Marvelous Challenges for Academia in Using ICT: Lessons from Public Sector Universities

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Information and Communication Technology (ICT) has universal impact on equity of education and the delivery of learning and instructions. Teachers' professional development is a dream without applying modern trends in education. It is most efficient and speedy way to improve the performance of learners. We are living in a constantly evolving digital world. ICT has an impact on nearly every aspect of our lives. The digital age has renovated the way young people communicate, network, seek help, access information and learn. The current paper is designed to explore the miracles and challenges faced by academia in using the ICT at higher educational level. The study is delimited to all the disciplines currently running and equipped with ICT at GC University Faisalabad and University of Sargodha, Pakistan. Eight departments were selected randomly where the applications of ICT were in progress. One hundred and sixty teachers were selected randomly. The teachers' engagement and motivation was assessed with self-developed instrument, ICT Engagement and Motivation Survey (ICT-EMS). T-test and ANOVA were applied. The results revealed that there exists a strong significant and positive impact of ICT on teachers' engagement and motivation. Female students were more curious in using ICT than that of males. Science teachers had more expertise in using ICT when compared with arts teachers. It is suggested that accepting the challenges of digital world, ICT must be applied at all levels of education and teachers should be trained for exploring the miracles of ICT.

Key words: *ICT miracles, Engagement, Motivation, Performance.*

Introduction

Flexible management needs economy for capital globalization, trade and production to paramount the demands of the society for individual freedom and communication. It is the miracle of microelectronics revolution towards the advancement of telecommunications and computing (Castells, 2001). The role of ICT is vital in business sector for the record and management of employees to improve the productivity. The case with the application of ICT in education is not yet explored fully due to lack of information and illiteracy by the educational managers towards ICT in the improvement of students' performance. The teachers are reluctant to use new technologies in classrooms due to insufficient skills and lack of training (Carnoy, 2005). The performance of students depends on educational environment, teachers and students' characteristics. A change is needed in higher education to use the ICT (Ben Youssef & Dahmani, 2008). Lack of leadership support, low investment in ICT equipment and infrastructure, lack of professional development are the prime challenges for educational leaders (Rabah, 2015). The role of ICT in learning improvement remains elusive surprisingly in traditional and novice instructional pedagogy on digital literacies and soft skills. It is difficult to switch over traditional benefits with alternatives. It depends on the actual persuasion of technological mediated relation between learner and instructors (Livingstone, 2012). A study conducted by Cerretani, Iturrioz, and Garay (2016) revealed that students use ICT four hours per day for studies and five hours for leisure activities without gender discrimination. The younger students used more ICT than older ones with poorer academic achievement and higher psychosocial maladjustment. Many teachers used more digital skills and ICT during classes than that of required frequency (Siddiq, Scherer, & Tondeur, 2016).

ICT experiences, learning collaboratively, and anxiety affect students' academic performance. The gender based studies revealed a slight difference with ICT experiences and positive attitude. Female students performed better visual learning styles than that of males. Location based analysis revealed that rural students had better learning attractiveness and more anxiety towards tablet use than urban fellows (Pruet, Ang, & Farzin, 2014). The causal correlation model of the technology recognition process of learning innovation in current era for graduate students are organizational support, perceived self-efficacy, learning acceptance and students' satisfaction (Amornkitpinyo & Wannapiroon, 2015). The executive dysfunction predicted sleep problems through nighttime awakenings. Anxiety increased daily smartphone usage which disturbs sleep. Both the cognitive and affective factors that are responsible to stimulate technology usage (Rosen, Carrier, Miller, Rokkum, & Ruiz, 2016).

The learners showed encouraging attitudes about technology in their final year. A strong positive correlation was found between the use of technology and attitudes. (Tubaishat, Aljezawi, Al-Rawajfah, Habiballah, & Akhu-Zaheya, 2016). The positive correlation between

students' attitude towards the use of tablet computer and learning styles is linked with academic performance (Pruet et al., 2014). The students feel it pleasure to receive positive feedback for using technology (Muis, Ranellucci, Trevors, & Duffy, 2015). When students used online technology they get better input in the form of online videos which improves English speaking ability (White, 2014).

