

# Examining the Role of Trust in Virtual Environment for Knowledge Exchange: A Study on Pakistani Universities

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## Abstract

The rationale behind conducting this study is to investigate the influence of Performance Expectancy on user ICT use Behavior for Knowledge Exchange. And in order to examine this relationship trust and intention were proposed and tested as mediating variables. In addition, previous researchers merely focused on knowledge sharing behavior, ignoring the fact that to make an “exchange relationship successful” it is important to examine whether ICT supports users in getting knowledge or not. Hence to obtain these objectives, two longitudinal field studies were conducted at two different time-periods. Study-1 reported 150 usable questionnaires to address ICT use Behavior for knowledge sharing behavior whereas Study-2 reported 350 usable questionnaires to address ICT use Behavior for knowledge seeking. The analysis of the data revealed full serial mediation in both the studies. Moreover, all the individual links also depicted positive and significant relationships.

**Keywords:** Performance Expectancy, Trust, Intention, Knowledge Exchange, ICT, Behavior

## 1. Introduction

Knowledge is considered as an intangible but valuable asset for an organization, as it helps in gaining competitive edge. Miller and Shamsie (1996) investigated the importance of Knowledge for the “organizations competing in uncertain environment”. They compared the Property-based resources with Knowledge-based resources and found that as compare to former, latter contributes more towards the performance of an organization in unpredictable and unstable environment settings. Therefore organizations are investigating more on Knowledge based systems to secure the information and experiences that are available in the human minds, which can further be used even when the employees are no longer associated with the organization.

Researches reported that for the organizations the aptitude for managing the knowledge has remained critical in “today’s Knowledge economy”. Capturing, creating, sharing and diffusing Knowledge has been the essential elements of Knowledge management. It is defined as “as the process of applying a systematic approach to the capture, structure, management, and dissemination of knowledge throughout an organization in order to work faster, reuse best practices, and reduce costly rework from project to project” (Nonaka and Takeuchi, 1995; Pasternack and Viscio, 1998; Pfeiffer and Sutton, 1999; Ruggles and Holtshouse, 1999). Hence based on this idea, Knowledge Management systems (KMs) has been introduced and successfully implemented in different organizations .

KM system is not only limited to the manufacturing industry and consultancy firms, but even educational institutes are making best use of it. In general, educational institutes use E-learning systems, where teachers and students interact with each other to share and seek knowledge. E-learning systems are automated systems where students interact with class fellows, teachers, and “learning materials” (assignments, lectures). Such computerized systems promise to provide flexible working environment with less time and cost. Earlier, KM systems were considered separate from E-learning technology, because researchers perceive that former deals with capturing, managing and sharing knowledge whereas latter focuses on delivering knowledge and content to the students via ICT. But Barron (2000), Allee (2000) and Lee (2009) investigated the similarities between the two and reported that KM in E-learning is all about capturing instructor’s knowledge; managing it and enabling faster and efficient leaning systems. Hence E-learning technologies connect students with their class-fellows and teachers to share and seek knowledge (Corrall, 1999).

Wang and Noe (2010) reported this Knowledge sharing and seeking phenomena as Knowledge Exchange (KE). In general, Knowledge exchange is referred as sharing of knowledge between the two, but researchers investigated that in order to ensure whether knowledge exchange via ICT is successful, it is important to know that knowledge shared is seek by the other or not. Hence, in order to investigate whether User perceive ICT useful for Knowledge Exchange, it is important to examine what builds user ICT use behavior for Knowledge Sharing and Seeking separately.

Trust has been reported as a “magical ingredient” that strengthens the possibility to exchange knowledge between the two individuals (Abrams, Cross, Lesser, and Levin, 2003). Further revealed that it is not needful to have stronger ties and frequent communication, in contrary individual interacting with out-group also develops trust based on positive belief over the competencies of others. In general, Offline trust has been widely studied and tested in different areas like: marketing, psychology, sociology, criminology and e-commerce. But past studies reported insufficient literature available on user trust in virtual environment for KE (Wang, 2014).

Keeping in view the gaps indentified from the above literature, the current study investigates the influence of Performance Expectancy on User ICT use Behavior for KE. Moreover trust and intention are taken as mediating variables that helps in addressing what build user trust on ICT for KE.

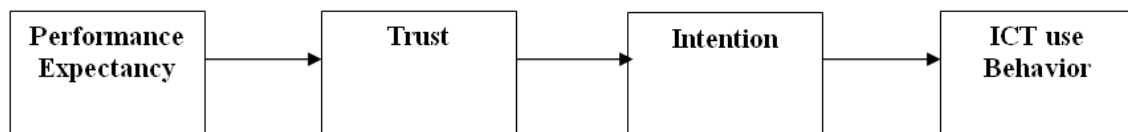


Figure: 1 Research model depicting the influence of Performance Expectancy on ICT use Behavior i.e. mediated through trust and intention to use.

