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Teachers' e-Readiness to Adopt Online Education: COVID 19 Infused Transformations in Education System

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ABSTRACT

The world is facing the cutting edge in transformations of education system. Information technology had become indispensable in meeting the need of the hour. This is changing the landscape of the education system and teachers are needed to embrace it and fully get equipped. Its influence on teaching and learning has started wide transformations with the effect of COVID 19. This made necessary for the Government, educational institutions and boards to train teachers. The objective of this study is to identify the factors obligatory for teachers in embracing and integrating technology. The methodology of this study is descriptive research design and adopted mix of convenience and snowball sampling. A structured questionnaire is administered technique targeting the teachers in the teaching fraternity throughout the country.239 respondents from different states in India ranging from school teachers to faculty teaching in varied colleges and universities are part of the survey.The variables analysed under this study are e-Competency, e-Challenges, e-Learning, e-Perceptions, e-Readiness, e-Support. The data collected on these variables are subjected to non-parametric tests using SPSS.The instrument is identified to possess relatively high internal consistency with reliability statistics as 0.957. The study identified there is difference between gender mean for e-Support (t value 2.321 and sig. <0.05). Based on the academic ranking, study revealed there is no difference in e-Perception $\chi2 = 4.311$, e-Competencies ($\chi2 = 4.554$), e-Challenges ($\chi2 = 1.430$), e-Support ($\chi2 = .901$) and e-Assessment ($\chi2 = 2.146$) of teachers e-Readiness. The analysis of affiliating institutions teachers e-Readiness observed there is no difference in e-Competencies ($\chi2 = 17.754$), e-Perception ($\chi2 = 10.945$), e-Challenges ($\chi2 = 12.312$), e-Support ($\chi2 = 8.808$) and e-Assessment ($\chi2 = 8.965$). The levels of e-Readiness of teachers exhibited male teachers possess high level and female teachers possess low level of e-Readiness. The Friedman test found e-Perception is main contributing factor followed by e-Support in e-Readiness of teachers.

Keywords: e-Competency, e-Challenges, e-Learning, e-Perceptions, e-Readiness, e-Support, online education

Introduction

The transformations in Indian education system are not a newly emerging context. This can be clearly identified and traced from ancient history to current scenario. The ages of civilisation, political and socio-economic variations lead to transformation of education either directly or indirectly. This legacy of transformation and perpetuity is now seeing a new meaning due to the unprecedented effect of COVID 19. The pandemic situation brought a divide between face-to-face or offline teaching and learning processes, buzzing, mode of education to be in the form of remote teaching and learning. The observation of recent past experiences under the prevailing pandemic circumstances indicates there is exponential increase in the usage of ICT tools, e-learning, online teaching etc. The literatureestablished by a study Lori Wozney, et.al. (2006) affirms there was 55% of variance in teacher use of technology and suggested further studies to emphasis upon the behavioural patterns on teachers, their apprehensions in integrating technology with education and the support of management. Further a case study on Egyptian university by AlaaSadik (2007) identified faculty are not trained and exhibited inadequate competencies in dealing e-learning. Literature indicates due to low motivation and lack of confidence on usage of technology, teachers possess poor ICT skills inintegrating technology into education.FilizKuskayaMumcu (2010) teachers ICT usage and examined instructional purposes, managerial purposes and personal purposes and found majority of teachers used ICT for preparation of question papers and preparation of personal profiles. And the study observation revealed in-class ICT usage is less than out-class activity. The outcome of a study on school teachers' perceptions on ICT usage by GhazwaAlharbi, et.al. (2012) found that teachers are positive in adopting ICT as a mode of e-learning and students are motivated with the usage of ICT in classroom and suggested that teachers need adequate training and equip with necessary teaching aids in engaging e-learning process.Arumugam Raman, et.al. (2013) observed both teachers and administrators play key role in promoting ICT in school, but teachers merely use ICT for searching online material for reading and preparation. VuyisileMsila (2015) studied teacher's readiness and ICT usage and found that teachers are ready for accepting and adopting ICT but opined they need adequate training to overcome the uncertainties exposed by ICT. However it has disclosed that young generation teachers are more tolerant than experienced counterparts.

Research Gap

The literature presented in the above section is inadequate in pronouncing teachers e-Readiness towards adopting online teaching. Therefore, there is need for teachers to get equip with necessary e-teaching modes and instil confidence for online presence. Hence this study firstly, will focus upon addressing this research gap aiming to identify what are the constraints or factors encountered at the end of teachers to integrate technology in education. Secondly, it focuses on the COVID 19 pandemic which has brought education on cross roads alarming that there is a dire need to bring significant changes in the education and pattern of delivery etc., via online.

