THE ASIAN BULLETIN OF BIG DATA MANAGMENT
Vol. 4. Issue 1 (2024)
https://doi.org/ 10.62019/abbdm.v4i1.74

Predicting students' E-retention in online learning during COVID pandemic: Evidence from the Students of Higher Education.

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Chronicle

Article history

Received: Dec 19, 2023
Received in the **revised format:** January 28, 2024
Accepted: March 04, 2024
Available online: March 5, 2024

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Abstract

On account of prevalent crisis of COVID-19, the challenges of pandemic compelled students to pitch in the advanced and extensive environment of e-learning. Thence, the study of epidemic change in the satisfaction and online learning outcomes require absolute investigation to inquire e-retention among students of higher education institutions. This study employed the PLS-SEM technique to analyze the research results through Smart PLS software. Additionally, data were collected from students of higher education through a questionnaire. The findings of this research reflect that all factors i.e., Direct Instructions/Lecture, Instructor-Learner Interactions, Learner- Learner Interactions, Internet Self-Efficacy, Perceived Social Presence have a positive and significant impact on Online Learning Outcomes and Online Learning Satisfaction. In response, these factors positively and significantly affect E-retention. Higher education institutions and policymakers are the prime beneficiaries of this research paper. As the literature indicates a void in terms of the direct impression of online learning outcomes and satisfaction in endorsing the retention of electronic learning, this paper makes a vital contribution to the literature by considering the role of online learning outcomes and online learning satisfaction for e-retention prediction in higher education, especially at the time of Covid-19. For instance, E-retention strategies can be informed by the benefits of online learning outcomes, which include its flexibility, personalized interaction, and data-driven support. By prioritizing these benefits, educational institutions may improve student happiness and retention—especially in times like the COVID-19 pandemic.

Keywords: E-Retention, Online Learning, Covid-19, E-Satisfaction, Higher Education, Smart PLS.

INTRODUCTION

With the inception of Covid-19, this pandemic took control over the entire world and altered the traditional approaches in almost every sphere of life, be it social and economic aspects or the educational activities. In order to minimize the adverse impacts of pandemic on educational life, countries and educational institutes came up with the milestone of online education, a way of distance learning aided by steady revolution of technological enhancement (Almaiah et al., 2020). During the last decade, a lot of advancements have been made in the division of educational technology which ultimately resulted as excessively beneficial during epidemic crisis (Dhawan, 2020;

Chatterjee & Chakraborty, 2020). As an outcome of covid-19 outburst and social isolation, the use of technology was immensely maximized, thus increasing the demand for e-learning. The speedy usage of the internet for educational purposes became one of the rationale of increased demand of e-learning (Bates, 2019; Wei & Chou, 2020). E-Learning even before the pandemic was quite popular in developed countries and certain courses were offered online. As per the study of Allen and Seaman (2010), almost 66% of educational institutes depicted that the contemporary demand for online programs and courses increased in the United States. E-learning markets are growing at such fast pace that it is expected that by 2023 they will hit 65.41 billion dollars at a growth rate of 7.07% (Research and Markets, 2018a). Moreover, Learning Management System (LMS) is anticipated to grow at 15.52% by 2025 (Research and Markets, 2018b). The focus on the expansion of E-learning is to provide flexible and quality learning through technological gadgets (Alsswey & Al-Samarraie, 2019). In spite of various ascendancy of online learning such as cost reduction, limited required learning time, flexibility and improving the quality of learning, retaining students on virtual platforms is quite an overriding challenge (Perna et al., 2014). The advantages of online learning are of no use until students have a good perception and a level of satisfaction. This becomes important since it is unclear if the students are highly satisfied with the content and mechanism of e-learning platforms (Al-rahmi et al., 2015).

Several studies have been conducted to analyze intention of students in adoption E-learning and the satisfaction after getting enrolled in online courses (Bolliger & Halupa, 2018; Samsudeen et al., 2019; Tarhini et al., 2017). Given the importance, e-satisfaction corresponds towards success of digitalization and implementation of technology, it becomes a necessity of determining the factors which can enable user satisfaction and make them continue using the online systems (Blasco et al., 2019). High dropout rates among students become one of the important challenges to make online-learning consistent (Richardson et al., 2017). Additionally, features such as perceived social presence and cognitive absorption help in sustaining the system and enhancing the level of satisfaction by making users understand that the particular system is easy to access and use and beneficial (Leong, 2011). Understanding the previous researches makes a pave way to better accelerate the factors and results. A study of Eom et al. (2006) was conducted in the context of university online education of US where various variables or predictors were used such as course structure, self-motivation, instructor feedback, learning styles and instructor knowledge and facilitation to predict learning outcomes and user satisfaction. In another study, e-retention in UAE was predicted by studying the impact of TAM factors along with external variables such as design features (DF) and enjoyment (ENJ) which proved to be significant predictors (Al-hawari et al., 2010).

In the study of Alqurashi (2019), it was examined that among the students of developed countries, learner-content interaction, learner-instructor interaction and learner-learner interaction can predict how perceived learning and satisfaction of students are impacted by these variables. It was observed that the students' satisfaction was highly indicated by learner-content interaction. Eom & Ashill (2016) used instructor and dialogue and course design to predict the satisfaction level and learning outcomes among students. Significant researches have been done on this area to elaborate the student satisfaction and retention rate but in developed countries. However, lesser amount of work has been done in the context of developing countries i.e. Pakistan. Majority of research work based in Pakistan covers e-learning challenges and opportunities

adoption. Previously researches on the dimensions of e-learning in Pakistan were conducted under the normal situation (Farid et al., 2015; Yousuf, 2007) excluding the consequences of Covid-19 pandemic. Student satisfaction has been predicted by using only TAM or Online Learning Compatibility. Haleem et al. (2021) examined the adoptability of e-learning using the variables of TAM and Online Learning Compatibility in the context of Pakistan. In the study of Ali and Ahmad (2011), they examined in their study that interaction between instructor and learner, well-designed content and skills of instructor in online education create an element of satisfaction. However, today the pandemic situation is quite different from the normal learning programs offered in past. Rahman et. (2020) investigated online learning satisfaction using online learning motivation, learner/ learner interaction, direct instructions/lectures, internet self-efficacy and instructor/ learner interaction from a survey done in Bangladesh.

