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Original Aricle

Revising the Lens: Relationship between E-Learning and Achievement of Research Scholars.

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ABSTRACT:

The study was conducted to investigate the relationship between E-learning and Academic achievement of research scholars in HEIs using multi mediators. The study used theoretical network approach for review of literature, Barron Kenny model for mediators. The study employed quantitative deductive cross-sectional survey design. Population of the study was doctoral and master of philosophy researchers in HEIs, and sample size was 137. Convenient sampling was done in administering the questionnaires. The study reported that PICT, EL, TF, and UDL enhance the SAA. It also finds that predictors explain significant variation in the criterion variable. The study reported that PEL is a significant mediator between UEL and SAA, and UEL between EL and SAA, whereas partial mediation is shown by TCF between UEL and SAA. The study finds that computer experience stands insignificant for more than three variables i.e., EL, TF, UDF and SAA except PICT, rest of demographics have significant role. It is concluded that efforts may be made to follow the principle of end user computing, usefulness and ease of use in developing eLearning system, developer should not play down the orgware and peopleware aspects of the organizations i.e., technology be given human face to avoid disturbances and resistance.

Key words: eLearning, Perceptions about ICTs, Training & Coaching Facilities, Use of DL, Students' Academic Achievement

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Introduction

The existing research reports over and over that education is the top user of software applications and web services (Nawaz & Kundi, 2011) thereby creating a diversity of users including teachers, students, knowledge-industry, academia, and the institutions which are providing advanced ICT-based education (Abdullah, Ward & Ahmed, 2016). E-Learning provides enlivening information facilities for both learners and educators (Manochehr, 2006). Recent reorientations of knowledge and economic globalization have forced the modern countries to transform their education system on digital literacy so that computer literate workforce may come into the market (Nawaz, 2011; Rhema & Miliszewska, 2014). HEIs are extensively anticipated to play revolutionary-role in the 'information-age' by producing knowledge and skills compatible with existing 'global-knowledge-economy' (Cheng, Liu, Sun, Liu & Yang, 2017). This role is supported by the fact that education-sector is considered as the 'leading user of software-applications (Oye *et al.,* 2012). The existence of digital-gadgets in higher education ever since the technology is introduced refers to an evolution in the design and application of educational technologies (Alvarez, Martin, Fernandez-Castro, & Urretavizcaya, 2013). The rapid and unparalleled innovations in chip - technology during the past few years has contributed in several transformational models of e-learning and its uses (Nawaz & Kundi, 2011).

Repeated claim of the supporters of the technology is that information and communication technology provides exceptional opportunities, in particular, for the 'developing –countries' (Arkorful & Abaidoo, 2015). This optimism is based on two grounds. First, the phenomenal potential of digital tools which have turned the world into a 'global village' with its unique feature of connectivity which have never been found in entire history of human civilization (Rhema & Miliszewska, 2014). Second, the developing and developed countries have long been suffering from isolation, lack of empowerment and different types of divisions (Setyohadi, Aristian, Sinaga & Hamid, 2017). ICT's been anticipated as having the ability to overcome all of those divisions and connect the world into a global-society (Parkes, Stein, & Reading, 2015). Introduction of the second generation products like wikis, blogs, social-bookmarking have been evolved from the amalgamation of Web 1.0 into Web 2.0 and reshaped one-way communication to two-way communication (Yousef Abdel Latif Abdel Jawad & Basem Shalash, 2020). The movement of 'Free and Open Source System' (FOSS) caused the digital transformation in educational sector in developing and poor countries. To attain the purpose of education for all (EFA) and lifelong learning (LLL), ICT4D included in its mission that all ICT-tools and resources to be posted on the internet for the use of public at large to exploit the benefits of world libraries and academic publications (Kundi, Albejaidi, & Akhtar, 2017).

