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Technology Acceptance by University Teachers: A Demographic Analysis

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Abstract
Teaching processes have been evolved over centuries by adopting new approaches, methods, tools, and technologies. Teachers must carefully use, evaluate, and adopt the changes to utilize these technologies for teaching. Prime focus of this study was to explore technology acceptance by university academics and to analyze it with demographic characteristics. Mixed method approach using sequential explanatory design was employed for collection of data. Population of study was comprised of university teachers around the Pakistan. Sample of 300 teachers was selected by employing proportionate stratified random sampling and 20 teachers were selected for conduct of interviews. Five point likert scale questionnaire was developed for quantitative data collection. Validity was ensured through experts' evaluation and pilot testing. Internal consistency and reliability of questionnaire items was checked through Cronbach's alpha and found 0.83. Researcher himself visited target audience for data collection. Data was analyzed through SPSS with arithmetic means, standard deviation, ANOVA, t-test and post-hoc multiple comparisons. Salient findings revealed that male teachers were significantly better in technology acceptance then their female counterparts; a significant and strong positive relationship was observed between technology acceptance and demographic characteristics of teachers. Technology Acceptance by university teachers was significantly less. It was recommended that the female teachers must be imparted training regarding effective use of technology and customized trainings must be conducted to enhance technology usage at university level.

Keywords: Educational Technology, Acceptance, Adoption, Higher Education, Academics

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1. Introduction

Since teaching learning processes have been revamped completely and use of technology in classrooms has gained momentum around the world. Integration of technology in teaching is

considered, now, an essential aspect of effective teaching (Davis, 2018). Modern developments all over world also necessitate for technology literate teachers to maneuver educational technology, effectively and efficiently in classroom teaching (Dantoe, 2018; Taras & Kartoglu, 2018).

Englund et al. (2017) argued, though modern technology has made significant inroads into universities, widespread use of technology by academics has not yielded the requisite conceptual changes to traditional modes of teaching. It is very disappointing because the envisaged potential of ICTs to transform teaching processes in higher education is being missed (Al-Senaidi et al. 2009). Although universities have invested significant, financial and human resources, academicians are using the LMS merely as a repository for subject materials and information sharing (Cabero-Almenara et al. 2019).

Role of social media in teaching-learning contexts is an emerging trend in higher education (Manca 2020). It is revealed through research that despite proliferation of Web 2.0 technology, academics have not embraced the opportunity to use this technology to support their pedagogy, content delivery and assessment (Manca and Ranieri, 2016). Lack of interest regarding use of social media in academic practices indicates that academics are ambivalent about the role that social media should play in teaching and learning. In light of this Stathopoulou, Siamagka and Christodoulides (2019) indicate that faculty members have been "advised to keep a balance in terms of relevance of social media use, control, and usage level" of social media platforms.

Stathopoulou et al. (2019) suggest that academic interest in use of social media for instructional purposes, most research indicate that academics are averse to its use (Manca & Ranieri, 2016). The ubiquity of social media in higher education transformed teaching processes through collaborative learning, flexible learning environments and interactive user-centred learning (Amin & Rajadurai 2018).

Thorvaldsen and Madsen (2020) posited that integration of ICTs into academics' pedagogic practice is a complex process as the teaching itself is a complex process (Loughran, 2013), technology integration should not only focus on academics' knowledge of technology, curriculum and pedagogy (Mishra & Koehler 2007). Teaching technologies have modified the traditional modes of education at higher education institutes globally, that provide equal prospects for teachers and students to equip themselves with modern skills (Laurillard, 2013). A huge capital was invested in technology for higher education; however, utmost use of technology by faculty members is not guaranteed. That is why numerous studies have been conducted on how university faculty goes about implementing technology within their instruction (Hoffman, 2013).

Machado & Chung, (2015) argued, in classroom instruction meaningful technology integration is indeed very important as it boosts student's achievement and learning. However, higher education faculty members lack the desire to implement new technology during their teaching (Jackson, 2019). Research conducted in the past explored salient aspects that influenced the acceptance and usage of technology in different contexts Parra (2019) and Khan (2018). However, educational sector was relegated and the factors affecting acceptance of technology were least focused.

Educational. technology is a diversified field developed from different elements of different domains. It is an amalgamation of '.Perception Psychology', 'Cognitive Psychology', 'Evaluation', 'Communication', 'Management', 'Measurement', Media and systems engineering elements. These elements are organized in a manner that the whole part is bigger than all of its components. This field was rapidly developed from the audio-visual educational system through the educational communications and then educational technology elements (Khan, 2018).

