developed based on the previous literature on the topic of "training". Results of the study clearly indicated that "computer training" is a multi-dimensional concept with a complex nature. Development of the subjective computer training Scale (SCTS) provides a step in providing a valid and reliable scale for assessment of computer training. The SCTS can serve as a diagnostic tool for measuring computer training within organizations as a guide for course and curriculum development by educators. Furthermore, developing computer training scale and assessment user's subjective computer training can facilitate planning and developing training courses to better meet the needs of users in organization.

Results

Table 1 presents the inter-correlations among the study variables. Adequate discriminant validity was demonstrated that the internal consistency reliabilities were much higher in all factors and the subscales.

TABLE 1. Intercorrelations among the study variables (Scales and sub-scales)

Variables	1	2	3	4	5
Computer attitude	1				
Patient care	0.88**	1			
Computer anxiety	-0.78**	-.43**	1		
Patient confidentiality	0.63*	.47**	-.32**	1	
Subjective computer training	0.0**	0.18	-.40**	0.24*	1

As expected, SCTS and NCATT had positive correlation in most of the subscales, except with computer anxiety that had negative correlation. Of interest, the score of the total SCTS correlated positively with the computer attitude ($r = 0.34$) while having a high negative correlation ($r = -0.78$) with the computer anxiety. These results suggest that the SCTS is measuring predominantly positive perspective. Part of this may be attributed to the fact that the items in the SCTS are positive. This suggestion is further supported by a larger negative correlation between anxiety and the subjective computer training ($r = -0.4$). These results confirm that the SCTS has the power to measure the assumed construct and also demonstrated satisfactory discriminant validity.

Information

The current research has been done in Australia by Dr Fariedeh Yaghmaie.

Acknowledgement

I would like to acknowledge the assistance of Dr Rohan Jayasuriya and Patrick Rawstone in the data analysis.

References

- 1-Bronsema G S, Keen PGW. Education intervention and implementation in MHS. *Slaon Mangement Review*, 1983; 24(4): 35-43.
- 2-Davis S A, Bostrom R P. Training end- users: An experimental investigation of the roles of the computer interface and training methods. *MIS quarterly*. 1993; 17(1):61-81.
- 3-Grann RP. Attitude and affective use of computers among hospital personnel. *IEEE* 1984; 543-5.
- 4-Kappelman LA, Guynes CS. End-user training and Empowerment. *J Sys Manage* 1995: 36.
- Liebers S. Computerized nursing management systems. *Nurs Manage* 1995; 26 (3), 29-36.
- 5-Armstrong A W , MeElhone A. Computer skills. in R.L. Craig (ed) *Training and development Handbook*. 1987; 697-716.
- 6-Bedworth, A.E. and Bedworth, D. A. *The profession and Practice of Health Education*. USA: WC Brown 1992.
- 7-Oxford *Advanced learners dictionary*, New York: Oxford university press. 1992.
- 8-Oakeshott, M. *Experience and its modes*. New York: Cambridge university press; 1966.
- 9-Rummler GA. Determining needs. In R. L. Craig (ed) *Training and development handbook*. New York: Mc Graw Hill; 1987;217-47.
- 10-Pepper AD. *Managing the training development function*. Aldershot: Gower publishing company Ltd; 1984.
- 11-Buckley R, Caple J. *The theory and practice of training*. London: Kogan Page Ltd 1990.
- 12-Burns R. *The adult learner at work*. Australia: Business & professional publishing 1995.
- 13-McClelland DC, Atkjinson JW, Clark RA, Lowell EL. *The achievement motive*. New York: Appleton-Century-Crofts Inc; 1953.
- 14-Yaverbaum G J, Nosek J. Effects of information system education and training on user satisfaction. *Info Manage* 1992; 22(4), 217-225.
- 15-Schiffman SJ, Meile LC, Igbaria M. An examination of end-user types. *Info Manage* 1992; 22(4), 207-215.
- 16-Igbaria M. An examination of microcomputer usage in Taiwan. *Info Manage* 1992; 22(1), 19-28.
- 17-Igbaria M. User acceptance of microcomputer technology: an empirical etes. *OMEGA* 1993; 21(1), 73-90.
- 18-Igbaria M, Chakrabarti A. Computer anxiety and attitudes towards microcomputer use. *Behav Info Tech* 1990; 9(3), 229-241.
- 19-Igbaria M, Guimaraes A, Davis G B. Testing the determinants of microcomputer usasge via a structural equation model. *J Manage Info Sys* 1995; 11(4), 87-114.
- 20-Igbaria M, Parasuraoman S, Baroudi J. A motivational model of microcomputer usage. *-J Manage Info Sys* 1996; 13(1), 127-143.
- 21-Vandenbosch B, Higgin CA. Executive support systems and learning: a model and empirical test. *J Manage Info Sys* 1995; 12(2), 99-130.
- 22-Mawhinney CH, Lederer AL. A study of personal computer utilization by managers. *Info Manage* 1990; 18(5): 243-253.
- 23-Dewey J. *Experience and Education*. New York: The Macmillan Company; 1993.
- 24-Szajan B. Determine information system usage: some issue and examples. *Info Manage* 1993; 25 (3), 147-154.
- 25-Robinson KRA. *Handbook of training Management*. Second Edition, London: Kogan Page Ltd, 1990.
- 26-Polit DF, Hungler BP. *Nursing research principles and methods*. Fifth edition. Philadelphia: JB Lippincott Company; 1995.
- 27-Campbell D T, Fiske D W. Convergent and discriminatnt validity by the mulitrait-multimethod maritx. *Psychological bulletin* 1959; 56: 81-105.
- 28-Jayasuriya R, Caputi P. Computer attituded and computer anxiety in nurming; validation of an instrument using an Australian sample. *Comput Nurs* 1996; 14 (5), 1-6.