Problem Statement

The role of ICT in the field of education has taken its sphere in the early 2000's. The pressing need of liberalisation and globalisation has brought a great change in the education system. The process of on-going evolution of integrating technology with education is seeing unprecedented changes due to COVID 19. This is emphasising the remote teaching and learning is the only solution in safeguarding the stakeholders in the education system. Hence there is a need to know the preparedness and readiness of teachers in integrating technology with education and the nuances of replacing traditional systems with online education systems, which is need of the hour.

Research Questions

RQ1   What are the factors obligatory for teachers' e-readiness?
RQ2   Do teachers own adequate knowledge on e-teaching aids?
RQ3   Did teachers possess accessibility to e-resources necessary for being e-ready?
RQ4   Does the managements/ affiliating bodies/ accrediting institutions and ICT enabling companies are ready to equip teachers and keep them e-ready?

Objective of the study

1.   To identify the determinants of teachers e-readiness affirming online presence.
2.   To study the profile of teachers and educational institutions readiness in embracing technology.

Methodology of the study

The design of the study is descriptive in nature and structured questionnaire is administered in measuring the e-Readiness of the teaching fraternity spread across the different states in India.The mix of convenience and snowball sampling technique is applied. Overall 239 responses are collected from different teachers teaching in schools, colleges and universities.

Data is analysed using SPSS and various non-parametric tests are conducted in analysing the teacher's e-Readiness. The Confirmatory Factor Analysis of factor reduction technique is applied using Principal Component Analysis with Varimax Rotation.

Variables of the study

The following are the variables identified to study the e-readiness of teachers in adopting online education are

[1]   e-Perception
[2]   e-Competency
[3]   e-Challenges
[4]   e-Support
[5]   e-Assessment

Data Analysis and Interpretation

The Table1a below presents the demographic profile based on gender, qualification, experience, affiliating institutions, academic ranking of teacher respondents.

Table 1a - Demographic Profile of Respondents			
Indicator	**Category**	**No of Respondents**	**Percentage**
Gender	Male	138	57.7
	Female	101	42.3
	Total	**239**	**100.0**
Education Qualification	UG	11	4.6
	PG	111	46.4
	M.Phil.	38	15.9
	Ph.D.	75	31.4
	Post-Doctoral	4	1.7
	Total	**239**	**100.0**
Experience	Upto 5Years	57	23.8
	6-10 Years	72	30.1
	11-15 Years	48	20.1
	16-20 Years	25	10.5
	21-25 Years	24	10.0
	26-30 Years	3	1.3
	Above 30 Years	10	4.2
	Total	**239**	**100.0**
Academic Ranking	Professor	7	2.9
	Associate Professor	24	10.0
	Assistant Professor	118	49.4
	Lecturer	63	26.4
	School Teacher	27	11.3
	Total	**239**	**100.0**
Affiliated Institution / Board	Central University	6	2.5
	SSC	10	4.2
	State University	47	19.7
	Constituent College	9	3.8
	Aided College	13	5.4
	Government College	22	9.2
	Deemed University	10	4.2
	Autonomous College	32	13.4
	Affiliated College	81	33.9
	ICSE/CBSE	9	3.8
	Total	**239**	**100.0**
Source: Primary Source - Survey			

Table 1b - I have uninterrupted internet and data connectivity (in %)	
Very Frequently	29.3 (70)
Frequently	46.9 (112)
Occasionally	13.8 (33)
Rarely	7.9 (19)
Never	2.1 (5)
Total	100.0
Source: Primary Source – Survey '( )' indicates number of respondents	

The Table 1b displays the responses in terms of percentages regarding the internet and data connectivity.

Table 1c – Efforts in acquisition of ICT knowledge (in %)			
Prior to COVID 19 lock down I have knowledge on ICT enabled tools and used		During COVID 19 lock down I have made necessary efforts to get equip with ICT tools	
Very Frequently	24.3 (58)	Strongly Disagree	0
Frequently	40.2 (96)	Disagree	.8 (2)
Occasionally	23.4 (56)	Neutral	10.5 (25)
Rarely	10.5 (25)	Agree	45.2 (108)
Never	1.7 (4)	Strongly Agree	43.5 (104)
Total	100.0	Total	100.0
Source: Primary Source – Survey '( )' indicates number of respondents			

The Table 1c displays the responses in terms of percentages regarding the agreement expressed by respondents that they have made efforts prior to and during COVID pandemic.

