

## 【附錄3】 Knowledge Sharing of Health Technology for Students in Universities of Technology

CHIN-MOU CHENG, LI-JUNG CHEN, CHI-KAO CHANG

College of Humanities and Management, Fooyin University  
151, Chihhsueh Rd., Ta-liao, Kaohsiung, Taiwan, R.O.C.  
Department of Industrial Technology Education  
National Kaohsiung Normal University  
116, Ho Ping 1Rd., Kaohsiung, Taiwan, R.O.C.

so003@mail.fy.edu.tw, littlecheng@gmail.com, <t644722@ms13.hinet.net>

*Abstract:* - Knowledge sharing of technology innovation is the main developmental force in the 21<sup>st</sup> century knowledge-based economy. This study aims to research the factors of students' knowledge sharing of health technology in universities of technology, validating a scale to measure the current situation for students' knowledge sharing of health technology and to test some models of constructing students' knowledge sharing of health technology. To achieve this goal, the following methods were adopted: literature review, Delphi survey, professional interview and sampling questionnaire survey (2,451 students from 14 technology universities in Taiwan) to examine the students' knowledge sharing of health technology. The results showed that the students' knowledge sharing of health technology consisted of behavior norm, sharing attitude, sharing intention, sharing behavior and sharing control in terms of the theory of planning behavior (TPB). The models of students' knowledge sharing of health technology were tested with good fit through structural equation modeling (SEM). Since the path correlation of model was based on TPB, the following hypotheses concerning the students' knowledge sharing behavior were supported: sharing attitude toward sharing intention, behavioral norm toward sharing intention, behavioral control toward sharing intention, sharing intention toward sharing behavior, and behavioral control toward sharing behavior, which all had positive effects. Finally, conclusions and suggestions were proposed for all forms of teaching, such as embedded teaching in health technological literacy, the methods of research and statistics, the policy of promoting students to the holistic health, and further researches including a bridge building between the universities of technology and industries for teachers and practitioners, then constructing a significant wireless connectivity of knowledge sharing with hardware and software of mobile learning in health technology should be considered.

Key-Words: health technology, structural equation modeling, universities of technology, knowledge sharing, theory of planning behavior

### 1 Introduction

The numbers of technology universities in Taiwan increased to 32 in the 2006 school year and has been increasingly expanded. Since the higher technological and vocational education deregulated, current students of higher education have placed themselves to the modern technological environment; they use and depend on technology more than the students in the past. The technology is helpful for their learning and training, but it's better not to impact their health. And the technology is originally one kind of process of question-solving in modern society, and the people use it with resources and creativity to solve effectively the practical questions. However, the students face all kinds of technological

environment, and they addict themselves to it and extricate themselves with difficulty. The survey discovered that there were 11% of college students who spent over six hours on the Internet every day, and thus they were stricken by headache, sleep disorder, and anxiety, and also could agitate restlessly when they were not on the Internet. They lost all interests in life and addicted themselves to network which threatened seriously their health. The current health technology had the direct and indirect influence to users' health of mind, body, physiological and psychological wound or psychogenic diseases and so on[8]. The college students contacted frequently the technology, but they often lacked actually the health technological literacy and did not understand the pros and cons of both sides of technology in terms of the impact of the health. Then they pursued constantly the innovative

products, and neglected the fact that it would initiate the serious problems in mind and body health and hoodwink their advantages.

Although the related articles of knowledge management and knowledge transfer were many in recent years, those based on the theory of planning behavior of social psychology to explain the knowledge sharing behavior of health technology actually were extremely rare. All the knowledge transfer or sharing behavior usually were carried on in organizations, such as the hospital doctor's knowledge sharing [25], or the individual nurse knowledge transfer in hospital[29]. There was not yet a paper in view of students knowledge sharing of health technology in technology universities. Therefore, the authors intend to explore the students' knowledge sharing of health technology in technology universities according to many years of teaching experience in technology universities.

