The impact of teacher's powers to knowledge sharing behavior and learning satisfaction in distance-learning environment

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Abstract

Teacher's powers are one of the major factors influencing the cohesiveness of a virtual learning group. Many prior studies have examined the interactions of distance education, but few have discussed the behavior of knowledge sharing. This study examines the influence of teacher's powers to students' knowledge-sharing behavior.

Data from 103 distance-learning students were used to investigate the relationship of knowledge-sharing behavior. The results indicated that student's learning satisfaction has direct relationship with knowledge-sharing behavior. However, interactions do not show significant relationship with learning satisfaction. Teacher's reward power had direct impact on interaction and knowledge sharing behavior, while other powers did not show strong impact on learner's knowledge sharing behavior.

Keyword: reward, punishment, legitimate, knowledge sharing, interaction

1. Introduction

Nowadays knowledge is one of the key successful factors for sustaining competitive advantage, especially in high knowledge intensive company. Knowledge has become the most precious property of company.

Knowledge sharing is the behavior of diffusing one's owned knowledge with other members within one's organization. (Ryu, Ho, and Han, 2003; Liebowitz and Megbolugbe, 2003). People would not share knowledge which they regard as valuable and important. (Ryu *et al*., 2003; Bock and Kim, 2002).

In this study, we consider a distance-learning group as one kind of virtual team. Here virtual team is defined as 'a temporary collection of individuals linked primarily through computer and communication technologies working across space and time to complete a specific task (Sarker, Valacich, and Sarker, 2003).

The objectives of this study are to examine the relationship of teacher's three powers in knowledge-sharing behavior in a distance-learning environment. I construct an empirical

model from the social power theory. This model examines the impact of teacher's powers which may influence on learners' knowledge-sharing behavior. The model is then verified by questionnaire survey data.

This paper is organized into six sections. Following this introduction is a literature review of the social power theory in the knowledge-sharing context. Then, I formulate the research model for testing. In Section four, I present the analysis and findings from a structural equation modeling method. In Section five, I discuss the significance of the findings and their implications. Finally, I conclude the paper with a discussion of the paper's contributions and suggestions for future research.

2. Literature Review

Social power has been examined from a wide variety of perspectives (Brass & Burkhardt, 1993; Erchul & Raven, 1997; Gaski, 1986; Hinkin & Schriesheim, 1994; Hinkin & Schriesheim, 1990; Johnson, Sakano, Cote, & Onzo, 1993; Kanter, 1979; Mechanic, 1962; Pavlou, 2002; Pfeffer, 1992; Raven, 1993; G. Yukl & Falbe, 1991). Power generally means one party's capability to influence a target person (G. Yukl, 2002). Power is defined as the ability of an agent to change or control the behavior, attitudes, opinions, objectives, needs and values of another agent (Rahim & Buntzman, 1989; Rahim, Antonioni, & Psenicka, 2001). The most influential framework proposed by French and Raven (1959) includes five types of power.

Reward Power is the ability of the manager to control and administer rewards for desired behavior.

Coercive Power is the ability of the manager to control and administer punishment if subordinates do not comply.

Legitimate Power is the subordinates' belief that a manager has the right to control and administer their behavior.

Expert Power is the subordinates' belief that a manager has knowledge, expertise, skill or abilities in a given area.

Reference Power is the subordinates' desires to admire or identify with the manager and wants to gain the manager's approval.

Different power sources have different effectiveness in both the influential extent of the individual and that of the specific task (Etgar, 1978). This study focuses on the teacher's powers and measures how the reward, punishment, and legitimate powers affect the knowledge-sharing behavior in the environment of distance learning.

Knowledge sharing

Knowledge that resides within an individual is referred to as tacit knowledge, which is hard to verbalize and codify. And knowledge that can be articulated and put into print is explicit knowledge. (Nonaka & Takeuchi, 1995). Knowledge sharing is the activity dependent on the interaction and communication between individuals. The success of knowledge sharing depends on the amount and quality of interaction between learners, and the willingness and ability of using knowledge (Lagerstrom & Andersson, 2003).

The attitude towards information sharing is not only affected by an individual's rational self-interest, but also affected by culture and policies (Lagerstrom & Andersson, 2003). It is important for teachers to develop a knowledge-supportive culture, where sharing and gift-giving is appreciated. Teachers can influence knowledge sharing by creating IT collaboration for stimulating social interaction (Nonaka & Takeuchi, 1995).