## 2. Literature Review and Hypothesis

### 2.1 Performance Expectancy:

Performance Expectancy (PE) is one of the construct of “Unified theory of acceptance and use of technology” (UTAUT). It is defined as “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003), and for this study its teaching and learning. While developing UTAUT, researchers reported five constructs that were studied and tested in the past studies. These constructs possesses similar notion i.e. to test whether user (Student and teacher) perceives ICT helpful and useful in accomplishing the respective task or not. The constructs used were (1) “Perceived Usefulness” (2) “Extrinsic Motivation” (3) “Relative Advantage” (4) “Outcome Expectation” (5) “Job-Fit” (Davis et al. 1989, 1992; Thompson et al. 1991; Moore and Benbasat 1991; Compeau and Higgins 1995; Plouffe et al. 2001). Venkatesh et al., (2003) after analyzing the similarity between the constructs align them under a single construct namely “Performance Expectancy”.

### 2.2 Performance Expectancy and Behavior

Studies in past has reported Performance Expectancy as a factor that strongly and positively influences user intention. This relationship has remained significant at all time period, in both voluntary and mandatory settings and for different technologies (Nanayakkara & Whiddett, 2005; Sahin & Shelley, 2008). But current study along with this developed and tested relationship, also investigates that if students and teachers perceive virtual environment useful and supportive; it actually enhances user trust on ICT that ultimately possesses a positive intention and behavior.

### 2.3 Performance Expectancy and Trust

Limited literature is available on factors that build user trust on ICT for Knowledge Exchange (Wang, 2014); but factors building user trust on E-commerce, E-banking and E-marketing have been widely studied. Like: Chen and Barnes (2007) conducted a study to examine factor building user initial trust on E-commerce site and reported perceived usefulness as a strongest predictor of user trust. Similarly, Suh and Han (2002) reported that regardless of risk associated with the use of online banking, still user consider it useful, helpful. Basically, customers find it supportive and trustworthy as it saves time and travelling cost and is available 24/7. Hence based on the above mentioned arguments, following hypothesis are proposed:

- H1a: Performance Expectancy is positively and significantly related to Trust on ICT for Knowledge Sharing
- H1b: Performance Expectancy is positively and significantly related to Trust on ICT for Knowledge Seeking
- H2a: Performance Expectancy is positively and significantly related to Intention to use ICT for Knowledge Sharing
- H2b: Performance Expectancy is positively and significantly related to Intention to use ICT for Knowledge Seeking
- H3a: Performance Expectancy is positively and significantly related to ICT use Behavior for Knowledge Sharing
- H3b: Performance Expectancy is positively and significantly related to ICT use Behavior for Knowledge Seeking
- H4a: Trust and Intention mediates the relationship between Performance Expectancy and ICT use Behavior for Knowledge Sharing
- H4b: Trust and Intention mediates the relationship between Performance Expectancy and ICT use Behavior for Knowledge Seeking

### 3. Methodology

#### 3.1 Sample

Longitudinal study was conducted at two time period with a gap of 3-4 months. As the purpose of conducting this study is to examine whether Virtual Environment supports Knowledge Exchange, therefore data was collected from teachers and students of two prestigious universities of Islamabad. These universities offer Distance Education programs and have their main campuses in Islamabad, Pakistan. As the respondents of this study are located at different locations, therefore online Questionnaire was designed and the administrator of the university was requested to email it to the respondents (teachers and students) along with the cover letter. The respondents were assured of the anonymity. Based on the notion of longitudinal study, the responses of those respondents were selected for analysis who responded in both time periods.

Two separate studies were conducted to address the gap identified in the current study. Study-1 investigated factors influencing teachers ICT use Behavior for Knowledge sharing, whereas study-2 investigated students ICT use Behavior for Knowledge Seeking. For study 1, in total 180 responses were received from teachers in Time1 and 155 at time 2. After inspection, 150 responses were selected to analyze teacher ICT use behavior for Knowledge Sharing. Similarly for study 2, in total 450 students in Time-1 and 420 students in Time-2 participated in the study. After deleting the unfinished and one time responses, 350 complete responses were selected for analyzing user ICT use behavior for knowledge seeking.

#### 3.2 Measure

To evaluate the propose relationships, questionnaire was developed based on the items adapted from the past studies. Items selected were previously tested in number of countries for different technologies. As English is the formal and official language of the selected universities, therefore questionnaire was not translated into Urdu or any other regional language. Following are the details of the adapted scale and Reliability value for the scale in both the study.

