

Investigation of Students disposition towards the use of online assessment during the pandemic outbreak in Pakistan: An empirical study

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Abstract: Pakistan has been affected by the outbreak of COVID-19 and government took effective initiatives to deal the prevailing situation in a possible means. Likely, in the education sector government adopted online learning process across the country and adapted the electronic learning environment in order to seize the spread the pandemic. This study investigates the perception of students regarding their adoption of digital assessment during COVID-19 outbreak to evaluate their educational activities. Digital assessment is also considered as electronic assessment in which students educational evaluation is materialized to encircle the online examination, assignment submission, and calculation of candidate's study progress. The aim of this study is to provide an empirical investigation of online via discovering the intentional approach of electronic learning users in Pakistan during COVID-19 outbreak. The interpretation of the questionnaires of student and teachers is based on the data that has been collected from the public universities in Sindh. For investigating users of digital assessment behavioral determinants were applied in which (PEOU, PU, SI and OA) measured with and intention to use digital assessment (ITDA) and proposed determinants users intention during the outbreak of the pandemic. The prevailing survey study follows the conceptual proposed framework model that assists to investigate the users' perception towards students' online assessment. For the data analysis 413 questionnaires were distributed and 286 respondents feedback restored by filling the research items online means. Moreover, SPSS version 24 was adopted and hypothesis tested through egressions and correlations. The research is confined to higher education and online learning system in Pakistan needs to be examined at higher secondary and country level.

Keywords: COVID-19, Perceived ease of use, Distance learning, online assessment

1. Introduction

As emergence of a global society is a miracle of globalization to alter our planet as a global village. The rising reputation of technological victory in the world management system accelerated it to grow, change faster and explore from any historical perspective of human civilization. Henceforth, development of science and technology entered the world in digital age that made ensure the provision of a rapid communication and interconnectivity of people across the world with the exploitation of information and communication technologies (ICTs) (Boutkhil, and Maouche 2020). It is considered to call 21st century is the era of digital learning and higher education sector has been affected by information and communication technologies (ICTs) and mobility of the society with great rapid change (Boutkhil, and Maouche 2020; Thieman, 2008).

The adoption of internet to learning and teaching inside and outside class has become a trouble free and practicable in the present time. The global COVID-19 pandemic suspended education activities in the numerous countries of the world which substituted the transformation of face to face learning to online classes as the format remained acceptable in the way to adopt online methodology (García-Peñalvo, 2020). By using innovative technologies for assessment allow educators to implement the information technology during the quarantine days for assessing the course work (Chandio, et al., 2020; Mukhtar, et al., 2020). Online assessment allows summative assessment that is considered appropriate for verifying the final achievements of a learner.

Assessment is an evaluation and Formative, Diagnostic, Summative, and Interim are the types of assessment. Educational assessment implies the educational evaluation and it is the systematic process of documenting and using empirical data on the knowledge, skill, attitudes, and beliefs to refine programs and improve student learning. Online assessment is a wireless based evaluation in the form of educational assessment. Online assessment is an online evaluation of a learner and it is considered an innovative method of assessment of students in Pakistan particular in Sindh and never learner faced such method and also becomes something new for institutions. It is identified by different terms which comprised as Online assessment, Digital assessment, computer-based assessment, electronic assessment, assessing online learning, online formative assessment, innovative assessment, online formative assessment (Gikandi, et al., 2011). Online assessment goes hand-in-hand with e-learning and it is based on the use of information technology which provide remote learning comfort, and accessibility and advantages of electronic assessment remained valuable in the obstruction of the COVID-19 pandemic (Chandio, 2020; Mukhtar, 2020).

The adoption of information technology sustained a significance position during the outbreak of COVID-19 pandemic in the educational sector made effective service in the way of learning management via interconnectivity and speedy accessibility between student and institution (Chandio, 2020). Higher education commission (HEC) adopted the policy and urged universities to hold online classes to meet the education loss and maintain health safety of student due to pandemic and issued decree to affiliated universities to launch a virtual learning and Digital-learning management system in the country (Chandio, 2020; Mukhtar, 2020).