A significant correlation was found among students' motivation, anxiety and attitudes. Female respondents exhibited higher anxiety level than that of males in using ICT (Gorjian, Mahmoudi, & Mir, 2012). A similar study conducted by Hwang, Hong, Cheng, Peng, and Wu (2013) found that girls had higher anxiety towards technology than that of boys. On the other hand, no significant differences were found between the achievement score of the learners regarding to gender and level of test anxiety. The male students with low level of test anxiety performed better in the mobile based tests (Karadeniz, 2011).

The students who learn through web receive better scores and performance skill (Gerdprasert, Pruksacheva, Panijpan, & Ruenwongsa, 2011). E-leaning helps to save time of learners (Sezer, 2016). The cell phone use is the type of ICT that is negatively correlated with achievement score and positively correlated with anxiety. The frequent use of cell phone had negative impact on mental health, academic performance, and learners' well-being (Lepp, Barkley, & Karpinski, 2014).

The teachers' may improve students' attitudes toward computer use through intense interventions aimed at their teachers. Future research should further investigate the mechanisms through which this relationship exits (Gibson et al., 2014). Students improve learning experiences through tablet use with satisfied performance. The learning activities for students are applied in rural schools with tablet-based interactive classroom environments (Kim & Jang, 2015).

The Major Barriers towards ICT use

The major barriers were lack of confidence, lack of competence, and lack of access to resources. These indicators are found to be critical for technology integration in schools. Teachers need technological support to use ICT resources of hardware and software. The teaching and learning opportunities may be increased if excellent integration of ICT is provided (Bingimlas, 2009). Internet addiction is the most frequently utilized time activity for adolescents. A significant and positive link between internet addiction and severity of depression and anxiety amongst the adolescents. However, it is not associated with the aggressiveness (Begovic, Pajevic, Hasanovic, & Avdibegovic, 2015).

Global ICT Trends in Education

1. Mobile Learning will prevail in classrooms with the help of smart phones.
2. Cloud Computing will be introduced with the availability of cheaper information appliances.
3. One-to-One computing. Classrooms should prepare for the universal availability resources with one to one computing of personal learning devices.
4. Global Learning. The connectivity of computers with cheaper infrastructure developed the ability to provide learning opportunities to students "anytime, anywhere".
5. Gaming. Educational games are more effective and attract the attention of learners.
6. Smart portfolio assessment. The management, collection, retrieving and sorting of data will help teachers to better understand learning. The students work together in an online portfolio.
7. Teacher mentors. The instructional role of teacher is like a guide students through individualized learning (Trucano et al., 2011).

The use of ICT are key dimensions of students' attitudes at work (Edmunds, Thorpe, & Conole, 2012). The teachers do not want to change their traditional practices (Mwalongo, 2011). The motivational effect of ICT on males had significant than that of females (Passey et al., 2003). While investigating the use of ICT towards the attainment of respondents, Harrison, et al. (2002) revealed no significant difference between males and females' performance in using ICT. Hence, the current study is an intension to explore the perceptions of teachers towards the use of ICT at university level.

Objectives of the Study

Following objectives were framed for the study:
1. Explore the perceptions of teachers towards the use of ICT.
2. Investigate the engagement and motivation of teachers about the use of ICT.
3. Identify the difference between male and female teachers about ICT use.
4. To find out the difference in the perceptions of teachers about the use of ICT indicators with respect to teachers' qualification, designation and experience.

Hypotheses

Following hypotheses were made to achieve the objectives:
Ho1: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teacher gender.
Ho2: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teaching subjects.

Ho3: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teachers' qualification.

Ho4: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teachers' designation.

Ho5: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teachers' experience.

Research Methodology

The current study was descriptive in nature and survey technique was used to collect the data.

Population and Sample

The population consisted of all the teachers teaching in GC University Faisalabad and University of Sargodha. First of all, the department were identified where the ICT use was in practice. It was astonishing that at university level, about seventy percent of faculty members were unable to use ICT or they had no intension to practice it. A total of one hundred and sixty faculty members were selected randomly, among them, one hundred teachers from GC University and sixty teachers from University of Sargodha.

