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MEDIATING ROLE OF TRANSFORMATIONAL & TRANSACTIONAL LEADERSHIP IN UNDERSTANDING MCLEAN & DELONE INFORMATION SYSTEM

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KEYWORDS

McLean & DeLeon Model, Information System, Transformational & Transactional leadership

ABSTRACT

This study aimed to develop existing knowledge in field of information system by integrating MCLean and DeLeon Modeling with Bass and Avolio style of leadership. For this purpose, data was collected from the university students of various departments through adopted questionnaires. Obtained information were analyzed through SPSS software and Barron and Kenny procedure was adopting to validate the mediation process. Results depict that in model one presented that transformational leadership indirect effect was still significant, which conform the partial mediation. While model two consist of transactional leadership and path c' was insignificant, that conforms full meditation. Hence it is proved that transactional leadership is major contributor to strengthen DMISM in Pakistan. This study is likely to be supportive in implementing and understanding student attitude toward online systems and the indispensable role of leader attitude toward inspiring students for knowledge sharing over technology. This study examines dynamic relationship between information system modeling and human behavioral interaction during learning process in HEI of Pakistan.

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INTRODUCTION

The online learning becomes top priority of developed and developing countries. For online learning various terminologies e.g. blended learning, distance base education and electronic mood of communication (Aldholay, Isaac, Abdullah & Ramayah, 2018). Clark and Mayer (2016) state that online learning is kind of communication that is delivered by using modern tools (computer, laptop, digital phones & tablets), governments across the globe try to get competitive advantage over other by introducing electronic learning to foster education

and research (Saif, Khan & Khan, 2020). Though, Pakistan is developing country and (ranked at 16) in the usage of information and communication technology (World Bank, 2020). Yet it has one of youngest population (64%) with literacy rate (58%) and mobile subscription rate of (73%) world Economic indicator (2017). After 9/11 incidence revolutionary changes in educational setup were introduced and focused on technology upgradation among higher education become top priority. Other government introduced scheme of the (Prime minster Laptop) to all deserving graduate in higher education sector. New governments of Pakistan move forwarded by hosting technology incubation centers, startup center, technological hubs and digital parks across the Pakistan to portray the bright face of youth generation in competitive situation.

According to report of UNESCO (2013) online learning is one of best tool with reduce cost, minimum infrastructure and wider access approach without disrupting educational process (Aldholay, Isaac, Abdullah & Ramayah, 2018). The number of theories and research model were introduced by different researchers in field of Information system to correlate human behavior with digital technologies. In order to validate the impact of human behavior other technology Ajzen is Fishbein (1980) introduced theory of reasoned action model, followed by AJZAN (1985) theory of planned behavior. Later on in (1989) Davis evolved the concept of the technology acceptance model, that was reshaped by DeLone and McLean (1992) as information systems success model. In 1995 diffusion of innovation theory was introduced by Rogers. Based on DOIT concept model of PC utilization was coined by Chang, (2013). In 2003, famous theory tidied unified theory of acceptance and use of technology was offered by Vankatesh, Morris, Davis and Davis (2003). In Pakistani universities and most particularly in KPK, students face multi-dimensional problem for learning diverse tools and techniques while in the final stage of the learning their degree completion. Mostly, students are facing problem in the data analysis, its tools and techniques as well as affective use of software for analyzing their data.

Research Objectives

- ✓ To find out characteristics of overall quality of using digital source basic problems of students while analyzing their data through software's.
- ✓ To find out effectiveness of McLean and Deleon modeling in using online media for learning among the students of university.
- ✓ To find out the most appropriate type of leadership for using the online and digital media for data analysis purpose.
- ✓ To find out mediating role of bass and avoid style of leadership styles in association between McLean and Deleon Modeling.