Table 1d - Taking responsibility to train and guide students' and teachers' about ICT tools usage (in %)				
	Management of Educational Institutions	Accrediting Institutions	Affiliating Bodies	All IT Companies developing ICT models
Unimportant	.8 (2)	.8 (2)	.8 (2)	.8 (2)
Of little Importance	1.3 (3)	1.7 (4)	2.5 (6)	4.2 (10)
Moderately important	3.8 (9)	7.1 (17)	8.8 (21)	6.7 (16)
Importance	23.0 (55)	33.5 (80)	29.7 (71)	28.5 (68)
Very Important	71.1 (170)	56.9 (136)	58.2 (139)	59.8 (143)
Total	100.0	100.0	100.0	100.0
Source: Primary Source – Survey '( )' indicates number of respondents				

The Table 1d displays the responses in terms of percentages on opinions to who should take responsibility to train and guide students and teachers about ICT toolsand usage.

Tests for Hypothesis

Hypothesis 1

H0=There is no significant difference between male and female with regard to Factors of E-Readiness of teachers

Table2 - t test for significant difference between Male and Female with regard to Factors of E-Readiness of teachers						
Factors of e-Readiness	**Gender**				**t-value**	*p**
	Male		**Female**			
	Mean	**SD**	**Mean**	**SD**		
e-Perception	22.087	10.3179	20.515	9.91929	1.183	0.238
e-Competencies	20.2174	10.2107	18.931	9.04683	1.028	0.305
e-Challenges	19.6957	10.007	18.05	8.90435	1.339	0.182
e-Support	22.0362	10.0614	19.069	9.33837	2.321	0.021
e-Assessment	19.2391	10.544	18.168	8.86123	0.851	0.396
Overall e-Readiness	**103.275**	**42.0897**	**94.733**	**36.8472**	**1.666**	**0.097**
Source: Researcher computation using SPSS * denotes significant at 5% level						

From Tanle2, *p*-value for e-Support is >0.05, hence accept the null hypothesis, and conclude that the mean factors of e-Readiness of teachers are significantly different.

The *p*-value for e-Perception, e-Competencies, e-Challenges, e-Assessment and Overall e-Readiness is <0.05, hence null hypothesis cannot be accepted and conclude that the mean factors of e-Readiness of teachers are not significantly different.

Hypothesis 2

H0=There is no significant difference amongExperience group with respect to Factors of E-Readiness of teachers

Table3 - ANOVA for significant difference among Experience Group with respect to Factors of e-Readiness of teachers									
Factors of e-Readiness	**Gender**							**t-value**	*p**
	Upto 5Years	**6-10 Years**	**11-15 Years**	**16-20 Years**	**21-25 Years**	**26-30 Years**	**Above 30 Years**		
e-Perception	21.45 (10.10)	21.23 (10)	21.45 (10.53)	23.24 (9.90)	19.91 (10.39)	24.33 (15.14)	20.6 (10.82	.272	.949
e-Competencies	18.78 (10.13)	20 (9.56)	20.145\(10.82)	21.04 (8.72)	20.20 (8.85)	12.33 (4.61)	17.6 (9.60)	.558	.763
e-Challenges	19.14 [ab](9.56)	20.87 [b](9.73)	18.43 [ab] (10.87)	19.56 [ab] (8.65)	15.87 [ab] (7.03)	11.33[a](2.51)	15.8 [ab] (8.49)	1.45	.195
e-Support	19.73 (9.93)	22.83 (9.95)	20.72 (10.54)	22 (9.41)	18.66 (8.57)	19.33 (12.01)	14.7 (5.92)	1.542	.165
e-Assessment	18.31 [ab](9.87)	20.54[ab] (9.52)	18.89 [ab] (10.93)	21.72[b] (10.40)	14.83 [ab] (7.77)	11[a] (4)	12.8 [ab] (5.11)	2.424	.027
Overall e-Readiness	**97.43 (38.42)**	**105.48 (41.23)**	**99.66 (46.42)**	**107.56 (36.59)**	**89.5 (33.87)**	**78.33 (23.35)**	**81.5 (27.81)**	**1.190**	**.312**
Source: Researcher computationusing SPSS; The value within bracket refers to SD; * denotes significant at 5% level Different alphabet among Experience Group in years denotes significant at 5% level using Duncan Multiple Range Test (DMRT)									

From the Table3 it is inferred, *p* value is less than 0.05 with regard to factors of e-Assessment of teachers; hence null hypothesis cannot be accepted at 5% level of significance. Based on Duncan Multiple Range Test, the experience group 16-20 years significantly differ with the experience group 26-30 years at 5% level of significance. But the experience group upto 5years, 6-10 years, 11-15 years, 21-25 years and above 30 years is not differing with any other experience group with respect to e-Readiness.

