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Substantial Impact of Cognitive Interpretation, Organization and Social Factors on the Effective Information Technology Usage

^a Nargis Abbas, ^b Saima Nasreen, ^c Uzma Ashiq

^a Assistant Professor, Department of Education, University of Sargodha, Pakistan

Email: nargis.abbas@uos.edu.pk

^b Lecturer, Department of Education, University of Sargodha, Bhakkar Campus, Bhakkar, Pakistan

^c Department of Social Work, University of Sargodha, Pakistan

Email: uzma.ashiq@uos.edu.pk

ARTICLE DETAILS	ABSTRACT
History: Accepted 19 Nov 2020 Available Online 31 Dec 2020	<i>Effective Information Technology (IT) usage refers to the intelligent utilization of IT tools to gain maximum benefits. In the current technological era, the teaching faculty is needed to use the information technology tools effectively to play a progressive role in the educational institutions. The major objective of this study is to explore the influence of social, individual, and organizational factors on the university teachers to use the information technology effectively. A sample of 300 teachers was selected from 3 general public universities through multistage sampling technique. A Quantitative Survey research design was used. The inferential and descriptive statistics were applied for the data analysis. It was revealed in the results that the effective use of IT was influenced by all the five sub variables of individual cognitive interpretation factors, including prior experience, perceived usefulness, image, personal innovativeness. In organizational factor, the sub variable ‘incentives’ were found to have a significant effect on the effective usage of IT. Similarly, under social factor, the peer pressure influence was found significantly determining the effective IT usage. It is suggested that for increasing the effective use of information technology, at administration level, information technology expertise should be made an integral part of selection criteria for university faculty.</i>
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Corresponding author's email address: nargis.abbas@uos.edu.pk

1. Introduction

Information technology has revolutionized every field of life including education (Bhatti & Hanif, 2013). Information technology may be defined as anything which is related to computing technology including both software and hardware for processing, storing and transferring information (Kripanont, 2007). According to Oye et al. (2012), the information technology is a vehicle for transmitting knowledge and its usage improves human capacity and efficiency. Effective information technology

usage refers to the effective utilization of all mediums of IT and gaining maximum benefits from it. Information technology usage (cited in Taylor & Todd, 1995) is conceived as not only the usage of hardware or software rather it involves the services, the individuals and the processes that support and are involved in technology usage. Information technology usage enhances efficiency in every dimension of education, and has benefited the education in a miraculous way (Kiper & Tercan, 2012).

A remarkable growth of information technology in educational field can be noticed in the past two decades which ensures the entire transformation of teaching process (Ali *et al.*, 2011; Al-Zaidiyeen *et al.*, 2010; Yuena & Ma, 2008). New digital technologies being having more efficient tools and services are frequently substituting the old ones (Talukder, 2011; Talukder *et al.*, 2008). Information technology has influenced every discipline of education including teaching styles, learning patterns, research methods, the resources and the means used in teaching and learning (Bhatti & Hanif, 2013; Tahir *et al.*, 2010). The information technology usage has transformed the higher education institutions into more challenging institutions and results in the enhancement of online learning process (Qadoos *et al.*, 2020; Ali *et al.*, 2011; Bhatti, 2010).

Information technology (IT) tools and services are rendering a productive role in education especially; the teaching process is becoming interesting as well as more accessible. Previous researches (Kiper & Tercan, 2012; Bhatti, 2010; Talukder *et al.*, 2008; Kripanont, 2007) mentioned a wide variety of information technologies, which can be used for educational purposes such as; computers, laptop, multimedia, projectors, filmstrips, television, transparencies, digital cameras, audiotapes, digital phone, i-pads, tablets, videodiscs and interactive whiteboards. The IT services which can be used for teaching purposes may include, Email, Voice mail, Data base, Spread sheet applications, Dial-up system, Word processing system, E-commerce, Drop box, Face book, Twitter, Skype, Online Digital Library, WhatsApp and E-brary (Bhatti, 2010; Tahir *et al.*, 2010). The effective usage of these tools and services by university teaching faculty and students makes the teaching learning process easier, efficient and more approachable (Islim & Cirak, 2017; Mukhtar & Rasid, 2013).

In the existing scenario, teaching faculty cannot keep continuing the traditional teaching methods, but they have to transform themselves into technology equipped personnel in order to make their teaching more effective and compatible with the new patterns of global standards (Ramorola, 2014). In a study, Teo (2011) concluded that technological professional development is necessary for teachers to face the current challenges because teachers who do not upgrade their knowledge and technology skills may soon develop avoidance behaviors about IT usage in their teaching work. Although many technological innovations are being in use, faculty members may vary in their willingness to adopt new information technologies and to effectively apply these technologies in their teaching (Talukder, 2014; Teo, 2011). According to Bhatti (2010), faculty members are intended to use IT but they lack adequate resources. Likewise, Gulbahar & Guven (2008) indicated that the teaching faculty was well aware and understood the role of technology in their teaching, however the major barrier towards their effective usage was the non-availability of adequate training and access.