LITERATURE REVIEW

Mason (1978) coined the taxonomy of Deleon and Mclean model after modifying Shannon and Weaver`s (1949) theory related to mathematical communication. Shannon and Weaver

(1949) concept of MTC proposed three major level concept relates to information system like technical, semantic and effectiveness. The technical level concept relates to information system accuracy and efficient desired results, semantic level express transfer of the intended communication, while effectiveness level define is impart on receiver. Mason (1978) works on MTC concept of Shannon and Weavers (1949) and applied it to IS, which extend the effectiveness component into 3 dimensions i.e. (a) reception of information, (b) impact on receiver and (c) influence on the overall system). Original D&M model consist of six major parts for successful implementation of IS. These factors are (System & information quality), system usage, satisfaction of user and (impact on individual & organization). Theory of IS postulate that information and system quality positively correlated to the performance, if the end users are satisfied and uses these systems appropriately (Dalle, Hastuti, Prasetia & Baharuddin, 2020).

Overall Quality

Practitioners and researcher (Wang & Lai, 2014; Adhloay et al, 2018) in field of information technology and information system that are trying to enhance the overall quality as well as functionality of digital information system to grab future growth prospects. According to the findings of (Issac, et al, 2017; Adholay et al, 2018, Tam & Oliveira, 2017) Overall quality is designed as major part of M&D IS that consist of 3-components (System, Information & service quality). System quality is explaining as believes response of uses about IS is (easy to use, learn & connect) and user friendly (Petter & Mclean, 2009). Information quality show user attitude toward online information validly, accuracy, relevancy to their topic, systematic and comprehensives (Halonen, Acton, Golden & Conboy, 2009), while service quality devote reliability, assurance, connectivity, procedures and responsiveness (Delone & Mclean, 2003; Adholay et al, 2018; Pituch & Lee, 2016, Tam & Oliveira, 2017). Current study propose that overall quality of the information system technology directly inflame top management, in response leaders and spur the feelings of motivation and encourage followers to use that technology information system, it is proposed that Overall quality has significant impact on transformational leader.

Transformational Leadership

Transformational leadership become one of the important factor to study the effectiveness of IS and technology adaptation (Adholey et al, 2018; Alos-Sim, 2017). Generally, TRL work for motivating employees to attain higher goals for organization (Saif et al., 2018; Khattak & Khan, 2016). TRL is based upon various elements namely intellectual stimulation (IST), Inspiring through motivation, individualized consideration, speaking vision and promoting group goals (Saif, Khan & Ali, 2019; Khan, Amin & Saif, 2022). For success of IS, technology and digital learning, university faculty can demonstrate higher confidence for IS promotion through on mentoring, coaling and supporting. Top management can provide support for better utilization of IS and to coverage students for online learning (Cho et al, 2011). Many scholars focus on study importance information systems (Aldholey et al, 2018; Dubelaar at

al., 2005). Previous studies focus on role of leadership for the innovation in process. Product and IS (Gumusluoglu, & Ilsev2009). Hence the current study will examine the meditational role of Bass and Avolio model of leadership between overall quality of information system and actual usage of (Issac et al, 2017b, Aldholay et al, 2018, Tam & Oliveria, 2007) as well as Bass leadership model direct effect on the actual usage of IS (Aldholay et al, 2018: Ghazali, Ahmad & Zakaria, 2015).

Relationship between Actual Usage of IS, Satisfaction & Performance

In the view of Deleon and Mchlean (2016) actual usage and capability of individuals to use IS in terms of using the system, time spent and nature / purpose of usage. Kim et al (2007) state that actual usage denotes intensity and duration of using online system. Results of Deleon and Mchlean (2016) denote that in the field of the information technology /mobile communication/wireless networking performance of IS based its actual usage. Many scholar studies evident the impact of actual usage of IS on satisfaction and actual performance of users (Hou, 2012) Previous research studies found mix of results regarding the relationship between actual usage and performance. Number of researchers (Isaac et al., 2017) evident significant relationship of IS actual usage with performance and satisfaction of users . While (Cho, Park & Michel, 2011) finding reported the insignificant relationship. In this drive, Jafari, Ali, Sambasivar and Said, (2011) assess the impact of satisfaction on IS actual usage in diverse situations for attaining the desired outcomes. However current study examines the impact of IS actual usage attitude toward satisfaction of the users, as recommended by (Issac et al., 2017).