Instrument

The data were collected with the help of self-constructed instrument, ICT Engagement and Motivation Survey (ICT-EMS). There were thirty-two items in the ICT-EMS. They were further subdivided into five factors namely, motivation, engagement, challenge, accessibility, and application. The instrument was validated by the three experts in the field of education. The reliability analysis was made by using Cronbach Alpha reliability coefficient. The value was computed .908 which was excellent for research purpose.

Data Analysis

Ho1: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teacher gender.

Table 1: Comparison of ICT Indicators with respect to Gender

Indicators	Gender	N	Mean	SD	t-value	Sig.
Motivation	Male	56	3.95	.816	-2.784	.006**
	Female	105	4.30	.725		
Engagement	Male	56	4.11	.891	-1.443	.086
	Female	105	4.34	.751		

Challenges	Male	56	3.87	.672	-2.442	.016*
	Female	105	4.12	.572		
Accessibility	Male	56	3.56	.775	-.153	.877
	Female	105	3.57	.679		
Application	Male	56	3.70	.884	.966	.335
	Female	105	3.84	.960		
Overall	Male	56	3.82	.546	-2.316	.022*
	Female	105	4.02	.503		

*p<0.05 and **p< 0.01

In Table 1, the results replicate a notable difference between male teachers and female teachers. Thus, the null hypothesis that, "there is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teacher gender" was rejected for motivation, challenges and overall ICT use. It was clear that male and female teachers had a momentous difference with respect to use of ICT. The mean value of the results shows that female teachers used frequently ICT resources as compared with their male colleagues. However, the aspects of engagement, accessibility, and application indicators did not show any significant difference.

Ho2: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teaching subjects.

Table 2: Comparison of ICT Indicators with respect to Subjects

Indicators	Subject	N	Mean	SD	t-value	Sig.
Motivation	Arts	67	4.03	.854	-1.945	.046*
	Science	93	4.28	.697		
Engagement	Arts	67	4.08	.863	-2.381	.018*
	Science	93	4.38	.744		
Challenges	Arts	67	3.88	.721	-2.522	.013*
	Science	93	4.14	.512		
Accessibility	Arts	67	3.51	.716	-.975	.331
	Science	93	3.62	.697		
Application	Arts	67	3.68	.949	-1.268	.207
	Science	93	3.87	.925		
Overall	Arts	67	3.82	.620	-2.494	.014*
	Science	93	4.04	.429		

*p<0.05

In Table 2, the results replicate a notable difference between science teachers and arts teachers. Thus, the null hypothesis that, "there is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teaching subjects" was rejected for motivation, engagement, challenges and overall ICT use. It was clear that science and arts teachers had a momentous difference with respect to use of ICT. The mean value of the results shows that science teachers used frequently ICT resources as compared with their arts colleagues. However, the aspects of accessibility and application indicators did not show any significant difference on the basis of teaching subjects.

Ho3: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teachers' qualification.

Table 3: Comparison of ICT Indicators with respect to Teachers' Qualification

		Sum of Squares	df	Mean Square	F	Sig.
Motivation	Between Groups	8.147	2	4.074	7.345	.001**
	Within Groups	87.082	157	.555		
	Total	95.229	159			
Engagement	Between Groups	2.784	2	1.392	2.162	.118
	Within Groups	101.066	157	.644		
	Total	103.850	159			
Challenges	Between Groups	3.372	2	1.686	4.580	.012*
	Within Groups	57.803	157	.368		
	Total	61.175	159			
Accessibility	Between Groups	.603	2	.301	.603	.548
	Within Groups	78.440	157	.500		
	Total	79.043	159			
Application	Between Groups	3.338	2	1.669	1.922	.150
	Within Groups	136.342	157	.868		
	Total	139.680	159			
Overall	Between Groups	3.008	2	1.504	5.733	.004**
	Within Groups	41.192	157	.262		
	Total	44.200	159			

*p<0.05, **p<0.01

ANOVA was used to explore the impact of ICT use with respect to qualification indicators. The table 3 found that qualification had strong significant impact on motivation, challenges, and overall indicators of ICT. However, engagement, accessibility, and application indicators did not show any significant difference among teachers' qualification.

Ho4: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teachers' designation.