With convenience of educational technologies around the globe, researchers have found that instructional technologies are getting places for educational used in HEIs offering unprecedented profit for HEIs for resolving their prolonged education issues (Cidral, Oliveira, Di Felice, & Aparicio, 2018). For example, e-learning facilities are proven to be beneficial in developing countries where accessing the population is hard when it comes to provide physical education facilities at the large scale (Nawaz, 2010). Likewise, eLearning technology is serving the HEIs well to lessen their isolation and connect them to the internet based world community through the internet and helping them to gain knowledge, entertainment and to provide assistance in politics and business (Rhema & Miliszewska, 2014). This fact cannot be ignored that educational technologies don't become automatically beneficial just because of its purchased and owned by million users and organizations, as there is a dire need that they have to be sorted and tackled according to the diverse requirements of the users (Nawaz & Kundi, 2011). There is a lengthy list of such gadgets and technologies that can't be generalized for every institution instead there is a need to make intelligent choice of appropriate software, hardware & networking facilities (Yousef Abdel Latif Abdel Jawad & Basem

Shalash, 2020; Kundi, Albejaidi, & Akhtar, 2017). The learning – edge syndrome is a gravest problem faced by the world where it comes to the preference of technology in e-learning projects (Cidral, Oliveira, Di Felice & Aparicio, 2018). Even though researchers stressed that already trialed technologies should be opted rather than advanced ones still most of the institutes prefer the latest technologies which are not only ultra-modern, and complex to use but also incur great expense.(Nawaz, 2011) Research on this issue reveals that when institutes opt for untested ultra-modern technologies instead of already tested technologies there is a chance that they will be stuck with white elephant or even worse such as difficulty of its adoption and fusion with already existing system effectively. However, this is a big problem for the developed countries as compared to the developing states (Oye *et al.*, 2012). Several benefits of E-Learning are presented in the favor of ICTs as an enabler technology for the teachers and students in higher education however; how far this new technology is contributing to the students' 'Academic-Achievement' is critical question which must be answered to assess the real contribution role of E-Learning (Abbasi, Ahmed, Sajjad, Alshahrani, Saeed & Sarfaraz *et al*., 2021).

The study aimed to explore the concepts of e-learning and its learning issues for research scholars, investigate the impacts of eLearning on students achievement, identify the relationships between different factors of eLearning, achievement scores of the students, and to examine the relationships between the student demographics and the research variables i.e., eLearning and student academic achievement.

Literature Review

Perceptions about ICTS [PICT]

The belief of students about the role of ICTs determines the level of a students' interest in using eLearning or progressing in Digital Literacy (Nawaz & Kundi, 2011). Research tells that some consider ICTs as silver-bullets and solution for all ills but quite others take them normally as rest of the technologies (Pham, Limbu, Bui, Nguyen, & Pham, 2019). The students in HEIs are considered to be digital citizens, and they open to e-learning platforms in the HEIs to enhance their understanding and academic performance (Greenhow & Galvin, 2020). However, existing research of students' perceptions about e-learning exhibit the lack of consistency in the results concerning thee prediction of their academic achievement (Woods, Baker, & Hopper, 2004). The aim of the current study was to investigate the perception of students of e-learning in HEIs, based on students' experiences, academic engagement and digital use of an e-learning platform for their academic achievement in HEIs (Henrie, Halverson, & Graham, 2015). It is reported that students positively perceive the e-learning experiences in HEIs, yet, they need to have powerful digital skills to dispense academic work, make commitment efforts and participation for e-learning environments (Jaggars & Xu, 2016). The empirical results of this study offer hands-on implications to augment effective espousal of e-learning environments by research scholars, educators as well as the administrators.

E-Learning [EL]

In global village, eLearning took the driving seat with excellent solution models for the HEIs operating in the environment of uncertainty and of rapid transformation (Al-Fraihat, Joy & Sinclair, 2020; Nawaz & Kundi, 2011). Taking into account the perception of students about eLearning, their expertise matters for successfully developing the academic programs, as attitude of end user towards application of eLearning is one of the critical factors (Kundi, Nawaz, & Khan, 2010). The electronic learning or eLearning, "is the application of Internet and computer technologies to create and deliver a learning environment with a range of instruction and information resources and their solutions (Kundi, Albejaidi, & Akhtar, 2017). The basic aim to gear up an individual and organizational performance (Cheng, Liu, Sun, Liu & Yang, 2017; Eze, Chinedu-Eze, & Bello, 2018).

Online learning or eLearning are interchangeably used concepts, and it is the use of computers and telecommunication technologies in teaching i.e., academic tasks and assignments. This technology is handy and it is one of the finest tools that increase significant role in success or otherwise failure. Several studies have been conducted to investee the different education delivery systems and methods, they found eLearning as an innovative instructional delivery system and method. Kim, Hong, & Song (2019) considered it as effective as the conventional traditional classroom. The review of the literature points that eLearning is playing a significant and instrumental role like conventional classroom learning, where learners anticipate the use of technology to gain experience with new technology through an enhanced and convenient way of quality learning (Elena Yu Zolochevskaya, Svetlana, Zubanova, Natalia, Fedorova & Yana Sivakova, 2021; Kundi & Nawaz, 2010b), however to meet the students expectations with varying background the decision makers in HEIs first need understand the preferences and needs of students. Kim, Hong, & Song (2019) reports that a number of students still prefer the blended learning. Lyons & Evans (2013) considers the student's satisfaction essential for successful execution of this new learning system. Therefore, the emphasis of may not be on eLearning technology, rather to use technology to create customized, personalized, and interactive learning.