The *p* value is greater than 0.05 for e-Perception, e-Competencies, e-Challenges and e-Support; hence null hypothesis is accepted, affirming there is no significant difference with regard to factors of e-Readiness of teachers. Based on Duncan Multiple Range Test, the experience group 6-10 years significantly differs with the experience group 26-30 years of experience group. But the experience group upto 5 years, 11-15 years, 16-20 years, 21-25 years and above 30 years does not differ with respect to e-Readiness.

Hypothesis 3

H0=There is no significant difference among mean rank of Academic Ranking of teachers with regard to Factors of E-Readiness of teachers.

Table4 - Kruskal-Wallis test for significant difference among Mean Rank of Academic Ranking with respect to Factors of e-Readiness of teachers							
Factors of e-Readiness	**Academic Ranking**					**Chi-Square value**	**p***
	Professor	**Associate Professor**	**Assistant Professor**	**Lecturer**	**School Teacher**		
e-Perception	147.86	134.81	122.17	108.17	117.74	4.311	.366
e-Competencies	109.21	146.06	118.59	112.29	123.76	4.554	.336
e-Challenges	108.86	120.19	117.97	118.94	134.06	1.430	.839
e-Support	102.43	125.90	117.91	121.64	124.63	.901	.924
e-Assessment	121.57	116.29	118.78	115.90	137.78	2.146	.709
Overall e-Readiness	**118.93**	**128.92**	**121.09**	**109.74**	**131.52**	**2.570**	**.632**
Source: Researcher computationusing SPSS; * denotes significant at 5% level							

Table4 presents the mean rank of academic ranking with respect to factors of e-Readiness of teachers. The mean rank of Professors (147.86) is highest and Lecturers (108.17) is lowest for e-Perception. The mean rank of Associate Professors (146.06), (120.19) is highest and Professors (109.21), (102.43) is lowest for e-Competencies and e-Support respectively. The mean rank of School Teachers (137.78) is highest and for lecturers (115.90) is lowest for e-Assessment.

Krushkal-Wallis test of the study did not demonstrate the statistical significant difference in e-Perception score between the different academic ranking group $\chi^2(4) = 4.311$, $p = .366$. The similar nature of observation was found with e-Competencies $\chi^2(4) = 4.554$, $p = .366$, e-Challenges $\chi^2(4) = 1.430$, $p = .839$, e-Support $\chi^2(4) = .901$, $p = .924$ and e-Assessment $\chi^2(4) = 2.146$, $p = .709$.

Hypothesis 4

H0=There is no significant difference among mean rank of Affiliating Institutions of teachers with regard to Factors of e-Readiness of teachers

Table5 - Krushkal-Wallis test for significant difference among Mean Rank of Affiliating Institutions with respect to Factors of e-Readiness of teachers												
Factors of e-Readiness	**Affiliating Institutions**										**Chi-Square value**	**p***
	Central University	**State University**	**Constituent College**	**Aided College**	**Government College**	**Deemed University**	**Autonomous College**	**Affiliated College**	**ICSE/CBSE**	**SSC**		
e-Perception	99.92	114.62	118.33	107.27	107.16	130.25	127.77	120.22	184.56	108.65	10.945	.280
e-Competencies	126.58	120.55	130.78	105.08	101.18	109.90	116.44	126.33	189.83	71.90	17.754	.038
e-Challenges	116.42	117.97	138.78	102.58	119.11	117.85	101.16	126.07	179.61	99.00	12.312	.196
e-Support	107.75	115.41	148.06	100.46	102.82	139.70	124.33	119.29	163.06	120.30	8.808	.455
e-Assessment	113.67	114.13	145.17	110.08	100.39	120.45	112.97	123.15	164.94	140.90	8.965	.440
Overall e-Readiness	**113.83**	**112.20**	**143.83**	**100.27**	**96.02**	**125.35**	**120.61**	**124.44**	**188.22**	**112.60**	**14.705**	**.099**
Source: Researcher computation using SPSS; * denotes significant at 5% level												

