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Academic Research in Collaborative Learning Environment: Evidence from a Developing Country

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Academic Research in Collaborative Learning Environment: Evidence from a Developing Country

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Abstract: Research is getting enormously important to compete with rival institutes for ranking, financial funding, students enrollment. However, there still exist numerous gaps in our understanding of creating a knowledge generating environment that will produce superior quality research. With the initiation of web 2.0 technology, a model of social networking sites has become increasingly famous. With ever increasing popularity, these social media have been used by researchers and academicians as well to enrich the learning outcome and academic performance. However, OSNS have been a debatable topic in academia with its impact on the academic performance of the students. In this study, the impact of OSNS is investigated on the research performance of students in Pakistan. The survey questionnaire technique is used to gather the data from a sample of 212 research students. And to testify the hypothesis, factor analysis and regression analysis technique are used. The results showed a contradiction in the perception and behavior of the research students. Perceived usefulness of OSNS, information quality and media sharing via OSNS have proved to have a positive impact on the researcher's performance whereas collaboration has a negative impact; perceived behavior and facilitation support have an insignificant impact on researcher's performance. It is suggested to the researcher and supervisor both to consider the implication of OSNS in research work for better research output.

Keywords: Social media, research, Facebook, Web 2.0 technology, educational research.

Introduction

Research is getting enormously important to compete with rival institutes for ranking, financial funding, students enrollment. [Cheol Shin, Jeung Lee, and Kim \(2013\)](#) resemble the competition among the universities for better ranking with the competition in Olympics and articulate that quality research has become an indicator in the matter of global rankings and topnotch universities. Similarly, [Fussy \(2019\)](#) states that research are the prominent agenda at the global, regional and national policies and reforms platforms due to the fact that it bridges the gap between academic fraternity and community services. [M.-C. Yu, Wu, Alhalabi, Kao, and Wu \(2016\)](#) also mention that research performance has become more important than ever before for academic institutions to compete for ranking, funding and students' enrollment.

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Sekaran and Bougie (2016) define research as a systematic and objective investigation conduct to obtain valid facts, draw conclusions and establish principles about an identifiable problem in some field of knowledge. Schmidt and Graversen (2018) argue that there still exist numerous gaps in our understanding of creating a knowledge generating environment that will produce superior quality research, also mention that research excellence is achieved when researcher's skills are combined with enabling research environment that includes networking, cooperation, funding etc. However in doing research, a researcher has to face certain hurdles which include obtaining required literature, accessing the target respondents for data collection, collaborating with the fellow researchers, for expert opinions on a certain topic or on data analysis issues.

With the initiation of web 2.0 technology, a model of social networking sites has become increasingly famous (A. Y. Yu, Tian, Vogel, & Kwok, 2010). The impact of online social networking sites (OSNSs) is profound in every aspect of society. In a report on the topic of 2018 social media latest trends, (Lau, 2017) mentions that there are almost 2.5 billion users of social media, businesses can no longer ignore the importance of social media, videos are the popular content to share, and user generated content can help in increasing the access and reach to the audience etc. Figure 1 shows the number of active users of social media over the years which are expected to be 3 billion by 2021.

Figure 1
Active users of OSNS worldwide

Source: eMarketer, taken from Statista (2017)

Every field of work now demands a worker with social media knowledge (Preston, 2012). With the ever increasing popularity, these social media have been used by researchers and academicians as well to enrich the learning process. Alqahtani and Issa (2018) articulate that social networking sites have been used as academic tools to assist in creating dedicated learning groups, sharing of ideas and learning material etc. Clark, Logan, Luckin, Mee, and Oliver (2009) say these social networking sites are blurring the demarcation between the formal and informal learning.

Therefore, numbers of researches have been done to investigate the impact of these social networking sites in the field of academics. Students were found to score better in the exams when they were taught by mixed teaching methodology of traditional teaching method and use of Whatsapp (Nura & Ibrahim, 2017). Students heavily rely on these communication technologies in order to build connections, sharing and seeking learning material, joining groups of interest. Studies depict that social networking tools provide support in the field of education by making interaction, collaboration, critical thinking, knowledge and resource sharing convenient (Mazman & Usluel, 2010). In order to connect with each other and remain updated about university and class affairs, Facebook is being used for establishing student societies, sporting societies, and class groups (Bosch, 2009).