Interaction Type

Moore (1993) proposes three types of interaction in distance education: learner to content interaction, learner to instructor interaction, and leaner to learner interaction. The first type, learner-content interaction is defined as the process of "intellectually interacting with content", thus changing learners' understanding, perspective or cognitive structure. Interaction with content is learners "talk to themselves" about information or ideas in a text, radio/television program, audio-tape, video tape or computer software (Moore, 1993). The second type of interaction is learner-instructor interaction, where an instructor stimulates or maintains students' interests, motivating them to learn and clarifying any misunderstandings of the content. The third type of interaction is learner-learner interaction, which is between learners, individually or in group settings, with or without the real-time presence of an instructor (Moore, 1993).

3. Research Model

This model is constructed to understand the knowledge-sharing behavior in distance education according to teacher's three direct powers: reward power, punishment power, and legitimate power. The research model is illustrated in Figure1.

Interaction is an important factor in human-computer interaction. Interaction is defined as learner perceived the degree of interaction with other learners and instructors. The theories of media richness and social presence suggest that computer-based communication media may eliminate the type of communication cues that individuals use to convey trust, warmth, attentiveness, and other interpersonal affections. However, contrary to the theories, empirical studies have found relational information exchange in computer-mediated team (Jarvenpaa

and Leidner, 1999). Richer interaction environments encourage students to have more social interaction and communication effectiveness than more restrictive environments (Webster, 1997).

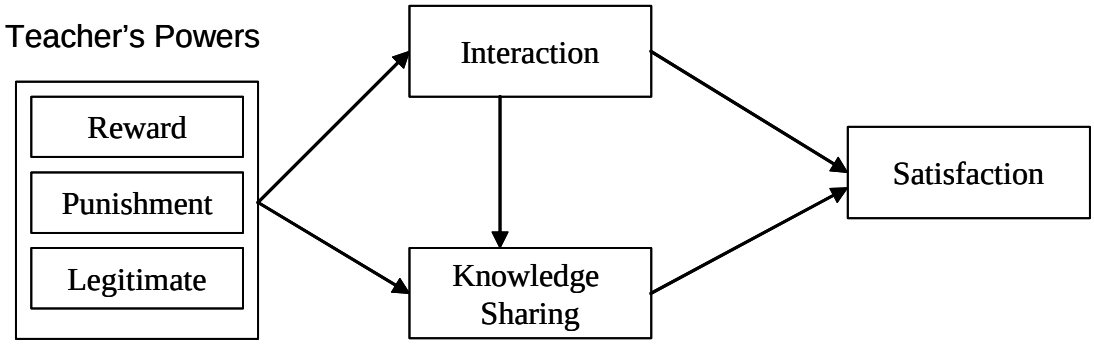

Figure 1 Research Model

Knowledge sharing is dependent on interaction and communication between individuals. Without significant interaction, learners would be distracted easily or misunderstood by other people. Trevino and Webster (1992) discuss the interaction between human-computer and explain such interaction as an experience of enjoyment and exploration. Therefore, the first hypothesis is:

H1: Interaction is positively related with satisfaction

In this study, knowledge-sharing behavior is viewed as the degree to which students actually share their knowledge with their classmates or teachers for course tasks. Satisfaction is defined as learning satisfaction which learners rated how satisfied they were with their overall learning experience.

Several studies have explored learning satisfaction with online program (Johnson, Aragon, Shaik, and Palma-Rivas, 2000; Hillman, Willis, and Gunawardena, 1994; Koh and Kim, 2004). There are two major different approaches activating knowledge sharing in a virtual community. The first viewpoint is the social perspective which focuses on sociability; the second is the socio-technical perspective which focuses on both sociability and usability (IT system or contents) (Koh and Kim, 2004). Many studies assess how the IT functionalities or IT interfaces impact learning satisfaction (Johnson *et al*., 2000; Hillman *et al*., 1994; Koh and Kim, 2004; Bhattacherjee and Premkumar, 2004). However, the fundamental of sharing knowledge is trust. According to the social exchange theory, if students perceived outcome as equal to or greater than their cost, they will feel satisfied (Chadwick-Jones, 1976).