Table5 presents the mean rank of affiliating institutions with respect to factors of e-Readiness of teachers. The mean rank of CBSE/ICSE teachers is highest for all the factors of e-Readiness of teachers i.e. for e-Perception 184.56, for e-Competencies 189.83, e-Challenges 179.61, for e-Support 163.06 and for e-Assessment 164.94. The mean rank of Central University 99.90 is lowest for e-Perception. The mean rank of SSC teachers is lowest for e-

Competencies 71.90 and e-Challenges 999. The mean rank of Aided College teachers is lowest for e-Support 100.46 and the mean rank of Government College e-Assessment College is lowest 100.39.

Krushkal-Wallis test of the study demonstrated the statistical significance difference in e-Competencies score between the affiliating institutions $\chi^2(9) = 17.754$, $p = .038$. The similar test of study on other factors did not demonstrate the statistical significance in e-Perception $\chi^2(9) = 10.945$, $p = .280$, e-Challenges $\chi^2(9) = 12.312$, $p = .196$, e-Support $\chi^2(9) = 8.808$, $p = .455$ and e-Assessment $\chi^2(9) = 8.965$, $p = .440$.

Hypothesis 5

H0=Levels of E-Readiness of teachers are equally distributed

Table6 - Chi-square test for goodness of fit of equality of level of e-Readiness of teachers				
Level of e-Readiness	Frequency	Percent	Chi-Square	p^*
Low Level	61	25.5		
Moderate Level	118	49.4	27.674	.000
Higher Level	60	25.1		
Total	**239**	**100.0**		
Source: Rese Researcher computation using SPSS; * denotes significant at 5% level				

Table6 depicts chi-square test for goodness of fit of equality of level of e-Readiness of teachers. It is found that p value is less than 0.05; the null hypothesis cannot be accepted at 5% level of significance. Hence, it is concluded that level of e-Readiness of teachers are not equally distributed. Based on percentage, majority of teachers belong to moderate level i.e. 49.4%.

Hypothesis 6

H0=There is no association between Gender andLevel of e-Readiness of teachers

Table7 - Chi-square test for association between Gender and Level of e-Readiness of teachers						
Gender	Level of e-Readiness			Total	Chi-Square	p^*
	Low Level	Moderate Level	Higher Level			
Male	37 (26.8) [60.7]	59 (42.8) [50]	42 (30.4) [70]	138 (100) [57.7]		
Female	24 (23.8) [39.3]	59 (58.4%) [50]	18 (17.8) [30]	101 (100) [42.3]	6.806	.033
Total	61 (25.5) [100]	118 (49.4) [100]	60 (52.1) [100]	239 (100) [100]		
Source: Researcher computation using SPSS; * denotes significant at 5% level; The value within ( ) refers to Row Percentage The value within [ ] refers to Column Percentage						

Table7 presents chi-square test for association between gender and level of e-Readiness of teachers. It is observed p value is less than 0.05, the null hypothesis is rejected at 5% level of significance. Hence, concluded that there is association between gender and level of e-Readiness of teachers. Based on row percentage 26.8% of male have low level of e-Readiness and 30.4% have high level of e-Readiness whereas for female teachers 23.8% have low level of e-Readiness and 17.8% have high level of e-Readiness of teachers. Hence majority of male teachers have high level of e-Readiness and majority of female teachers have low level of e-Readiness.

Hypothesis 7

H0=There is no relationship between Factors of E-Readiness of teachers

Table8 - Karl Pearson Correlation Coefficient between Factors of e-Readiness of teachers					
Factors of e-Readiness	e-Perception	e-Competencies	e-Challenges	e-Support	e-Assessment
e-Perception	1	.613**	.512**	.551**	.495**
e-Competencies		1	.606**	.540**	.567**
e-Challenges			1	.623**	.661**
e-Support				1	.650**
e-Assessment					1
Source: Researcher computation using SPSS; ** denotes significant at 1% level					

Table8 presents correlation between factors of e-Readiness of teachers.The correlation coefficient between e-Perception and e-Competencies is .613 which indicates (.613² = .376) 37.6 % positive relationshipand significant at 1% level.The correlation coefficient between e-Competencies and e-Challenges is .606 which indicates (.606² = 0.367) 36.7% positive relationship at 1% level of significance. The correlation coefficient between e-Challenges and e-Assessment is .661 which indicates (.661² = 0.437) 43.7% positive relationship at 1% level of significance. And the correlation coefficient between e-Support and e-Assessment is .650 which indicates (.650² = 0.423) 42.3% positive relationship at 1% level of significance.