##### 3.2.1 Performance Expectancy:

Performance Expectancy was measured using the scale developed and tested by Venkatesh et al., (2012) for UTAUT2. The scale consist of four (4) items: "I find the ICT useful"; "Using the ICT increases my chances of sharing/seeking Knowledge"; "Using the ICT enables me to accomplish things more quickly"; "Using the ICT increases my productivity". To test the reliability of the data collected from teacher and students, Cronbach alpha reliability test for both the studies were run separately. Study 1 depicts  $\alpha = 0.893$  and study 2 depicts  $\alpha=0.877$  respectively for "Performance Expectancy" scale.

##### 3.2.2 Trust:

User Trust on ICT was measured using the scale developed by Cho and Fiorito (2009). The scale consist of following 4 items: "I feel that I am respected on this system", "Practices on this system are related to the users best interests", "It is an efficient system for teaching/learning", "Information provided through ICT is reliable". For study 1 and Study 2 Cronbach alpha reliability for this scale was run. The analysis depicted  $\alpha=0.690$  for study 1 and  $\alpha=0.785$  for Study 2 respectively.

##### 3.2.3 Intention:

Items to measure user Intention was adapted from the scale developed by Taylor and Todd (1995). Sample items for this scale were: "I intend to use ICT frequently in this semester", "I intend to use ICT for Lectures, Assignments, Projects in this semester", "I intend to use ICT in this semester". Responses were measured on 7 point likert scale. Data collected from teachers for study 1 depicted the reliability  $\alpha=0.819$  whereas data collected from students for study 2 depicted reliability value  $\alpha=0.795$  respectively.

##### 3.2.4 Behavior:

User ICT use behavior was measured using the scale developed and tested by Davis et al., (1989). Scale was used to measure the frequency: "average use of ICT" and "average hour spends on it". To test the reliability of the data, the Cronbach alpha for the scale measured for study 1 was  $\alpha=0.738$  and for study 2 was  $\alpha=0.815$  respectively.

Table 1: Scale Summary

S. No	Construct	Authors	Items	Cronbach $\alpha$ Reliability	
				Study 1	Study 2
1	Performance Expectancy	Venkatesh et al., (2012)	4	0.893	0.877
2	Trust	Cho and Fiorito (2009)	4	0.690	0.785
3	Intention	Taylor and Todd (1995)	3	0.819	0.795
4	Use Behavior	Davis et al., (1989)	2	0.738	0.815

#### 3.3 Procedure:

After scrutiny, 150 responses from study-1 and 350 responses from Study-2 was selected for analyzing the data. Data was entered and coded using SPSS 19.0. Descriptive statistics was obtained using the Demographic

Variables. Respondents were inquired about their gender and ICT use for Knowledge Exchange.

Confirmatory factor analysis (CFA) was run to test the validity of the data. AMOS version 16 was used to run CFA. In addition, to test the Serial mediation between the proposed variables, “MACRO PROCESS” developed by Hayee (2013) was run. Following sections illustrates the analysis of data for study 1 and study 2 separately.

#### 4. Results and Discussion

##### 4.1 Descriptive Statistics

###### 4.1.1 Study 1:

For study-1, data was collected from teachers who use ICT or Virtual Environment for Knowledge Sharing. Respondents were asked about their gender and ICT they use. The analysis of the data revealed that out of 150; 31 females and 119 males participated in the study. In addition, the analysis revealed that 116 respondents use E-learning portals; 25 teachers use Video Conferencing and 9 use Audio and Video cassettes for Sharing Knowledge.

###### 4.1.2 Study 2:

To examine user ICT use behavior for Knowledge seeking, data was collected from students who are enrolled in Distance Education Programs of Universities. The analysis revealed that 119 male and 231 female participated in the study. Analysis further illustrated that 258 students use E-learning portals; 85 students use Video-Conferencing and 7 students use Audio/Video Cassettes for getting knowledge.

Table 2: Descriptive Statistics for Study 1 and Study 2

Variable		Study 1	Study 2
Gender	Male	119	119
	Female	31	231
ICT in use	E-learning portal	116	258
	Video Conferencing	25	85
	Audio/Video Cassettes	9	7

##### 4.2 Confirmatory Factor Analysis (CFA)

As all the constructs of both the studies (Study-1 and Study-2) were addressed by similar groups (teachers and students) respectively, therefore there is a need to examine whether respondents perceives one construct different from the other or not. In order to address this issue, CFA was conducted and Fit indices were analyzed. Table 3 illustrates the results of CFA for Study 1 and Study 2 separately. The analysis revealed good Fit indices, explaining that the model is good and can be used further for testing the relationship.