Findings of a research conducted in Pakistan also revealed that the university teachers are not using the technology to their utmost potentials for teaching purposes (Ellahi. & Zaka, 2014).

Additionally, another study regarding administrative barriers in dual mode universities revealed that faculty members do not possess requisite skills and the head of departments lack appropriate skills of motivating their faculty for successful dissemination of distance education at dual mode universities
(Saifi, 2016). Hence, this research focused to check relationship between technology acceptance by university teachers and their demographic characteristics.

1.1. Objectives of the Study

Following are the objectives of this research:

1.To examine the acceptance and use of technology of. by university teachers.

2.To explore relationship of demographic characteristics with technology acceptance of university teachers.

1.2.Research Questions

Following questions served purpose of the research:

1.To what extent the university teachers have acceptance of technology?

2. To what extent the characteristics of the teachers correlate with technology acceptance at university level?

1.3.Research Hypothesis

Following were the .hypothesis of research:-

H1There is sufficient acceptance of technology by university teachers.

H2There is a significant relationship between demographic characteristics and technology acceptance of university teachers.

2. Literature Review

2.1. Introduction

Technology acceptance in higher education is often considered as utopian notion without proper research to comprehend the context and requisite technological skills for teachers (Marshal, 2018). Educational technology is often expected as the .hardware only; although, it is in fact, the most important is software that is, material and requisite procedures that determine specific ways hardware is used for the purpose toward it is desired (Sharma, 2018).

Lewis, Fretwell, Ryan, and Parham, (2013) suggested few emerging technologies to be used in higher education i.e. Course Management System (Blackboard, Moodle, etc), Linkedln, face-book, and twitter, that are at the moment are being well thought-out a novel .communication modes for effective delivery of instruction in classrooms. Schoonenboom, (2014) argued that the teachers in higher education institutes perform some instructional tasks through learning management system. Similarly, Teixeira, Costa and Alvelos, (2019) analyzed the .acceptance and usage of technology by university academicians in their teaching and revealed that the highest technology that were used are moodle, face-book and you-tube. However, findings of the research conducted by Shana & Abulibdeh (2017) concluded that imagined ease of use by teachers affects their intentions to use ICTs in future endeavors.

Highlighting the role of teacher and technology, Sharma (2018) argued that people presume that .educational .technology would certainly replace the teachers and there are likely chances that it may result into plenty of jobless the teachers. Actually, they are mistaken, as, the technology could never take the place of a teacher. This is because of three dimensions of the .educational .technology i.e. (a) Input, (b) Process, and (c) Output. Since, input is the job of a teacher hence; the technology would not be able to snatch that position.

Fathema and Sutton (2013) identified the salient aspects, including the documents sharing, posting of grades and exchange of assignments as most commonly used features of Blackboard LMS by

the university teachers. It was further identified that specific challenges encountered by the faculty members include the design issues and system problems that has lessened all around usage of learning management system by teachers. Holdan and Rada (2011) stated the technology effectiveness of teachers also affects their technology acceptance and usage.

2.1. Educational Technology

Educational technology is the use of a novel idea or .technology to help out the processes of successful classroom teaching (Newhouse, Trinidad & Clarkson, 2002). The educational technology is a broader field of knowledge and there are a number of definitions from various disciplines which are based on theoretical knowledge. Cifuentes, Maxwell, and Bulu (2011) explained that the educational technology is combination of different tools and the processes which play role in meeting the needs and problems of education. Moreover, it emphasizes upon application of the recent gadgets and tools i.e. software applications, computers and electronic devices, etc.

2.2.1 The World Wide Web.

It is the hyper-text languages system which uses effective means of transport mechanism (Akir, 2006). Users try to map the world by clicking on these links that are connected through multiple connections and display another document. Integration of different forms of multimedia through hypertext, the Web has turned into a perfect medium for sharing the content on the internet (McIsaac & Gunawardena, 2001). Ko and Rossen (2017) explained that it is a networked based multiple locations that allow the users to share the protocols which are common for the graphic displays, texts, videos and audios, etc. the internet explorer, firefox, google chrome, and safari, etc. are few of common programs of software which extend support for delivery of the W3.

2.2.2 Learning Management System.

LMSs in higher education are becoming primary gears for dissemination of education through distance learning in the colleges and higher education institutions all over the globe. These tools are being employed to introduce a diversified combination of the blended or completely on-line teaching which may be mediated through a tutor. The learning management systems play a significant role in university .campuses as it is a novel concept for educational processes to discover in assorted settings of education (Akir, 2006).