Table 4: Comparison of ICT Indicators with respect to Teachers' Designation

		Sum of Squares	df	Mean Square	F	Sig.
Motivation	Between Groups	11.470	2	5.735	10.750	.000**
	Within Groups	83.759	157	.533		
	Total	95.229	159			
Engagement	Between Groups	5.133	2	2.566	4.081	.019*
	Within Groups	98.717	157	.629		
	Total	103.850	159			
Challenges	Between Groups	5.358	2	2.679	7.536	.001**
	Within Groups	55.817	157	.356		
	Total	61.175	159			
Accessibility	Between Groups	.883	2	.441	.887	.414
	Within Groups	78.160	157	.498		
	Total	79.043	159			
Application	Between Groups	5.500	2	2.750	3.218	.043*
	Within Groups	134.180	157	.855		
	Total	139.680	159			
Overall	Between Groups	4.847	2	2.424	9.669	.000**
	Within Groups	39.353	157	.251		
	Total	44.200	159			

*$p<0.05$, **$p<0.01$

ANOVA was used to explore the impact of ICT use with respect to designation. The table 4 found that designation had strong significant impact on motivation, engagement, challenges, application, and overall indicators of ICT. However, accessibility indicator did not show any significant difference among teachers' designation.

Ho5: There is no significant difference in the perceptions of teachers about the use of ICT indicators with respect to teachers' experience.

Table 5: Comparison of ICT Indicators with respect to Teachers' Experience

		Sum of Squares	df	Mean Square	F	Sig.
Motivation	Between Groups	4.227	3	1.409	2.415	.069
	Within Groups	91.002	156	.583		
	Total	95.229	159			
Engagement	Between Groups	1.672	3	.557	.851	.468
	Within Groups	102.178	156	.655		
	Total	103.850	159			
Challenges	Between Groups	1.664	3	.555	1.454	.229
	Within Groups	59.511	156	.381		
	Total	61.175	159			
Accessibility	Between Groups	1.041	3	.347	.694	.557
	Within Groups	78.002	156	.500		
	Total	79.043	159			
Application	Between Groups	1.181	3	.394	.443	.722
	Within Groups	138.499	156	.888		
	Total	139.680	159			
Overall	Between Groups	1.482	3	.494	1.804	.149
	Within Groups	42.719	156	.274		
	Total	44.200	159			

ANOVA was used to explore the impact of ICT use with respect to designation. The table 5 found that experience had no significant impact on all the indicators of ICT.

Discussion and Conclusion

The current study had difference in using ICT between male and female teachers. ICT indicators like motivation and challenges were significant with respect to teacher gender. It was clear that male and female teachers had a momentous difference in using ICT. Female teachers were found more curious in using ICT resources as compared with their male colleagues. The current study had many similarities and resemblances with the previous studies. A significant correlation was found among students' motivation, anxiety and attitudes. Female respondents had higher anxiety level than males (Gorjian, Mahmoudi, & Mir, 2012). Hwang, Hong, Cheng, Peng, and Wu (2013) also found that girls had higher anxiety towards technology than that of boys. On the other hand, no significant differences were found between the achievement score of the learners regarding to gender and test anxiety. The male students with low level of test anxiety performed better in the mobile based tests (Karadeniz, 2011). The Motivational effect of ICT on males had significant than that of females (Passey et al., 2003). However, the aspects of engagement, accessibility, and application indicators were equally perceived by both genders.

Science and arts teachers had a momentous difference with respect to use of ICT. The mean value of the results show that science teachers used frequently ICT resources as compared with their arts colleagues. They were more concerned with motivation, engagement and IT challenges. However, the aspects of accessibility and application indicators did not show any significant difference on the basis of teaching subjects. As perceived by the teachers, rural students had better learning attractiveness and more anxiety towards tablet use than urban fellows (Pruet, Ang, & Farzin, 2014). The qualification of teachers had strong significant impact on motivation, challenges, and overall indicators of ICT. However, engagement, accessibility, and application indicators did not show any significant difference. Designation had strong significant impact on motivation, engagement, challenges, application, and overall indicators of ICT. However, accessibility indicator did not show any significant difference among teachers' designation. Teaching experience had no significant impact on all the indicators of ICT.

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