Assessing ICT Adoption and Evaluating ICT Acceptance by Academicians Using UTAUT Model: A Case Study of University of Sindh, Pakistan

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Abstract: Information and communication technology has become the integral part of education system. Worldwide different studies are being conducted to evaluate ICT for better performance. This study focused on assessing the general adoption, acceptance and usage of the information and communication technology by the academicians at the University of Sindh, Pakistan. Though many established models are available to assess acceptance and use of ICT, for this research Unified Theory of Acceptance and Use of Technology (UTAUT) is used with some external factor like Culture, Incentives, Perceived needs and Job Relevance. The research used mix method approach by distributing 200 survey questionnaires among the academic staff and in addition, used interview method for making survey results stronger. The results revealed that all the constructs have significant effect on academicians towards their intention to use ICT in their academic work, on other side it was also found that there is lack of ICT infrastructure as well as usability due to dependency of administrative work on manual system, Moreover lack of equipment's found major hindrance in automated class environment.

Keywords: ICT, Academicians, UTAUT Model, University, Pakistan

1. INTRODUCTION

The focus of developed world on knowledge economy has also directed developing world to concentrate on it, therefore everywhere, especial focus on higher educational institution is being given. It has also been observed that growing competition of economy and technology expects much from the academicians in terms of teaching, learning, research, innovation and knowledge sharing (Oye, *et. al,* 2012). Hence, academician's soundness in technology comes foremost for the successful growth of knowledge economy. Moreover, knowledge is shared faster than ever and everywhere, this has created much effect on educational sector because the education sector is responsible for preparing the new generation to face the new technological challenges (Alassaf, 2014). Since, the last twenty years' higher educational institutions in Pakistan, has started to adopt ICT. The currently, ICT in higher education system of Pakistan is in practice. Pakistan government has invested alot and higher education commission has implemented a host of programs to establish a world class ICT infrastructure which provides high-speed internet connectivity to universities across the country, ICT based educational services, like digital library, video conferencing facilities, Pakistan research repository ,campus management systems and much more has been put in place (Ahsan, 2009). In the light of this research focused on assessing the level of ICT adoption and its

acceptance by academicians. In this regard one of the old and first university established after independence of Pakistan called University of Sindh, Jamshoro is studied as case study, to assess what sort of ICT environment is adopted at university and how the Academicians are accepting the ICT services. Hence, research assesses success of Information and technology in university with the effective acceptance and use by the academicians. Moreover, to obtain successful results one of the established theory UTAUT was used along with additional factors like culture, external incentives, perceived need and job relevance, which are defined in literature review section.

2. LITERATURE BACKGROUND

Technology implementation, adoption acceptance and usability is discussion of researchers since many decades, since then, many theories and models are developed for assessing implementation of technology. Moreover, known that the key factor in success of any innovation is education system and academicians. Hence, worldwide many studies have been conducted on technology acceptance using, Theory of reasoned action (Hale, et. at, 2003), Theory of Planned behavior (Processes, 1991), Technology acceptance model (Chuttur, 2009), and one of the latest theory, the unified theory of acceptance and use of technology are also used to assess ICT adoption in educational institution and ICT acceptance and use by academicians.

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The UTAUT was originally proposed by (Venkatesh, *et. al,* 2003), where all previously established eight theories were combined and a comprehensive theory was developed. Now this theory UTAUT is considered most dominant in information system field (Williams, *et. al,* 2015). Likely, this research was also carried out based on UTAUT along with additional factors especially added due to different context of research.