Training & Coaching Facilities [TF]

The students learn computer applications either through some formal course or diploma or informally through family members, friends and self-learning (Yousef Abdel Latif Abdel Jawad & Basem Shalash, 2020). The provision of facilities by the HEIs contributes to the speed of students' digitization in their learning process (Eze, Chinedu-Eze, & Bello, 2018). The availability of the training and coaching facilities to learn computers for learning purposes. The well-equipped computer labs and training by professionals changes the role of eLearning in the learning process. Research shows that developing coaching expertise increases employees' skills and competencies and has a long-lasting systemic impact on talent retention and the bottom line (Nawaz & Kundi, 2011). To date, the challenge for HEIs has been how to spread fundamental coaching skills beyond leaders and managers who typically attend in-person workshops. Performance consultants created e-Learning coaching training so that organizations can expand access to learning and provide cost-effective training throughout the institution (Greenhow & Galvin, 2020).

Use of DL [UDL]

The term eLearning or digital literacy implies the use of computers by the teachers and students in the teaching and learning process (Islam, 2013). Since social networks are widely used by the teachers as well the students (McNaught & Kennedy, 2005), many researchers have explored and investigated particularly one can be related Facebook to academic performance of students in HEIs (Deng & Tavares, 2013). Kirschner & Karpinski (2010) studies use of Facebook and its association with the students' academic achievement through self-reported Grade Point Average (GPA) measurement and the time -hours they spent on studying in a week. They reported that users of the Facebook had lower GPAs inter alia they spend lesser time/ hours per week studying as compared to the than non-users (Cheng, Liu, Sun, Liu & Yang, 2017).

Likewise, in another study, Junco (2012) conducted a study with a large sample i.e., 1839 to investigate the association between several measures of incidence of Facebook use, chipping in in Facebook events, and time used up for preparing for the class with 4 GPA. The results show that time spent by the students on the Facebook is significantly, strongly but negatively correlated with the overall GPA of the students. Yet, surprisingly, its use to collect and share data was found with positive relationship to the student's outcome; however, again, they reported negative relationship of Facebook used with use for socialization.

Students' Academic Achievement [SAA]

The impacts of eLearning and students' digital skills on their academic performance using their achievement scores and relating them with digital knowledge and skills of the same students have not been explored in the developing countries like Pakistan. The research student's academic achievement is generally measured with GPA score as an outcome in HEIs (Leong, Kasmin, Hii, & Tan, 2017). According to Kundi & Nawaz (2010a) it is used to understand the role and impact of instructional methods since GPA is consider the ideal and real predictor of the research students' academic achievement, and it is decided based on the previously attained knowledge and skills, abilities and several elements for example, time and resources dedicated for academic learning (Kiviniemi, 2014). Likewise, it is reported that academic achievement of the research students is significantly and positively with instructional methods and technologies (Carini, Kuh, & Klein, 2006). Similarly, (Hodge, Wright, & Bennett, 2018) found that deeper the engagement of the students better will be the results in the sense of an all-inclusive learning.

The academic achievement of research students in HEIs is significantly predicted by their e-learning experiences. The students who are using the e-learning mode have established improvement in learning, achievement (Chou & Liu, 2005). Goh *et al*. (2017) share similar results. They investigated the use of e-learning resources for academic purposes concerning the lack of student to the access and use of eLearning systems. Castillo-Merino & Serradell-Lopez (2014) and Kiviniemi (2014) however, argue that blended learning approaches that make use of both in-person and e-learning are the best for the improved course components and student's achievement (Hidalgo-Camacho, Escudero, Villacís, & Varela, (2021).