## 2 Documentary analysis

### 2.1 The meaning of health technology

The health technology is one kind of technology which is associated directly with person's health, and promotion of person's health and prevention of disease. Using this technology, one could improve the condition to restore the health for sickness (medical service), and would strength the longevity with health caring for no sickness (health care). The health technology contains the health service to promote health, to prevent and the treating method of disease, as well as the improvement condition and restoration of the health (<http://www.ncchta.org/>). The health technology is not only the exquisite, innovative utensil or medicine, but also contains the related health activity, as well as using medicine and health caring, such as accepting the innovative technology to protect health with a positive effectiveness [9]. At present the vitality diet holds a preventive medicine and health status of reconstruction, and it has two functions: treatment of illness and health caring (<http://life.edu.tw/>). This study explores the students' cognition of health technology in technology universities, under the technological environment to health cognition which contains medical and health caring of body and mind to share the health knowledge sharing behavior.

The college students should consider the impact of their health under the technological environment [28]. Because of lacking the cognition of health technology to share initiatively the health knowledge;

they heavily rely on the network technology and bring about a morbid state, unhealthy, and an abnormal mind [15] [27]. It wants to compile a suitable quantitative tool to understand their health technological knowledge sharing [10] [22] [14]. We understand the meaning of health technology through literature review about the impact of health under the technological environment.

### 2.2 Theory of Planning Behavior

Based on the Theory of Planning Behavior(TPB), the attitude, subjective norm and perceived behavioral control affect the behavior and intention. The more advantageous attitude, subjective norm and perceived behavioral control are, the stronger individual intention to solve behavior question is. Perceived behavioral control refers to the individual perception of difficulty to carry out the advantageous behavior and corresponds to self-efficacy which affects directly the behavior intention and behavior. The factors which affect directly or indirectly the knowledge sharing behavior are subjective norm, attitude intention, perceived behavioral control and so on [25]. However, actual behaviors on Internet usage and perceptions on the usefulness of Internet were more important than affective responses toward computer networks in predicting adolescents' Internet addiction[29].

To predict whether a person intends to do something, we need to know: Whether the person is in favor of doing it (attitude); how much social pressure the person feels in doing it (subjective norm); whether the person feels in control of the action in question (perceived behavioral control)

By changing these three 'predictors', we can increase the chance that the person will intend to do a desired action and thus increase the person's chance of actually doing it. In a clinical consultation, the clinician's treatment decisions and actions are examples of intentional behavior. The Theory of Planned Behavior can be useful for designing strategies to help people to adopt healthy behaviors TPB developed initiatively in 1975[17], from 1975 to January 2007, apparently, hundreds of researchers have used this theory[1] [2] [3] [4] [5] [6] to know the influence of attitudes on behavior, intention to behavior and the relationship of attitude, personality and behavior. TPB had been widely utilized to the medical behavior, lifelong study, health, on-line declaring goods [32], information system and so on, and therefore this research explores initiatively the knowledge sharing of health technology. The research model was constructed as in Figure 1.

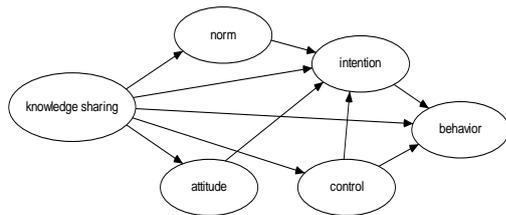


Figure 1 The research model

### 2.3 Knowledge transfer(sharing)

The focus of knowledge management is knowledge sharing in 21st century knowledge-based economy. The industries of the related health take gradually the knowledge as the standard community group and form a link with the healing institute and the consumers to reduce the cost of organizations and promotion of quality by sharing knowledge[7]. But the related knowledge sharing research, such as individual knowledge transfer [30] and knowledge transfer of network community [12]. This study explores the knowledge sharing behavior of health technology from students' viewpoint. The related papers, such as factors impacting on nurses' transference of theoretical knowledge of holistic care into clinical practice [20]; knowledge sharing behavior of physicians in hospitals [25] and so on. The healthy professional of educational situation may penetrate the training to share knowledge of health technology [26]. In hospitals the clients who want to share health knowledge are few [27]. The health knowledge is created by a cooperative relation way to product an innovative knowledge transfer [11]. A study of taxpayer intentions explores the acceptance of electronic tax filing, showing the influence of attitude, subjective norm, and self-efficacy toward intention [17]. Knowledge sharing behavior of health technology, for example, "I share something right after it is gained from the elder member of family the health technological knowledge." The related articles showed that the sharing health technology knowledge was decided by intention, subjective norm, perceived behavior control and what not [23] [19] [20] [13]. The hypotheses of this study are derived from TPB, after the sharing attitude, norm, control, and intention, then sharing behavior, and use structure equation modeling(SEM) to confirm these hypotheses.