On the contrary there are certain researches that explore the negative correlation between the academic performance and the use of OSNSs. It is argued that over-usage of social media by students may adversely affect academic performance (J. Al-Menayes, 2014; Skiera, Hinz, & Spann, 2015). Students can get distracted with other entertainment content that is available on such OSNSs while using them for study purpose (Cassidy, 2006).

It is needed to place focus of research on students' learning with commonly used technologies taking social media development into account (DeBoer, Ho, Stump, & Breslow, 2014; Greenhow, Robelia, & Hughes, 2009; Reich, Murnane, & Willett, 2012). Recent educational researches have called to focus on changing scholars practices in the era of technological advancements (Greenhow, Gleason, Marich, & Willet, 2017).

Majoka and Khan (2017) discuss the higher education and research in Pakistan and say that the Education Policy (2009) recommends to emphasize on research that may bring economic development to the country; encouraging universities to initiate basic research and development activities and endowment of research grants etc. In addition, it is also recommended in the policy to integrate information and communication technologies (ICTs) in teaching, learning and research to improve the communication between the teachers and researchers; enhance the distant education and easy access to scholarly material and technical resources.

Considering above all, in this study we are aimed to uncover the role of social media in conducting academic research in Pakistan. Easiness in collaborating with other researchers, supervisor; accessing target population and helpful resources are the emphasis of this study. Thus, this study is designed to discover the impact of social media on the performance of research students. Table 1 illustrates the trend of using OSNSs in Pakistan by research students during the course of research work. The usage trend makes it clear that research students in Pakistan access Facebook, ResearchGate, Whatsapp and

YouTube in greater frequency as compared to Twitter, Academia.edu, Qoura, LinkedIn.

Literature Review

In this section, theoretical review is elaborated, which then follows the empirical review of the related literature and development of hypothesis.

Theoretical Review

Considering all the potential benefits and short comings of the OSNSs, what makes the people use new innovative communication technologies is a question which was answered by the technology acceptance model (TAM) developed by [Davis \(1985\)](#). TAM is an extension of the earlier work of [Fishbein and Ajzen \(1977\)](#) who proposed the theory of reasoned action. [Davis \(1985\)](#) says that any individual accepts and uses new technology on the basis of its perceived usefulness and perceived ease of use. When individuals find various useful features in any application or technology, they more likely to accept it and use it. Hence, TAM is the underpinning theory in our current study. TAM permits us to investigate the perceived ease of use and perceived usefulness of OSNSs in relation with research work.

Foremost Educationist [Dewey \(2007\)](#) theorized that in the process of learning, students' experiences are the significant elements. Therefore, pedagogical learning doctrine of active learning is the supporting theory for the research. Active learning is referred as collaborative learning, sharing of knowledge, self-paced and interactive learning.

Empirical Literature Review

Online Social Networking Sites (OSNS) and Academic Performance

Social media is defined by several scholars in numerous ways. [Terry \(2009\)](#) loosely defines social media as user-generated content using internet based transmitting technologies, unlike traditional print and broadcast media. Similarly, [Grosseck \(2009\)](#) defines social media as ways of communication, collaboration and sharing of information virtually through user generated content. However, there are many other definitions in different disciplines, which have attempted to define social media. Social media includes Facebook, Twitter, Google+, Whatsapp, Instagram, YouTube, Skype, Academia.com, ResearchGate, Wikis etc., these all are the platforms that offer opportunity to the users to search content, share experiences and establish relationships to serve purposes like educational or social ([Jiao, Gao, & Yang, 2015](#)).

A lot of studies can be found about the association of internet and OSNSs and academic performance of students with respect to class learning, sharing material and information for core courses or extra-curricular activities.