2.2.3 Electronic Mail.

It is a tool of asynchronous communications which is accepted at a large scale for effective communication in the domain of education (Gasaymeh, 2009). According to Akir (2002), few pertinent advantages of electronic mail are: easily communication between students and tutors anytime; it also minimizes face-to-face interaction between learners and their tutors; it also allows the tutors in sharing any type of announcement to students followed by the surety that those messages are received and read; and also improves delivery of the learning material. It also allows the users for attachment of learning material e.g. graphics, presentation, or any type of files that may provide support during learning.

2.2.4 Discussion Bulletin Boards.

It is a very important mode of exchanging the learner specific communications (Akir, 2006). It is a useful software program for sending and receiving the messages (Ko & Rossen, 2010). Discussion Bulletin Board term may also be replaced and used with the discussion forums, electronic bulletin boards, conference areas, web forums, conversation groups, Interactive messages and the news groups (Ko & Rossen, 2010).

2.2.5. Video and Audio Conferencing.

In 21st century, this is been a workable solution for delivery of distance education to correspond with one and other i.e. students and tutors. According to Hu and Wong (2006), the biggest problem with asynchronous tools is that learners and teachers cannot view and hear the gestures and expressions of both teacher and students. Moreover, the audio-video conferencing is a software program which permits audio and video communications-one-to-one or among the groups (Ko & Rossen, 2010). This term may also be exchanged with the video-conferencing or the video-teleconferencing. The video conferencing permits the tutors to remain connected with the learners; the teachers may also share the lecturers from guest speakers from other universities, further allows the academics to participate in the defense of thesis from or at the remote campuses and also enables communication between teachers and the learners (Ko & Rossen, 2010).

2.2.6 Wiki.

It is a program that permits copying, creating and cutting of matter on web pages with no specific awareness and understanding about the codes of a programming language (Ko & Rossen, 2010). It is a short letter taken from Hawaiian language, the wiki-wiki, that represents the speedy or rapid (Richardson, 2010). Wiki wiki web was the only wiki that was developed by Mr. Ward Cunningham in the end of 20th century (Kessler, 2009). Similarly, the encyclopedia, the wikipedia, wiki spaces are the popular models. It is an effective tool for internet based distance education to enhance the .collaborative writing techniques of learners (Kessler, 2009).

Franklin and Thankachan (2012) enumerated a number of advantages of using the 'Wikis'. It permits learners to extend and formulate their self developed websites and exchange necessary data with the friends. It also permits the learners to give feedback, mark, present their assignments and projects. It further facilitates the tutors to evaluate the work of their students and extend necessary support, when they needed and suggest other resources as well as the thoughts that are based on findings of other students.

2.2.Technology Acceptance

Introduction of technology brings forth new opportunities for academics in higher education institutions to reconfigure the way they conduct their business of facilitating teaching and learning (Vandeyar, 2020). Educators have always experienced the art of teaching, which evolved over centuries by adopting new approaches, methods, tools, and technologies. Rapid growth emerged in science and technology in last century which resulted in ground breaking innovations and exciting new technologies (Akbar, 2016).

According to Saifi (2016) technology acceptance is very significant for successful accomplishment of educational processes in any organization. Teachers can utilize technology applications as a simulation of the real-world, creating the opportunity for students to explore authentic tasks, such as interacting with people in different cultures, exploring various locations around the world, and gathering information to solve the problems or implementation of the information systems. In present research, technology acceptance phrase is being used to refer to the issue under investigation.

Davis (2018) highlighted that oftenly employee are un-willing to adopt the novel concepts or technology even considered it may considerably increase the performances of users. While discussing the adoption of new technology by employees, Davis (2018) suggested that the personnel involved in research practices need to comprehend the reasons of not accepting the new ideas and technology by the employees and how they resist new technology so that system which are applicable may be devised to enhance the acceptability of novel ideas. Some of the faculties in educational institutions resist learning about and using the technology (Khalil, 2013).

A body of research has probed into the ways how the demographic, social, and personal attributes of the teachers impact the acceptance of technology influence at higher education institutes. Bayhan, Olgun and Yelland (2002) concluded, most of the teachers do not use the technology during teaching in their classrooms. It was further asserted that the less level of the confidence and requirement of specialized grooming of the instructors significantly contributed to such results. Aypay (2010) investigated the attitudes of .teachers towards ICTs and concluded that the experience, factors of motivation, demographics, and various methods of teaching influenced usage of ICTs and other technology by teachers. One of the most thrilling results of this study unfolded that computer knowledge of more than 70% of the teachers was found very less as compared to most thrilling results of this study unfolded that computer knowledge which indicated that the computer literacy indirectly or straightforwardly related to the use and incorporation of the technologies in processes of education.