Table 3: Confirmatory Factor analysis results for Study 1 and Study 2

	Study 1	Study 2
$\chi^2$	89.824	153.454
df	53	52
$\chi^2/df$	1.695	2.951
RMSEA	0.068	0.075
GFI	0.925	0.935
CFI	0.963	0.958
IFI	0.964	0.958
TLI	0.945	0.937

##### 4.3 Correlation Analysis

Table 4 depicts Mean, Standard Deviation and Bivariate correlation between the variables of both the studies. For study 1 the mean and Standard Deviation for Performance Expectancy were (M=5.325, SD=1.294), Trust (M=5.058, SD=0.933), Intention (M=5.140, SD=1.249), Use Behavior (M=4.870, SD=1.342) respectively. Similarly, for study -2 Performance Expectancy illustrates (M=5.116, SD=1.350); Trust (M=4.925, SD=1.084); Intention (M=4.960, SD=1.255); Use Behavior (M=4.720, SD=1.458) respectively.

For study-1 and study-2 Bivariate Correlation analysis was also conducted. The analysis of the data revealed a positive and significant relationship between the variables (as shown in Table 4).

Table 4: Mean, Standard Deviation, Correlation for main constructs of both the studies

		Mean	SD	PE*	Trust	Intention	Use Behavior
PE*	Study 1	5.325	1.294	1			
	Study 2	5.116	1.350	1			
Trust	Study 1	5.058	0.933	0.568**	1		
	Study 2	4.925	1.084	0.534**	1		
Intention	Study 1	5.140	1.249	0.517**	0.522**	1	
	Study 2	4.960	1.255	0.576**	0.571**	1	
Use Behavior	Study 1	4.870	1.342	0.512**	0.578**	0.484**	1
	Study 2	4.720	1.458	0.495**	0.577**	0.492**	1

\* PE: Performance Expectancy

\*\* Correlation is significant at the 0.01 level (2-tailed).

#### 4.4 Serial Mediation Analysis

In the research model of the current study, Performance Expectancy is taken as an Independent Variable; Trust as first mediator; Intention as second mediator and Use Behavior as Dependent Variable. To begin with the regression analysis, the relationship between IV and Mediator-1, IV and Mediator-2, Mediator-1 and Mediator-2; IV and DV; Mediator-1 and DV; Mediator-2 and DV was tested for both the studies. Coefficient values and significant sign in Figure 2 and 3 depict a positive and significant relationship between the proposed relationships.

Lastly, MACRO PROCESS developed by Hayee (2013) was run. To check the serial mediation, Hayee (2013) reported the need to analyze the indirect effect using Bootstrap Confidence Interval. Henceforth, Table 5 given below illustrates that full serial mediation exists between Performance Expectancy and Use Behavior based on the criteria reported by Hayee(2013) i.e. Confidence Interval should not contain a “Zero”.

Table 5: “Bootstrap Confidence Interval for Indirect Effects”

	Relationship	Effect	LLCL	ULCL
Study 1	PE → Trust → INT → UB	0.3128	0.2028	0.4468
Study 2	PE → Trust → INT → UB	0.3180	0.2290	0.4178