[Chen and Peng \(2008\)](#); [Kubey, Lavin, and Barrows \(2001\)](#) studied the impact of internet usage and academic performance and found that internet users who spend less time in using internet have better academic performance and learning satisfaction as compared

Table 1
Frequency of using OSNs by Participants

	Never	Once a month	Once a week	Several times a week	Once a day	Several times a day	All the time	Total
Facebook	42	16	31	15	21	70	17	212
Twitter	154	22	18	3	8	4	3	212
Research Gate	37	47	31	39	15	28	15	212
Academia.edu	57	55	25	28	11	19	17	212
Quora	130	32	14	17	10	6	3	212
Ask.fm	159	19	9	12	5	6	2	212
Wikis	95	21	22	25	8	33	8	212
Whatsapp	53	14	26	18	15	52	34	212
YouTube	17	21	38	34	27	55	20	212
Daily Motion	137	32	8	19	7	5	4	212
Vimeo	166	18	10	7	6	3	2	212
Skype	130	26	21	13	9	9	4	212
IMO	162	16	10	7	6	7	4	212
Line	180	12	4	6	5	2	3	212
Survey Monkey	148	33	6	12	3	3	7	212
LinkedIn	84	37	24	16	22	11	18	212
Instagram	146	16	12	8	15	9	6	212
Tumblr	179	11	3	8	5	2	4	212
Flickr	181	9	4	7	7	2	2	212
Pinterest	158	19	10	11	8	2	4	212

to the power users. Then the rising wave of social media took over the entire sight of researchers to focus their work on various impacts of OSNs on the real-world affairs (Asur & Huberman, 2010) with no exception to academia (Greenhow, 2011; Lambić, 2016).

Lambić (2016) worked to identify the association between the use of Facebook for academic purposes and academic performance. Results revealed a positively moderate correlation between the usage of Facebook for learning. Similarly, Kirschner and Karpinski (2010) studied the impact of Facebook on the academic performance and results indicated that Facebook users had lower GPA and spent fewer hours in studying as compared to non-users. Lau (2017) worked to find out the impact of social media usage and social media multitasking on the academic performance of university students.

Communication with peers regarding educational matters, new collaborations to enhance learning process and information sharing influence the use of Facebook for the study purpose (Sánchez, Cortijo, & Javed, 2014). Hsiao, Shu and Huan (accepted manuscript) examined the social media and its likely effect on academic performance. They considered course grades as a benchmark of academic performance and to surprise no negative relation was identified between the variables. On the contrary, Al-Rahmi, Othman, and Yusuf (2015) investigated the dimensions of social media addiction among Kuwaiti students in order to identify the association with the academic performance. Results revealed the negative association between the social media addiction and academic performance which was measured via GPA. Similarly Paul, Baker, and Cochran (2012) reached on a finding that there is a negative association between the time spent on social media and academic performance.

Junco (2012) considered only Facebook to study its impact on students' overall GPA and again a negative relation is established between the time spent on Facebook and the GPA. Though, Estus (2010) in an experimental research found that Facebook is a helpful learning tool that enhances the class room learning experience. Mingle and Adams (2015) probed the students and heads of senior high school to find out the relation of involvement with social networking sites and students' performance in terms of grammar, spelling mistakes and their grades. Results specified a negative impact on the mentioned variables. However, it was also discovered that social media can be used for educational purposes like discussion about exams, topics etc. Likewise YouTube and its use in performing arts was stated a useful learning tool along with the traditional learning methods (DeWitt et al., 2013).

Similarly, Michikyan, Subrahmanyam, and Dennis (2015) investigated the use of Facebook and its likely impact on academic performance. In this study the nature of Facebook posts were examined over a span of 18 weeks. Researchers said that positive or negative posts by students and commenting on these posts indicate the learning experiences of students. Results showed that students tend to project their academic lives on Facebook. Students with higher GPAs project themselves positively whereas students with lower GPAs are more inclined towards negative Facebook statuses and updates in order to take out their negative learning experiences.

On the other hand, Chtouki, Harroud, Khalidi, and Bennani (2012) in their study found that YouTube videos had been a useful learning source and enhance the learning experience of students. Two groups of students were introduced to the traditional learn-

ing methods however one of the groups was additionally provided with YouTube videos. Result depicted that, students who were given YouTube videos as an added learning aid had better concept retention as compared to the group who came across with traditional learning methods merely. It was also discovered that when YouTube videos were introduced as an additional learning tool, students' passing rate increased as compared to previous years.