Unified Theory of Acceptance and Use of Technology (Utaut)

UTAUT is more comprehensive theory as compare to other models as it has condensed the almost all the variables found in the existing models like (TRA, TPB, TAM, MM, C-TPB-TAM, MPCU, IDT, and SCT) in to four moderating factors (Iahad, and Rahim, 2012). So, the combination of constructs and moderating factors has increased the efficiency of UTAUT over older models (Alkhasawneh, and Alanazy, 2015).
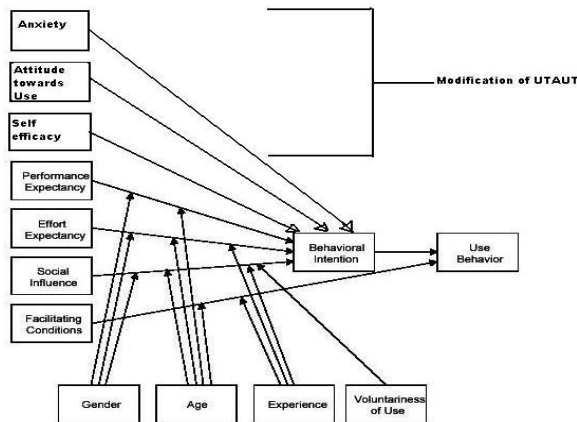

Fig. 1 UTAUT Theory

Framework Used for this Research

The framework used for this research is developed using UTAUT model along with some additional constructs called Information and Communication technology assessment and acceptance (ICT-AA) (Sadry, 2016).
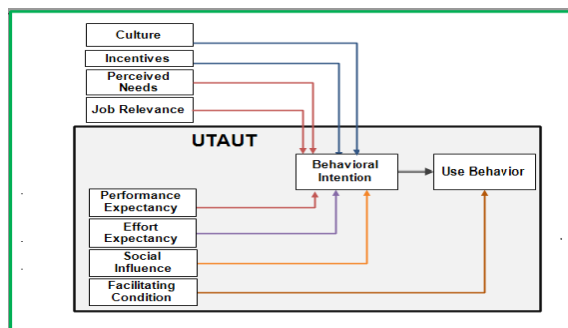

Figure-2 Framework ICT-AA

The root constructs and additional constructs used in the framework are defined below.

BI-level to which an individual intends to perform a specific behaviour (Venkatesh, *et. al,* 2003)

Use Behavior-The actual behaviour of user measured through frequency of use (Venkatesh, *et. al,* 2003)

Culture-the impact of prevailing practices on an individual (Zakour, 2004)

EI-impetus to incite an action in an individual (Locke, 1968)

PN- Level of Improvement in performance (Fatimah, *et. al*, 2011)

JR-The application of intended system in an individual's Job (Venkatesh, 2008).

PE - is the extent an individual believes the system will help them do their jobs better (Venkatesh, *et. al,* 2003)

EE - relate to how ease an individual believes the system is to use (Venkatesh, et. al, 2003).

SI– Individual's intention to use the system by inspiring others (Venkatesh, *et. al,* 2003).

FC - Organization resources available to individuals to use the system (Venkatesh, *et. al,* 2003).

Research Questions

1. What is ICT implementation level at University of Sindh?
2. What are the barriers to using ICT by Teachers in University of Sindh?
3. What is the level of ICT acquaintance and use by academicians at university of Sindh?
4. What are the factors influencing academician for using ICT in teaching and research?
5. How to bring improvements in status of ICT environment?

3.   RESEARCH METHODOLOGY

Mix methodology approach was used by adopting explanatory research strategy (Uma, and Roger, 2014). The target population was academicians which were identified based on stratified random sampling, first quantitative research questionnaire was distributed among the academicians of different faculty in University of Sindh. Questionnaire distribution was based on stratified random sampling, this is used for reducing heterogeneity in the population for a given sample size for achieving greater accuracy in estimated sample results. (Creswell, 2009) A survey questionnaire was containing seven points Likert scales options from 1 strongly disagree to 7 strongly agree. Total 200 questionnaires were distributed among the faculty. While in qualitative part comprised of interview. Interview was based on expert sampling technique, this is used to conduct interviews from the experts of the field. In the end section of the research methods triangulation was performed to generate the cohesive results.