The current research highlights perception of electronic learning to carry out students' assessment during the outbreak of COVID-19 pandemic. Prevailing research encompasses the quantitative research methodology and section study. In addition, structured instruments applied and developed survey questionnaires as earlier research approved the same line of action. Current research highlight the impact of online assessment on students in which learners' intention has been measured and the collection of data derived from by the university students and they followed the digital assessment mechanism in their study. The demographic section in this study follows the gender, qualification, age, educator, and learner and 21 research items in order to measure the proposed factors. Moreover, items were written in English and means and standard Deviation presented.

2. Literature review

Research encircled with divers' term relate to digital assessment where it is considered a online assessment, digital assessment, internet base assessment, information technology or computer based assessment, and wireless assessment (Eyal, 2012; Gikandi, et al., 2011). Digital assessment drives the role of teacher in a digital environment is sustain assessment of students. Educational institutions around the world suffered setback during the outbreak of the COVID-19 that becomes the cause universities, colleges and schools and it turned down traditional assessment (Zahra, et al., 2020). Moreover, prevailing study encompasses to examine the perceptual approach of students and teachers to use digital learning in their assessment during the COVID-19 outbreak and universities in Pakistan take initiatives to adopt digital and distance courses (Adnan, and Anwar, 2020). Undergraduate, graduate and postgraduate surveyed to discover users intention to use digital assessment and preference to online education system in the country.

Digital assessment tests the learners skills and capability is assessed via an online means and it also monitors both teacher and student in their teaching and learning approach (WHO 2016; Eyal, 2012). Monitoring and evaluating students study leave diver practical implications in which he/she perceives to be free from physical hesitation of teacher and consider it an open learning atmosphere . The adoption of digital assessment mechanism in the poor countries will assist students to carry out their study at low financial burden. In addition, Digital assessment literacy is also a cheap process to government itself that is based on the technological environment and users' expertise in the way to benefit from the online assessment process. Assessment is a term that incorporates the numerous ways and methods to gather information through learners' performance in one' learning process and progress in studies (Schank, 2001). Reviewing, evaluating, and grading assignments often turn a teacher's everyday work into a routine. In the digital assessment online tools and development of technology educators can materialize grade the work of students speedily and easily by saving precious time and high cost.

For investigating the study proposed factors have been used to drive out perception of assessment users as perceived ease of use (PEOU), perceived usefulness (PU), social influence (SI), online assessment (OA), and intention to use digital assessment. The proposed determinants as perceived ease of use implies the trouble free use of system by the users and it is based on the digital assessment users to use particular system in their study except any uneasiness (Chandio, 2020). Furthermore, the proposed construct was used by number of researcher in their studies in diverse nature of technology adoption (Haider , et al., 2019; Samsudeen, and Mohamed, 2019; Punnoose, A2012; Davis, 1989). The perceived ease of use impacts the student and teachers intention to us the digital assessment system in their evaluation process and the system is considered as the trouble free (Punnoose, 2012). The proposed construct perceived usefulness (PU) implies the perception of digital technology users in their online assessment considers the adoption of innovative technology is a useful (Chandio, 2020). The proposed factors have been use in varies studies of the earlier researchers with a slight modification of language and subject matter of study as in the TAM model (PU), job fit (Thompson et al., 1991) and by Moore and Benbasat, (1991) mentioned as elative gain. The proposed variable perceived usefulness is to highlight the perception of users to consider the acceptance of technology is useful in their use to deliver online assessment. (Chandio, 2020; Haider , et al., 2019). Another construct social influence have been measured with the intention to use digital assessment along with PEOU, PU, and OA which highlights the social perception and the degree of perception of people in the society to prefer its use (Chandio, 2020; Haider , et al., 2019). This factors has been use at wide scale and borrowed from the UTAUT model (Venkatesh, et al. 2003). Based on the data analysis it is investigated that all independent factors (PEOU, PU, SI, and OA) were maintained the considerable affect with the intention to use digital assessment (ITDA). Digital assessment is the need of hour in the modern learning management system in the 21st century and teachers must require acquiring adequate efficiency and expertise in electronic learning (Eyal, 201). The role of digital literacy can play significant service to achieve digital learning in teacher information technology literacy is an effective essential ingredient.

3. Digital assessment

Digital assessment is referred to as electronic assessment that states to evaluation of learners performance using technology. For the triumph of a digital assessment number of elements is required to meet the target in which digital infrastructure and IT skills can be appreciated. Moreover, digital assessment requires the human and non-human resource in the way to meet the set goal. Lack of digital infrastructure is the major obstruction in the way to materialize the online education and preparing a successful electronic learning atmosphere is based on the easy accessibility of the information technology that can allow users to meet the transformational learning process.