Wang and Wang (2009) identified that the most thrilling results of this study unfolded that computer knowledge based technology, however the 'perceived usefulness' influenced a lot. Similarly, Petko's (2012) research revealed that instructors do not choose the online learning as it was thought by them that this would be very easy to use. Motaghian, Hassanzadeh and Moghadam, (2013) also concluded the same results about instructors at university of technology in the Iran.

2.3. Unified Theory of Acceptance and Use of Technology.

It is an authentic and popular framework in the domain of models and theories of acceptance of technology. Similarly, the earlier models, it also focused to elaborate user intentions in using the information systems and the use behaviors of the individuals. Similarly, researchers like Venkatesh, Morris, and Davis (2003) framed the amalgamated construction to elaborate thorough concept of the acceptance processes than the prior models. Till now, more than eight models were presented in the field of information systems with more or less deviations. However, all of those models had genesis in field of sociology, psychology, and various systems of communication and these earlier models forecasted and explained the individual behavior while using number dependant variables. This model was contextualized on the perceptual and experimental differences and similarities among eight models. Four key constructs were the basis of this unified theory which are the effort expectancy, performance expectancy, social influence, and the facilitating conditions (Venkatesh et al., 2003).

Moreover, few mediating variable like experience, gender, and age were assumed for the impacts of four fundamental aspects on intention and behavior of technology usage. Effects of the usefulness, perceived ease of use, and the actual intentions were also moderated by mediating variable like experience, gender, and age were assumed for the impacts of four fundamental aspects on intention and behavior of technology use varied with age and gender (Venkatash et al., 2003). The theory is based on four determinants of behavioral intents and intentions to use; which are the performances, efforts expectancies, social influences and the facilitating condition. Following are the determinants:-

2.3.1. Performance Expectancy.

The extent to that an individual believes; the use of system will increase his/her maximum achievements and performance at the job.

2.3.2. Effort Expectancy.

It is the level of ease connected with convenience involved in the use of information systems.

2.3.3. Social Influence.

It is the extent to that one perceives that the people around him/her believe that he/she must use the novel technology/systems.

2.3.4. Facilitating Conditions.

Extent to that any individual believes, the requisite technical and organizational infrastructures exist to support the utilization of novel systems /technology.

2.5. UTAUT in Educational Context

In the domain of education, this model was adopted in a number of studies; however, few of them claimed that this model received very less validation in education contexts (Wong, Teo, & Russo, 2014). It was also proven through past literature that implementation of the technology model extends its validity with a number of researches pertaining to the technology. Implementation of the interactive whiteboards in the field of education also produced thrilling results in terms of constructive teaching. Studies conducted Wong et al., (2014) investigated the level of acceptance among teachers and the student teachers with this model. These researches found contradicting results and the performance expectancy influenced significantly the behavioral intentions, but the effort expectancy had no specific effects in one of the study. However, the facilitating conditions and the social influences have less relevance in both of these researches.

3. Methodology

3.1. Nature of Study

It was a co-relational research as the objective was to ascertain association between technology acceptance of university teachers and their demographic characteristics. According to Gay, Mills and Airasian (2012), co-relational research involves the data collection to conclude if, and to what extent, correlation exists between the variables under investigation. Core objective of any co-relational research is to ascertain the associations or to use the existing ones for making the predictions. Correlation may be referred as statistical calculation of the level of association.

3.2. Research Design

Mixed method research was embarked upon and the sequential explanatory research design was pursued. Mixed methods researches combine the qualitative and quantitative approaches by mixing both the quantitative as well as the qualitative information in one research. Core objective of the mixed method researches is to develop on the strengths and the synergy which persists between these methods of qualitative and quantitative researches to comprehend the experiences more forcefully than it is possible by using any of the quantitative or qualitative techniques, alone (Gay, Mills & Airasian, 2012).

3.3. Population

In the process of transformation of university education, higher education commission established a number of private and public sector universities nationwide. At present, a total of one hundred and seventy-one universities have been set up all over country and out of those, thirteen universities were mandated with the task to launch distance education programs. All teachers involved in teaching in the dual mode programs were the population of this study.

3.4. Sample and Sampling

Proportionate stratified random sampling technique was used for selection of appropriate sample and a representative sample of 300 teachers was randomly selected by following the table of random numbers. In order to conduct interviews for qualitative data collection, 20 teachers were randomly chosen to triangulate and validate the information collected through survey questionnaire.

3.5. Research Instruments

Quantitative data was collected through five point likert scale questionnaire and the qualitative information was obtained through semi-structured interviews of participants. Questionnaire items

were adopted from different scales used in previous researches. However, the adopted items were rephrased in line with specific context and background of the study.