These variables are hard to find in any of the research done in the context of Pakistan. Perceived social presence is found to be an impactful variable to improvise the satisfaction rate (Hayashi et al., 2020; Leong, 2011) to assess user retention and satisfaction. In this study, Researchers also integrated perceived social presence and internet self-efficacy. This variable has not been used to investigate the retention rate and satisfaction of students during the pandemic in the previous studies. Online learning outcomes along with online learning satisfaction together cannot be seen in any of the previous studies to investigate the e-retention in the setting of developing countries i.e. Pakistan, however these variables have been selected in the US-based study by Eom and Ashill (2016). Considering these gaps, it is believed that this study intends to provide answers to questions regarding the factors in the prediction of online learning retention among students during and covid-19 pandemic and post pandemic era in developing countries. Therefore, the present study is focused on key variables such as Direct Instruction/Lecture, Learner-Learner Interactions, Instructor-Learner Interactions, Internet Self-Efficacy, and Perceived Social Presence are examples of independent variables. Three dependent variables—online learning outcomes, online learning satisfaction, and e-retention—are analyzed in connection to these aspects. According to Ku et al. (2011), learners tend to engage more and achieve better results when online lectures or courses are structured dynamically with appropriate guidelines and delivery. Likewise, Course design and lecture content impact the level of satisfaction among users.

Additionally, it is imperative that all interactions, including those between students and instructors, have a notably favorable effect on the learning outcomes of those students. By offering helpful criticism, teachers can foster a cooperative relationship with students that increases the likelihood that they will complete their assignments (Arbaugh et al., (2007). Similarly, examining how student interactions—like group discussions and cooperative activities—shape the results, satisfaction, and retention of online learning is the aim of the study. Further, students' satisfaction level with online courses might be influenced by their assessment of their Internet capabilities and convenience of usage (Wei & Chou, 2020). Along with that, a learner's sense of social presence in an online environment can also influence the results of online learning. Thus, having a strong and positive online learning environment and satisfaction with online platforms can help retain electronic learning.

This research provides noteworthy contributions in literature as it provides a comprehensive model with various variables which can predict student's E-retention. The

results generated from this research will aid contemporary researchers to implement the model and the results of this research for further investigations. Since, several institutes in developing countries are interested in introducing more online courses and retaining the modes of online learning but lack enough insights about the perception and behavior of students for continuing studying online. Therefore, analyzing the factors influencing the e-retention as a result of online learning outcomes and satisfaction is the salient research area. This research will help educational institutes and policy makers of higher education belonging to developing countries to enhance online lectures and learning experience for increased satisfaction of students.

The structure of this study is organized into five sections; the first section incorporates a brief introduction of the research followed by second section which is Literature Review, where the development of hypotheses is concerned. Then, Research Methodology has been discussed in the third section to elaborate research design, demographics, data gathering and instrument details. Next, in section four, data analysis and its results have been presented. Lastly, conclusion with discussion, practical and literary implications along with limitations and recommendations are addressed in the last section of the study.

LITERATURE REVIEW

Direct Instructions/ Lectures are regarded as "direct or indirect teachings in the form of audio/ visual lessons, written material, constructive feedback, discussion sessions and lectures provided by instructor" (Garrison et al., 2000). Muhsin et al. (2019) stated that improvement in learning, skills and understanding of students takes place when proper learning methods and lectures are introduced. When online lectures or courses are organized dynamically with proper guidelines and delivery, learners tend to engage more and produce positive outcomes (Dykman & Davis, 2008; Ku et al., 2011). In another research, it is found that lecture structure, design and instructions by lecturer directly affect the process of learning and its outcomes among students (Rubin & Fernandes, 2013; Swan et al., 2012).

High quality students can be produced by efficient instructors and well-arranged lectures (Gee, 2018) along with the level of satisfaction students possess from direct instructions and lectures. Osman and Saputra (2019) in their study investigated the impact of teaching material and style of instructor towards student satisfaction. They found these variables significant determinant of learning quality and satisfaction. Another study shows the evidences of how the user's satisfaction is influenced by course design and lectures. For example, Tarigan (2011) found that course structure such as material, lectures, sessions and content create a positive increase in students' satisfaction rather than by technology for delivering the lectures. Chen et al. (2008) Liaw (2008) also indicated the positive yet significant influence of electronic learning activities/material upon students' satisfaction. Eom and Ashill (2016) stated that online lectures and courses are directly associated with both user's satisfaction and learning outcomes if the content and lectures are understandable by students. Therefore, as per the above discussion, we formulated the following hypotheses.

H1 (a). Direct Instructions/ Lecture has a significant and positive impact on Online Learning Outcomes.

H1 (b). Direct Instructions/ Lecture has a significant and positive impact on Online Learning Satisfaction.

Instructor-Learner Interactions

As defined by Kuo et al. (2014), Instructor-Learner Interactions (ILI) is a two-way communication or interaction between learners and instructors. Interactive category is divided into three types such as learner-instructor, learner-learner and learner-content interactions are being utilized to explain effective way of communication in online education (Yildiz Durak, 2018; Garrison et al., 2003). Significant researches have provided evidences about the influence on online learning satisfaction and online learning outcomes. ILI proves to be a prominent element in creating an impact over learner's satisfaction and outcomes (Kuo et al., 2014; Burnett et al., 2007). The learner-instructor interactions and peer or class interactions have a positive relation with the satisfaction of online learning and increase the e-learning performance of students (Lu et al., 2013). Arbaugh et al. (2007) found out that all interactions such as student- instructor interaction has a significantly positive impact on the learning outcomes of students. When instructors provide constructive feedback, they can develop a cooperative bond with learners thus, increasing the chances of students' task accomplishment (Gray & DiLoreto, 2016).

As compared to less interactive learning, frequent and high-quality interaction such as feedbacks and reactions of instructor can result in increased motivation, satisfaction and improved learning (Croxton, 2014). In addition, Ali and Ahmad (2011) stated ILI the strongest predictor of learner satisfaction. Previous researches also indicated ILI a powerful variable which results in satisfaction of learner (Kuo et al., 2014; Gray & DiLoreto, 2016; Bray et al., 2008). Hence, based on the above discussion, following hypotheses are developed:

H2 (a). Instructor-Learner Interactions has a significant and positive impact on Online Learning Outcomes.

H2 (b). Instructor-Learner Interactions has a significant and positive impact on Online Learning Satisfaction.