The measurement for knowledge sharing developed in this study contains four items: (1) Learners will voluntarily exchange their knowledge and experience; (2) Learners will actively provide their personal opinions during discussion; (3) Learners will try their best to answers

others' questions; (4) Learner will try to recognize others' viewpoints. The Cronbach's α is 0.8333 with variance extraction of 64.584%, satisfying the criteria. Therefore, the second hypothesis is as follows:

H2: Knowledge-sharing behavior is positively related with satisfaction

Interaction is the key to effective learning and information exchange (Keegan, 1986). Webster and Trevino (1993) indicate that interaction is one of the successful keys in distance education. Without significant interaction, learners would be distracted easily or misunderstood by other people. Learners need skills to operate the delivery medium before they can successfully interact with the content, instructor and other learners.

Knowledge sharing is something else but related to communication (Hendriks, 1999). It is also dependent on interaction, communication between learner and learner or learner and instructor. The success of knowledge sharing depends on the amount and quality of interaction. (Lagerstrom and Andersson, 2003).Therefore, the third hypothesis is:

H3: Interaction is positively related with knowledge-sharing behavior

Rewards are defined as exchanged resources that are pleasurable and gratifying while costs denote exchanged resources that result in a loss or punishment (Thibault & Kelley, 1952; Sprecher, 1998). Teacher owns three kinds of social power: reward power, punishment power and legitimate power. Power generally means one party's capability to influence a target person (Yukl, 2002). Reward power denotes the ability of the teacher to control and administer rewards for desired behavior while punishment power refers to the ability of the teacher to control and administer punishment if students do not comply.

This study develops a new measurement scale for teacher's reward power and punishment power. Questions for reward power are (1) teacher can influence my score; (2) teacher can increase my score; (3) teacher can provide new knowledge; and (4) teacher can make me learn happily. The reliability is 0.7533, satisfying the criteria of 0.7 (Nunnally, 1978). However the extracted variance is 57.604%, higher than an acceptance level of 50% (Fornell & Larcker, 1981).

The measurement scale of punishment power includes questions such as (1) teacher can give me a bad score; (2) teacher can give me difficult homework; (3) teacher can make me learn unhappily; and (4) teacher can make me detest learning. The Cronbach's α is 0.8137 with variance extraction of 64.471%, satisfying the criteria. The measurement scale of legitimate power adapted from Hinkin, Schriesheim 1989. The Cronbach's α is 0.7268 with variance extraction of 52.073%, satisfying the criteria. The hypotheses are as follows:

H4: Reward is positively related with interaction
H5: Reward is positively related with knowledge sharing behavior
H6: Punishment is positively related with interaction
H7: Punishment is positively related with knowledge sharing behavior
H8: Legitimate is positively related with interaction
H9: Legitimate is positively related with knowledge sharing behavior

4. Research Methodology

A field survey was considered with questionnaires filled by distance-learning students in a face-to-face meeting. The instrument was reviewed and revised by two professors in MIS Department of Chengchi University, Taiwan to enhance face and content validity (Nunnally, 1978). To avoid misunderstanding the meaning of the instrument, a pilot test was implemented in Chiao-Tung University, Taiwan, and nineteen students answered the questionnaire. Chengchi University, Taiwan is the main research context. The survey items are listed in Appendix B.

Table 1 Demographic Information of Subjects

		Count	Percentage
Gender	Female	72	69.9 %
	Male	31	30.1 %
Duration of using Distance Learning System	0-6 month	61	59.2 %
	7-12 month	12	11.7 %
	1-2 year	23	22.3 %
	above 2 year	7	6.8 %
School Year	Freshman	47	45.6 %
	Sophomore	24	23.3 %
	Junior	22	21.4 %
	Senior	10	9.7 %

Data were collected using a self-administered questionnaire. The unit of analysis was the individual student who has been attending a distant learning course. Subjects were undergraduate students enrolled and studying in a distant learning course. Data were gathered during a face-to-face meeting in three classes with a single subject. Totally there were 109 responses with six responses eliminated due to incomplete data or regular answers. Consequently, there were 103 responses obtained for use in the final analysis in the study. Table 1 shows the demographic information of the subjects.

A Structural Equation Modeling (SEM) technique called Linear Structural Relationships

(LISREL) is used in this study. SEM is used mainly to explain the pattern of a series of inter-related dependence relationships between a set of latent constructs measured by one or more manifest variables (Chin, 1998).To analyze data, LISREL 8.52 and SPSS 10.0 were used.