3.5.1. Validity and Reliability of Instrument.

Initially developed questionnaire was comprised of 75 statements and to ascertain the validity it was shared and consulted with subject experts in field and their valuable feedback was acquired for subsequent amendments. Valuable suggestions and recommendations like re-phrasing of statements and substitution of difficult words were incorporated to make questionnaire easily understandable. Internal consistency and reliability of tool was checked through Cronbach's alpha and overall reliability was found as 0.83.

3.6. Data Collection and Analysis

Refined questionnaire was distributed personally to sampled 300 respondents and out of those, 287 questionnaires complete in all respects were received back and response rate was found 95%, as few of participants did not respond properly. In order to analyze qualitative data, percentages, arithmetic means, standard deviation, and t-tests were applied through SPSS and thematic technique of analysis was employed for qualitative data analysis.

4. Data Analysis

4.1. Quantitative Data Analysis

H1 There is sufficient acceptance of technology by university teachers.

Table 4.1. Cumulative results regarding Technology Acceptance

Table 4.1. Cumulative results regarding Technology Acceptance

S No	Indicators	N	SDA	DA	N	A	SA
1	Performance Expectancy	287	9.6	35.5	3.8	18.8	32.3
2	Effort Expectancy	287	12.3	31.5	4.2	25.0	27
3	Social Influence	287	17.7	34.7	3.5	22.6	21.4
4	Facilitating Conditions	287	29.2	32.0	1.2	20.7	16.9
5	Intention to Use	287	17.7	19.6	4.0	33.3	25.0
6	Actual Use	287	25.1	33.7	4.6	19.9	16.8
Overall Percentage			18.6	31.2	4.2	23.4	23.2

Table 4.1 depicts that 9.6% of participants were strongly disagreed, 35.5% were disagreed, 3.8% remained neutral, 18.8% were agreed, and 32.3% were strongly agreed that teaching performance increases with educational technology. It may be concluded that majority of participants were disagreed that teaching performance is increased while using technology in teaching.

12.3% of the participants were strongly disagreed, 31.5% were disagreed, 4.2% remained neutral, 25.0% were agreed, and 27% were strongly agreed that effort is required for teaching with technology. It may be concluded that the majority of participants were disagreed that more effort is required for teaching with technology.
17.7% of participants were strongly disagreed, 34.7% were disagreed, 3.5% remained neutral, 22.6% were agreed, and 21.4% were strongly agreed that he/she is socially influenced for use of technology. It may be concluded that greater majority of participants were disagreed that he/she was socially influenced for use of technology in teaching.
29.2% of respondents were strongly disagreed, 32% were disagreed, 1.2% remained neutral, 20.7% were agreed and 16.9% were strongly agreed with statement that I am facilitated for use of technology. It may be concluded that majority of participants were disagreed with statement that he/she is facilitated for use of technology in teaching. 17.7% of the participants were strongly disagreed, 19.6% were disagreed, 4.0% remained neutral, 33.3% were agreed and 25% were strongly agreed with statement that I intend to use technology in teaching. It may be concluded that greater majority of respondents have intentions to use technology in teaching. 25.1% strongly disagreed, 33.7% were disagreed, 4.6% remained neutral, 19.9% were agreed, and 16.8% strongly agreed that he/she uses technology in teaching. It may be concluded that greater majority of participants were not using technology in teaching.
It is clear from overall findings that 18.6% of respondents were strongly disagreed, 31.2% were disagreed, 4.2% remained neutral, 23.4% were agreed, and 23.2% were strongly agreed with statement that I am using technology for teaching. Therefore, it may be concluded that greater majority of participants were not using educational technology in teaching.

Table 4.2. Mean scores, Std. Deviation, Std. Error of mean of the sub-components of Technology Acceptance

Variables	N	Mean	Std. Deviation	Std. Error of mean
Performance Expectancy	287	4.15	.487	.028
Effort Expectancy	287	3.83	.541	.031
Social Influence	287	3.84	.617	.036
Facilitating Conditions	287	3.82	.496	.029
Intention to Use	287	4.37	.210	.012
Actual Use	287	3.34	.871	.051

Table 4.2 shows that mean scores of Performance expectancy was 4.15, Effort expectancy was 3.83, Social influence was 3.84, Facilitating conditions was 3.82, Intention to use was 4.37 and Actual Use was 3.34. Therefore, it may be concluded that performance expectancy and intention to use the educational technology were stronger components as compared to effort expectancy, social influence, and facilitating conditions. However, actual usage of technology was very less.
Therefore, it may be concluded that there was significantly less acceptance of technology by university teachers.

H2 There is a significant relationship between demographic characteristics and Technology acceptance of university teachers.