Theoretical Framework on the Relationship between Predictors, Mediators and Criterion Variables

In the current decade, numerous studies have been conducted that explored the perception of students and their expectation from eLearning in HEIs for example, Cheng, Liu, Sun, Liu & Yang, (2017), Nawaz and Kundi (2011) and Waits & Lewis (2003). Likewise, research findings highlight that students' perception of e-learning in HEIs are induced by several factors. Keller & Cernerud (2002) found age, gender, experience, past experience of computers, technology acceptance and individual learning styles as significant predictors which are based on various theories of technology acceptance for example Roger (2003) diffusion of innovations theory, Davis & Warsaw (1989) Technology Acceptance Model emphasized on perceived ease of use and perceived usefulness. Likewise, Venkatesh, Morris & David (2003) reconsidered the Davis and Warsaw model inter alia Unified Theory of Acceptance and Use of Technology (UTAUT) model, etc.

The model of this study taking into account user's perception about eLearning, training and coaching facilities, use of digital literacy as direct and indirect predictors, and students' academic achievement as a criterion variable (Chu & Chen, 2016). The theoretical framework of this study illustrates the creation of interrelationships between the working concepts (variables) extracted from the literature. The experts note that unless the research variables are connected together, the list of them makes no sense (Mironov & Popovici, 2015). The connections are created according to the principles as prescribed in practice and experience and recorded in the existing body of knowledge (Olelewe & Agomuo, 2016). Figure 1 is the schematic diagram of the conceptual model used as a guideline in the current study. The studies reports that use of eLearning for academic achievement is significantly dependent on the perception of students about the use of eLearning technologies in HEIs.

It is well documented that perception of the students mediates relationship between use of eLearning and students' academic achievement (Nawaz & Kundi, 2010b). Research has also found that relationship between use of eLearning and students' academic achievement is also mediated by eLearning Kim, Hong & Song (2019). The previous studies brought into fore that significance of training and coaching facilities, and considered it imperative for success. Abuhassna, Megat, Yahaya, Azlina & Al-

rahmi (2020) and Kundi & Nawaz (2014) reported that training and facilities mediates the relationship between use of eLearning and students' academic achievement. Based on the above mentioned discussed relationship between predictors, mediators and criterion variables and below given schematic diagram of theoretical framework, below are proposed hypotheses:

H_1: *Predictors and Criterion variables are Significantly Associated*

H_2: *Predictors explain the variation in Criterion-variable.*

H_3: *PEL as mediator in UEL-SAA relationship.*

H_4: *EL as mediator in UEL-SAA relationship.*

H_5: *TCF as mediator in UEL-SAA relationship.*

H_6: *Private-sector sample is scoring higher than the other group.*

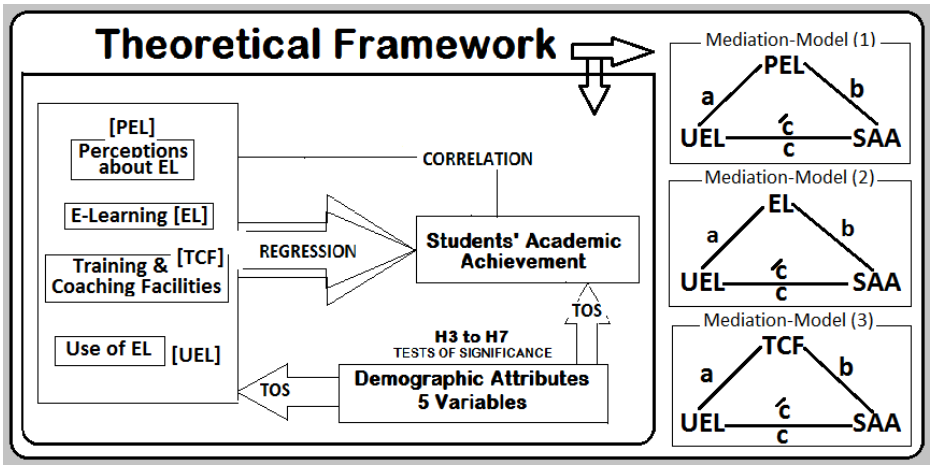
H_7: *Locals are scoring higher than the Non-Locals*

H_8: *Males are scoring higher than their counterparts*

H9: *Respondents with Greater Experience (>= 5) are scoring higher*

Figure 1

Schematic Diagram of the Theoretical Framework



The left side of the model indicates the direct while right side shows the indirect effect.

Method

This study used quantitative deductive cross-sectional survey design (Creswell & Creswell, 2017**)**, sample was selected by using a standard formula for computing sample size under 'Finite Population'. Population of the study was doctoral and master of philosophy researchers in HEIs. The data for the formula was taken from the pilot study undertaken for the purpose of testing the variables, questions and getting statistics for

the formula to compute the required sample size for the main study. Table 1 gives the details of the formula and measurements for sample size selected (n=137).