Hypothesis 8

H0= There is no significant difference among mean rank towards Factors of E-Readiness of teachers.

Table9 - Friedman test for significant difference among mean rank towards Factors of E-Readiness of teachers			
Factors of e-Readiness	**Mean Rank**	**Chi-Square**	**_p_***
e-Perception	3.25		
e-Competencies	2.93		
e-Challenges	2.86	14.473	0.006
e-Support	3.10		
e-Assessment	2.86		
Source: Researcher computation using SPSS; * denotes significant at 5% level;			

Table9 explains the difference among mean rank towards factors of e-readiness of teachers. The _p_ value being less than .05%, the null hypothesis cannot be accepted at 5% level of significance. Hence study concludes that there is a significant difference among mean ranks towards factors of e-Readiness of teachers. Based on mean rank e-Perception (3.25) is an important factor of e-Readiness of teachers, followed by e-Support (3.10), e-Competencies (2.93), and e-Challenges and e-Assessment both with 2.86.

Validity and Reliability Analysis of Instrument

Table 10 – Validity Statistics – Correlation Between Overall e-Readiness Score of All StatementWith Individual Statement				
	Factor/ Variable	**Statement**	**r**	**Sig.**
Overall e-Readiness	ePerception1	I am sure that I am computer-literate for using e-resources in instructional environments	.559**	.000
	ePerception2	I am aware of the e-opportunities in instructional environments	.594**	.000
	ePerception3	I think that technology supported teaching makes learning more effective	.579**	.000
	ePerception4	I think the use of e- instructional technologies increases the quality of course	.609**	.000
	ePerception5	I think that the use of e- instructional technologies makes it easier to prepare course materials (assignments, handouts etc.)	.594**	.000
	ePerception6	I can enhance learners' motivation	.668**	.000
	ePerception7	I think e- resources for instructional purposes makes effective use of class time	.634**	.000
	eCompetencies1	I can make use of Learning Management Systems effectively in instructional environments	.664**	.000
	eCompetencies2	I can design Web pages for e-learning and make instructional environment engaging	.575**	.000
	eCompetencies3	I can moderate e-discussions in instructional environment in achieving the intended outcomes	.625**	.000
	eCompetencies4	I can provide perfect guidance to my students on usage of LMS and e-resources	.694**	.000
	eCompetencies5	I can create e-content effectively and support students' different learning styles	.648**	.000
	eCompetencies6	I can deal with legal issues related to e-learning (e.g. copyrights)	.611**	.000
	eCompetencies7	I can design group work assignments for e-learners	.672**	.000
	eChallenges1	It does not result in students neglecting important traditional learning resources (e.g., library books)	.667**	.000
	eChallenges2	It is successful only for institutions have self-customised Learning Management System	.659**	.000
	eChallenges3	It does not demand that too much time be spent on technical problems	.679**	.000
	eChallenges4	It fits in disseminating knowledge in the subjects which need experimental work/hand on experience too	.680**	.000
	eChallenges5	It is a perfect replacement of traditional education	.682**	.000
	eChallenges6	It will increase the amount of stress and anxiety students' experience	.584**	.000
	eChallenges7	It gives teaching fraternity the opportunity to be a learning facilitator instead of information provider	.650**	.000

eSupport1	It is successful only with full commitment and support of parents	.555**	.000
eSupport2	It is successful only with full commitment and support of management	.601**	.000
eSupport3	It is successful only with mutual support among teaching fraternity	.580**	.000
eSupport4	It promotes student collaboration	.688**	.000
eSupport5	It promotes teacher collaboration	.685**	.000
eSupport6	It will not reduce the number of teachers employed in the future	.644**	.000
eSupport7	It requires software-skills training that is not too time consuming	.623**	.000
eAssessment1	I believe e-assessment procedure eliminates the chances of malpractice	.665**	.000
eAssessment2	I believe e-assessment eliminates the barrier of subjective opinions of teacher's manual assessment process	.649**	.000
eAssessment3	I believe student(s) can give his/her test even staying at their home	.675**	.000
eAssessment4	I believe student can give his/her test in fair and transparent manner	.677**	.000
eAssessment5	I believe e-assessment and grading mechanism will be much more fair and transparent than traditional assessment process	.685**	.000
eAssessment6	I believe waiting period for declaration of results can be eliminated	.675**	.000
eAssessment7	I believe Universities and colleges can overcome the huge cost involved in traditional assessment process	.631**	.000

Source: SPSS Computation;
Correlation is significant at the 0.01 level (2-tailed).