The essential components of the digital infrastructure for an online education of a mobility of electronic learning encompasses the ubiquitous accessibility of a high speed internet in and out of an educational institution, Powerful learning devices (mobile device in order to connect the users), digital learning content (producing relevant experience and design and engage), and adoption of the responsible use policies (ensuring users/ students that prevailing infrastructure is applied to support learning).

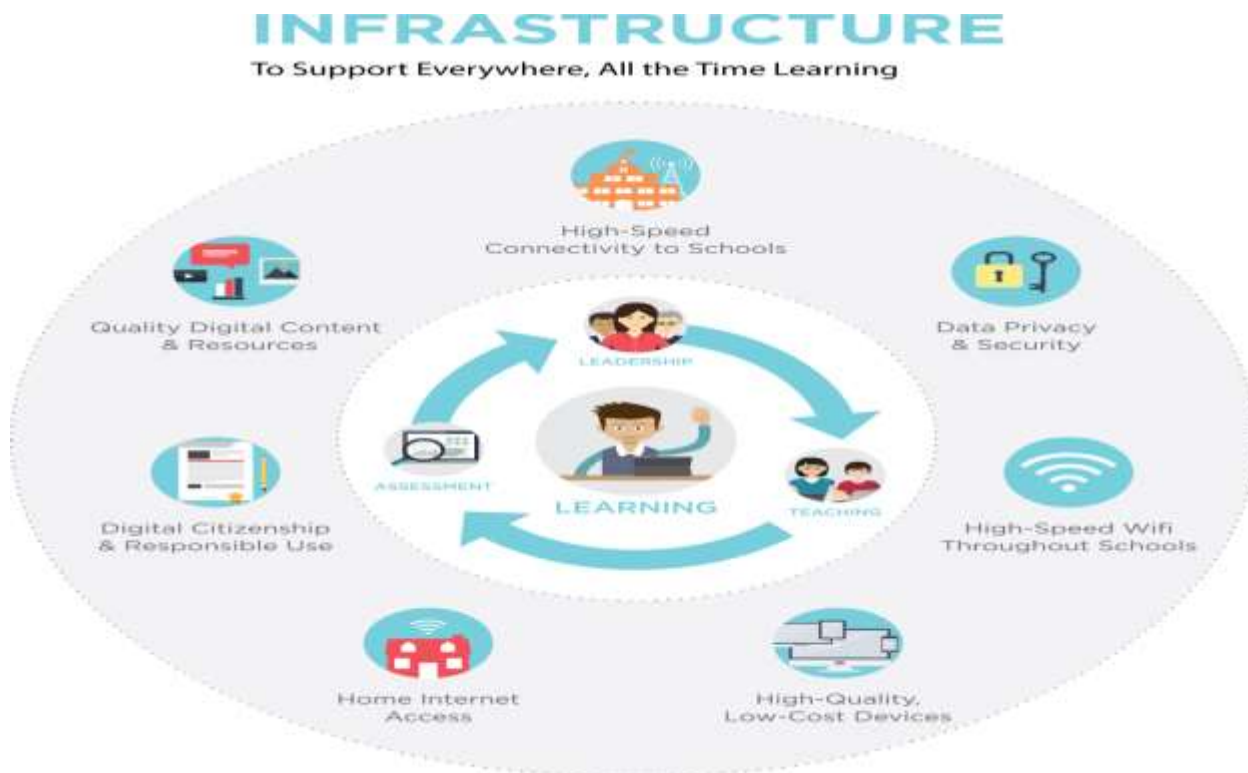


Figure. 1 Digital Infrastructure (Source: <https://tech.ed.gov/netp/infrastructure/>)

Digital assessment is based on both learners and the teaching of learning process which encompasses collection of documented data and cross-checking a variety of digital tools over time and the capability to use interpretation to promote learning. Online assessment or digital assessment is gaining importance in the education sphere which allows the provision of a cheap and time saving transformation of knowledge (Karami et al., 2009). Digital assessment system not only allows the review of factual knowledge, but adds the assessment of competence levels and the decision-making processes of students (Karami et al., 2009). It provides an immediate grading and prompt feedback, no privacy, very low time consuming and monotonous task.