Table 4.3. Gender wise t-test results of Participants on Technology Acceptance

Gender	N	Mean	Std. Deviation	Std. Error of Mean	Degree of Freedom	T Value	P Value
Male	157	3.99	.174	0.013	285	4.362	0.0001

Significance Level 0.05

Data in the table 4.3 depicts that the mean scores of male participants on technology acceptance is higher than their female counterparts and t value (4.362) is also significant at 0.05 level of significance and there is a significant difference between mean scores in favor of male respondents. Therefore, it may be concluded that the male teachers are significantly better on technology acceptance at university level.

Table 4.4. t-test scores on Technology Acceptance in terms of University Status

Status	N	Mean	Std. Deviation	Std. Error of Mean	Degree of Freedom	T Value	P Value
Public	253	5.12	1.580	0.123	285	5.895	0.0001
Private	34	4.02	1.844	0.137			

Significance Level 0.05

Data in the Table 4.4 depicts that mean scores of participants from public sector universities regarding technology acceptance is higher than the respondents from private sector universities and t value (5.895) is significant at 0.05 level of significance and there is a significant difference between mean scores in favor of teachers from public sector universities. So it is concluded that teachers from public sector universities were significantly better on technology acceptance as compared to the teachers from private sector universities.

Table 4.5 One way ANOVA results on Technology acceptance in terms of University Location

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.217	4	.554	18.596	0.000
Within Groups	8.406	282	.030		
Total	10.624	286			

Significance Level 0.05

Data in the table 4.5 depicts that P value is less than 0.05 which shows that there is a significant difference on technology acceptance in terms of university location and it is decided to run post-hoc multiple comparisons.

Table 4.6. Post-hoc multiple comparison scores on Technology Acceptance in terms of the University Location

Variables	Mean Difference	P Value
Baluchistan vs Punjab	0.226	0.0001
Baluchistan vs Sindh	0.259	0.0001
Baluchistan vs KP	0.192	0.001
Islamabad vs Punjab	0.342	0.0001
Islamabad vs Sindh	0.375	0.0001
Islamabad vs KP	0.308	0.0001

Table 4.6 shows that participants from universities located in Baluchistan were significantly using more technology then respondents from the Punjab, Sindh and KP. Moreover, respondents from Islamabad were using more technology than respondents from universities located in Punjab, Sindh and KP. So, it can be concluded that respondents from universities located in Baluchistan and Islamabad were significantly better among group on technology acceptance.

Table 4.7. Department-wise One way ANOVA results on Technology Acceptance

	Sum of Squares	df	Mean Square	F	Sig.
Between groups	0.516	6	.086	2.383	0.029
Within groups	10.108	280	.036		
Total	10.624	286			

Significance Level 0.05

Data in table 4.7 depicts that P value is less than 0.05, it shows that there is significant difference on technology acceptance of university teachers in terms of different departments and it is decided to run post-hoc multiple comparisons.

Table 4.8. Department-wise scores of Post-hoc multiple comparisons on Technology Acceptance

Variables	Mean difference	P Value
Education vs History / Pak Studies	0.179	0.001
Education vs Islamic Studies	0.127	0.036
Education vs Economics	0.175	0.001
Education vs English	0.131	0.009
English vs History / Pak Studies	0.139	0.023
English vs Economics	0.127	0.026
English vs Urdu	0.175	0.001
Business Administration vs Economics	0.131	0.009

Table 4.8 shows that participants from department of Education were using significantly more technology than respondents from departments of History / Pak Studies, Islamic Studies, Economics and English. Respondents from department of English were also using significantly more technology than the respondents from History Pak Studies, Economics and Urdu. Respondents from the department of Business Administration were also significantly better in technology usage than the respondents from Economics department. So it is concluded that respondents from the departments of Education and English were significantly better among group on technology acceptance.

Table 4.9. One-way ANOVA scores on Technology Acceptance in terms of Teachers' Ranks

	Sum of Squares	df	Mean square	F	Sig.
Between the groups	1.368	4	.342	10.419	0.0001
Within the groups	9.256	282	.033		
Total	10.624	286			

Significance Level 0.05

Data presented in table 4.9 depicts that P value is less than 0.05 which shows that there is a significant difference on technology acceptance in terms of teachers' ranks and it is decided to run post-hoc multiple comparisons.

Table 4.9. Post-hoc multiple comparison results on Technology Acceptance in terms of Teachers' Ranks

Variables	Mean difference	P Value
Associate Professor vs Lecturer	0.098	0.004
Associate Professor vs Assistant Professor	0.171	0.0001
Professor vs Lecturer	0.099	0.021

Professor vs Assistant Professor	0.173	0.0001

Data presented in table 4.9 shows that participants having rank of Associate Professor are using more technology than Lecturers and Assistant Professors. Similarly respondents having rank of Professor are significantly using more technology than Lecturers and Assistant Professors. Hence, it is concluded that the participants having rank of Associate Professor and Professor were significantly better among the group on Technology acceptance.