OSNS and Research

[Sussex \(2008\)](#) discussed the role of communication technologies in the supervision of remote research students. It was elucidated in detail that in pre internet age there were only two modes of communication possible telephone and fax to discuss the research affairs. But advancement in technology has made it possible to communicate in a fast and inexpensive fashion. Hence a remote research student can communicate with his/her supervisor at relatively faster pace and can employ rich media for communication. These technologies have made it possible to record the voice or video and retrieve it later as well. These technologies have lessened the remoteness of the remote student. Similarly, University of Arizona's Learning Technologies Center uses wikis to assist the students who were enrolled remotely in information course from across the USA ([Glogoff, 2006](#)).

At the State University of New York, the Geneseo Collaborative Writing Project deploys wikis for students to work together to interpret texts, author articles and essays, share ideas, and improve their research and communication skills collectively. Using wikis in this way provides the opportunity for students to reflect and comment on either their work or others ([Anderson, 2006](#)). Researchers are required to abolish the various obstacles in accessing the general public and fellow researchers. [Cheol Shin et al. \(2013\)](#) expressed that collaboration among researchers particularly between disciplines provide a broader perspective due to alliance of intelligence; also the rate of citation is higher for those researches that have been written with international collaboration. However, it gets difficult at times to collaborate ([Page & Reynolds, 2015](#)).

Academic social networking sites like ResearchGate and Academia.edu assist the researchers to establish collaboration with fellow research scholars, make their own work accessible ([Ebrahim, 2017](#)).

[Kenchakkanavar, Hadagali, and Kashappanavar \(2016\)](#) studied the Facebook usage by research scholars. This study was conducted on the research scholars belonging to faculty of Sciences. Data was collected through a questionnaire. Descriptive statistics were used to analyze the data, 70% of the research scholars agreed that Facebook has made a positive influence on their research work. It was reported that they find useful links and information related to the respective interest area on Facebook.

Over the past decade these OSNSs have brought changes in the field of research in number of ways. Publication is the most basic method to share the research material and these technology enabled communication tools have made it trouble-free and scholarly material is now available via web; ([Thelwall & Kousha, 2015](#)) argued that the way researchers used to promulgate and publicize their research has been tremendously altered because of web publications. Academic publication has undergone a transition in past

couple of years from print to electronic format; websites like ResearchGate, Academia.edu, LinkedIn and Google scholar etc. are developed by the researchers or academic institutions to foster the collaboration among the research scholars and sharing the research outcomes to gain peer recognition (M.-C. Yu et al., 2016).

Greenhow et al. (2017) used mixed methodologies to investigate the relation between social media and researchers, study was conducted on the 1st year doctoral students and it was explored that doctorate students have positive perceptions of using Twitter in order to seek new knowledge in the field of interest. Social media can offer opportunities to build up a network, generate and update knowledge however time investment may threaten the doctoral student's performance. Sadruddin (2019) on the other hand, narrated his personal learning experience with the use of two ICT tools in post graduate distance learning program. It was mentioned that ICT tools develop the critical thinking and also facilitated the collaborative learning.

Moving further, Pirani and Hussain (2019) reported that teachers and parents recommend the application of technology in class room that bring multi-faceted benefits to the students. Cen, Ruta, Powell, Hirsch, and Ng (2016) discussed that computer supported collaborative learning environment signifies a new pedagogical learning approach which is delineated as enrichment of learning and knowledge of participants via technology driven communication tools. Lambić (2016) argued that cooperation among students helps them to transfer the knowledge and identify the deficient knowledge. These OSNSs have made it possible to collaborate and connect synchronously or asynchronously with peers for the transference of the knowledge. Greenhow et al. (2017) considered the social scholarship of discovery in connection with open and digital technologies of communication (i.e. OSNSs) that facilitate the peer reviewing of published or in progress research work.

Social media serves as a broader review platform for research scholars. By posting or sharing a piece of literature with the wider audience of different genre (e.g. other scholars, teachers, policy makers, students etc.) helps to get re-sharing, commenting or criticism that ultimately transfer the knowledge or improve the knowledge. Similarly J. J. Al-Menayes (2015) investigated the effects of social media on the academic performance of researchers in an environment of collaborative learning. Data was collected through a questionnaire from a sample of researchers. Analysis revealed that introvert researchers perceive OSNSs a great help to seek collaborative learning in their research work. Also Pearson's correlation showed that researcher's academic performance has positive and significant correlation with perceived ease of use, with collaborative learning and with perceived usefulness. At last researchers suggested employing the OSNSs at higher education level.