Table 1

Pilot-Study data used for Sample Size Determination

z-value for 95% Confidence Level	SD	SE	N	n
1.96	0.061	0.0085	450	137.1

Data Collection & Analysis Tools

In a survey, the researcher selects a sample of respondents and then administers a standardized questionnaire to them (Babbie, 2021:256). Field surveys are very popular in the research on students' satisfaction all over the world. The researcher constructed a structured questionnaire from the existing literature and distributed among the sample (137) selected from the population of research scholars from Gomal and Qurtuba Universities in DIKhan.

Theoretical Network Approach

This approach applies 'theory' to conceptualize the topic and serves as a guideline to point out and then collect relevant data, organize and interpret to present findings in systematic and effective manner. Whereas, according to Goode & Hatt (1952:9); Babbie (1993:49); Sekaran (1999:103), theory is a well-established and documented to perform all above presented steps in a social research process. Likewise, TAN had capitalized the concepts of 'Argumentation' (Toulmin, 1858) and Glasser & Strauss (1967) 'Grounded-theory'. Jennifer A Stirling (2001) gave an approach named as TNA that starts with preparation of research cards which are then grouped into research constructs. Finally, this data is given order in line with the principles of theory employing the argumentation, this process could be seen in figure 2. Inter alia 'Grounded-theory' by Glasser (2001) and 'Framework-Analysis' by Ritchie and Spencer (1994) for developing a TNA are also useful for studies like one in hand. However, it should be noted that this approach is fundamentally based on Toulmin's (1958) 'Argumentation-theory'. Which is a structured way to analyze and understand argument process.

Findings

It could be seen in table 3 that Students' Academic Achievement [SAA] was recorded with 4.752 which has highest mean value among rest of the 4 variables, followed by Perceptions about ICTs [PICT] with mean score 4.312, and Training, Coaching Facilities [TF], eLearning [EL] and Use of DL [UDL] with their respective means score of 4.018, 3.945 and 3.435. This highlights that student academic achievement is most dominant variable.

Correlation Analysis

Hypothesis # 1 Predictors and Criterion variables are Significantly Associated

Table 4: Correlations Results.

	PICT		PICT	EL	TF	UDL	SAA
2	EL	r	.690**	1			
3	TF	r	.737**	.819**	1		
4	UDL	r	.731**	.671**	.715**	1	
6	SAA	r	.696**	.645**	.637**	.741**	.259**

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

**. Correlation is significant at the 0.05 level (2-tailed).*

n= 137

The relationship between PICT and SAA is moderate at r .696, $p < 0.05$, moreover, it could be observed from table 4 for EL is .645, TF r .637, and UDL r .741 at , $p < 0.05$ level of significance. With the increase or decrease in the PIC, EL, TF, and UDL SAA could also change accordingly. This implies that PICT, EL, TF, and UDL enhance the SAA, thus we accept our proposed hypothesis H_1 i.e., predictors are significantly associated with criterion-variable is substantiated.

Discussions and Conclusion

The HEIs in developing countries are undergoing the intense environmental changes, demanding to educate more graduates especially in the field of research with varied backgrounds, different age groups with diverse requirements (Yousef Abdel Latif Abdel Jawad & Basem Shalash, 2020). eLearning is considered very significant and critical in streamlining their operations and functioning therefore, irrespective of the background differences, all HEIs are investing heavily in the development of new systems and services i.e. they are putting in place new and modern IT infrastructure, web-based online management systems, and the academic management system (Nawaz & Kundi, 2010a). They working to fully integrate these technologies with their learning management systems, digital libraries, financial and administrative systems besides investment in their employee development through digital trainings (Elena Yu Zolochevskaya, Svetlana, Zubanova, Natalia, Fedorova & Yana Sivakova, 2021). Yet, one could underscore the complexities and issue posed by the innovations for the academics as well the students (Hidalgo-Camacho, Escudero, Villacis, & Varela, 2021). Today students are said to be the digital natives who are prone to the use of these digital gadgets as an integral part of life.