The trend of IT usage among faculty members has a long lasting, reflective and enduring influence on the students' cognitive developments, their attitudinal notions (Hu *et al.*, 2003). When teachers use information technologies, it provides encouragement to students to use the similar technologies for learning and consequently, the students able to master the technology skills learned from their teachers that may be beneficial in future (Leftwich *et al.*, 2010; Gibson *et al.*, 2008; Hu *et al.*, 2003). Albeit the incorporation of ITs in the educational process would be a complicated task, as it may be comprised of a wide range of problems associated with it (Schoepp, 2005). Various researches (Al-

Shbou, 2019; Semary, 2011; Alwani & Soomro, 2010; Bhatti, 2010; Al-Senaidi *et al.*, 2009) conducted to explore the problems and barriers faced by teachers in effective usage of IT. Literature identified the common barriers to effective usage of information technology, such as, lack of awareness about data retrieval sources, lack of enough time for IT related activities, lack of internet access, lack of opportunities for professional development in teachers, absence of English training and proficiency needed for IT usage, lack of hardware, insufficiency of equipment, no specific IT budget, lack of clear plan for effective technology usage, absence of incentives and the most importantly provision of no support from the particular institution (Singhavi & Basargekar, 2019). Similarly, previous research studies (Tarhini *et al.*, 2013; Talukder *et al.*, 2008; Kripanont, 2007; Medlin, 2001) indicated various factors affecting the information technology usage. The major determinants of IT usage include social factors, organizational factors and individual factors. Despite of these, there are other additional factors that strongly influence the effective use of technology among teaching faculty such as, facilitating conditions, self-efficacy and perceived ease of use (Venkatesh & Davis, 2000; Taylor & Todd, 1995b; Davis *et al.*, 1989).

Indeed, various research studies (Alwani & Soomro, 2010; Gulbahar & Guven, 2008; Porter & Donthu, 2006; Medlin, 2001) were conducted about information technology usage but in developed countries. There is dearth of knowledge about IT usage among university faculty members in developing countries like, Pakistan. Therefore, the aim of this study was to explore the substantial impact of cognitive interpretive factors, organizational factors and social influence factors in determining the effective usage of IT tools of university faculty in their teaching and further, to measure the group differences in these factors.

The theoretical framework for this study is based on the enhanced model of innovation adoption presented by Talukder. This model was originated from three theories including “Theory of Reasoned Action”, the conceptual framework advocated by Frambach and Schillewaert (2002), and the “Technology Acceptance Model”. It was used to examine several variables which may have a strong impact on the adoption of innovation by an individual in the organizational setting (Talukder *et al.*, 2008).

2. Operational definition of the variables of the study

Individual factors may be defined as individuals’ cognitive interpretations of innovation (Lewis *et al.*, 2003), includes five sub variables; perceived usefulness, personal innovativeness, enjoyment with innovation, and prior experience. Perceived usefulness describes the extent to which an individual assumes that as result of the usage of any specific innovation, his job performance would be improved (Bhattacharjee & Sanford, 2009). Personal innovativeness indicates the extent of willingness of an individual for using any innovation (Agarwal & Parsad, 1998). Image describes the degree to which the image of an individual within any particular organization is enhanced as a result of using any particular technology (Talukder *et al.*, 2008). Prior experience may be described as the usage of the similar or same technology or innovation by an individual previously or possessing similar innovation skills (Talukder, 2011). Enjoyment with innovation refers to “the degree to which any individual feels happy and contented, and assumes the experience of usage of any new technology enjoyable” (Talukder *et al.*, 2008).

Organizational factors may be defined as the external factors which include incentives, training and managerial support (Frambach & Schillewaert, 2002). Training refers to the degree of provision of any training to the individuals in order to enhance their expertise and knowledge for using any particular technology. Incentives include materials and non-materials benefits which could be provided

by an organization to the employees who use information technology innovation. Managerial support indicates the extent to which senior management encourages employees and provides adequate resources for using information technology (Talukder, 2014; 2011).

Social factors influence indicates that the individuals are more intended to do any task or activity if they assume the presence of an extreme social pressure from their important ones to execute that task. Social factors consisted influence of peer pressure and social network. Peer pressure influence indicates the degree to which co-workers influence the behaviour i.e., the motivation, the encouragement and the influence that the colleagues may have on an individual for adopting any innovation. Social network influence indicates the degree to which the other members in a similar organization or discipline as well as outside the working setting influences an individual's behavioural patterns (Pacurar & Abbas, 2015).