Demographic Details

Demographics of this study shows that there were 141 valid response rate of 70%, including 68.1 male and 31.9 female respondents, while most of the respondents were lecturers comprising almost (41.8% with n=59), while, Assistant Professor were (22%, n=31). Moreover, teaching assistant were (14.9%, n= 21), in addition Associate Professor and Professors response was (12.8%, n=18) and (8.5%, n=12) respectively, hence details are given in **(Table-1)**.

Table-1 Demographic details

Variable	Category	Frequency of responses	Perc %
Gender	Male	96	68.1
	Female	45	31.9
Job Designation	Teaching Assistant	21	14.9%
	Lecturer	59	41.8%
	Assistant Professor	31	22.0%
	Associate Professor	18	12.8%
	Professor	12	8.5%

4. RESULTS

Results are given by providing answer for each research question mentioned earlier in this paper.

Q. No 1 What is ICT adoption level at University of Sindh?

The ICT adoption was examined by the results given in table 2, which shows that various ICT features are being adopted with internet being the largest service at the university, which should be 100% to all but it is about 90% facilitated while computer labs are provided to 66% departments, Computer software according to demand are not available while those available are only for 31% staff. While digital library access is responded positively by 52% while it is provided to whole university staff, it shows that there is lack of awareness about its accessibility, moreover video conference facility is accessible for 28% of staff, in addition multimedia system are still in shortage hence only 64.53 people responded it positively. Moreover, it was noted was management system is not yet adopted, therefore still environment looks manual in nature while other features are there up to some extent but not in ideal position. This all reveals that there is a need of further efforts to facilitate the resources to the individuals in different departments, while awareness and motivation strategy is also must be adopted to bring ICT services in knowledge of academic staff.

Table 2 Adoption level of ICT

Variable	Items	Frequency of responses	Percentage %
Availability of ICT equipment	Internet	127	90%
	Computer labs	93	66%
	Software	44	31%
	Digital library access	73	52%
	Video Conference System	39	28%
	Multimedia System	91	64.53
	Campus Management Information System	0	0%
	Wi-Fi	45	32%

Q. No.2 What are the greatest barriers to using ICT by academician?

Answer to this question was equipment availability as 51.8% (n=73) respondents replied this question about barrier in ICT adoption is non-availability of equipment's, while training was the second most challenge responded by 27% (n=38) academicians, hence technical support remain third most challenge with 9.2% (n=13) moreover environment, time, cost, interest also were responded as the barrier in ICT adoption with the 5%, 4.3%, 2.1% and .7%, respectively. Details are shown in **(Table 3)**

Q.No.3 What is the level of ICT acceptance and use by academicians at university of Sindh?

Answer to this question is demonstrated in table 4, which shows that the use of even available resources is not full, as results displays that (27.7%, n=39) respondents said that they use all available resources while 39%, n=55 responded that they use most of the available resources, hence, the estimated use of resources available at institute by academicians is equal to 66.6% while remaining respondents said they use few available resources (19.1%, n=27 and 14.2%, n=20) respectively, that can be concluded as about

(33.3%, n=47) respondents not use all the resources at all. Therefore, it can be concluded that still there is need to motivate academicians at university to use ICT tool in their teaching, research and data management. In addition, it was also evaluated that what is the common use of ICT tool by academicians as sub part of this question, that revealed that most common use is in teaching, research, personal planning and student's evaluation by ratio of (39.7%, n=56) while second most response is about the use of ICT Tools in the teaching & research by ratio of (36.9%, n=52), moreover , there are the respondents who use ICT only either in their research or teaching, that revealed the ration of (9.9% ,n=14 and 6.4%, n= 9)respectively.