Relationship between User Satisfaction & Employees' Performance

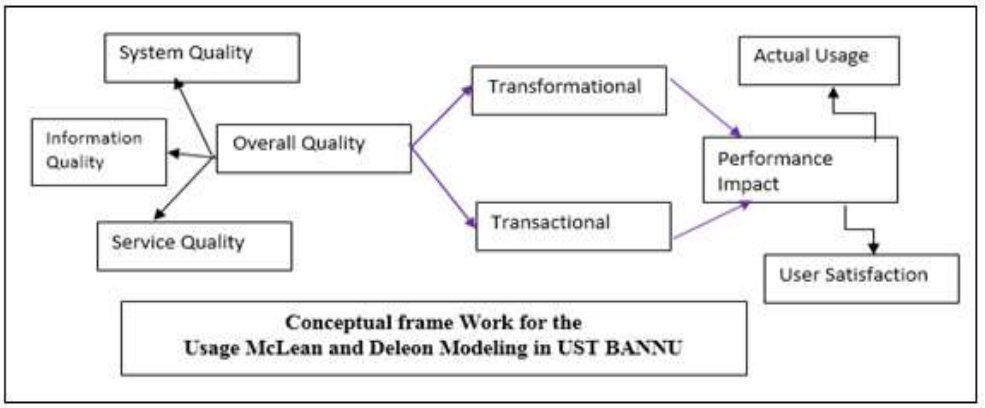
User satisfaction become one of important indicator to measure success of implementing the information system adaptation (Deleon & Mclean, 2016; Aldholay et al., 2018; Tam & Oliveria, 2017), expresses concept of user satisfaction as attitude of user toward perceived usefulness and usage of IS again and again on the other side, Lin and Wang (2012) depict importance of user satisfaction by its speed , variation in function , quality and formatting of IS User satisfaction digital information is also explained as ``students satisfaction from online system/digital information system/live learning and their intention to use it in future (Roca et al., 2006). Previous studies evident that user satisfactions have significant impact over performance of workers working in technology based applications. For instance, Isaac (2017) reported that user satisfaction has direct effect on performance, while Culibrk (2016) forward evident the association between user satisfaction and benefits. Similarly, Aldholay et al. (2018) results depict that user satisfaction enhances employee performance in using IS. Tam and Oliveria (2017) results in electronic mobile banking also support the findings of (Aldholay et al., 2018).

Relationship between User Satisfaction & Performance Impact

Repaid changes occurring in world has direct effect on technological system and IS usage among various sectors. The word performance impact is the association to enhancement in

individual capabilities to evaluate and measure success of IS (Isaac et al., 2017, Chen, 2013). Performance impact denote the quality of work done with Information System efficiency of individuals, reduce errors, improve performance and allow maximum control over work (Isaac et al., 2016). Studies, Aldholay et al. (2018) state that user satisfaction has significant impact of performance impact of employees as endorsed by different studies conducted in different contexts.

Figure 1 Conceptual Model



Hypothesis of Study

H_1: Overall quality has a positive effect on TRL.
H_2: Overall quality has a positive effect on TSL.
H_3: TRL has a positive effect on Performance Impact.
H_4: TSL has a positive effect on Performance Impact.
H_5: TRL mediates the relationship between overall quality and performance impact.
H_6: TSL mediates the relationship between overall quality and performance impact.

RESEARCH METHODOLOGY

The present study used both descriptive and inferential approaches to conduct the study and reach conclusion. Current research is based on getting information from respondents through questionnaire, so, its comes under descriptive study while examined relationships over inferential analysis.

Measurement

For current research adopted questionnaires from previous study are used. Zhou (2011) construct was used to measure System quality attributes. The information quality as well as service quality were assessed over (Lin & Wang, 2012); (Pituch & Lee, 2006) respectively. Transformational leadership was investigated over (Elkhani, Soltani, & Nazir Ahmad, 2014) while transactional leadership was inquired through adopted construct of (Saif, Khattak & Khan, 2016). Kim et al. (2007) construct was used to investigate the actual use attribute while

user satisfaction was assessed through (Huang et al., 2008). Thus, performance impact was examined by adopted construct of (Datta, & Roy, 2011). The response was recorded on 5 point Likert scale.