The test of the measurement model included internal consistency and the convergent and discriminate validity of the instrument items. Convergent validity was assessed by Confirmatory Factor Analysis (CFA) and Maximum Likelihood (ML) Estimation. Table 2 presented the results of descriptive statistics and confirmatory factor analysis. Composite reliability and variance extraction were the tests for unidimensionality of a construct. The composite alpha was 0.7268 ~ 0.8333, which was higher than 0.7, thus satisfying Nunnaly's criteria. For variance extraction, the acceptance level was 50% (Fornell and Larcker, 1981). The estimations of variance extracted ranged from 52.073% to 68.660%, which exceeded the recommended value.

Table 2 Descriptive Statistics and Confirmatory Factor Analysis

Variables	Mean	Std.	Composite Reliability	Variance Extraction
Reward	2.480	.618	.7533	57.604 %
Punishment	2.368	.647	.8137	64.471 %
Legitimate	1.970	.5451	.7268	52.073 %
Interaction	2.612	.569	.8218	52.230 %
Knowledge sharing	2.377	.523	.8333	64.584 %
Satisfaction	2.602	.637	.8298	68.660 %

The test of discriminate validity was used to check on multicollinearity. Thus, a measure should correlate with all measures of the same construct more highly than any measures in other constructs (Chin, 1998). Table 3 displayed the correlations between variables. The highest correlation was 0.425 between legitimate and satisfaction, while the other correlations ranged from 0.419 to -0.210.

Table 3 Interrelation Among Variables

	Reward	Punishment	Legitimate	Interaction	K.S.	Satisfaction
Reward	1.000					
Punishment	.107	1.000				
Legitimate	.213	.106	1.000			
Interaction	.205	-.064	.054	1.000		
K.S.	.259	-.015	.154	.419	1.000	
Satisfaction	.311	-.210	.425	.275	.353	1.000

Before assessing the structural or measurement model, we examined the overall fit of the model to ensure model adequacy. There were three types of goodness-of-fit measurement: absolute fit measures, incremental fit measures and parsimonious fit measures (Hair, Anderson, Tatham, and Black, 1995; Reisinger and Turner, 1999). Table 4 displays the results of goodness-of-fit measurements.

Table 4 Goodness-of-Fit Measurement Table

Absolute Fit Measures	Incremental Fit Measures	Parsimonious Fit Measures
GFI = 0.85	NFI = 0.89	CFI = 0.94
RMSEA = 0.062	NNFI = 0.92	IFI = 0.94

Goodness-of-fit index (GFI) and root mean square error of approximation (RMSEA) were absolute fit measures. The GFI was 0.85 which was less than 0.9; however, it was still at a marginal acceptance level. The value of RMSEA was 0.062 which was less than 0.08, satisfying the criteria of 0.08.

Normed fit index (NFI) and Non-normed fit index (NNFI) were incremental fit measures. The NFI was 0.89, which was slightly less than the criteria of 0.9 and the NNFI index was 0.92, which was higher than 0.9. Comparative fit index (CFI) and Incremental fit index (IFI) were parsimonious fit measures. Both the CFI and IFI were 0.94, higher than the criteria of 0.9. The overall model fit tests indicated that the research model was relatively adequate to represent the proposed relationships.

Path coefficients were performed in the test of the structural model, which indicated the strengths of the relationships between the dependent and independent variables. Here, the R^2 value represented the amount of variance explained by the independent variables, and the interpretation of R^2 was just the same as in the regression analysis. 5% level of significance was used for all statistical tests.

The results of the analysis were presented in Figure 2. According to the test of Hypotheses 1 and 2, learning satisfaction was associated with interaction and knowledge-sharing behavior which together explained 23.3% of the variance of learning satisfaction construct. Out of expectation, Hypothesis 1 did not show significant relationship with learning satisfaction (β = 0.12; t = 0.96; p > 0.05). Hypothesis 2 indicated that interaction had significant relationship with learning satisfaction which supported H2 (β = 0.42; t = 3.28; p < 0.01).