Digital assessment or online assessment is select-response tests such as multiple choice sheets can be marked instantly. It also increases the engagement of student and it makes easier to evaluate in diverse question types and it ensure the Quicker announcement of the exam results . Digital assessment or online assessment assists to preserve and record the teaching and learning incidents and it recording in video and audio for an examination purpose can support teacher to recall in ones' teaching gaps and help learners to repeat the earlier class work possibly (Karami et al., 2009).

The procedure of digital of electronic assessment for testing of students 90 (34.4%) participants from social science ensured their electronic assessment of class work and besides this 25 (8.7%) candidates from pharmacy department, 61 (21.32%) were belong to medical sciences, 71 (24.8%) natural science, 11 (3.8%) electronic department and 28 from department concerned local languages. In this perspective to organize electronic exam in the education institutions pool follow as.

- The chief purpose designed for allocating of an electronic test exam.
- Conducting online survey in which participants were mailed in the way to produce their opinion regarding electronic assessment in their department/ discipline.
- A note book was maintained in which categories were materialized to divide all participants in their interest with different discipline in the various universities. In this perspective, each department record was sustained and collection of E-mail addresses was gathered through department, colleague, teachers of concerned department, and personal relation of the researcher.
- Conducting electronic mail to student and teachers and accumulation of feedback and this whole cycle took 3 to 5 months to be accomplished.

Online assessment is a internet based assessment in which student answers the question of teacher through online means whereas tradition assessment require paper in the purpose to write up the answer to evaluate the study parameter of a learner which is checked by a teacher. Adoption of innovative technology has made varied and frequent assessment via online means in the education atmosphere as it distinct with traditional learning environment (Meyen, et al., 2002).

Table 1. Traditional and digital assessment

Traditional Assessment	Digital/ Online Assessment
Traditional assessment is less faster as compare the online assessment via taking time and investment	Online assessment is more faster as compare the traditional assessment via taking less time and investment
In traditional assessment student and teacher face more stress. Moreover, students physical appearance create hesitation and psychological matchless to instructional environment in crowd and mobility of much social contacts	In Online assessment students remain less stress and psychological pressure in which learner face more relax and less physical pressure
In traditional assessment manual work has been preferred and it can handle mobility of education remotely	It is a fruitful for distance study learning and student can accomplish his/her study at at home by online means
Traditional assessment student takes much time to be accomplished and it is not accessible speedily	Online learning organize time, speedy provision of knowledge to students, ease to be submitted, and easier focused

4. Theoretical approach

The theoretical approach encircles the UTAUT and TAM model to discover the intention of the technology users in the way of digital assessment. The proposed constructs have been derived from the concerned theories and literature of the diverse studies. In the TAM model numerous variables were borrowed as intention to use (ITU), perceived ease of use (PEOU), and perceived usefulness (PU) (Punnoose, 2012; Davis, 1989).

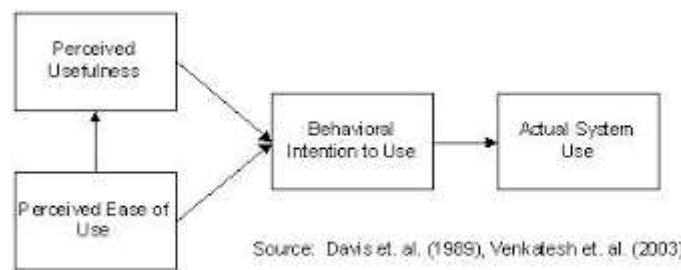


Figure 2. Technology Acceptance Model (TAM)

The TAM model is considered a theory of an information system's user's acceptance and use of technology. In this theory researchers borrow constructs (PEOU, PU and ITU) in order to investigate the users' intentional level to adopt the innovative system in their use of the digital assessment process.