3. Research Methodology

A quantitative survey research design was adopted. All the teaching faculty of public sector universities in Punjab was taken as the population for this research and through multistage sampling technique was used to select the sample of the study. At first stage, a sample of three public sector universities of Punjab (University of Sargodha, GC University Faisalabad and University of Gujarat) was selected purposively. The inclusion criterion was maximum twenty years age of the university. On the second stage, three major faculties from each university were selected. These faculties were comprised of "Natural and Physical Sciences", "Arts & Social sciences", and, "Management & Administrative Sciences". The Arts and Social Sciences Faculty included the departments Psychology, Education, Social work, Mass communication, Law and English. The Faculty of Natural & Physical Sciences included departments as Mathematics, Statistics, Chemistry, Zoology, Botany, Physics and CS/IT department, while the Faculty of Management and Administrative Sciences comprised of department of Business administration, Management and Economics. And lastly a sample of 300 faculty members was selected randomly as sample from these departments.

4. Research Instrument

A questionnaire based on scales to measure the variable the study was constructed after reviewing extensive literature of previous researches and using already developed research tools based on Davis's *Technology Acceptance Model* (TAM) and M. Talukder's *Enhanced Model of Innovation Adoption*. This research instrument consisted of one dependent variable and ten independent variables measured by 61 items measured on a seven-point Likert scale. There were two sections of the research instrument: Section A included the demographic characteristics of teaching faculty such as Gender, Age, Current organization, Department, Academic qualification, Designation, Job experience, Mode of job, Training IT Courses. Whereas, section B was consisted of scale measuring the effective usage of IT resources and ten dependent variables which may have a substantial impact on the effective information technology usage mentioned in table 1. Cronbach's Alpha by using SPSS v.20 was applied to measure the reliability of all scales and content validity was ensured through experts. The alpha value of each variable is shown in table 1.

Table 1: Description of the Factor-wise detail of items of the Tool

Sr. No	Variables	Items No.	Alpha Values
1	Perceived usefulness	1-7	.822
2	Personal innovativeness	8-12	.841
3	Enjoyment wit innovation	13-18	.884
4	Image	19-22	.838
5	Prior Experience	23-28	.754
6	Training	29-32	.784
7	Managerial support	33-39	.894
8	Incentives	40-43	.838
9	Peers influence	44-48	.816
10	Social network influence	49-51	.801
11	Effective use of IT tools	52-61	.717

5. Results

The research objective was to investigate the group differences in cognitive interpretive factors, organizational factors and social influence factors. Further, this study was aimed to explore the substantial impact of these factors in determining the effective usage of IT tools in teaching. Inferential statistics, t-test and one-way ANOVA were applied for group differences and multiple regression analysis was applied for determining the substantial impact of the factors on effective usage of IT. The demographic description of the faculty in the form of frequency distribution is presented in table 2.

Table 2: Demographic summary of the Respondents

Demographic variables	Values
Gender	
• Female	139 (46.3%)
• Male	161 (53.7%)
Age	
• Under 35	155 (51.7%)
• 35-44	97 (32.3%)
• 45 or Above	48 (16%)
University	
• University of Sargodha	100 (33.3%)
• GC University Faisalabad	100 (33.3%)
• University of Gujarat	100 (33.3%)
Faculty (Department)	
• Arts and Social Sciences	120 (40%)
• Natural and Physical Sciences	140 (46.7%)
• Management and Administrative Sciences	40 (13.3 %)
Job experience	
• Less than 1 year	49 (16.3%)
• 1-5 years	95 (31.7%)
• Above 5 years	156 (52%)
Mode of Job	
• Regular	185 (61.7%)
• Contract	115 (51.7%)
Training IT courses	
• Attended	145 (48.3%)
• Not attended	155 (51.7%)

Table 2 presents the demographic profile of the sample of the study which shows the homogenous distribution regarding gender, university, mode of job and training of IT courses. Regarding the variable “age”, the results show that half of the respondent were below 35 years old, while half of the respondents were above 35 years, which shows that most of the faculty in these universities were young and supposed to have the familiarity with the information technology tools in their teaching. This can be further observed from the sample distribution in the variable “training in IT course”, that approximately half of the sample claimed to have such trainings.

5.1 Group Differences

In the current study, the t-test was applied for comparison of male and female faculty members for individual, organizational, social factors and, effective usage of IT. The results of data analysis indicated that no significant differences ($t = 0.901, p < .05$) were found among the male faculty ($M = 149.11, SD = 20.62$) and female faculty members ($M = 146.95, SD = 20.95$) regarding individual factors. Similarly, the results regarding the organizational factors reflected no significant difference ($t = 1.03, p < .05$) among the male ($M = 66.29, SD = 15.35$) and the female faculty members ($M = 64.42, SD = 15.85$). Likewise, there was no significant difference ($t = 0.841, p < .05$) found among the mean scores of male ($M = 41.70, SD = 7.05$) and the mean scores of female faculty members ($M = 41.00, SD = 7.32$) with respect to the social factors. However, the results regarding the effective usage of IT demonstrated that the mean scores of male faculty members were ($M = 30.70, SD = 6.31$) and the mean scores of female faculty members were ($M = 29.78, SD = 6.02$), reflecting no significant difference ($t = 129, p < .05$).