Sample & Population

Population comprises student working on their final year project using software to analyze data. According to information from different department total 900 students are working on various final year projects in business, computer science, physical science, social science in university campus as well as affiliated institutions. As (Sekran, 2004) recommend charts that consist of relevant sample for known population. Hence based on recommendations of (Sekran, 2004) total 344 sample is enough to get response about the desired phenomena. Data was than analyzed through SPSS through different statistical tools like correlation (for understanding the relationship), regression analysis for coefficient values while mediation process was investigating through Preacher and Hayes (2004) procedure in order to attain desired objectives.

RESULT & DISCUSSIONS

The descriptive table shows the detail about the numbers of respondents, their age group differences, gender variation, subject specializations, current level of the study and marital status used in this study.

Table 1 Demographic Information

S.N	Particulars	Group	No. of Respondents	Percentage
1	Gender	Male	210	77.78
		Female	60	23.22
2	Age	Below than 20	20	7.40
		21-25 Years	150	55.55
		26-30 Years	70	25.9
		Above than 30	30	10.01
3	Marital Status	Single	200	74.08
		Married	70	25.99
4	Domicile	Bannu	140	51.88
		Lakki Marwat	56	20.70
		Waziresistan	44	16.22
		Karak	20	7.40
		Others	10	3.7
5	Subject	Social Sciences	60	22.22
		Management sciences	30	11.11
		Numerical Sciences	40	14.81
		Biological Sciences	140	51.851
			270	100%

Reliability Analysis

Results from table (2) indicate that Cronbach Alpha value for all variables are higher than threshold level of (0.6). Highest alpha value belongs to transactional leadership (α=0.826) while lowest reliability statistics to service quality (α =0.611) and thus showed the suitable internal consistencies.

Table 2 Reliability Statistics

S.N	Variable	Adopted from	α
1	Overall Quality	Saif (2016)	.788
	System quality	Zhou, (2011)	.688
	Information Quality	Lin & Wang (2012)	.811
	Service Quality	Pituch & Lee (2006)	.611
2	Transformational	Elkhani, Soltani & Ahmad (2014)	.644
	Transactional	Saif (2016)	.826
3	Actual Use	Kim et al. (2007)	.708
	User Satisfaction	Huang, Chen, Huang & Lei (2008)	.699
	Performance Impact	Datta, & Roy (2011)	.722

Correlation Analysis

Results from table (3) indicate the strength of relationship between variables depend upon the significant level of (90% and 95%). Findings depict all three components of quality are related to overall quality while the correlation between overall quality and transformational and transactional leadership is 19% and 63%. The mediating variable like (transformational leadership) is correlated to actual use (r=416: P<0.05) and transactional leadership to actual use relation is (r=114; P<0.01). Results of correlation indicate that all variables are related to each other.

Table 3 Correlation Analysis

	1	2	3	4	5	6	7	8
1: OVRAQ	1							
2: SERQ	.722**	1						
3: INFQ	.612**	.201*	1					
4: SYSQ	.644**	.109	.114	1				
5: TRANF	.195*	.088	.091	.221**	1			
6: TRANS	.613**	.111	.107	.221**	.113	1		
7: ACTU	.311**	.201*	.221**	.416**	.195**	.114*	1	
8: USAT	.433**	.298**	.203*	.277**	.290*	.399**	.224**	1
9: PERI	.388**	.281*	.311**	.401**	.355*	.607**	.276*	.338**

SERQ= Service Quality; INFQ= Information Quality; SYSQ= System Quality TRANF; = Transformational Leadership, TRANS= Transactional leadership, ACTU= Actual Use; USAT= User Satisfaction; PERI= Performance Impact.