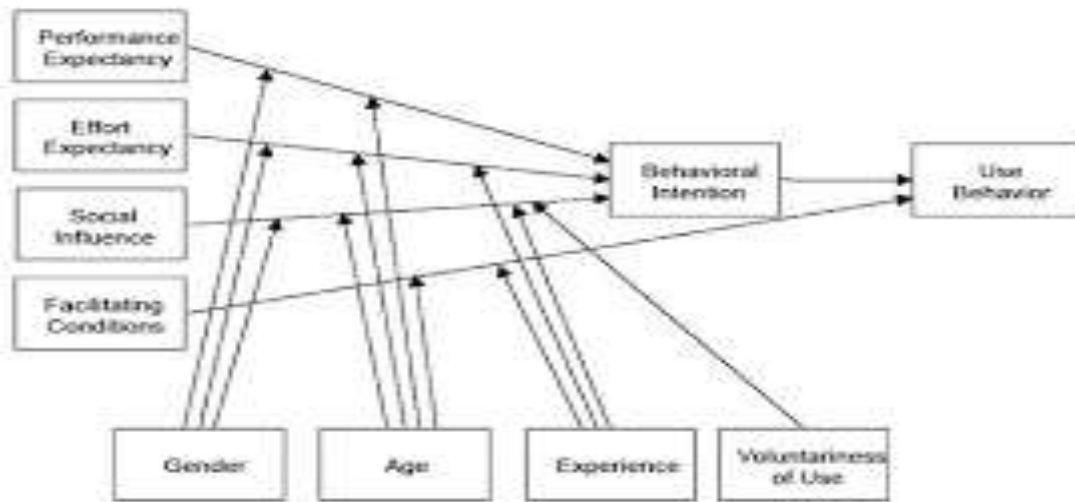


Figure. 3 UTAUT model

In the UTAUT model users tendency in the way to use technology is envisaged (Venkatesh, et al., 2003). Prevailing study has borrowed a factor social influence from the model in which proposed factor indicates the perception of users and influence by psychology from others in the society to urge him to adopt innovative technology in the students and teachers digital assessment process.

5. CONCEPTUAL FRAMEWORK

The proposed model in this study has been framed on the major theories as TAM, UTAUT, TB and TRA. In this regard, construct PEOU, PU and ITU have been borrowed from the theory of technology acceptance. Through a deep assumption it is presumed that digital assessment (online assessment) will be influenced via the proposed PU (TAM, UTAUT), PEOU (TAM, UTAUT, TAM2), Social influence (TRA, TB, UTAUT) and the factors in this study hypothesized to influence digital assessment (Online assessment).

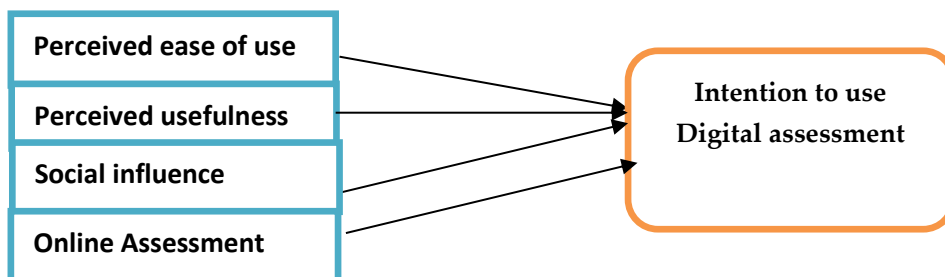


Figure. 4 Proposed conceptual model

6. The research questions and hypotheses

6.1 Research Question

Based on the earlier literature and the nature, proposed model will try to produce answer of two research question that match to discover the empirical notion of the current research.

RQ1. What type of your vision for supporting digital assessment that is based on the technology infrastructure?

RQ2. How you perceive the digital learning and what sort of perception is belong to you to compare the digital and non-digital assessment

6.2 Hypotheses

H1. A positive and significant relationship between the construct perceived ease of use (PEOU) and Intention to use digital assessment (ITUDA) has been restored.

H2. A positive and significant relationship between the construct perceived usefulness (PU) and Intention to use digital assessment (ITUDA) has been restored.

H3. A positive and significant relationship between the construct Social Influence (SI) and Intention to use digital assessment (ITUDA) has been restored.

H4. A positive and significant relationship between the construct online assessment (OA) and Intention to use digital assessment (ITUDA) has been restored.