Table 4.10. One-way ANOVA results on Technology Acceptance in terms of Participants' Age

	Sum of Squares	df	Mean Square	F	Sig.
Between the groups	.794	4	.199	5.696	.0001
Within the groups	9.830	282	.035		
Total	10.624	286			

Significance Level 0.05

Data shown in the table 4.10 depicts that P value is less than 0.05 which shows that there is a significant difference on technology acceptance in terms of age of participants and it is decided to run post-hoc multiple comparisons.

Table 4.11. Post-hoc multiple Comparisons on Technology Acceptance in terms of Teachers' Age

Variables	Mean Difference	P value
31-40 vs < 30	0.722	0.003
31-40 vs 51-60	0.155	0.0001
41-50 vs 31-40	0.120	0.001
41-50 vs 51-60	0.707	0.004

Data in the table 4.11 depicts that the respondents having age between 31-40 years were significantly using more technology than the participants having age <30 and between 51-60 years. Similarly, respondents having age between 41-50 years are significantly using more technology than the respondents having age bracket 31-40 and 51-60 years. Therefore, it is concluded that the participants having age between 31-50 years were significantly better among group on technology acceptance.

Table 4.12. One-way ANOVA results on Technology Acceptance in terms of Academics Qualifications

	Sum of squares	df	Mean squares	F	Sig.
Between Groups	0.241	3	0.080	2.193	0.089
Within Groups	10.383	283	0.037		
Total	10.624	284			

Significance Level 0.05

Data presented in the table 4.12 reflects that the P value is greater than 0.05 which shows that there is no significant difference on acceptance of technology in terms of academic qualifications of participants.

Table 4.13. One-way ANOVA results on Technology Acceptance in terms of Teaching Experience

	Sum of squares	df	Mean square	F	Sig.
Between groups	0.770	4	0.192	5.505	0.0001
Within groups	9.854	282	0.035		
Total	10.624	286			

Significance Level 0.05

Table 4.13 shows the P value is less than 0.05 which reflects that there is a significant difference on technology acceptance in terms of teaching experiences and it is decided to run post-hoc multiple comparisons.

Table 4.14. Post-hoc multiple comparisons regarding Technology Acceptance in terms of Teaching Experiences (Years)

Variables	Mean Difference	P value
11-15 vs 6-10	0.089	0.004
11-15 vs 16-20	0.123	0.0001
11-15 vs 20+	0.094	0.045
6-10 vs 1-5	0.740	0.003

Table 4.14 depicts that participants having 11-15 years of teaching experience were significantly using more technology than the participants having 6-10 years, 16-20 and 20+ years of teaching experience. Similarly, participants having 6-10 years teaching experience is using more technology than respondents having 1-5 years of teaching experience. Therefore, it may be concluded that participants having 11-15 years of teaching experience were significantly better among group on technology acceptance.

4.2. Qualitative Data Analysis

In order to collect qualitative data, interviews were conducted from twenty academicians. A number of techniques and methods are available for qualitative data analysis e.g. content analysis, discourse analysis, thematic analysis and grounded theory (Brawn & Clarke, 2013). However,

thematic analysis technique is widely used and considered as most predominating technique for analysis of qualitative data (Christofi, Nunes, & Peng, 2009). Mr. Brawn & Clarke (2013) described, it is a technique for identification, analyzing and reporting the patterns within specific information (2006). This approach of data analysis may be applied across a variety of epistemological and theoretical techniques (Braun & Clarke, 2013). During in-depth analysis of information collected through interviews following themes and sub-themes were surfaced out.

Theme 1: Acceptance and use of technology by university teachers

It is universal truth that changes in any organization are always discouraged. However, human expectations and efforts compel them to adapt to that change process and make sure that the individuals implement the change at their own.

Sub Theme 1: Outcomes while teaching with technology

There are several factors that create an impetuous among the individuals in adoption of novel technology in teaching. One of the respondent told that "teaching outcomes are increased while teaching with technology" (Respondent-12).

Another teacher commented that "constructive teaching outcomes can be achieved if student and teachers interact frequently. However, technology supports and facilitates in visualizing the concepts in the form of objective reality" (Respondent-2).

Sub Theme 2: Efforts required for integration of technology

Training workshops and seminars must be conducted for imparting peculiar skills and techniques necessary for incorporation of technology in teaching. One of the teachers told, "a lot of effort is required for technology use in teaching however, particular skills may do the job easy for us" (Respondents-11).