Figure 2 Conceptual Outcomes

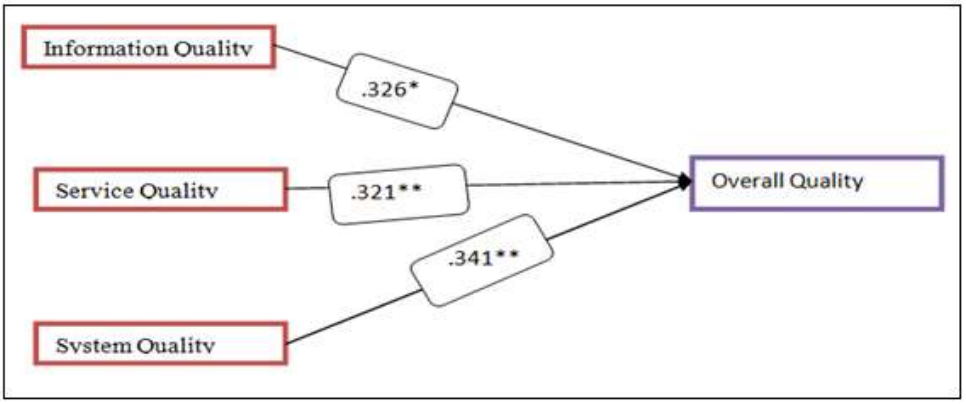


Table 4 Regression Analysis

Model Summery									
Model	R	R2	Adjusted R2	SEE	R2 Change	F-Change	Df1	DF2	Sig
1	.947a	.897	.896	.2293	.897	779.03	3	269	.000

ANOVA					
Model	S-Square	DF	M-Square	F	Sig
Regression	122.891	3	40.964	779.031	.000b
Residual	14.04	267	.53		
Total	136.93	270			

Coefficient					
Model	Unstandardized Coefficient		Standardized Coefficient		
	Beta	Std. Error	Beta	T	Sig
1 Constant	.023	.075		.306	
SYSQ	.341	.017	.433	20.152	.000
INFQ	.326	.017	.408	18.773	.000
SERQ	.321	.016	.425	19.804	.000
A: predictors; SYSQ, INFQ, SER; B: Dependent Variable; OVAQ					

Table (4) depict information for the regression analysis of the overall quality (OVAQ) and its components. Results state that R-Square (.897) with S.E of Estimates (.2293) and F value (779.03) and DW (1.323). Hence overall model is significant with explanatory power of 89% overall quality by its dimension. While, the results from coefficient table denote that system quality (B=.341, P<0.05), information quality (B=.326: P<0.05:t=18.773) and service quality (B=.321: P<0.05:t=19.804). In this connection, thus, it is evident that 1% change in system

quality, INFQ and SERQ will produce the change of (34%), (32.6%) and (32.1%) in the overall quality of IS.