Similarly, to study the group differences with respect to mode of job of faculty members, t-test was applied. The results indicated that no significant difference ($t = -.58, p < .05$) was found among the faculty members having contract mode of job ($M = 149.00, SD = 17.44$) and those faculty members having regular jobs ($M = 147.56, SD = 22.61$) regarding the individual factors. While the results regarding the organizational factors reflected that the mean scores of faculty members having regular job ($M = 65.23, SD = 16.08$) and the mean scores of faculty members having contract job ($M = 65.72, SD = 14.83$) were not significantly different ($t = -.26, p < .05$) from each other. On the other hand, the results regarding the social factors exhibited no significant difference ($t = -.822, p < .05$) among the faculty members who were having regular jobs ($M = 41.12, SD = 7.39$) and those who were having contract jobs ($M = 41.82, SD = 7.05$). Likewise, the results regarding the effective usage of IT demonstrated indicated no significant difference ($t = 4.05, p < .05$) among the mean scores of faculty members having regular jobs ($M = 31.39, SD = 6.14$) and the mean scores of faculty members having contract jobs ($M = 28.48, SD = 5.85$).

However, independent-samples t-test was applied for comparison of the faculty members who attended and who did not attend training IT courses for individual, organizational, social factors and, effective usage of IT. The results regarding the individual factors depicted that a significant difference ($t = 2.41^*, p < .05$) existed between the faculty members who attended training IT courses ($M = 151.08, SD = 19.32$) and those who did not attend any training IT courses ($M = 145.33, SD = 21.74$). On the other hand, the results regarding the organizational factors depicted that the faculty members who attended training IT courses ($M = 69.24, SD = 15.38$) were significantly different ($t = 4.21^*, p < .05$) from the faculty members who did not attend training IT courses ($M = 61.85, SD = 14.97$). Similarly, the results regarding the social factors reported that there is a significant difference ($t = 2.29^*, p < .05$) among the faculty members who attended training IT courses ($M = 42.36, SD = 7.09$) and those who did not attend training IT courses ($M = 40.46, SD = 7.32$). Likewise, the results regarding the effective usage of IT demonstrated that there was no significant difference ($t = 1.75, p < .05$) among the faculty

members who attended training IT courses ($M = 69.24$, $SD = 15.38$) and the faculty members who did not attend training IT courses ($M = 61.85$, $SD = 14.97$).

On the other hand, to determine the group differences among the teaching faculty with respect to age, analysis of variances was computed. It was reported in the results that the mean scores of faculty members belonging to different age groups were not significantly different ($F(3, 296) = 1.989$, $p < .05$) from each other regarding the effective usage of information technology. Moreover, the descriptive statistics computed for the effective usage illustrated the means and standard deviation for faculty members belonging to age group under 35 ($M=29.56$, $SD=6.40$), for faculty members of age group 35-44 ($M=30.72$, $SD=5.78$), for faculty members belonging to age group 45-54 ($M=31.44$, $SD=6.10$), and for faculty members belonging to age group of 54 and above ($M=34.00$, $SD=5.61$), indicating that the group of respondents belonging to age group 54 and Above had the higher mean scores while the group of respondents belonging to age group under 35 had the lower mean scores than other various age groups regarding effective usage of information technology.

Furthermore, one-way ANOVA was conducted to measure the group differences of universities regarding individual factors, organizational factors, social factors and effective usage of IT. It was found that groups of universities were significantly different from each other regarding individual factors ($F_{(2,297)} = 4.896$, $p = .008$). In order to further investigate that which group of universities was significantly different for individual factors, Bonferroni test was applied. The results indicated that UOS and GCUF were significantly different (Mean difference $_{(1-J)} = 7.0064$ at $p \leq 0.05$). Likewise, the results revealed that UOS and UOG were significantly different (Mean difference $_{(1-J)} = 8.50$ at $p \leq 0.05$). Whereas, the group differences of universities regarding organizational factors were significant at $p \leq 0.05$. It indicated that groups of universities were significantly different regarding organizational factors ($F_{(2, 297)} = 3.66$, $p = .027$). In order to further investigate that which group of universities was significantly different for organizational factors, Bonferroni test was applied. Results indicated that UOS and UOG were significantly different (Mean difference $_{(1-J)} = -5.78$ at $p \leq 0.05$). The group differences of universities regarding social factors were significant at $p \leq 0.05$. Consequently, it was reported that groups of universities were significantly different from each other regarding social factors ($F_{(2,297)} = 2.90$, $p = .056$). On the other hand, the group differences of universities regarding effective usage of IT were significant at $p \leq 0.05$. It indicated that groups of universities were significantly different regarding organizational factors ($F_{(2,297)} = 7.75$, $p = .001$). In order to further investigate that which group of universities was significantly different for effective usage of IT, Bonferroni test was applied. Results indicated that UOS and GCUF were significantly different (Mean difference $_{(1-J)} = 2.68$ at $p \leq 0.05$). Likewise, the results revealed that UOS and UOG were significantly different (Mean difference $_{(1-J)} = 3.11$ at $p \leq 0.05$).