Learner-Learner Interactions

According to Moore (1989), Learner-learner interaction (LLI) is a two-way communication between learners which occurs for information sharing and exchange of notions and content. LLI is important in online learning if course curriculum is learner-centered and formative (Tawfik et al., 2017). The significance of interactions has been highlighted in previous researches (Kuo et al., 2013, 2014; Alqurashi, 2018), where LLI is considered a strong indicator for online success and satisfaction among students (Moore, 2014). In another research, it is found that LLI is positively significant in predicting online learning outcomes (Arbaugh et al., 2007). LLI is pivotal variable to establish progressive learning environment which ultimately increase the academic achievements and success of learners (Elizondo-Garcia & Gallardo, 2020; Kurucay & Inan, 2017).

A study was conducted by Kuo et al. (2014) where LLI was assessed that may impact the outcomes of online learning and students' satisfaction. It was explored that LLI did not influence the satisfaction of students in online environment. However, Kurucay & Inan (2017) found significant relationship of LLI with satisfaction among the undergraduate

students. Additionally, LLI was a powerful indicator of online satisfaction (Bolliger & Martindale, 2004). Based on the above discourse, following hypotheses are formulated as:

H3 (a). Learner-Learner Interactions has a significant and positive impact on Online Learning Outcomes.

H3 (b). Learner-Learner Interactions has a significant and positive impact on Online Learning Satisfaction.

Internet Self Efficacy

Self-efficacy is a level to which a person has a level of confidence to perform a certain task and fulfill a particular goal (Bandura, 1977). Considering online learning, previous researches have engrossed technological aspect of self-efficacy, namely Internet self-efficacy (Kuo et al., 2014; Alqurashi, 2019). It represents the belief of individuals over capabilities to complete tasks using Internet (Kuo & Belland, 2019). In an e-learning environment, those learners who possess higher ISE tend to be more satisfied and produce much better results because students could use internet in expanding knowledge (Liang and Tsai, 2008). In order to thrive for better learning outcomes, e-learning requires specific skills to operate Internet platforms for completing academic assignments (Chu & Chu, 2010). Moreover, Kuo et al. (2020) showed that ISE is positively related with students' performance and outcomes instead of self-regulation.

Alqurashi (2019) recognized ISE as a vital indicator of students' satisfaction. ISE along with learning outcomes can also predict satisfaction of students from online leaning. Furthermore, students' perception about their capability and ease of use of Internet can add up in their satisfaction level concerning online courses (Wei & Chou, 2020). Other researchers also found ISE putting noteable impact on e-satisfaction (Alqurashi, 2018; Prifti, 2020; Kuo et al., 2014). Therefore, on the basis of above discourse, following hypotheses are proposed as:

H4 (a). Internet Self Efficacy has a significant and positive impact on Online Learning Outcomes.

H4 (b). Internet Self Efficacy has a significant and positive impact on Online Learning Satisfaction.

Perceived Social Presence

Perceived social presence (PSP) is a concept referring to the feeling or closeness with peers or other groups which relates to communicative behavior for improving non-linguistic interaction (Mehrabian, 1969). Such feelings serve as the motivating element to continue technological systems for learning (Ooi et al., 2018; Cyr et al., 2007). Since interaction in online classrooms is contrary to face-to-face classrooms, the non-verbal interaction or social presence is limited to get exposed but is quite crucial to deal with in order to make users continue online learning. Fortunately, it is indicated that social presence predicts the perceived learning and satisfaction very well (Richardson et al, 2017). Social presence is a powerful indicator in the analysis of online learning and satisfaction among students (Richardson et al., 2017). In another research on nursing education, Cobb (2011) found PSP as highly correlated with both e-satisfaction and

perceived learning. Students become satisfied in an environment where they experience high social presence among peer groups. Thus, online learning satisfaction is positively indicated by PSP (Horzum, 2017). As a result of the above literary discussion, following hypotheses are developed as:

H5 (a). Perceived Social Presence has a significant and positive impact on Online Learning Outcomes.

H5 (b). Perceived Social Presence has a significant and positive impact on Online Learning Satisfaction.

Online Learning Outcomes

Online learning outcomes is the concept referring to how much the students are achieving success and increasing their knowledge and grades after using online systems of learning. When users are satisfied from the experience of using a particular online system of learning, it becomes essential to study the achievements of students to further continue studying online. Prior researchers tried to find a relation between online learning success or achievements and the intention to continue learning online. For instance, Holsapple et al. (2006) explained that the online readiness of students has a definite relationship with the successful performance in course and satisfaction, thus increasing the chances for students to continue studying online courses. The importance of continuing online education is emphasized by the influence of student's motivation with regards to adoption of instructions and e-learning usage (Paechter et al., 2010). The intention of studying online courses is significantly impacted by cognitive style and self-efficacy for improving learning achievements and motivation to e-learning environment (Valencia-Vallejo et al., 2018). Hence, from the traces of literary review, following hypothesis is developed as:

H6. Online Learning Outcomes has a significant and positive impact on E-retention.

Online Learning Satisfaction

According to Szymanski and Hise (2000), online learning satisfaction is a degree to which customers perceive their online experience of learning as well satisfied and better over a given time. During technological advancement era, the need of assessing degree of satisfaction is critical as technological environment has produced a vacuity in the relationship of customer and service provider success (Salimon et al., 2016). Al-Hawari and Mouakket (2010) revealed e-satisfaction an indispensable constituent due to its influence over the decision of users that whether users are keen to continue using a system or not. Certain traces have been found in the literature which suggest that a retention and satisfaction are positively related (Hsiao et al., 2016). When students possess high level of satisfaction form the online content and courses, they experience a level of motivation to continue learning online. Using variety of variables of TAM model, Cognitive absorption and perceived social presence, it is inspected that e-retention among students is positively and significantly predicted by e-satisfaction (Salimon et al., 2021). Furthermore, in the dimension of online learning, electronic satisfaction arousing from online courses increase the level of e-retention (Al-Hawari and Mouakket, 2010). From above discussion, an hypothesis is presented as:

H7. Online Learning Satisfaction has a significant and positive impact on E-retention.

RESEARCH METHODOLOGY

Research Framework

The conceptual research model used to investigate e-retention is proposed, it can be seen in Figure-1. The figure incorporates appropriate factors for analyzing the e-retention of students in response to online learning. The developed conceptual model includes Direct Instructions/ Lecture, Instructor-Learner Interactions, Learner-Learner Interactions, Internet Self Efficacy and Perceived Social Presence as the influencing factors. However, Online Learning Outcomes along with Online Learning Satisfaction have also been explored by authors in this study to determine their impact on e-retention.