Teacher's powers explained 28.3% variance of interaction. Teacher's powers and interaction have explained 43.2% variance of knowledge sharing. The data demonstrated that interaction had significant relationship with knowledge-sharing behavior which supported H3 (β = 0.26; t = 2.07; p < 0.05). According to Hypotheses 4~9, reward power showed significant relationships with interaction which supported H4 (β = 0.24; t = 2.09; p < 0.05). Reward power and legitimate power had significant relationship with knowledge-sharing

behavior which supported H5 (β = 0.22; t = 2.01; p < 0.05) and H9 (β = 0.26; t = 2.38; p < 0.05). Punishment and legitimate powers did not show significant relationship with interaction therefore did not support H6 (β = 0.06; t = 0.28; p > 0.05) and H8 (β = 0.18; t = 0.57; p > 0.05). Punishment power did not show positive relationship with knowledge sharing behavior therefore did not supported H7 (β = 0.05; t = 0.11; p > 0.05). Figure 2 illustrated the SEM results, where the dotted line indicated no significant relationship.

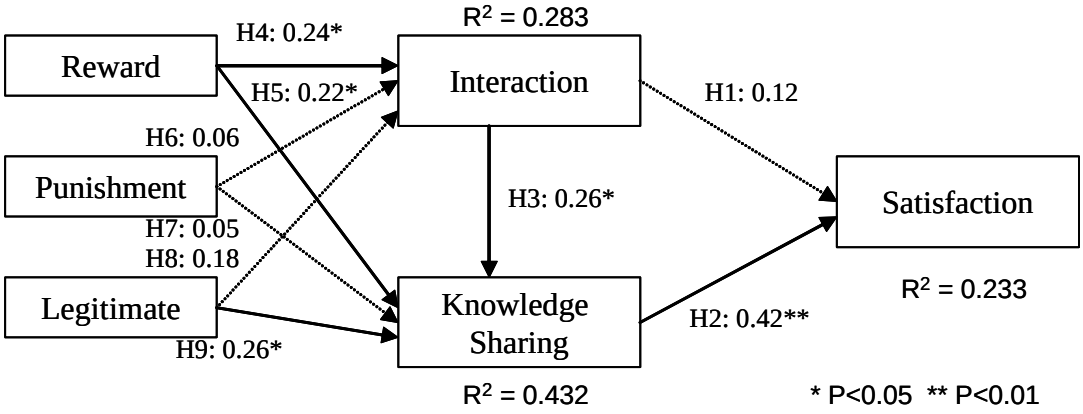

Figure 2 SEM results of Research Model

5. Discussion

Students' perceived interaction influenced the behavior of knowledge sharing. Knowledge-sharing behavior indeed had direct impact on learning satisfaction. However, our findings show that interaction had no significant effect on learning satisfaction.

Distance learning is one kind of learning types. Learners join in the system to acquire knowledge and enhance their skills. Consequently, gathering knowledge from others or sharing their experience with other learners could satisfy their learning desire.

According to the results, reward power had direct and significant relationship with knowledge-sharing behavior. However, punishment power did not support the hypothesis of affecting learner's knowledge-sharing behavior.

Interaction was an important factor in human-computer interaction (Trevino and Webster, 1992; Novak and Hoffman, 1998); however, the findings did not support that interaction was important to learning satisfaction. Interaction itself could be interact with system interfaces, or could be interact with other learners or teachers. That could be one of the reasons that interaction has no significant with learning satisfaction.

6. Conclusion

This study examined the relationship of teacher's powers and knowledge-sharing

behavior in a distance-learning environment. According to the social power theory, I assessed how teacher's powers affected learners' knowledge-sharing behavior.

The primary contribution of this study was its introduction of the social power theory to distance-learning environment. In the study, I examined teacher's reward, punishment, and legitimate powers which affected knowledge-sharing behavior. And, a new measurement of knowledge-sharing behavior in a distance-learning environment was developed

Since this study has a number of limitations, further study is needed. First, this study uses a self-reported scale under instructors' agreement to measure the proposed variables, which may cause some bias for some of the results. Second, the results indicate that interaction does not show significant relation with learning satisfaction. It is worth to carefully examine. Finally, the sample is restricted to university students in Taiwan, so replication is required to validate the effect of knowledge-sharing behavior in a distance-learning environment for other subject groups.

References:

[1] Bhattacharya, R., and Devinney, T. M. (1998). A Formal Model of Trust based on Outcomes. *Academy of Management Review, 23*(3), 459-472.

[2] Bhattacherjee , A., and Premkumar, G. (2004). Understanding Changes in Belief and Attitude Toward Information Technology Usage: A Theoretical Model and Longitudinal Test. *MIS Quarterly, 28*(2), 229-254.