5.2 Multiple Linear Regression Analysis

The Multiple Linear Regression Analysis was applied for predicting the value of the dependent variable (effective usage of information technology) from the ten sub variables of three major independent variables as individual factors (enjoyment with innovation, prior experience, perceived usefulness, image and personal innovativeness), the organizational factors (incentives, training and managerial support), and the social factors (social network influence and peers influence). The results are shown in table 3.

Table 3: Prediction of the effective information technology usage

		Unstandardized coefficients		Stand coefficients	t-values
Model		B	Std Error	Beta	
	Constant	21.751	3.060		7.108
Cognitive interpretation factor	1.Perceived usefulness	.185	.064	.164	2.876**
	2.Personal Innovativeness	.310	.067	.259	4.629***
	3.Enjoyment	.226	.061	.211	3.721***
	4.Image	.224	0.77	.180	3.163**
	5.Prior Experience	.209	.058	.205	3.607***
Organizational factors	1.Training Courses	.101	.069	.084	1.452
	2.Managerial support	.032	.074	.022	0.727
	3.Incentives	.232	.087	.193	2.674**
Social influence factors	1.Peer pressure	.176	.071	.142	2.478*
	2.Social network influence	.069	.112	.036	.615
	R ²	0.381			
	F	3.581***			
	Adjusted R ²	0.359			

* $p \leq 0.05$; ** $p < 0.01$; *** $p < 0.001$

For the Model in table 3, the ANOVA results verified the significance of the regression model for the dependant variable “Effective IT usage” ($F_{(10, 289)} = 3.581, p < .001$). Moreover, the value of R² value which explains the variation in the model was found .381 which means individual factors (personal innovativeness, perceived usefulness, enjoyment with innovation, prior experience, image), the organizational factors (incentives, training and managerial support), and the social factors (social network influence and peers influence) had 38% impact on effective usage of information technology among faculty members of universities.

The first variable perceived usefulness of cognitive interpretation factor was found to have significant impact on effective IT usage among faculty members ($b = .164, t = 2.81, p = .004$). The second variable “personal innovativeness” was also appeared as a significant predictor of effective IT usage members ($b = .259, t = 4.629, p = .000$). The standardized regression coefficient indicates that one unit increase in personal innovativeness increase 0.24 units effective IT usage among university teachers. Moreover, the variable “Enjoyment” also appeared as the significant predictor for the dependent variable of the study ($b = .211, t = 3.721, p = .000$), it was revealed that one unit increase in the feeling of enjoying the IT contributed .211 units increase in the use of information technology effectively. In addition, the variable “image” of the individual in the organization was found a significant predictor for using IT in their teaching effectively ($b = .180, t = 3.163, p = .001$), means it contributes .18 units in effective IT usage. The last variable of the factor cognitive interpretation, that is, “prior experience” was found to have significant positive contribution in IT usage in the class ($b = .205, t = 3.607, p = .000$).

The sub variable of organizational factor, that is, “training courses” of information technology was not found to have significant impact on IT usage among faculty members ($b = .084, t = 1.452, p = .148$). This means training of IT increase 0.084 of effective IT usage however such contribution was not

significant. The second variable “Managerial support” was also found a non-significant predictor of dependent variable ($b = .022$, $t = 0.727$, $p = .467$). the last variable of this organizational factor was “incentives” ($b = .193$, $t = 2.674$, $p = .008$). The standardized regression coefficient indicates that one unit increase in “incentives” increase 0.193 units effective IT usage among university teachers.

Lastly, the third major factor of the study was “social influence”, which was measured by two sub variables. The results reflected that the “peer pressure” had a significant impact on university faculty regarding effective usage of information technology ($b = .142$, $t = 2.478$, $p = .014$). the regression coefficient indicates that one unit increase in the peer pressure due to co-worker’s behaviour increase .14 units in the use of IT effectively. However, the “social network influence” was found a non-significant predictor of the effective usage of It in teaching ($b = .036$, $t = .615$, $p = .54$).

6. Discussion and Conclusion

The results of this study are very much similar to the findings of a previous research conducted by Alshankity and Alshawhi (2008) and Phua et al. (2007), which confirmed that gender did not have any influence on faculty members use of technology. It infers that with the passage of time, the gender gap regarding the technology usage had vanished. While the results were contrary to the findings of Venkatesh & Davis (2000), who found gender differences regarding social influence and technology usage.