Figure 3 Conceptual Outcomes

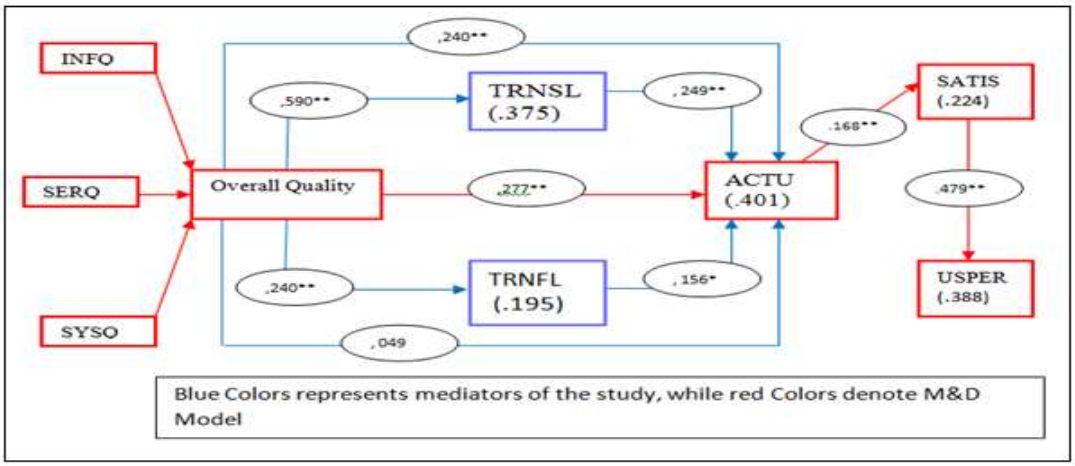


Figure (3) shows detail information about effect of OVAQ on mediation (2) transformational leadership. The results postulate that R2 Change (.375), it means that OVAQ and TRANS leadership are 37% correlated to each other. Similarly, coefficient statistics depict that Beta value OVAQ is (B=.590: P<0.05; t=12.78) it means that 1% change in overall quality of IS will change 24% behavior of faculty in form of transactional leadership. It provides detail information's about TRASF and actual usage. Results denote that R*2* value is (0.195). While Beta value is also very low (B=.240; p=0.03). Relationship between TRNFL as well as TRNSL and actual use is significant hence path b for both mediators is significant, that fulfill the assumption of (Baron & Kenny, 1986) assumptions. Still, indirect (c'=0.240) path between transformational leadership and actual use is the insignificant, while TRNSL and ACTU is still significant (c=0.49). as per (Baron & Kenny, 1986) if model after adding mediating variables become insignificant that mediators signals as full mediation, in contrast if model remain significant after adding mediator (s) and justified as partially mediation (Khan, Idris & Amin, 2021). Transformational leadership act as full mediator while transactional behavior was recorded as partial mediator. Figure (3) denote detail information about other attributes of M&D Model. According to results actual use enhances student's satisfaction from system (Beta=.165; p<0.05) that lead to enhanced performance in form of user performance in particular subject (Beta=.479; p<0.05).

CONCLUSION

Based upon the study of Aldholay et al. (2018) the current study validate extended model of DMISM in Pakistani universities setup. The current study conform that overall quality is based upon important component e.g. (SERQ – INFQ and SYSQ). Previous studies Aldholay

et al. (2018-2018b) also confirms similar results from the prospective of Yemen universities. Findings of the current study state that overall quality is significantly associated to both the transformational and transactional styles. The study of Aldholay et al. (2018a) found that the transformational leadership is strong style of directing the university students, while the current study found that transactional style of leadership is more important than TRNSFL. Hence the current study more one step forward and extend the existing DMISM model by investigating role of transactional leadership. In this regard, results further state that both transformational / transactional are associated with the actual usage of IS. Actually faculty members irrespective of their leadership attributes try to guide student to effectually use information system in different situations. The study of Aldholay et al (2018a) evident only transformational leadership.

In order to validate DMISM user actual usage behavior is also investigated with satisfaction level of students. The results from current study depict that satisfaction enhanced once the user knows exact/actual usage of system to generate appropriate information's at desired level. If students are not actually managing information system properly their satisfaction level will directly reduce. That ultimately affect their outputs in the form of results in test, mark in specific subject. The similar results were recorded by Aldholay et al. (2018a, 2018b) Tam and Oliveira (2017), Cho et al. (2015), Isaac et al. (2017a), Hon (2012). However, Isaac et al. (2017) validate the relationship through extension of task technology model. While Aldholay et al. (2018) and Tam and Oliveria (2017) conform the relationship in the higher education and banking sector of different countries. Finally, user satisfaction level impact on performance of user is also investigated. Findings conformed that performance shows its impact, if the user of IS, is highly satisfied from the source and guidance provided by their teacher, the results can be judged their students' performance in the assigned task in the specific subject.