Another respondent remarked that "majority of the teaching staff is not familiar with use of new software and their application in teaching" (Respondent-9).

Sub Theme 3: Social influence

In day to day life activities the social influence has a significant role in implementation of new changes. It may be due to peer pressures or might be to enhance the student's interest and comprehension. One of the participants told that "students' participation is increased. Moreover, peers have also guided me to use appropriate technology" (Respondant-3).

Another respondent remarked, "my near and dear ones guided me to use technology and keeping in view the students' interest I have diverted my focus" (Respondant-11).

4.3. Integrated Analysis

When a researcher selects the two different data sets and tactfully combines the both type of data or integrates the both types, it required to be merged. Therefore, researchers merge the both type of data sets during its interpretation phase. Analyzing the both data sets, independently, during findings segment and combining or mixing the both results in analysis or interpretation stage or in discussion stage of data (Cresswell, Vicki & Clark, 2011).

Numeric analysis further revealed that technology acceptance / use was significantly very low and the same was endorsed during interviews data analysis that university teachers were not using the technology for teaching due to various reasons. Further, quantitative analysis revealed that the male university teachers were significantly better on utilization of technology in their teaching as compared to their female counterparts and the same was endorsed during interviews analysis that female teacher were less prone towards use of technology for teaching as few remarked that they were unable to handle CMS / LMS for communication with their students.

4.4. Discussion

Prime focus of this research was to investigate relationship of technology acceptance with demographic characteristics of teachers. This study unfolded few thrilling results which are delineated in the subsequent paragraphs. Male teachers were significantly good in acceptance of technology as compared to their female counter part and it corroborates the findings of research conducted by Mr. John (2015), who explored the attitude of the faculty members towards technology integration during teaching process. However, it contradicts with the findings of Osman (2014) whose research was about staff members' usage of the ICTs in university of Khartoom and significant difference was not observed between the male and female participants. Further results revealed that the respondents having age between 31-40 years were significantly better on technology acceptance these findings corroborated with another study conducted by Gyamfi (2017) that younger staff members make more use of ICT as compared to older ones. Moreover, findings from the study of John (2015) also corroborated these results. The research revealed significant difference on acceptance of technology among the teachers of different disciplines as it revealed that teachers from the department of education were significantly better in group on acceptance of technology which is in consistency with the finding of research conducted by John and Velle (2004) that teachers from mathematics and science disciplines were more open in employing the technology in their classrooms than those teachers who were teaching in departments of humanities and music. Results revealed that the respondents from public sector universities were significantly better on technology acceptance than those from the teachers who belonged to universities of private sector and it contradict with findings of Osman (2014) that a significant difference was found in the use of information systems and ICTs for teaching purposes by the staff members of the universities in favor of teachers who belong to the private universities and similar results were surfaced from the study conducted by Nour and Samia (2011). This research found that respondents having rank of Associate Professor and Professor were significantly better on technology acceptance which is inconformity with findings of (Abdulraheem & Almusawi, 2003).

5. Conclusions

5.1. Conclusions

From the general picture of analysis based results, following conclusions were drawn:-

1. Male teachers were significantly better than their female counterpart in technology acceptance.
2. Teacher from public sector universities were significantly better in acceptance and use of technology than teachers belonging to private sector universities.
3. Teachers from universities of Baluchistan and Islamabad were significantly better in technology acceptance.
4. Teachers from department of Education were significantly better in technology acceptance.
5. Teachers having rank of Associate Professor and Professor were significantly better in technology acceptance.
6. Respondents having age between 31-40 years were significantly better in technology acceptance.
7. Respondents having teaching experience between 11-15 years were significantly better in technology acceptance.
8. Acceptance of technology by university teachers was found significantly very less.

5.2. Recommendations

Keeping in view findings and conclusions of research, following recommendations are offered:-

1. Female university teachers should also be motivated to use technology for teaching.
2. Management of private sector universities must focus on acceptance and use of technology by teachers.
3. Teachers from department of Business Administration, English, Urdu, Economics and Islamic Studies must focus on the use of technology. Moreover, customized training must be conducted regarding usage of modern technology for teaching.
4. Lecturers and Assistant Professor must lay special emphasis on use of educational technology for teaching.
5. Availability of un-interrupted internet / wi-fi connection must be ensured in all universities / sub campuses.
6. SOPs / LOPs for teachers may be formulated at department level regarding integration and use of technology in teaching.
7. Necessary amendments must be incorporated in syllabus and curriculum of teacher training programs regarding effective integration and use of technology.

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