Considering the significance of the results of the previous studies it is most relevant to take critical view of our results in light of the previous findings how far they agree or disagree with the findings of the previous researches. Number of research studies have reported that the number of educational websites and learning management systems are growing with unprecedented speed (Abuhassna, Megat, Yahaya, Azlina & Al-rahmi, 2020). The crisis of Covid-19 tripled the effect since HEIs are physically shut for classes and there is mushroom growth and switchover to the eLearning platforms. Since March 2020 most communications are done online. With this perspective, this study finds significant but moderate relationship between PICT and SAA as for as EL was significantly related to TF, and UDL, which implies that increase or decrease in the PIC, EL, TF, and UDL with SAA also bring changes. This indicates that PICT, EL, TF, and UDL enhance the SAA. Likewise, predictors are reported to have significant direct effects on the criterion variable i.e., R^2 .549 for model 1, .600 for model 2 and .615 for model 3, it could concluded from above

results that R^2 .615 shows collect effect upon SAA, this indicate 61.5% of variance in the criterion, however, training and coaching facilities were found iinsignificant. Partial mediation was found of PEL as Mediator on the relationship between UEL-SAA, relationship inter alia partial mediated is also reported for EL as Mediator in relationship between UEL-SAA. TCF as mmediator in UEL-SAA Relationship also mediates partially. The PICT, EL, TF, UDF and SAA were found insignificant for more than three variables i.e., EL, TF, UDF and SAA however, it was found significant for PICT, rest of the demographics, however, rest of the demographic were reported to have significant difference of mean scores with research variables of the study.

The findings of this study therefore suggest that research students generally are flexible, eager to learn and open to innovative learning technologies. Since, a positive relationship was found between the perceptions of eLearning is an enough evidence that led us to infer eLearning is beneficial for research students. Yet, it is observed that fine-tuned balance of operations and learners is vital to use of the technology in education. However, one cannot consider that learners will accept more the use of eLearning since, it literature suggest that use of the advanced technology with complications limit the eLearning strategies. Therefore, it is imperative to take into account the possible user's resistance while devising plans for innovative uses of technology in the learning at HEIs. On the contrary, if induction and planning for eLearning are appropriately developed and executed, as findings of this study confirms that perception of the students for eLearning will also improve once a student experiences its benefits, thus, with good experience of an eLearning, there are great chances that students will acknowledge and will engaging in such experiences enthusiastically.

The study has investigated perception of the students on eLearning technology in public and private sector HEIs. Based on findings and discussion this study comes to conclude that research students are central for successful execution of eLearning management systems in HEIs therefore all possible efforts may be made keeping in view the principle of end user computing, usefulness and ease of use. While developing eLearning system, besides technical dimensions, developer should not play down the orgware and peopleware aspects of the organizations. This necessitates the technology should be given human face to avoid disturbances and resistance inter alia list of complaints from the leaners as well as the teachers and instructors. This way students will be able to relate the learning material with method of learning through a teacher or with peer learners to fully reap the benefits of being face to face with being face to face mode of teaching and learning. This will be helpful for better comprehension on how to enhance learning experience with online mode of teaching, though students are well aware and equip with these innovative technologies, however, it seems that they need to understand with help of their teachers about more robust and coherent mechanism to prove more efficient and effective users' of eLearning systems as teachers are there to plan, organize and implement teaching-learning activities in HEIs. This suggests a systematized and well contrived approach to eLearning in HEIs, this will empower the students to get benefits of online mode of teaching in their studies and research.

Contributions

The findings of current study will be informative and assisting to different stakeholders including university teachers, students and administrators. The computers are making changes in every sector of society where higher education is said to be most affected by the technological interventions. The role of ICTs in higher education need to be explored so that its impacts could be managed properly and in the favor of university constituents. The researchers can use the research-model of this study for their research projects after necessary modifications. The findings will be an addition to the existing knowledge. This study suggests that it is necessary to further study the auxiliary antecedents that could also be the

critical factors with regards to eLearning, for researcher can extend this model by added some new variables as predictors and mediators i.e., academic engagement and eReadiness, etc., (Henrie, Halverson, & Graham, 2015). Similarly, demographic factors like, experiences of technology adoption and parents support during early age may also need to be examined by the future studies. The researchers could also investigate different levels of adoption with respect to e-learning environments in HEIs.

Limitations

This study was conducted to investigate the relationship between eLearning, and achievement of research scholars in HEIs of a developing country. Since this study is limited to one region of a developing country, therefore, this model can also be used to study eLearning systems and students perceptions in other settings, regions, and countries too to collect evidence on the generalizability of the model.

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Declaration of Interest: The author declares that there is no clash of interest.

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