7. Results and discussion

The current study contains the quantitative and online survey based research which also pursues the cross-sectional study. All proposed hypotheses sustain positive association with independent and dependent constructs. The proposed determinants such as PEOU, PU, SI, and OA show their positive relationship with dependent construct intention to use digital assessment. In this study data was collected from the public universities of Sindh such as Shah Abdul Latif University, University of Sindh, University of Karachi and Shaheed Mohtarma Benazir Bhutto Medical University (CMC). Besides proposed factor of prevailing study have been used by earlier scholars with light different in language, area of research, and nature of study as this research related to discover the intention of digital assessment users (student and teacher) during COVID-19 outbreak who apply information technology in learning purpose and it investigates to highlight the electronic learning users in the way to present their online assessment and evaluation of study (Chandio, et al., 2020; Haider, et al., 2019; Venkatesh, et al., 2003). Five point Likert scale is used in this study for the data collection that contain five options for instance 1- strongly disagree (SD), 2- Disagree (D) , 3- Neutral (N), 4- Agree (A) and 5- Strongly agree (SA). For the testing the validity of hypotheses correlation and regression analysis has been used.

Table 2. Demographic characteristics

Variables	Description	Frequency	Percentage
Gender	Male	213	74.4%
	Female	73	25.5%
Age	21-30	187	65.3%
	31-40	99	34.6%
Education	Master/Bachelor	201	70.2%
	M.Phil/ P.hd	85	29.7%
User	Teacher	40	13.9%
	Student	246	86.0%

Table 3. Survey items, standard deviations and mean

Proposed Items	Mean	SD
Q1: Making intention to adopt online assessment is a purposeful in my study (ITDA).	3.691	.9643
Q2: I expect to use of online assessment (ITDA).	3.7468	.85112
Q3: I envision a plan to establish the use of online assessment system (ITDA).	3.7124	.86536
Q4: Using online assessment is easy to me to produce the feedback to a question (PEOU).	3.6652	.84560
Q5: The use of online assessment is the trouble-freefor to achieve my study objects (PEOU)	3.7210	.76245
Q6: It would easy for my assessment and educational activities via implementing the online assessment mechanism (PEOU)	3.7897	.72723
Q7: Online assessment can be helpful for to carry out my examination and study evaluation process faster (PU)	3.8369	.76509
Q8: Online assessment provides me an easiness to perform my examinational activities to be done (PU).	3.8841	.74241
Q9: Using online assessment can assist to produce my performance and eliminate hindrance to asses in my class outcome easily (PU).	3.7768	.78344

Q10: People influence the user to use the online assessment and digital learning system (SI)	3.7124	.74201
Q11: People of Influential class of my society consider that I must adopt the online assessment system in the way to produce outcome during COVID-19 outbreak (SI)	4.0043	2.68215
Q12: the most significant people consider the online assessment user to prefer the online technological system to be beneficial in the evaluation process of our study (SI)	3.8155	.76300
Q13: Online tests are more accessible than paper-based exams. (OA)	3.7124	.71840
Q14: The technology used in online assessments is reliable (OA)	3.7210	.78473
Q15: Online assessments favour some students more than others (OA)	3.6996	.72210
Q16: Online assessment can do things paper based exams (OA)		

Significant correlation helps to find out the relationship of the constructs and its statistics to measure the degree relation of two variables to each other. In this perspective, an inquiry has been carried out to find out the relationship of independent factors and dependent factor by means of Pearson’s correlation. In this study results show a significant relation at the 0.1 level that highlight the factors to support the conceptual frame model and all factors remained significant with the criterion variable.

Table 4. Pearson Correlation

	ITU	PEOU	PU	SI	OA
ITUDA	1				
PEOU	.596**	1			
PU	.556**	.517**	1		
SI	.550**	.486**	.462**	1	
OA	.563**	.572**	.564**	.534**	1

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

The correlation of all proposed variables remained between (.462 to .596) in which correlation of PEOU (.596), PU (.556 .517) , SI (.486 .462), and OA (.564 .534) confirmed. The highest relation persisted in the variable (.596) whereas the lowest correlation sustained (.486 .462). Multiple regression shows the impact independent factor to dependent factor and test the hypothesis and it used to predict the value of two or more variables.

Table 5. Regression analysis

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.799	.297		-2.687	.008
PEOU	.380	.081	.283	4.680	.000
PU	.344	.080	.255	4.316	.000
SI	.257	.075	.198	3.415	.001
OA	.218	.090	.153	2.411	.017

In this research 286 respondents sustained their feedback that aided to meet the empirical study. The majority students supported the adoption of digital assessment and this study pursues the cross section which is recommended to apply the longitudinal study in order to reinterpret the users’ intention due to dynamic nature human behavior.