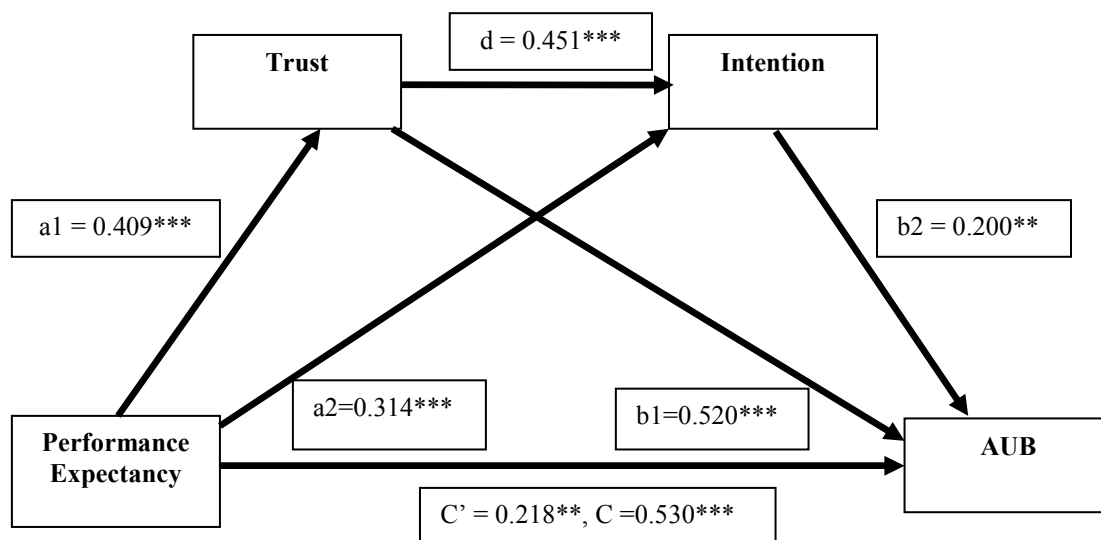


Figure 2: Statistical Diagram of Serial Mediation for study-1

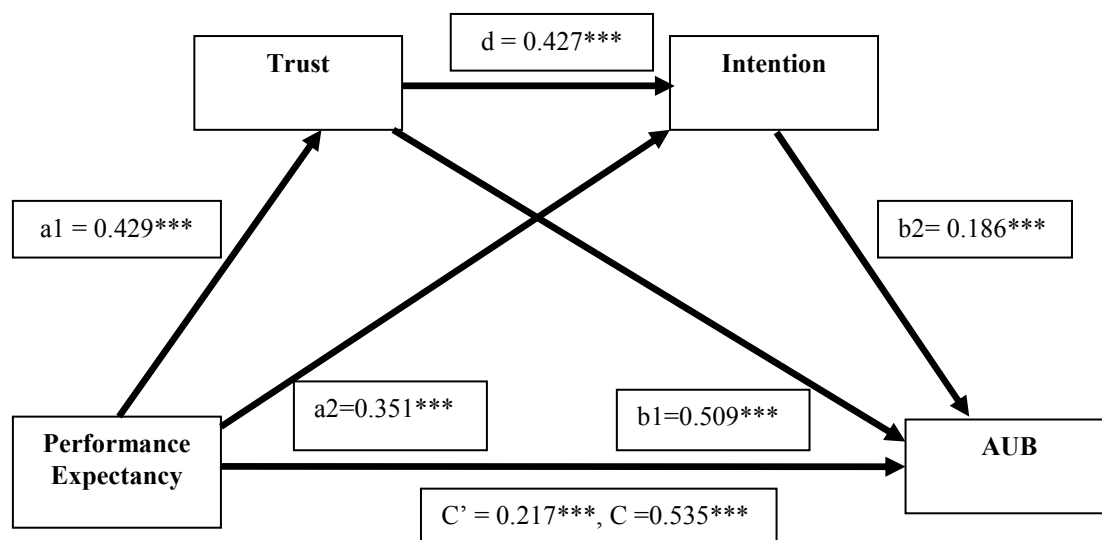


Figure 3: Statistical Diagram of Serial Mediation for study-2

## 5. Conclusion and Limitation

Tremendous studies has been conducted in past to examine factors determining User ICT use behavior for Knowledge sharing. But scarcity of literature is available explaining the actual phenomena of Knowledge Exchange. The current study is first of its kind to examine user ICT use Behavior for Knowledge sharing and seeking separately. In addition, considering the importance of trust in an environment where knowledge is exchanged via ICT, the current study examined the mediating role of trust on technology. On the basis of the gap identified from the above mentioned literature, very few studies has been conducted on examining factors that helps in building user trust on ICT for Knowledge Exchange. Although, technology based trust is not a new phenomena but researchers revealed that studies merely focused on user trust in E-commerce, E-banking, and E-marketing (Wang, 2014).

Keeping in view the identified gap, the current study examined teachers and students ICT use behavior for Knowledge Sharing and seeking respectively. Fortunately, the analysis of the current study revealed that trust plays an essential role in developing user behavior. Moreover it was also depicted that user trust on ICT is significantly and positively influenced by how much users perceive technology supportive, helpful and useful. Hence, teachers trust to use ICT for knowledge sharing in distance teaching program only if they find that the respective technology is fulfilling the actual purpose i.e. of knowledge sharing. Similarly, students perceive technology trustworthy only if the find technology useful for Knowledge Seeking.

### 5.1 Limitation and Future direction

Following are the limitation of the current study (1) study failed to identify the moderating effect of Demographic Variables on User ICT use Behavior. (2) Performance Expectancy is one salient belief that was addressed by Venkatesh et al., (2003). There are three other beliefs that are needed to be tested in the proposed model. (3) Wang and Noe (2010) in their review paper illustrated that Big-five personality and Self Efficacy should be used as a moderating variable between PE and trust.

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