The above Table 10 explains the validity of the instrument, the sig. value of all factor statements are .000 < .05. Hence it can be concluded all the questions of the instrument are valid.

Table11 – Reliability Statistics	
Cronbach's Alpha	N of Items
0.957	35
Source: Researcher computation using SPSS;	

The above Table11 provides the reliability statistics of the instrument. The Cronbach's Alpha coefficient for 35 items is 0.957greater than the standard reliability coefficient 0.7. Therefore it suggests that the items have relatively high internal consistency with respect to the sample of the study.

Measure of Sampling Adequacy of the Study

Table12 – KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.932
Bartlett's Test of Sphericity	Approx. Chi-Square	5367.462
	Sig.	0.000
Source: Researcher computation using SPSS;		

The above Table12 explains Kaiser-Meyer-Olkin measure of sampling adequacy. The results of the study communicates KMO measure of sampling adequacy is .932 > .6 suggested minimum and closer to 1. It indicates that the factor analysis could be used for the selected sample. The Bartlett's test of Sphericity testing for the significance of the correlation matrix of the variables indicates that the correlation coefficient matrix is significant as indicated by the p value corresponding the chi-square statistics. The p value is .000 < .05. This shows that the correlation matrix of variables is significant.

Factor	Factor Loading	Eigen Value	% of Variance	Cumulative %
Table 13 - Factor Loading, Eigen value and Percentage of Extraction using Principle Component Method based on e-Readiness of Teachers				
e-Assessment 4	.739	4.754	13.582	3.582
e-Assessment 6	.736			
e-Assessment 5	.729			
e-Assessment 3	.715			
e-Assessment 2	.714			
e-Assessment 1	.663			
e-Assessment 7	.634			
e-Perception 5	.771	4.621	13.204	26.786
e-Perception 3	.757			
e-Perception 4	.754			
e-Perception 7	.702			
e-Perception 6	.688			
e-Perception 2	.666			
e-Perception 1	.591			
e-Challenges6	.729	4.392	12.549	39.336
e-Challenges3	.716			
e-Challenges7	.702			
e-Challenges4	.687			
e-Challenges5	.677			
e-Challenges2	.650			
e-Challenges1	.609			
e-Competencies 4	.763	4.281	12.23	51.566
e-Competencies 6	.760			
e-Competencies 5	.742			
e-Competencies 7	.733			
e-Competencies 3	.690			
e-Competencies 2	.682			
e-Competencies 1	.403			
e-Support 3	.771	3.879	11.082	62.648
e-Support 2	.725			
e-Support 4	.661			
e-Support 1	.660			
e-Support 5	.650			
e-Support 6	.512			
e-Support 7	.506			
Source: Researcher computation using SPSS;				

The above Table 13 displays the assessment of 35 items and factor loadings for the rotated factors using Principal Component Analysis with Varimax Rotation. The 35 factor statements are indexed to 5 constructs viz., e-Assessment, e-Perception, e-Challenges, e-Competencies and e-Support were requested in extracting the factor loadings. The initial eigenvalues before rotation identified 6 factor statements with eigenvalues greater than one and explains much variance compared to the other factor statements. According to the request imputed into SPSS for 5 factor construct the factor loading s are clustered as shown in the Table 13. After rotation e-Assessment, e-Perception, e-Challenges, e-Competencies and e-Support accounted for 13.582 percent, 13.204 percent, 12.549 percent, 12.230 percent and 11.082 percent variation respectively.

Findings

1) The study found that 217 respondents accounting to 90.8 percent own smart phones and 132 (55.2 percent) own laptop, followed by 42 (17.6 percent), 27 (11.3 percent), 5 (2.1%) own PCs, Tablets and Mac Book respectively.

2) Majority of the respondents expressed the inability that they have frequent interruption of internet and data connectivity, which accounted for 46.9 percent and 29.3 percent expressed they have very frequent interruption.13.8 percent of the respondents expressed occasional interruption and 7.9 percent rarely.

3) There is very meagre percentage of 2.1 expressed they never faced interruption of internet and data connectivity.