## 3 Research design

### 3.1 Research hypotheses

The research hypotheses are derived from TPB and the related literature review mentioned above, and these hypotheses are listed as follows:

3.1.1 There is a positive correlation between the sharing attitude and sharing intention.

3.1.2 There is a positive correlation between the sharing norm and sharing intention.

3.1.3 There is a positive correlation between the behavioral control and sharing intention.

3.1.4 There is a positive correlation between the sharing intention and sharing behavior.

3.1.5 There is a positive correlation between the behavioral control and sharing behavior.

## 3.2 Method

### 3.2.1 Samples

By using survey method with cluster and stratified random sampling from 14 technology universities in Taiwan, 3,000 questionnaires were sent out, and 2,451 of effective questionnaires were returned, with a survey reaching 81.7% of return-ratio.

### 3.2.2 Research tool

The completion of scale about knowledge sharing of health technology for college students functions as a measuring tool which is derived from the process of literature analysis, by way of consulting with 10 experts and the Delphi questionnaire survey of which 16 experts' opinions tend to be consistent with and develop the official scale. Using the confirmatory factor analysis (CFA), this study supposes that the knowledge sharing of health technology (second-order factor) for college students contains 5 variables: behavioral norm, sharing attitude, behavioral control, sharing intention and sharing behavior (first order factor). This scale consists of 18 items and analyzes with tow-order CFA by using AMOS6.0 statistics software as shown in Figure 2.

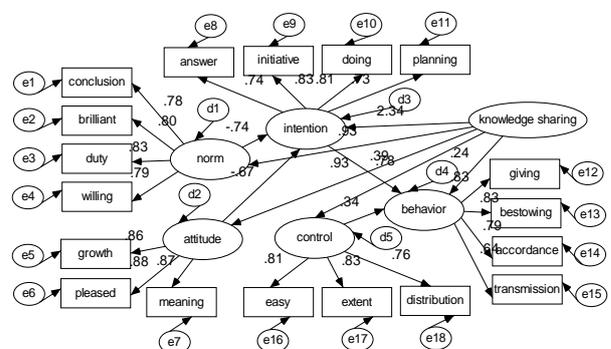


Figure2 Two-order factor model of scale

On the individual variable of this model, the all standardized loading coefficients of observation variables are in a very high significant level as shown in Figure 2. It showed that the hypotheses of theoretical model and the actual observational material were very good fit as shown in Table 1. Therefore, the 5 variables of first-order factor were suitably used to explain 18 observation variables, and the knowledge sharing of health technology of second-order factor explains the 5 first-order factor.

Table 1 Two-order factor analysis good fit test

Good fit indicator	norm	data	Judgement
Chi-square/df	<3 P>.001	1.498 P=.002	Good fit
RMSEA	<0.05	0.014	Good fit
RMR	<0.05	0.009	Good fit
SRMR	<0.05	0.039	Good fit
GFI	>0.9	0.994	Good fit
AGFI	>0.9	0.989	Good fit
NFI	>0.9	0.996	Good fit
NNFI	>0.9	0.998	Good fit
CFI	>0.9	0.999	Good fit
IFI	>0.9	0.999	Good fit
RFI	>0.9	0.993	Good fit
PNFI	>0.5	0.586	Good fit
PGFI	>0.5	0.523	Good fit
CN	>200	2057	Good fit

### 3.2.3 Factor analysis

Using factor analysis, the construct validity of scale could be constructed. The knowledge sharing of health technology(18 items) was suitably used to implement the factor analysis by Kaiser- Meyer-Olkin Measure of Sampling Adequacy (coefficient=.967, Chi-square =32101.783,  $p < .001$ ). The knowledge sharing of health technology (second-order factor) contained the behavioral norm, sharing attitude, behavioral control, sharing intention, and sharing behavior (first-order factor). Therefore, this scale embraced the whole construction effect.

### 3.2.4 Reliability analysis

As to a reliability analysis, Table 2 showed that the scale items Cronbach's alpha coefficient of knowledge sharing were all over .80, with the entire scale reaching as high as .955, and Guttman Split-half alpha coefficient all over .70, and it demonstrated the consistence of internal contents was very intense.