[3] Bock, G. W., and Kim, Y. (2002). Breaking the Myths of Rewards: An Exploratory Study of Attitudes About Knowledge Sharing. *Information Resources Management Journal, 15*(2), 14-21.

[4] Brass, D. J., & Burkhardt, M. E. (1993). Potential Power and Power Use: an investigation of structure and behavior. *Academy of Management Journal, 36*(3), 441-470.

[5] Chadwick-Jones, J. L. (1976). *Social Exchange Theory: its structure and influence in social psychology*Academic Press.

[6] Chin, W. W. (1998). The Partial Least Squares Approach to Structural Equation Modeling. *in G.A. Marcoulides (ed.), Modern Methods for Business Research, ,* 295-336.

[7] Erchul, W. P., & Raven, B. H. (1997). Social Power in School Consultation: A Contemporary View of French and Raven's Bases of Power Model. *Journal of School Psychology, 35*(2), 137-171.

[8] Etgar, M. (1978). Selection of an effective channel control mix. *Journal of Marketing, 42*(3), 53-58.

[9] French, J., & Raven, B. H. (1959). The Bases of Social Power. Studies in Social Power (pp. 150-167)Ann Arbor, MI: Institute for Social Research.

[10] Fornell, C., and Larcker, D. F. (1981). Structural Equation Models with Unobservable Variables and Measurement Errors. *Journal of Marketing Research, 18*(2), 39-50.

[11] Gaski, J. F. (1986). Interrelations Among a Channel Entity's Power Sources: Impact of the Exercise of Reward and Coercion on Expert, Referent, and Legitimate Power Sources. *Journal of*

Marketing Research, 23, 62-77.

[12] Hair, J. F., Anderson, R. E., Tatham, R. L., and Black, W. C. (1995). *Multivariate Data Analysis with Reading*Prentice Hall.

[13] Hall, H. (2001). Input-Friendliness: motivating knowledge sharing across intranets. *Journal of Information Science, 27*(3), 139-146.

[14] Hendriks, P. (1999). Why Share Knowldege? The Influence of ICT on the Motivation for Knowledge Sharing. *Knowledge and Process Management, 6*(2), 91-100.

[15] Hillman, C. A., Willis, D. J., and Gunawardena, C. N. (1994). Learner-Interface Interaction in Distance Education: An Extension of Contemporary Models and Strategies for Practitioners. *The American Journal of Distance Education, 8*(2)

[16] Hinkin, T. R., & Schriesheim, C. A. (1990). Relationships Between Subordinate Perceptions of Supervisor Influence Tactics and Attributed Bases of Supervisory Power. *Human Relations, 43*(3), 221-237.

[17] Hinkin, T. R., & Schriesheim, C. A. (1994). An Examination of Subordinate-Perceived Relationships Between Leader Reward and Punishment Behavior and Leader Bases of Power. *Human Relations, 47*(7), 779-800.

[18] Jarvenpaa, S. L., and Leidner, D. E. (1999). Communication and Trust in Globla Virtual Teams. *Organization Science, 10*(6), 791-815.

[19] Jarvenpaa, S. L., Knoll, K., and Leidner, D. E. (1998). Is Anybody Out There? Antecedents of Trust in Global Virtual Teams. *Journal of Management Information Systems, 14*(4), 29-64.

[20] Johnson, J. L., Sakano, T., Cote, J. A., & Onzo, N. (1993). The Exercise of Interfirm Power and Its Repercussions in U.S.-Japanese Channel Relationships. *Journal of Marketing, 57,* 1-10.

[21] Johnson, S. D., Aragon, S. R., Shaik, N., and Palma-Rivas, N. (2000). Comparative Analysis of Learner Satisfaction and Learning Outcomes in Online and Face-to-Face Learning Environments. *Journal of Interactive Learning Research, 11*(1), 29-49.

[22] Kanter, R. M. (1979). Power Failure in Management Circuits. *Harvard Business Reveiw, ,* 65-75.

[23] Keegan, D. (1986). *Foundations of distance education.* Routledge.

[24] Koh, J., and Kim, Y. -. (2004). Knowledge sharing in virtual communities: an e-business perspective. *Expert Systems with Applications, 26,* 155-166.

[25] Lagerstrom, K., and Andersson, M. (2003). Creating and sharing knowledge within a transactional team - the development of a global business system. *Journal of World Business, 38,* 84-95.