4) The survey revealed 96 respondents accounting to 40.2 percent made efforts to acquire knowledge on ICT enabled tools prior to COVID 19. And 1.7 percent of respondents never made any efforts prior to COVID 19.

5) Among 239 respondents 108 respondents accounting to 45.2 percent agreed that they made necessary efforts to get equip with ICT tools and 104 respondents accounting to 43.5 percent strongly agreed. 10.5 percent respondents remained neutral and meager proportion of 0.8 disagreed.

6) The survey identified 147 respondents accounting to61.5 percent expressed that it is very important that institutions should have self-customized learning management system portal. And 77 (32.2 percent) expressed it is important. Only 1 respondent (0.4 percent) expressed it is unimportant to have self-customized LMS.

7) The study found 71.1 percent, 59.9 percent, 58.2 percent and 59.8 percent expressed it is very important for management of educational institutions, accrediting institutions, affiliating bodies and all IT companies developing ICT models need to take responsibility to train and guide students and teachers about ICT tools usage respectively. Contrary two respondents accounting 0.8 percent expressed it is unimportant.

8) The t-test for difference of two means identified there is significant difference between male and female with regard to e-Perception, e-Competencies, e-Challenges, e-Assessment. Whereas e-Support is significantly differing, indicates there is gender bias in gaining the necessary access with regard to e-Support.

9) The study found there is no significant difference among the experience groups concerning to e-Perception, e-Competencies, e-Challenges and e-Support. It is found e-Assessment among the experience group there exists a significant difference.

10) The Kruskal-Wallis test of the study indicated there is no significant difference among mean rank irrespective of academic ranking of teachers. Contrary, the similar test identified significant difference between affiliating institutions regarding the e-Competencies.

11) The study identified the level of e-Readiness of teachers is not equally distributedindicating lower efficiency of teachers in dealing with online mode of delivery.

12) The study found there is a strong association between gender and level of e-Readiness of teachers. However, majority of male teachers are under high level and female under low level of e-Readiness.

13) The study identified there is significantly strong relation between all factors of the study.

14) The Friedman test identified e-Perception followed by e-Support are the key factors of e-Readiness of teachers. It is even observed by the study that there is significantly strong relationship between these factors.

15) The mean rank of e-Challenges and e-Assessment is found to be similar, however there exists strong relationship between these factors. It indicates the quantum of rise in e-Challenges is associated with rise in e-Assessment and vice-versa.

Suggestionsand Recommendations

1) The study suggests the management of educational institutions, accrediting bodies and Government to provide adequate training to teachers and bring awareness on various ICT tools and usage.

2) The study suggests irrespective of the experience,teachers need to strive to learn and adopt to the changes in the assessment procedures through online mode.

3) The study recommends the individual institutions need to take as stride and motivate teachers in improving their e-Competencies.

4) The study suggests teachers need to gear-up in understanding the online environment and become self-reliant to deal with various modes of online delivery mechanisms.

5) The study recommends Government, institutions and authorities to investigate and understand the practical issues and provide feasible solutions and enhance quality in mode of online delivery.

6) The study suggests irrespective of schools, colleges, and universities to develop their own LMS platforms and train teachers and students.

Conclusion

Teachers e-Readiness is one the key feature in delivering, communicating, making students to understand the concepts and/or issues discussed using online mode of instruction. This research was an effort to examine the factors and items which are relevant in examining the e-Readiness of teachers. No one had the thought of replacement of traditional education with online education. To cope up with this pandemic there is an ongoing shift in mode of delivery and it is positive to some extent as everyone are able to upgrade their knowledge. But it is standing as a hinder between face-to-face environment oflearning. No doubt online education is beneficial but it also has its demeritscreating a division among students due to the various underlying reasons in terms of socio-economic status, rural and urban, accessibility to network connectivity, increase in strain due to continuous access of gadgets etc.Even, it should not lead to subsiding of teachers' role in the long run.To conclude, online mode of teaching and assessing can be used effectively when there is an efficient monitoringof technical glitches at both the ends, and it will be successful only with integration and effective participation of Governments, institution managements, teachers, students and parents.

Scope for Future Research

The future studies can be focused on the following aspects of online education and online learning:
1. Students e-Readiness in equipping with ICT tools and usage.
2. Government, managements role in creating awareness among teachers and students.
3. Parents perception on the online education.
4. Study on side effects of prolonged exposure to screen.

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