The current study also reported that no age wise differences exist among faculty members of universities regarding effective usage of IT, individual factors, organizational factors, and social factors. These results are consistent with the study of Kennedy et al. (2008), who found that no significant age differences in using information technology. However, these results were contradictory to those of Van Derkaay & Young (2012) explored, i.e., older faculty members use technology comparatively less than the young faculty members. Similarly, this study also found the significant impact of personal innovativeness, enjoyment with innovation, image, perceived usefulness, and prior experience and, peers influence on effective usage of information technology. While, there was no impact of incentives, training and managerial support, and, social network on effective IT usage among faculty members was found. These results were quite similar with previous researches Venkatesh *et al.*, (2012), Igbaria (1996) and Davis (1989). However, these findings are contradictory to the findings of Talukder et al. (2008) who revealed that perceived usefulness, personal innovativeness, training and managerial support significantly influence the usage, while enjoyment with innovation, prior experience, image, incentives, peers influence and likewise, the variable social network influence did not affect the usage significantly.

7. Suggestions

The current research would provide teachers as well as teachers’ trainers the awareness about the determinants and the factors, which are influential in effective utilization of information technology in teaching. Likewise, this research would be helpful for institutions to accumulate what changes are needed in organizational policies and strategies for promoting and enhancing the effective IT usage university teachers. In the light of results of this study, it is suggested that a university should launch training sessions about the IT innovations and facilitate the faculty members to use it effectively. Further, the faculty members who are more innovative would be more intended to use IT and thus, they should be considered as agents of change in the organization. This study also deemed that an organization should not only provide information about the work-related advantages of using IT to its personnel, but also educate them about the fun features of IT to make them appreciate enjoyable and pleasurable aspects of technologies. The results also revealed that the universities must be made the IT

expertise an integral part of selection criteria of a university teacher along with the academic qualification and job experience because innovative and updated professionalism is the demand of the current digital era.

References

- Agarwal, R., & Parsad, J. (1998). The Antecedents and Consequents of User Perceptions in Information Technology Adoption. *Decision Support Systems*, 22(1), 15-29. [https://doi.org/10.1016/S0167-9236\(97\)00006-7](https://doi.org/10.1016/S0167-9236(97)00006-7)
- Alshankity, Z., & Alshawhi, A. (2008). Gender Differences in Internet Usage among Faculty Members: The Case of Saudi Arabia. Krakow. <https://digitalcommons.unl.edu/libphilprac/1052>
- Ali, M., Ahmed, A., Shaikh, A., & Bukhari, A. (2011). Impacts of Information Technology on E-learning System in Pakistan. *Sindh University Research Journal (Science Series)*, 43(1), 29-34. https://www.researchgate.net/publication/301892936_Impacts_of_Information_Technology_on_E-learning_System_in_Pakistan
- Al-Senaidi, S., Lin, L., & Poirot, J. (2009). Barriers to Adopting Technology for Teaching and Learning in Oman. *Computers & Education*, 53, 575-590. doi: 10.1016/j.compedu.2009.03.015
- Al-Shbou, M. A. (2019). Incentives and Obstacles Influencing Faculty Members' Use of Information and Communication Technology (ICT). *Modern Applied Science*, 13(3), 66-100. <https://doi.org/10.5539/mas.v13n3p66>
- Al-Zaidiyeen, N. J., Mei, L. L., & Fook, F. S. (2010). Teachers' Attitudes and Levels of Technology Use in Classrooms: The Case of Jordan Schools. *International Education Studies*, 3(2). <https://www.learntechlib.org/p/158242/>.
- Alwani, A., & Soomro, S. (2010). Barriers to Effective Use of Information Technology in Science Education at Yanbu Kingdom of Saudi Arabia. <https://www.intechopen.com/books/e-learning-experiences-and-future/barriers-to-effective-use-of-information-technology-in-science-education-at-yanbu-kingdom-of-saudi-a>
- Bhattacharjee, A., & Sanford, C. . (2009). The Intention-Behaviour Gap in Technology Usage: The Moderating Role of Attitude Strength. *Behaviour & Information Technology*, 28(4), 389-401. doi: 10.1080/01449290802121230
- Bhatti, R. (2010). Internet Use among Faculty Members in the Changing Higher Education Environment at the Islamia University of Bahawalpur, Pakistan. *Library Philosophy and Practice*, 1-8. <https://digitalcommons.unl.edu/libphilprac/383>
- Bhatti, R., & Hanif, M. (2013). Impact of ICT on Social Science Faculty Members' Information Usage Pattern at Bahauddin Zakariya University, Multan. *Library Philosophy and Practice*, 1-13. <https://digitalcommons.unl.edu/libphilprac/928>
- Chhachhar, A. R., Khushk, G. M., Chachar, A. A., & Qureshi, B. (2013). Internet Usage among University Students in Pakistan. *Journal of Basic and Applied Scientific Research*, 3(9), 31-35. <https://www.semanticscholar.org/paper/Internet-Usage-among-University-Students-in-Chhachhar-Khushk/eed3253031fd10fd8acd5d2de02a4354d8fbc8dc8>
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 35(8), 982-1003. <https://www.researchgate.net/publication/227446117>
- Frambach, R., & Schillewaert, N. (2002). Organizational Innovation Adoption: A Multi-Level Framework of Determinants and Opportunities for Future Research. *Journal of Business Research*, 55(2), 163-176. doi: 10.1016/S0148-2963(00)00152-1
- Gibson, S. G., Harris, M. L., & Colaric, S. M. (2008). Technology Acceptance in an Academic Context: Faculty Acceptance of Online Education. *Journal of Education for Business*, 83(6), 355-359. doi: 10.3200/JOEB.83.6.355-359
- Gulbahar, Y., & Guven, I. . (2008). A Survey of ICT Usage and Perceptions of Social Science Teachers in Turkey. *Educational Technology and Society*, 11(3), 37-51. <https://www.semanticscholar.org/paper/A-Survey-on->