Therefore, the above-mentioned scale of knowledge sharing of health technology for students

in technology universities is a suitable measuring tool with high validity and reliability.

Table 2 Factor analysis, reliability analysis

Factor item-total	factor loading	Cronbach's $\alpha$	Split-half
Knowledge sharing (18 items)		.955	.894
norm (4 items)		.875	.894
conclusion	.675	.716	
brilliant	.706	.743	
duty	.742	.778	
willing	.735	.771	
attitude (3items)		.901	.798
growth	.765	.802	
pleased	.770	.807	
meaning	.771	.807	
intention (4 items)		.853	.837
answer	.706	.748	
initiative	.760	.793	
doing	.742	.776	
planning	.707	.738	
behavior (4 items)		.845	.814
giving	.764	.795	
bestowing	.760	.778	
accordance	.725	.756	
transmission.608	.642		
control(3 items)		.840	.753
easy	.705	.734	
extent	.706	.733	
distribution .649	.681		

## 4 Results and Discussion

The findings showed the background factors of technology universities students, such as: gender, educational system, department, using technology, social relationship, family relationship and awareness of health; besides the age; it showed differences on the scale contents of knowledge sharing of health technology.

The findings also support TPB applied to the forecast and explaining knowledge sharing behavior of health technology. The path correlation of model was according to TPB, and the following hypotheses were concerned with the knowledge sharing behavior as the students in technology universities proved: sharing attitude toward sharing intention(3.1.1), behavioral norm toward sharing intention(3.1.2), behavioral control toward sharing intention(3.1.3), sharing intention toward sharing behavior(3.1.4), and behavioral control toward sharing behavior(3.1.5), and all showed positive effects. Based on the TPB, knowledge sharing of health technology by using multi-groups(man group, female group) model analysis, the results also conform to the TPB findings [33] [24] [34]. It is truly said that to predict whether

students in technology universities intend to do knowledge sharing, we know: the students are in favor of doing knowledge sharing (sharing attitude), feel social pressure to do knowledge sharing (behavioral norm), and feel in control of the action in sharing question (behavioral control), and then these three 'predictors' will let students intend to do a desired knowledge sharing (sharing intention) and hence increase the students' chance of actually doing knowledge sharing.

## 5 Conclusions and Suggestions

This study discovered the background factors of technology universities students, such as: gender, educational system, department, using technology, social relationship, family relationship and awareness of health; besides the age, revealing the significant differences on scale contents of knowledge sharing of health technology. Then the model of knowledge sharing structure of health technology for university students had a good suitably fit through structural equation modeling (SEM). The hypotheses derived from literature review were proved just as TPB had conform. It meant that the sharing attitude had a positive correlation toward behavioral intention; behavioral norm also had a positive correlation toward sharing intention; behavioral control also had a positive correlation toward sharing intention; sharing intention also had a positive correlation toward sharing behavior, and behavioral control also had a positive correlation toward sharing behavior. In other words, the more positive sharing attitude of students in technology universities toward health technological knowledge are, the more obvious their sharing intention to health technological knowledge are; the more effective their behavioral norm from family or group are, the more obvious their sharing intention to health technological knowledge are; the easier their behavioral control of perception are, the stronger their sharing intention; the more obvious their sharing intention to health technological knowledge are; the more frequentative their actual sharing behavior of health technological knowledge are; and the easier their behavioral control of perception, the more frequentative their actual sharing behavior of health technological knowledge are.

The suggestions were proposed for related forms of teaching, such as embedded teaching of enhancing the knowledge sharing of health technology for students in technology universities. It can serve as references for further researches, like bridge building between the universities of

technology and industries for teachers and practitioners. Then the papers of choiceness or high quality of the related health technology could be submitted to international journals to promote the research level of professional and vocational universities. Finally, it proves feasible to use the structural equation modeling (SEM) to construct a model of knowledge sharing on health technology in cooperation between schools and industries in the foreseeable future.

Finally, the mobile features are indeed considered useful [18] for nursing and medical students by using wireless personal digital assistants (PDAs) [31] to construct a significant wireless connectivity of knowledge sharing with hardware and software of mobile learning in health technology. All of this should be concerned about.

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