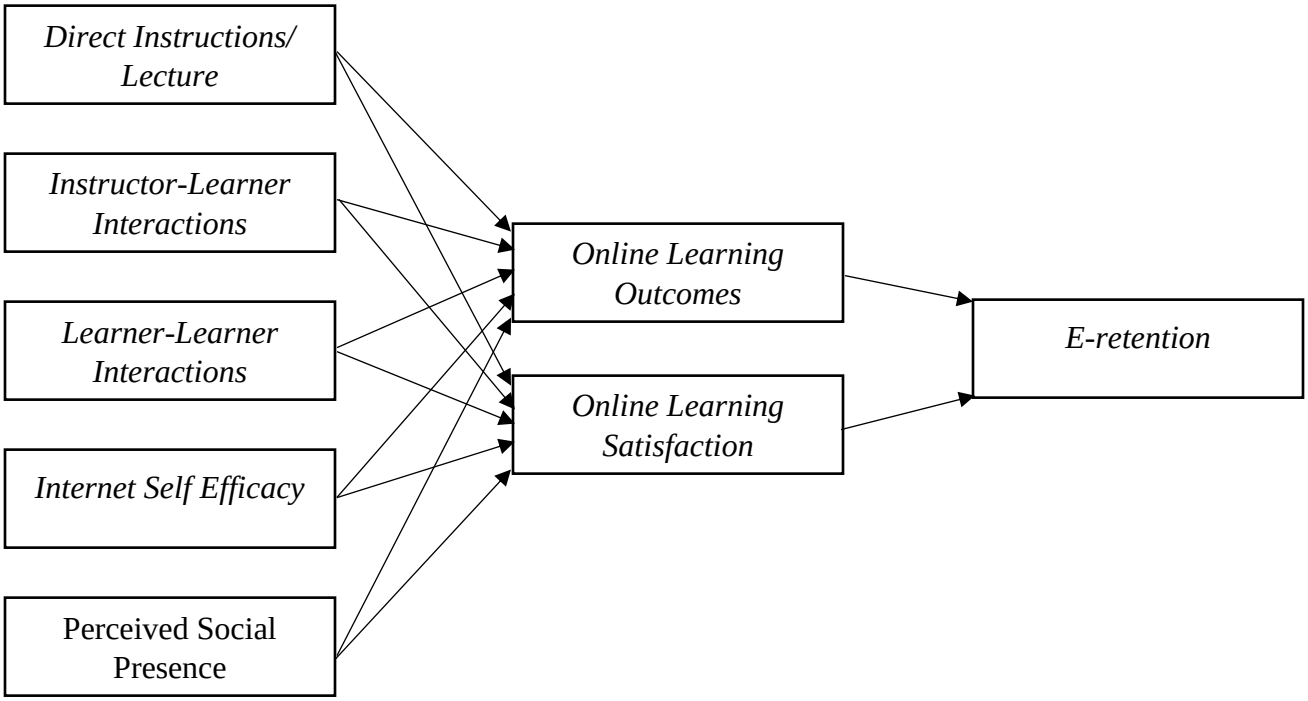

Figure 1.
Conceptual Research Model

DATA COLLECTION AND INSTRUMENTATION

The data for this study was collected from the students of higher education institutes since students are taken out as the target population and direct respondents for this research. Initially, the data was collected from 500 students but after excluding the outliers, the present sample size of 467 students was finalized. The choice of 500 students is made in order to obtain a representative sample size that offers statistical power for insightful analysis. This kind of sample size is frequently selected to guarantee that research results can be extrapolated to a larger group of online learners. Significantly distinct data points from the rest are known as outliers, and they can unreasonably affect statistical conclusions. Data points that fall outside of a predefined range, as those that are more than 1.5 times the interquartile range from the median, are frequently used as criteria for removing outliers. Thus, the same criteria allowed authors to deal with outliers. The sample size in this research is based upon the guidelines of Khaskheli et al. (2020), Comrey and

Lee (2013) which present the sample based on 50 is considered as inferior, sample size of 300 as good, 500 as very good and sample size of 1000 is considered as the excellent when regrading analysis. The data was collected using convenience sampling technique under the umbrella of non-probabilistic method in which data is collected from those people who are available conveniently. The data was gathered through a questionnaire based upon the five-point Likert scale starting from strongly disagree to strongly agree. The questionnaire included closed-ended questions utilizing the Likert scale. The response options are based on 5 5-point Likert scale ranging from strongly disagree to strongly disagree. By having specialists examine the questionnaire to make sure it measures the things it is supposed to measure, content validity is guaranteed. Furthermore, construct validity and internal consistency are performed, which are explained in the data analysis section to ensure the efficiency of the questionnaire. The constructs of Direct Instructions/ Lecture, Instructor-Learner Interactions, Learner-Learner Interactions, Internet Self Efficacy and Online Learning Satisfaction were extracted from Rahman et al. (2021) while items of Perceived Social Presence were adopted from Walter et al. (2015). Moreover the questions of Online Learning Outcomes were gathered from the research of Eom and Ashill (2016) and questions of E- Retention got adapted from the research of Al-Hawari and Mouakket (2010). The research design of this study appears to be correlation as it is intended to analyze the association between variables.

Demographics

Demographics refer to the information of respondents for instance age, gender and education. The analysis of demographics from collected data is illustrated as Table. 1. The demonstration of this table refers to gender distribution portraying male respondents by 56.1 percent while 43.9 percent respondents were female. Given the consideration to age group, the highest of 55.7 percent respondents belonged to the age bracket of 18-24, 29.1 percent respondents belonged to the age bracket of 25-31, 12.2 percent of respondents belonged to age bracket of 32-38 while only 3 percent of respondents lie in the age bracket of 39 or above. Moreover, under the category of education, majority of respondents were undergraduates as in figures 58.9 percent, 36.2 percent of respondents were enrolled in graduate programs while only 3% of respondents were enrolled in post graduate programs and 1.9 percent of respondents reported other category of education.