In the light of previous researches and increased trend of using OSNSs to connect with faculty and establish relations with the peers, (Sheeran & Cummings, 2018) examined the relatedness of Facebook groups and students' engagement with faculty, peers etc. Results revealed that officially designed Facebook groups improve the relationship with faculty whereas Facebook groups that have been created officially or unofficially support the students to create their connection with peers.

The literature reviewed suggests to investigate the implication of these OSNSs in re-

search, therefore following hypothesis is developed:

Hypothesis: Online social networking sites (OSNS) significantly impact the researcher's performance.

Methodology

For this study quantitative approach has been used to explore the impact of OSNSs on the performance of a researcher. Data have been collected through a research survey questionnaire from 212 research students who are either enrolled or completed 18 years education or above and have studied research methodology course. Moreover it has been made sure that respondents must have completed one of their qualifications from Pakistan i.e. MPhil/PhD or equivalent.

Independent variables included in the study have been adapted from earlier researches, the operational definitions and their sources are given in Table 2. On the other hand, to measure researcher's performance GPA (marks range) in Research Methodology or relevant course is taken as a proxy. Al-Rahmi et al. (2015); Lambić (2016) have used the same procedure to determine the students' academic performance. Later at analysis stage, an average of each marks range is calculated.

Regression Model

To estimate the effects of the OSNSs on the researcher's performance, following regression equation has been developed,

$$RP = \alpha_0 + \beta_1 COL + \beta_2 PU + \beta_3 FS + \beta_4 MS + \beta_5 PB + \beta_6 IQ + \epsilon$$

Where α_0 is the constant, ϵ is the error term, RP is the researcher's performance, COL is collaboration, PU is referring to perceived usefulness, FS is representing facilitation support, MS is media sharing, PB is perceived behavior, and IQ is information quality.

Estimations and Results

In current section demographics of respondents, data analysis procedure and results will be discussed.

Demographics

In this study total 212 respondents recorded their responses out of which 116 are males whereas 96 are females. As far as qualification is concerned 89 respondents are currently pursuing their 18 years qualification, while 60 have completed their 18 years of qualification, 58 are enrolled in PhD program whereas only 5 respondents have completed their doctoral degree. Majority of the respondents belong to the field of Management Sciences

Table 2
Variable's definitions and their Sources

Items	Definition	Source
Collaboration	OSNS are helpful to share ideas, discuss subject of interest with the people who have similar interests, or have knowledge on the topic in order to better comprehend the topics of research and overcoming the difficulties in the course of research.	Mazman and Usluel (2010); Al-Rahmi et al. (2015)
Perceived Usefulness	Perceived usefulness is defined by Davis (1989) as a degree to which any tool or system would help the user performing his/her job better i.e. whether the OSNS are assisting the researcher in performing his/her research tasks.	Lambić (2016)
Perceived Usefulness	This construct is measuring the available support on each OSNS and its likely impact on the researcher's performance.	Mazman and Usluel (2010)
Resource /Material Sharing	OSNS are helpful in sharing useful material, links, information in the form of documents, photos, videos and audios for the sake of research.	Mazman and Usluel (2010)
Predicting Behavior	This construct measures the perceived behavior of the researcher to use the OSNS because of the added support and benefits.	Paul et al. (2012)
Information Quality	This variable measures the reliability and flexibility of the system that encourages the user to use the system. OSNS and the information available on such sites are perceived as reliable and easily accessible.	Wu and Chen (2015)

i.e. 120 whereas 56 and 36 respondents belong to Social Sciences and Natural Sciences respectively.

Table 3
Demographics of respondents

Description	Frequency
Qualification	
18 years of education/MPhil- Completed	60
18 years of education/MPhil- Enrolled	89
PhD-Completed	5
PhD-Enrolled	58
Gender	
Male	116
Female	96
Discipline of education	
Management Sciences	120
Social Sciences	56
Natural Sciences	36

Reliability Analysis

To measure the reliability of instrument and data, Cronbach's alpha is a valid statistical tool, which determines the consistency of the items that make up a construct of interest. And make it evident that all the items within a construct are measuring the same thing. [Hair, Black, and Babin \(2010\)](#) say that Cronbach's values above 0.6 are satisfactory. Questionnaire that has been designed for this study contains 28 items in total (excluding items that either have low factor loading or cross loaded). Table 2 depicts the alpha values of each individual construct and overall instrument. The alpha value of each construct is in good range and the overall reliability is 0.956 which is a smart value and make it credible to go for further estimations.