- ICT-Usage-and-the-Perceptions-of-Social-G%C3%BCIbahar-G%C3%BCven/70b8d5134907db6933efb03ef97431230bbddaad
- Hu, P., Clark, T., & Ma, W. (2003). Examining Technology Acceptance by School Teachers: A Longitudinal Study. *Information & Management*, 41, 227-241. doi: 10.1016/S0378-7206(03)00050-8
- Igbaria, M., Guimaraes, T., & Davis, G. B. (1995). Testing the Determinants of Microcomputer Usage via a Structural Equation Model. *Journal of Management Information Systems*, 11(4), 87-114. <https://doi.org/10.1080/07421222.1995.11518061>
- Islim, O. F., & Cirak, N. S. (2017). Technology and College Students: What Faculty Members Think About the Use of Technology in Higher Education. *Malaysian Online Journal of Educational Technology*, 5(2), 51-67. <http://www.mojet.net>
- Kennedy, G., Dalgarno, B., Bennett, S., Judd, T., Gray, K., & Chang, R. (2008). Immigrants and Natives: Investigating Differences between Staff and Students' Use of Technology. *Proceedings ascilite Melbourne*, 484-492. <http://www.ascilite.org.au/conferences/melbourne08/procs/kennedy.pdf>
- Kiper, A., & Tercan, S. (2012). The Usage of Information Technologies in Classroom Environment among Primary School Teachers and their Perceptions on in-service Training Programs on IT (Sample of Sakarya). *The Turkish Online Journal of Educational Technology*, 11(3), 386-392. https://www.researchgate.net/publication/292920984_The_usage_of_information_technologies_in_classroom_environment_among_primary_school_teachers_and_their_perception_on_in-service_training_programs_on_it_sample_of_Sakarya
- Kripanont, N. (2007). Examining a Technology Acceptance Model of Internet Usage by Academics within Thai Business Schools. Doctor of Philosophy Phd, Victoria University Melbourne, Australia, Melbourne. <http://vuir.vu.edu.au/1512/1/Kripanont.pdf>
- Leftwich, A. T., Glazewski, K. D., Newby, T. J., & Ertmer, P. A. (2010). Teacher Value Beliefs Associated with Using Technology: Addressing Professional and Student Needs. *Computers & Education* 55, 1321-1335. doi: 10.1016/j.compedu.2010.06.002
- Lewis, W., Agarwal, R., & Sambamurthy, V. (2003). Sources of Influence on Beliefs about Information Technology Use: An Empirical Study of Knowledge Workers. *MIS Quarterly*, 27(4), 657-678. <https://www.jstor.org/stable/30036552>
- Medlin, B. D. (2001). The Factors that may Influence a Faculty Members' Decision to Adopt Electronic Technologies in Instruction. Doctor, Virginia Polytechnic Institute and State University, Blacksburg, Virginia. <http://scholar.lib.vt.edu/theses/available/etd-09282001-155044/unrestricted/NewCOMPLETE2.pdf>
- Mukhtar, S., & Rashid, K. (2013). Importance of Information Technology in Education of Pakistan. Paper presented at the 3rd International Conference on Business and Management, Lahore. <http://cgr.umt.edu.pk/icobm2013/index.html>
- Oye, N. D., Iahad, N. A., & Rahim, N. Ab. (2012). The History of UTAUT Model and its Impact on ICT Acceptance and Usage by Academicians. *Educ Inf Technol*. doi: 10.1007/s10639-012-9189-9
- Pacurar, E., & Abbas, N. (2015). Analysis of French secondary school teachers' intention to integrate digital work environments into their teaching practices. *Education and Information Technologies*, 20(3), 537-557. doi:10.1007/s10639-013-9301-9
- Phua, P. L., Wong, S. L., & Abu, R. (2012). Factors Influencing the Behavioural Intention to Use the Internet as a Teaching-Learning Tool in Home Economics. *Procedia - Social and Behavioral Sciences*, 59, 180-187. doi: 10.1016/j.sbspro.2012.09.263
- Porter, C. E., & Donthu, N. (2006). Using the Technology Acceptance Model to Explain how Attitudes Determine Internet Usage: The Role of Perceived Access Barriers and Demographics. *Journal of Business Research*, 59(9), 999-1007. doi: 10.1016/j.jbusres.2006.06.003
- Qadoos, I., Talha, M. A., Hashim, M., & Rizwan, M. (2020). Role of Electronic Media in Changing Fashion Trends among University Students: A Case of Bahaiddin Zakariya University Multan. *Review of Education, Administration & LAW*, 3(1), 31-40. <https://doi.org/10.47067/real.v3i1.19>
- Ramorola, M. Z. (2014). Challenge of Effective Technology Integration into Teaching and Learning. *Africa Education Review*, 10(4), 654-670. doi: 10.1080/18146627.2013.853559
- Semary, H. I. (2011). Barriers to the Effective Use of Technology in Education: Case Study of UAE University.