Table 1.
Demographics

Demographic Items	Frequency	Percent
Gender		
Male	262	56.1
Female	205	43.9
Total	467	100.0
Age		
18-24	260	55.7
25-31	136	29.1
32-38	57	12.2
39 and above	14	3.0
Total	467	100.0
Education		
Undergraduate	275	58.9

Graduate	169	36.2
Post graduate	14	3.0
Other	9	1.9
Total	467	100.0

LIMITATIONS OF METHODOLOGY

Acknowledging specific limitations is crucial to assessing the methodology's robustness as it can impact the interpretation and generalizability of the results. For instance, the study's dependence on a particular set of 500 students could lead to sampling bias and limit how broadly the results can be applied. There could be systematic differences between students who freely participated and those who did not, which could impact the study's external validity. Moreover, the study uses a questionnaire to collect self-report data, which raises the possibility of response or social desirability bias. Answers from participants that they believe to be socially acceptable may be given instead of ones that accurately represent their beliefs or experiences.

DATA ANALYSIS

Structural Equation Model is a statistical technique which can measure the viability of the theory (Ringle et al., 2005). Thus, PLS-SEM is deployed for determining the conceptual model of this research. Smart PLS software is a suitable procedure which can befit with various coherent models while reviewing the complex research scenarios (Raza, 2017). Therefore, software namely Smart PLS 3.2.3 is used to perform data analysis (Ringle et al., 2015). Assessments of the data are founded upon the two-step approach (Anderson and Gerbing, 1988) i.e., (i) measurement model (ii) structural model.

MEASUREMENT MODEL

The objective of this model falls in an assessment of its competency. Therefore, following tests are analyzed to evaluate its competency (i) Construct reliability (ii) Individual item reliability (iii) Convergent validity (iv) Discriminant validity. The results of data of Cronbach's alpha, composite reliability and average variance extract (AVE) are represented in Table 2. It can be seen that every value for Cronbach's alpha along with composite reliability result better than the standard of 0.7 which meets the criteria of (Straub, 1989; Churchill, 1979). Lastly the result of every variable had a minimum value of 0.5 which aligns to the benchmark of Fornell and Larcker (1981) average variance extracted (AVE). The instrument's reliability is confirmed by a loading over 0.7. As a result, the convergent validity is confirmed through AVE. Next discriminant validity is analyzed for Fornell and Larcker criterion, cross-loading analysis and the Heterotrait-Monotrait ratio of correlations (HTMT) in table 3, 4 and 5. The diagonal values of table 3 refer to the square root of AVE showing correlation among variables as significant meeting the standard of Fornell and Larcker (1981) and validate the data to be discriminant. The matrix of table 4 shows the results of loadings and cross loadings. As per the criteria of Gefen and Straub (2005) cross loading difference must be greater than 0.1 and variables must have the higher values with their own constructs. Therefore, table 4 depicts that items are highly loaded with their own variables in comparison to the other constructs meeting the criteria of (Gefen and Straub, 2005). Finally, the analysis of HTMT is demonstrated in Table 5. In this table all the values of HTMT ratios of correlations follow the criteria as the values are not

higher than 0.85 (Raza et al., 2020; Henseler et al., 2015). As a result of these tests, the competency of measurement model is confirmed and now the structural model can be examined.

Table 2.
Measurement Model Results

	Items	Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
DL	**DL1**	0.794			
	DL2	0.841	0.780	0.872	0.694
	DL3	0.863			
ER	**ER1**	0.908			
	ER2	0.920	0.881	0.926	0.808
	ER3	0.868			
ILI	**ILI1**	0.830			
	ILI2	0.895	0.844	0.906	0.763
	ILI3	0.894			
ISE	**ISE1**	0.857			
	ISE2	0.881	0.772	0.868	0.688
	ISE3	0.744			
LLI	**LLI1**	0.889			
	LLI2	0.873			
	LLI3	0.874	0.917	0.936	0.747
	LLI4	0.846			
	LLI5	0.837			
OLO	**OLO1**	0.865			
	OLO2	0.863	0.777	0.870	0.692
	OLO3	0.764			
OLS	**OLS1**	0.784			
	OLS2	0.816	0.761	0.863	0.677
	OLS3	0.867			
PSP	**PSP1**	0.860			
	PSP2	0.816	0.708	0.838	0.634
	PSP3	0.706			

Notes: DL= Direct Lectures, ER= E-retention, ILI= Instructor-Learner Interactions, ISE= Internet Self-Efficacy, LLI= Learner-Learner Interactions, OLO= Online Learning Outcomes, OLS= Online Learning Satisfaction, PSP= Perceived Social Presence.

Table 3.
Discriminant Validity
Fornell-Larcker Criterion

	DL	ER	ILI	ISE	LLI	OLO	OLS	PSP
DL	**0.833**							
ER	0.474	**0.899**						

ILI	0.718	0.543	**0.874**					
ISE	0.663	0.487	0.630	**0.829**				
LLI	-0.013	0.187	0.053	0.042	**0.864**			
OLO	0.698	0.556	0.716	0.587	0.144	**0.832**		
OLS	0.596	0.724	0.634	0.549	0.140	0.654	**0.823**	
PSP	0.608	0.586	0.648	0.557	0.061	0.605	0.710	**0.796**

Notes: DL= Direct Lectures, ER= E-retention, ILI= Instructor-Learner Interactions, ISE= Internet Self-Efficacy, LLI= Learner-Learner Interactions, OLO= Online Learning Outcomes, OLS= Online Learning Satisfaction, PSP= Perceived Social Presence. The diagonal elements (bold) represent the square root of average variance extracted (AVE).