[26] Liebowitz, J., and Megbolugbe, I. (2003). A set of frameworks to aid the project manager in conceptualizing and implementing knowledge management initiatives. *International Journal of Project Management, 21,* 189-198.

[27] Mechanic, D. (1962). Sources of Power of Lower Participants in Complex Organizations. *Administrative Science Quarterly, 24,* 349-364.

[28] Moore, M. G., & Kearsley, G. (1996). *Distance Education: A Systems View* Belmont: Wadsworth.

[29] Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company*Oxford University Press

Inc.

[30] Novak, T. P., and Hoffman, D. L. (1998). Modeling the structure of the flow experience among web users. *INFORMS marketing science and the internet mini-conference MIT,*

[31] Nunnally, J. C. (1978). *Psychometric Theory*. New York: McGraw-Hill.

[32] Pavlou, P. A. (2002). Institution-based trust in interorganizational exchange relationships: the role of online B2B marketplaces on trust formation. *Journal of Strategic Information Systems, 11*, 215-243.

[33] Pfeffer, J. (1992). Understanding Power in Organizations. *California Management Review, 34*(2), 29-50.

[34] Rahim, M. A., & Buntzman, G. F. (1989). Supervisory Power Bases, Styles of Handling Conflict with Subordinates, and Subordinate Compliance and Satisfaction. *The Journal of Psychology, 123*(2), 195-210.

[35] Rahim, M. A., Antonioni, D., & Psenicka, C. (2001). A Structural Equations Model of Leader Power, Subordinates' Styles of Handling Conflict, and Job Performance. *The International Journal of Conflict Management, 12*(3), 191-211.

[36] Raven, B. H. (1993). The Bases of Power: Origins and Recent Developments. *Journal of Social Issues, 49*(4), 227-251.

[37] Reisinger, Y., and Turner, L. (1999). Structural Equation Modeling with Lisrel: application in tourism. *Tourism Management, 20*, 71-88.

[38] Ryu, S., Ho, S. H., and Han, I. (2003). Knowledge sharing behavior of physicians in hospitals. *Expert System, 25*, 113-122.

[39] Sarker, S., Valacich, J. S., and Sarker, S. (2003). Virtual Team Trust: Instrument Development and Validation in an IS Educational Environment. *Information Resources Management, 16*(2), 35-55.

[40] Sherry, A. C., Fulford, C. P., & Zhand, S. (1998). Assessing Distance Learners' Satisfaction with Instruction: A Quantitative and a Qualitative Measure. *The American Journal of Distance Education, 12*(3), 4-26.

[41] Sprecher, S. (1998), Social Exchange Theories and Sexuality. *The Journal of Sex Research, 35(1),* 32-43.

[42] Thibault J. W. & Kelley H.H. (1952). *The Social Psychology of Groups.* John Wiley & Sons, New York.

[43] Trevino, L. K., and Webster, J. (1992). Flow in Computer-Mediated Communication: Electronic Mail and Voice mail evaluation and impacts. *Communication Research, 19*(5), 539-573.

[44] Webster, J. (1997). Teaching Effectiveness in Technology-mediated Distance Learning. *Academy of Management Journal, 40*(6), 1282-1309.

[45] Webster, J., Trevino, L. K., & Ryan, L. (1993). The dimensionality and correlates of Flow in human-computer interactions. *Computers in Human Behavior, 9*, 411-426.

[46] Yukl, G. (2002). *Leadership in Organizations* (5th ed. ed.). N.J.: Prentice-Hall.

Appendices:

Appendix A: Rotated Component Matrix

Items	Loading factor	Eigenvalues	% of Variance	Cronbach's α
KS 1	0.821			
KS 2	0.812	2.583	64.584	0.8333
KS 3	0.813			
KS 4	0.768			

Extraction Method: Principal Component Analysis

Appendix B:

Interaction (Sherry, *et al*., 1998)

1. I find learners often ask each other questions.
2. I feel there are high interactions between learners.
3. I find interactions between the instructor and the class is high.
4. I find the instructor frequently asks learners questions.

Learning Satisfaction (Bhattacherjee and Premkumar, 2004)

1. Learning through the distance-learning system, I feel pleased.
2. Learning through this distance-learning system, I feel contented.
3. Learning through this distance-learning system, I feel delighted.
4. Learning through this distance-learning system, I feel satisfied.