Interest	1	0.7%
Technical support	13	9.2%
Environment	7	5.0%
Cost	3	2.1%

It can be concluded that there is still lack of fully automated information systems inside university, to compel or provide direction to use ICT tools and ICT systems for more sophisticated use of ICT in all the tasks of academicians. Hence acceptance of ICT technology is indirectly related with the awareness, availability, training and motivation at large. Furthermore, the level of computer literacy was also asked from the respondents, according to response majority of the academicians said they are average in use of available ICT resources (72.3%, n=102) while only 5% were expert and 6.4% were of the opinion that they are familiar up to advance level in computing and technology, moreover, there were also 6.4% respondent who said they have only basic level of computer literacy.

Table 3 Barriers to ICT

Attribute	Response rate	Percentage
Equipment availability	73	51.8%
Training	38	27.0%
Time	6	4.3%

Table 4 level of use and acceptance by academicians

	Attribute	Response rate	Percentage
Usage of ICT facilities available	All available resources	39	27.7
	Most of the available resources	55	39.0
	Few of the available resources	27	19.1
	Very few of the available resources	20	14.2
Level of Computer literacy	Basic	9	6.4
	Average	102	72.3
	Advance	23	16.3
	Expert	7	5.0
Common use of ICT	Teaching	9	6.4
	Research	14	9.9
	Teaching & Research	52	36.9
	Teaching, Research & Personal planning	10	7.1
	Teaching, Research, Personal planning and Student evaluation	56	39.7

Q. 4What are the factors influencing academician for using ICT in teaching and research?

This question is answered by four core constructs of UTAUT model along with some additional constructs, which were proposed as significant determinants on creating behavioral intention to accept and use information and communication technology. For this purpose, reliability statistics was applied, the result shows that, all the proposed factors were found acceptable and significant with acceptable, good to highly excellent reliability results, therefore, it can be concluded that, for enhancing the use of ICT by academicians, these factors should be especially concentrated at institutions.

Q.No.5 How to bring improvements in status of ICT environment?

Before answering this question, it is important to mention here that, there is no ICT directorate in university nor human resource division is properly defined. Hence, research revealed from the interview from the responsible person working in administration team of the university, demonstrates that, there should be established ICT directorate to provide and monitor ICT services, initiatives should be taken to make ICT services usability compulsory by transferring manual communication procedure with online internetwork facilities. Furthermore, it was advised that equipment lacking is the biggest issue therefore, all standards ICT

equipment's should be provided and implemented as per world best university standards.

Table-5 Reliability Analysis

S. No	Constructs	Reliability
1	Behavioral Intention	.952
2	Use Behavior	.902
3	Power Distance	.942
4	Individualism/Collectivism	.825
5	Uncertainty Avoidance	.906
6	Masculine / Feminine	.928
7	External Incentives	.902
8	Perceived Needs	.801
9	Job Relevance	.741
10	Performance Expectancy	.933
11	Effort Expectancy	.965
12	Social Influence	.889
13	Facilitating Conditions	.820

6. CONCLUSION

The research was conducted in Pakistan at one of the oldest university called University of Sindh, focus of the research remains to assess ICT adoption at the University and evaluate ICT acceptance and use by the university academicians. The results are obtained in two categories like category one depicts that the ICT is being practiced at university but still at primary level, like most of the teachers were of the view that there is lack of equipment's, training, and troubleshooting services, even it was noted that there is no properly established ICT directorate. Manual system for routine work at various departments is common. while second category confirmed that UTAUT variable along with additional constructs were found valid in context of the university, as a result, this research revealed the important factors effecting intention of academic staff towards the adoption and use of ICT by academic staff.

RECOMMENDATIONS

- Standard equipment's labs should be provided to each department
- Campus Information system should be implemented to divert manual communication to ICT based
- ICT directorate should be established with expert team
- All teachers should undertake mandatory trainings regarding latest ICT tools
- University should have clear cut ICT policy and human resource department
- Factors revealed from the proposed framework should be used as motivation for better use of ICT by academic staff
- The ICT tools should be accessible to academic staff and students as well in their class
- Motivational and awareness campaign about ICT should be launched at campus

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