Table: 04
Loadings and Cross Loadings

	DL	ER	ILI	ISE	LLI	OLO	OLS	PSP
DL1	**0.794**	0.345	0.521	0.540	-0.044	0.586	0.413	0.400
DL2	**0.841**	0.348	0.594	0.552	-0.034	0.524	0.474	0.504
DL3	**0.863**	0.478	0.668	0.564	0.035	0.629	0.586	0.599
ER1	0.406	**0.908**	0.475	0.435	0.166	0.509	0.644	0.532
ER2	0.394	**0.920**	0.491	0.429	0.204	0.502	0.662	0.526
ER3	0.479	**0.868**	0.497	0.448	0.133	0.489	0.647	0.524
ILI1	0.688	0.510	**0.830**	0.543	0.039	0.632	0.575	0.573
ILI2	0.625	0.442	**0.895**	0.563	0.052	0.624	0.539	0.579
ILI3	0.564	0.468	**0.894**	0.544	0.049	0.618	0.545	0.545
ISE1	0.597	0.448	0.567	**0.857**	0.052	0.542	0.504	0.498
ISE2	0.592	0.420	0.549	**0.881**	0.037	0.484	0.484	0.484
ISE3	0.445	0.332	0.441	**0.744**	0.011	0.426	0.362	0.394
LLI1	0.025	0.184	0.058	0.066	**0.889**	0.141	0.141	0.072
LLI2	-0.011	0.164	0.052	0.018	**0.873**	0.171	0.141	0.090
LLI3	-0.057	0.116	0.006	-0.016	**0.874**	0.082	0.069	-0.003
LLI4	-0.026	0.162	0.052	0.054	**0.846**	0.085	0.113	0.040
LLI5	-0.014	0.161	0.046	0.045	**0.837**	0.104	0.113	0.023
OLO1	0.564	0.419	0.633	0.472	0.095	**0.865**	0.533	0.481
OLO2	0.549	0.604	0.640	0.507	0.202	**0.863**	0.644	0.557
OLO3	0.647	0.333	0.502	0.488	0.042	**0.764**	0.432	0.464
OLS1	0.399	0.656	0.471	0.436	0.230	0.498	**0.784**	0.527
OLS2	0.530	0.514	0.498	0.439	0.003	0.508	**0.816**	0.608
OLS3	0.542	0.613	0.591	0.478	0.106	0.603	**0.867**	0.617
PSP1	0.528	0.525	0.522	0.444	0.022	0.498	0.633	**0.860**
PSP2	0.540	0.441	0.548	0.463	-0.009	0.492	0.566	**0.816**
PSP3	0.372	0.431	0.478	0.424	0.145	0.456	0.487	**0.706**

Notes: DL= Direct Lectures, ER= E-retention, ILI= Instructor-Learner Interactions, ISE= Internet Self-Efficacy, LLI= Learner-Learner Interactions, OLO= Online Learning Outcomes, OLS= Online Learning Satisfaction, PSP= Perceived Social Presence.

Table: 05

Heterotrait-Monotrait Ratio (HTMT)

	DL	ER	ILI	ISE	LLI	OLO	OLS	PSP
DL								
ER	0.565							
ILI	0.877	0.629						
ISE	0.847	0.585	0.775					
LLI	0.058	0.202	0.057	0.054				
OLO	0.803	0.657	0.877	0.755	0.150			
OLS	0.766	0.883	0.788	0.708	0.166	0.837		
PSP	0.804	0.742	0.839	0.751	0.103	0.813	0.815	

Notes: DL= Direct Lectures, ER= E-retention, ILI= Instructor-Learner Interactions, ISE= Internet Self-Efficacy, LLI= Learner-Learner Interactions, OLO= Online Learning Outcomes, OLS= Online Learning Satisfaction, PSP= Perceived Social Presence.

Structural Model

The Structural model is analyzed to examine the standard path in this research. Since it is aimed to determine the association between variables, standard paths refer to hypothesis which are tested using structural model. This model is evaluated based upon regression analysis. The results of twelve hypotheses are deployed in Table 6. The testing of developed hypothesis is examined through β-Coefficient and P-values. If the β-Coefficient value is positive in nature, then there happens to be positive relation between variables. Whereas P values determine the significance of variables. P value must be less than 0.1 for the acceptance of hypothesis. As the table 6 represents the results of hypothesis, it can be seen that all the hypotheses are accepted with positive relationship between variables. Figure 2 depicts the results of path analysis.

Table 6.
Results of Path Analysis.

Hypothesis	Regression Path	Effect type	β-Coeff	P Values	Remarks
H1a	DL -> OLO	Direct Effect	0.318	0.000	Supported
H1b	DL -> OLS	Direct Effect	0.126	0.024	Supported
H2a	ILI -> OLO	Direct Effect	0.342	0.000	Supported
H2b	ILI -> OLS	Direct Effect	0.186	0.001	Supported
H3a	LLI -> OLO	Direct Effect	0.120	0.000	Supported
H3b	LLI -> OLS	Direct Effect	0.103	0.000	Supported
H4a	ISE -> OLO	Direct Effect	0.077	0.076	Supported
H4b	ISE -> OLS	Direct Effect	0.086	0.075	Supported
H5a	PSP -> OLO	Direct Effect	0.140	0.000	Supported
H5b	PSP -> OLS	Direct Effect	0.459	0.000	Supported
H6	OLO -> ER	Direct Effect	0.146	0.001	Supported
H7	OLS -> ER	Direct Effect	0.629	0.000	Supported

Notes: DL= Direct Lectures, ER= E-retention, ILI= Instructor-Learner Interactions, ISE= Internet Self-Efficacy, LLI= Learner-Learner Interactions, OLO= Online Learning Outcomes, OLS= Online Learning Satisfaction, PSP= Perceived Social Presence.