- Asian Transactions on Science & Technology, 1(5), 22-32.
<https://library.iated.org/view/ELSEMARY2011BAR>
- Schoepp, K. (2005). Barriers to Technology Integration in a Technology-Rich Environment (Vol. 2, pp. 1-24): Zayed University, Abu Dhabi.
https://www.researchgate.net/publication/249916610_Barriers_to_Technology_Integration_in_a_Technology-Rich_Environment
- Singhavi, C. & Basargekar, P. (2019). Barriers Perceived by Teachers for use of Information and Communication Technology (ICT) in the Classroom in Maharashtra, India. International Journal of Education and Development using Information and Communication Technology, 15 (2), 62-78.
<https://files.eric.ed.gov/fulltext/EJ1220774.pdf>
- Tahir, M., Mahmood, K., & Shafique, F. (2010). Use of Electronic Information Resources and Facilities by Humanities Scholars. The Electronic Library, 28(1), 122-136. doi: 10.1108/02640471011023423
- Talukder, M., Harris, H., & Mapunda, G. (2008). Adoption of Innovations by Individuals within Organizations: An Australian Study. Asia Pacific Management Review, 13(2), 463-480.
https://www.researchgate.net/publication/267698256_Adoption_of_Innovations_by_Individuals_within_Organizations_An_Australian_Study
- Talukder, M. (2011). Development of an Enhanced Model of Innovation Adoption by Individual Employees. Journal of Asia-Pacific Business, 12, 316-339. doi: 10.1080/10599231.2011.591691
- Talukder, M. (2014). Managing Innovation Adoption: From Innovation to Implementation. Uk: Gower/Ashgate Publishing. <http://www.mendeley.com/research/managing-innovation-adoption>
- Tarhini, A., Hone, K., & Liu, X. (2013). User Acceptance Towards Web-based Learning Systems: Investigating the Role of Social, Organizational and Individual Factors in European Higher Education. Procedia Computer Science, 17, 189-197. doi: 10.1016/j.procs.2013.05.026
- Taylor, S., & Todd, P. (1995a). Assessing IT Usage: The Role of Prior Experience. MIS Quarterly, 19(4), 561-570.
<http://links.jstor.org/sici?sici=0276-7783%28199512%2919%3A4%3C561%3AAIUTRO%3E2.o.CO%3B2-8>
- Taylor, S., & Todd, P. A. (1995b). Understanding Information Technology Usage: A Test of Competing Models. Information Systems Research, 6(2), 144-176. <https://www.jstor.org/stable/23011007>
- Teo, T. (2011). Considering common method variance in educational technology research. British Journal of Educational Technology, 42(5), 94-96. <https://doi.org/10.1111/j.1467-8535.2011.01202.x>
- Van derKaay, C. D., & Young, W. H. (2012). Age-Related Differences in Technology Usage Among Community College Faculty. Community College Journal of Research and Practice, 36(8), 570-579. doi: 10.1080/10668920903054865
- Venkatesh, V., & Davis, F. (2000). A Theoretical Extension of Technology Acceptance Model: Four Longitudinal Studies. Management Sciences, 46(42), 186-204. <https://doi.org/10.1287/mnsc.46.2.186.11926>
- Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance of Use Technology. MIS Quarterly, 36(1), 157-178.
<https://doi.org/10.2307/41410412>
- Yuena, A., & Ma, W. (2008). Exploring Teacher Acceptance of E-Learning Technology. Asia-Pacific Journal of Teacher Education, 36(3), 229-243. doi: 10.1080/13598660802232779