Table 6. Hypotheses

Variable	Stand Beta	t- value	Significance- level	H	status of Hypothesis
Perceived ease of use (PEOU)	.283	4.680	.000	H1	Supported
Perceived usefulness (PU)	.255	4.316	.000	H2	Supported
Social influence (SI)	.198	3.415	.001	H3	Supported

Online assessment (OA)	.153	2.411	.017	H4	Supported
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The extant study highlights that all proposed variables supported and recommended researcher to expand the limitation and range of research at Pakistan level in order to drive out the technology users intention to use online assessment. Moreover, parents of students and other citizen participation must be added to coming investigation of the electronic learning in the education sector thus at large scope study must be broadened.

8. Research methodology and sampling process

The current study encompasses the cross sectional study and quantitative research methodology. Structural instrument and survey questionnaires used like adopted by earlier researcher Research find out the impact of the digital assessment and data collection was gathered from the teacher and students to use wireless technology in their way to materialize the assessment during the COVID-19 outbreak. The demographic section contained gender, education, age and user and incorporate the 16 items that assist to measure the proposed variables and these questionnaires (items) written in English language and survey Questionnaires encircle with means and standard Deviation.

The data collection was secured from the public universities like Shah Abdul Latif University, University of Sindh, University of Karachi and Shaheed Mohtarma Benazir Bhutto Medical University (CMC). It has been focused to notice intention of students to use technology in their assessment process during the pandemic. In this perspective, 413 questionnaires were distributed among students and teachers and 286 respondents produced their feedback that met 69.2% feedback. Moreover, in the process data collection 40 (13.9%) teachers and 246 (86.01%) students participated and five points Likert scale used in this regard. The criteria of Krejcie and Morgan (1970) have been applied in the way of population sampling and data analysis and hypotheses tests were carried out through regressions and correlations.

9. Conclusion

Digital assessment is an online evaluation of student and teaching process of teachers which occupied due place and reputable significance during the pandemic and lockdown in Pakistan. The user s' outcomes is based on the students perception regarding their digital assessment and it is materialized via information communication technologies (ICT) and the internet. The flaws and fluctuations in the education setup and poor investment on the information technology impact on the propagation and disseminating teaching and learning. In Pakistan technology users in education sector require deep keen interest and acquisition of IT short courses in each discipline as compulsory can support to meet the situational requirement to boost up information technology literacy. The faculty member and users must adopt the necessary initiatives to promote electronic learning in assist learners to evaluate their study and meet the digital assessment criteria during the COVID-19 pandemic lockdown and other future critical natural calamities.

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Appendix A

Statement		SD	D	N	A	SA
Q.No:01	Making intention to adopt online assessment is a purposeful in my study (ITDA).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No:02	I expect to use of online assessment (ITDA).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No:03	Q3: I envision a plan to establish the use of online assessment system (ITDA).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No: 04	Using online assessment is easy to me to produce the feedback to a question (PEOU).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q.No:05	The use of online assessment is the trouble-free for to achieve my study objects (PEOU)	1	2	3	4	5
Q.No: 06	It would easy for my assessment and educational activities via implementing the online assessment mechanism (PEOU)	1	2	3	4	5
Q.No: 07	Online assessment can be helpful for to carry out my examination and study evaluation process faster (PU)	1	2	3	4	5
Q.No: 08	Online assessment provides me an easiness to perform my examinational activities to be done (PU).	1	2	3	4	5
Q.No: 09	Using online assessment can assist to produce my performance and eliminate hindrance to asses in my class outcome easily (PU).	1	2	3	4	5
Q.No: 10	People influence the user to use the online assessment and digital learning system (SI)	1	2	3	4	5
Q.No: 11	People of Influential class of my society consider that I must adopt the online assessment system in the way to produce outcome during COVID-19 outbreak (SI)	1	2	3	4	5
Q.No: 12	The most significant people consider the online assessment user to prefer the online technological system to be beneficial in the evaluation process of our study (SI)	1	2	3	4	5
Q.No: 13	Online tests are more accessible than paper-based exams. (DA)	1	2	3	4	5
Q.No: 14	The technology used in Digital assessments is reliable (DA)	1	2	3	4	5
Q.No: 15	Online assessments favour some students more than others (OA)	1	2	3	4	5
Q.No: 16	Online assessment can do things paper based exams (OA)	1	2	3	4	5