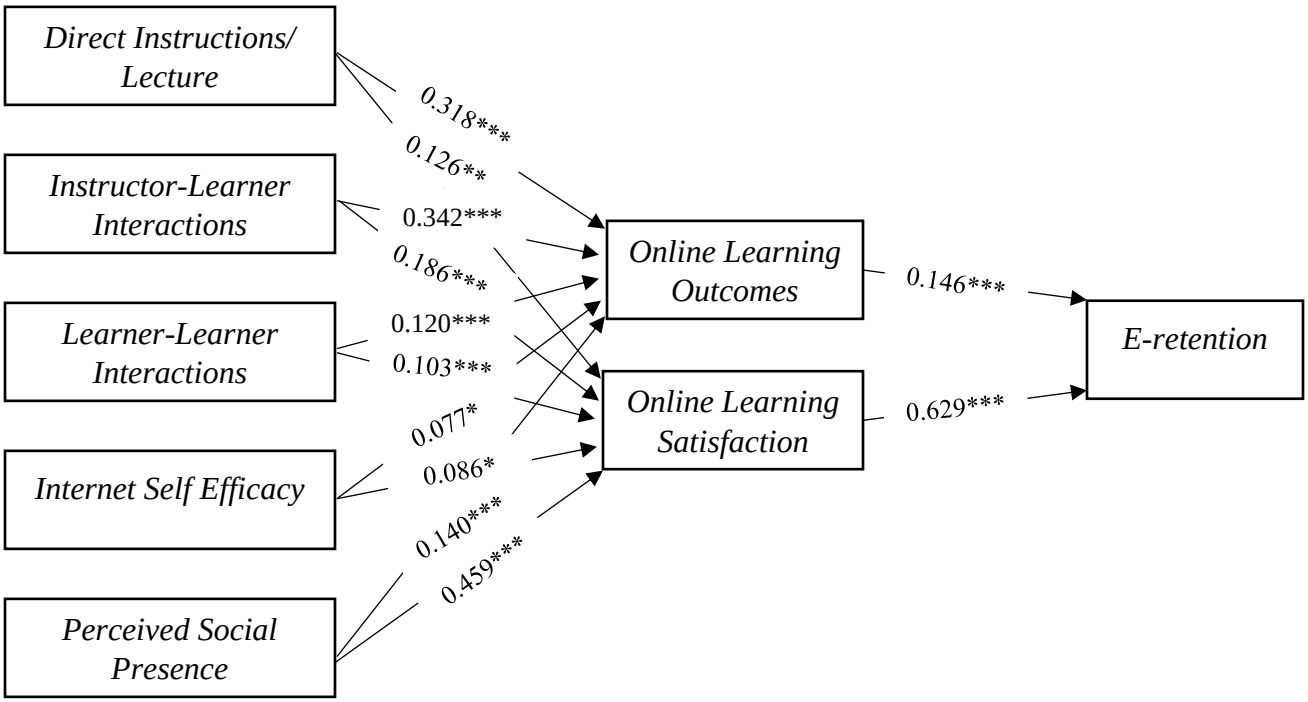

Figure-2.
Results of Path Analysis

DISCUSSION

The H1a and H1b hypotheses which show the relationship between Direct Learning (DL) and Online Learning Outcomes (OLO) and Direct Learning (DL) and Online Learning Satisfaction (OLS) are accepted as there happens to be a significant and positive relationship (β =0.318, p <0.01) and (β =0.126, p <0.01). These results are supported by previous research studies (Eom & Ashill, 2016; Ku et al., 2011; Goh et al., 2017; Rahman et al., 2021). Students tend to score greater in online education tests with correspondence of lecture and course material. If lectures given to students are comprehensive and easy to understand, students feel satisfied and perform well in exams. Hence, institutes must work on the course design, lecture formulation and material to gauge more students and retain them.

The H2a (ILI -> OLO) and H2b (ILI -> OLS) reveal the positive yet significant association between Instructor Learner Interaction (ILI) and Online Learning Outcomes (OLO) as (β =0.342, p <0.01) and between Instructor Learner Interaction (ILI) and Online Learning Satisfaction (OLS) as (β =0.186, p <0.01). These results can be seen in accordance with previous studies (Yildiz Durak, 2018; Kuo et al., 2014; Gray & DiLoreto, 2016). Therefore, instructor learner interaction is the most important variable in determining the triumph or setbacks of online education. When there is proper platform or networking between lecturer and learner, the communication gap becomes less and a relationship builds up which increases the satisfaction of students. When students and instructors get to know about each other, chances are higher for better understanding which ultimately results

in the good performance of students. Thus, online education system must have a proper platform where students and instructor can connect to each other and give feedback.

The H3a and H3b paths (LLI -> OLO) and (LLI -> OLS) depict the significant and direct positive relationship which results in the acceptance of H3a (β =0.120, p <0.01) and H3b (β =0.103, p <0.01). Prior researches support the results of these hypotheses (Moore, 2014; Elizondo-Garcia & Gallardo, 2020; Su & Guo, 2021). It means that students are captivated with the idea of interaction with their fellow learners. Students prefer those learning system which provide an interactive phase where students can share their ideas with fellow learners to increase their learning understanding. Students' satisfaction level with online learning becomes sturdier when they get a chance to interact with their peer to share knowledge, ideas and assistance.

The H4a and H4b hypotheses (ISE -> OLO) and (ISE -> OLS) resulted in positively significant relationship (β =0.077, p <0.01) and (β =0.086, p <0.01). Various earlier researches correspond to the findings of this research (Liang and Tsai, 2008; Rahman et al., 2021; Kuo et al., 2020). Learners who are efficient with their ability of internet use tend to generate positive results in their overall grades of online education. Self-efficacy aligned with internet can bring about positive enhancement on the grading of students. Moreover, students become satisfied if they know they have the ability of accessing online learning in quite an easy way. Therefore, institutes should provide training sessions to students to increase their e-skills for accessing the online learning systems.

The H5a and H5b hypotheses are accepted because Perceived Social Presence (PSP) tends to be positively significant to Online Learning Outcomes (OLO) and Online Learning Satisfaction (OLS) as (β =0.140, p <0.01) and (β =0.459, p <0.01). These results are supported by previous studies (Richardson et al, 2017; Horzum, 2017). The findings reveal that student's level of perception regarding their social presence contributes towards the success of e-learning. Learners perceive it necessary to have social presence which makes them satisfied with e-learning environment. It is found that students perform exceptionally when they hold a social presence among other students. As a result, learning system must be designed in a way which could provide a sense of social presence. Additionally, education institutes should keep this in mind to provide an environment to its students which increases their perceived social presence.

The H6 hypothesis regarding the impact of Online Learning Outcomes (OLO) on E-retention (ER) shows the significant and positive yet direct relationship (β =0.103, p <0.01). Hence, H6 can be accepted. Studies which support these findings are Valencia-Vallejo et al. (2018) and Paechter et al. (2010). The chances of e-retention are increased by enhancing the way where online learning outcomes are greater. Those students who score higher or perform well after studying an online course thinks of enrolling into another online course. Students believe that if the outcomes such as knowledge, grades, performance, critical thinking and emotional intelligence escalate through learning online, they develop an attitude to retain studying this way. If academic institutes desire to introduce more online courses, they are obliged to develop courses in a way where learning outcomes are focused and multiplied to provide progressive practical results.

The last hypothesis test H7 between Online Learning Satisfaction (OLS) and E-retention (ER) is found to be positively significant. Thus, H7 is approved (β =0.629, p <0.01). Results of this hypothesis are aligned with prior studies such as Al-Hawari and Mouakket (2010),

Salimon et al. (2021) and Hsiao et al. (2016). From the results, it can be stated that satisfaction arising from online education can drive students in continuous learning of online courses. This signifies that students who lack satisfactory level do not continue online studying. In order to continue online learning, students identify the degree of satisfaction from the experience of online learning. These results drive us to the strategies which can be undertaken to increase satisfactory element among students. For instance, universities can employ the factors which predict e-satisfaction and work carefully on them and continuously assess students' feedback which can help them identify their level of satisfaction for predicting e-retention.