The similar results were recorded by Isaac et al. (2017) change et al. (2015), Aldholay et al. (2018a; 2018b), Norzaidi et al. (2007) and Iqbal and Qureshi (2012). However, Norzaidi et al. (2007) conduct their studies among managers of Port industry, while Cheng et al (2015) conforms the relationship in the electronic portfolio system. For meditational analysis results state that transactional leaders act stronger mediator in comparison to transformational. The results are quite novel in nature as only one study (Aldholay et al., 2018), investigate the role of transformational leadership between DMISM among HEI's sector of developing country. The current study found that transactional style of leadership is more important than TRNSFL. Hence current study more one step forward and extend the existing DMISM model by investigating role of transactional leadership. However, in developing countries prospective stronger role of transactional leadership in understanding DMISM. In this regard, the current model may be used in other areas, mobile banking, online compliant system, Prime Minister Complaint cell, online purchasing to get more information to attain desired outcomes.

Recommendation

- In the current study data was obtain from only one university. This is the limitation. Hence, the future researchers may get from public / private sector universities to compare the model.
- The current model may be used in other areas, the mobile banking, online compliant system, Prime Minister Complaint cell, online purchasing to get more information and outcomes.
- Data was obtained through questionnaire at one. However, future researcher may interval the questionnaire technology and other data collection tool to validate the model.

REFFERENCES

Ajzen, I. (1991). The theory of the planned behavior. *Organizational behavior and human decision processes*, 50 (2), 179-211.

Ajzen, I., & Fishbein, M. A. (1980). Understanding Attitudes and Predicting Social Behavior (1st ed.). New York: Pearson.

Aldholay, A. H., Isaac, O., Abdullah, Z., & Ramayah, T. (2018). The role of transformational leadership as a mediating variable in DeLone and McLean information system success model: Context of online learning usage in Yemen. *Telematics and Informatics*, 35(5), 1421-1437.

Bass, M., & Avolio, B. (1994). Transformational leadership and organizational culture. *The International Journal of Public Administration*, 17(3-4), 541-554.

Chen, Y. S. (2013). The study of behavioral intention for mobile commerce- via integrated model of TAM and TTF. *Quality and Quantity*, 47(580), 1009–1020.

Cho, J., Park, I., & Michel, J. W. (2011). How does leadership affect information systems success? the role of transformational leadership. *Information and Management*, 48(7), 270–277.

Clark, C., & Mayer, E. (2016). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning. john Wiley & sons.

Culibrk, D., Lalic, B., Stefanovic, D., & Delic, M. (2016). The Information and Management Assessing success of e-government systems: An employee perspective. *Information & Management*, 53(1), 717–726.

Dalle, J., Hastuti, D., Mahmud, M., Prasetia, I., & Baharuddin, B. (2020). DeLone and McLean model evaluation of information system success: A case study of master program of civil engineering Universitas Lambung Mangkurat. *International Journal of Advanced Science and Technology*, 29(4), 1909-1919.

Davis, F. D. (1989). perceived Usefulness, Perceived ease of use, and User Acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.

DeLone, H., & McLean, R. (1992). Information systems success: The quest for dependent variable. *Information systems research*, 3(1), 60-95.

Dubelaar, C., Sohal, A., & Savic, V. (2005). Benefits, impediments and critical success factors in B2C E-business adoption. *Technovation*, 25(11), 1251–1262.

Elkhani, N., Soltani, S., & Nazir Ahmad, M. (2014). The effects of transformational leadership and ERP system self-efficacy on ERP system usage. *Journal of Enterprise Information Management*, 27(6), 759–785.

Ghazali, R., Ahmad, M. N., & Zakaria, N. H. (2015). Mediating role of knowledge integration in effect of leadership styles on enterprise systems success. *Journal of Enterprise Information Management*, 28(4), 531– 555.

Gumusluoglu, L., & Ilsev, A. (2009). The Transformational leadership, creativity, and organizational innovation. Journal of Business Research, 62(4), 461–473.

Halonen, R., Acton, T., Golden, W., & Conboy, K. (2009). DeLone & McLean success model as descriptive tool in assessing virtual learning environment. International Conference on Organizational Learning, Knowledge and Capabilities (OLKC 2009), (2008), 16.

Ho, L. A., Kuo, T. H., & Lin, B. (2010). Influence of online learning skills in cyberspace. *Internet Research*, 20(1), 55–71.

Huang, Y., Chen, T., Huang, P., & Lei, L. (2008). Generalizable methodology for quantifying user satisfaction. *IEICE transactions on communications*, 91(5), 1260-1268.

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017a). Examining the Relationship Between Overall Quality, User Satisfaction and Internet Usage: An Integrated Individual, Technological, Organizational and Social Perspective. *Asian Journal of Information Technology*, 16(1), 100–124.

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017b). Internet usage, user satisfaction, task-technology fit, performance impact among public sector employees in Yemen. *The International Journal of Information and Learning Technology*, 34(3), 210–241.

Jafari, S. M., Ali, N. A., Sambasivan, M., & Said, M. F. (2011). A respecification and extension of DeLone and McLean model of IS success in the citizen-centric e-governance. Proceedings of the 2011 IEEE International Conference on Information Reuse and Integration, IRI 2011, (2003), 342–346.

Khan, I. U., Amin, R. U., & Saif, N. (2022). The contributions of inspirational motivation and intellectual stimulation in connecting individualized consideration and idealized influence. *International Journal of Leadership in Education*, 1-11.

Kim, H. W., Chan, H. C., & Gupta, S. (2007). Value-based Adoption of Mobile Internet: An empirical investigation. *Decision Support Systems*, 43(1), 111–126.

Lin, W. S., & Wang, C. H. (2012). Antecedences to continued intentions of adopting e-learning system in blended learning instruction: A contingency framework based on models of information system success and task technology fit. *Computers & Education*, 58(1), 88–99.

Mason, R. O. (1978). Measuring information output: a communication systems approach. *Information & Management*, 1(4), 219e234.

Petter, S., DeLone, W., & McLean, E. R. (2013). Information systems success: the quest for independent variables. *Journal of Management Information Systems*, 29(4), 7e62.

Pituch, K. A., & Lee, Y. (2006). The influence of system characteristics on e-learning use. *Computers & Education*, 47(1), 222–244.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, instruments, & computers*, 36(4), 717-731.

Roca, J. C., Chiu, C. M., & Martinez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *International Journal of Human Computer Studies*, 64(8), 683–696.

Rogers, E. M. (1995). The Diffusion of Innovations (4th ed.). The New York, London: The Free Press

Saif, N., Khan, I. U., & Khan, G. A. (2020). I. Investigating the impact of mobile application on learning among teachers based on technology acceptance model (TAM). *Global Educational Studies Revie*w, 2, 45-54.

Saif, N., Khan, M. T., & Ali, S. (2019). Laohavichien Model of Leadership And Quality For Pakistan. What It Is and Why It's Important for SME's. *IBT Journal of Business Studies (JBS)*, 2(2).

Saif, N., Khattak, B. K., & Khan, I. U. (2016). Relationship Between Transformational Leadership and Organization Citizenship Behavior in SME's Sector of Pakistan. *Gomal university journal of researc*h, 32(2).

Shannon, C. E., & Weaver, W. (1949). The mathematical theory of communication. Urbana, IL: University of Illinois Press.

Tam, C., & Oliveira, T. (2016). Understanding the impact of m-banking on individual performance: DeLone& McLean and TTF perspective. *Computers in Human Behavior*, 61(1), 233–244.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27(3), 425–478.

Wang, Y. S., & Liao, Y. W. (2008). Assessing e-Government systems success: A validation of DeLone and McLean model of information systems success. *Government Information Quarterly*, 25(4), 717–733.

World Bank. (2020). Remote learning and COVID-19. The use of educational technologies at scale across an education system as a result of massive school closings in response to the COVID-19 pandemic to enable distance education and online learning. Revised draft 16 March 2020.

Xinli, H. (2015). Effectiveness of information technology in reducing corruption in China. *Electronic Library*, 33(1),52–64.

Zhou, T. (2013). An empirical examination of continuance intention of mobile payment services. *Decision Support Systems*, 54(2), 1085e1091.