CONCLUSION

E-learning has been widely adopted by profuse educational institutes to continue educational systems even in the time of pandemic. Therefore, probing the grounds on the basis of which students intend to not only adopt but also retain E-Systems of learning becomes demanding scope for researchers. On that account, this research plans to inspect certain propelling factors which can trigger an urge of students in retaining online education in the context of Pakistan. To carry out the research objective, a conceptual framework has been established which incorporates key variables such as online learning outcomes and online learning satisfaction to predict E-retention. Influencing factors such as Direct Instructions/ Lecture, Instructor-Learner Interactions, Learner-Learner Interactions, Internet Self Efficacy and Perceived Social Presence are adopted in determining the impact of these variables on Online Learning Outcomes and Online Learning Satisfaction. These factors have never been studied together with online learning outcomes and online learning satisfaction in the prediction of e-retention by researchers in the context of higher educational institutes of Pakistan.

Hence, this study provides extensive information and knowledge to educational institutes, policy makers and future researchers. The data in the form of survey-based questionnaire was collected from 467 students belonging to higher education institutes and the responses were transformed into insights using PLS-SEM technique. The results deduced from this research paper reveal all twelve hypotheses reflect significant path association. The results portray that Direct Instructions/ Lecture, Instructor-Learner Interactions, Learner-Learner Interactions, Internet Self Efficacy and Perceived Social Presence are positively significant with Online Learning Outcomes and Online Learning Satisfaction. Furthermore, the impact of Online Learning Outcomes and Online Learning Satisfaction disclose a positive and significance prediction of e-retention.

MANAGERIAL OR POLICY IMPLICATIONS

On account of practical managerial implications, the study provides indications, firstly, the academic administration should re-educate or train instructors to polish their skills of developing better course designs and lectures which can contribute in students' satisfaction generated from e-learning. Secondly, as students perceive a sense of social presence and require an interactive platform, this leads to another implication that online learning software or systems need to be designed in such a way that could provide learners with easy access to interactive platforms where students and teachers can interact and provide feedback in a more efficacious way. The introduction of features such as live chat, feedback polls and discussion boards can accommodate the

requirement of having social presence of students and lecturers. In this way students are satisfied with system and eventually can be retained. Thirdly, when higher institutes of education tend to introduce more online courses, they should arrange a training session where students are facilitated with proper guidelines and training and describe benefits associated with the usage of internet for educational purpose so that their internet self-efficacy can be improved. Fourthly, higher education policy makers can assign more productive and learning outcomes with online courses as online learning outcomes is of the strong predictor of e-retention.

In terms of the outcomes of the hypothesis, the study proposes practical implications such that: The effectiveness of structured content delivery is suggested by the favorable and considerable influence that direct instructions have on online learning outcomes and satisfaction. Thus, Pakistani educational institutions ought to prioritize putting together interesting and well-structured online lessons, incorporating multimedia and interactive components to improve student engagement. Next, positive and noteworthy effects emphasize how important it is for students and teachers to actively participate in the online learning environment. As a result, regular contact, and timely feedback will probably boost student happiness and course results in online learning environments. Later on, the result of Learner-Learner Interactions with online learning and satisfaction suggests that facilitating discussion boards, group projects, and virtual collaborations can improve learning outcomes and satisfaction by educational institutes. Considering the results of the role of internet self-efficacy and perceived social presence, it is suggested that schools ought to provide courses that improve students' internet self-efficacy so they can use online tools and platforms with ease along with inclusive techniques to improve social presence—like online social gatherings or group projects—can have a good impact on learning results, student satisfaction, and retention.

THEORETICAL CONTRIBUTIONS

The findings of this research contribute in literature in various modes. Firstly, with the context of Pakistan, literature incorporate studies with reference to e-learning adoption while being limited to the studies of e-retention during or the post pandemic situation which becomes and understudied area of the existing body of literature. Secondly, e-satisfaction has been widely used by researches to identify the behavioral intention of students towards e-retention but this current study involves the integration of e-satisfaction and online learning outcomes in predicting e-retention as online learning outcomes also play a pivotal role in rooting e-retention. Thirdly, this research produced a comprehensive research model by commencing internet self-efficacy and perceived social presence together with direct lectures, learner-learner interaction, instructor-learner interaction and their influence on online learning outcomes and online learning satisfaction to predict e-retention. Moreover, several researches have been performed using TAM model and its factors to identify the behavior of students towards e-retention but not the variables such as internet self-efficacy, perceived social presence, learner-learner interaction, instructor-learner interaction and direct lectures have been studied which creates a gap in literature to analyze e-retention by assessing diverse variables and their effects. In the context of online education in Pakistan, the study's importance stems from its ability to give educators and policymakers evidence-based perspectives on how to best enhance virtual learning environments. Moreover, by recognizing the

unique elements—like the value of social presence and internet self-efficacy—that affect Pakistani students' success with online learning, educational institutions can customize their approaches to effectively address the distinct obstacles and prospects present in Pakistani education.

FUTURE RECOMMENDATIONS

Regardless of considerable contributions bestowed by this research through its finding, this study is confined with subjective limitations which should be entailed to overcome in future researches. Firstly, as this study targets the audience of only specific city such as Karachi so, we suggest future researchers to target respondents such as learners or students of some other cities of Pakistan. Secondly, we recommend new researchers to initiate such relative study by targeting students of different educational sectors such they can integrate the study to find e-retention among the students belonging to both private and government educational sector. In these more diverse results can be obtained depicting behavior of students from different university background. Thirdly, it is recommended to conduct similar research by adapting it to a mixed research approach such as quantitative and qualitative. Fourth, the study can also be enhanced by incorporating mediating variables which might extend the research model such as Cognitive Factors or Motivation. Fifth, it is suggested to instigate a comparative analysis based on this research model i.e. comparing two or more countries of same region. A comparison between developing and developed country and a comparative analysis of e-retention between countries of two continents. At last, a recommendation can be given to future researchers to use different data analysis technique other than PLS-SEM and smart PLS 3.2.3 software to analyze data more dynamically.

DECLARATIONS

Acknowledgement: We appreciate the generous support from all the supervisors and their different affiliations.

Funding: No funding body in the public, private, or nonprofit sectors provided a particular grant for this research.

Availability of data and material: In the approach, the data sources for the variables are stated.

Authors' contributions: Each author participated equally to the creation of this work.

Conflicts of Interests: The authors declare no conflict of interest.

Consent to Participate: Yes

Consent for publication and Ethical approval: Because this study does not include human or animal data, ethical approval is not required for publication. All authors have given their consent.

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