Kaiser-Meyer-Olkin and Bartlett's Tests of Sampling Adequacy

To check the adequacy of the sample collected, Kaiser-Meyer-Olkin (KMO) and Bartlett's tests are used. KMO test measures whether each factor is having sufficient number of items to make an appropriate group. [Morgan, Leech, and Barrett \(2005\)](#) say that to make an appropriate group each item in a factor must have value above 0.5 else it would be assumed that number of items to make a proper group is insufficient. And for the current study as shown in table 3, KMO value is greater than 0.7 which proves that sufficient numbers of items are included in each construct to make an appropriate group.

On the other hand, Bartlett's test of sphericity determines that correlation matrix is significantly different from an identity matrix. The probability value of Bartlett's test less than 0.05 shows that correlation matrix is significantly different from an identity matrix ([Morgan et al., 2005](#)). For this study, Bartlett's test probability value is 0.000 which is less than 0.05 thus satisfying the basic criteria for factor analysis.

Table 4
Reliability Analysis

Variable	No. of Items	Cronbach's Alpha
Collaboration	3	0.897
Facilitation Support	5	0.843
Information Quality	5	0.863
Perceived Usefulness	4	0.866
Predicting Behavior	9	0.928
Resource/Material Sharing	2	0.700
Overall	28	0.956

Table 5
Results of KMO & Bartlett's Tests

KMO measure of sampling adequacy	0.935
Bartlett's test of sphericity	
Approximate chi-square	4117.403
Degree of freedom	378
Probability	0.000

Total Variance Explained

Total variance explained is the indicator of useful factors (Gaur & Gaur, 2006) and it shows that how much total variance explained is distributed in 6 factors. For a factor to be useful in a study the general criterion is that eigenvalues must be greater than 1.0, which shows that a factor is explaining the maximum information. Table 5 shows the percentage of variance and cumulative variance after extraction. All the six factors that have been employed in this study are explaining 70% variance approximately.

Table 6
Total Variance Explained

Items	% of Variance	Cumulative %
COL	46.44	46.440
PU	6.065	52.505
FS	4.913	57.418
PB	4.750	62.168
IQ	4.116	66.284
MS	3.451	69.735

*COL= Collaboration, PU= Perceived usefulness,
FS= Facilitation Support, PB= Perceived Behavior,
IQ= Information quality, MS= Media sharing.

Factor Analysis

Factor analysis is a useful technique of data analysis therefore, for this study principal component method is applied. A total 34 Likert scale items were used in the questionnaire to analyze the association of social media with the researcher's performance.

However due to factor loading less than 0.4, 6 items are excluded from the analysis and total 28 items are considered for the final analysis. Table 6 shows six underlying factors that contains items that are correlated to each other and measuring the same thing. For example factor 1 loads all the items which are measuring use of social media in order

to connect with researchers and subject matter experts and discuss the matters of interest with each other, factor 2 contains items that measure the perception of a researcher about social media benefits for research, factor 3 contains 5 items that are measuring the support and assistance that OSNSs offer, factor 4 includes items about researcher's perceived behavior towards using OSNSs for the course of research, factor 5 contains items that are measuring the quality of information that a researcher gets from these OSNSs and lastly factor 6 contains the items about resource/media sharing via OSNSs.

Regression Analysis

Linear regression technique is applied to test the hypothesis that has been established earlier. Table 7 shows the results of regression analysis, it is found that perceived usefulness and media sharing are positively and significantly associated with the dependent variable i.e. researcher's performance as the prob. value is less than 0.001 and 0.05 with an intensity of 0.792 and 0.846 respectively. Whereas collaboration is significantly and negatively affecting the researcher's performance with a value 0.874 which shows that collaboration has very strong negative impact on the researcher's performance. On the other hand information quality has significant and positive impact on the researchers performance as prob. value <0.1. However, perceived behavior and facilitation support are insignificant and have no profound impact on researcher's performance.

Hence out of six hypotheses, three hypotheses are found statistically significant and have positive impact on researcher's performance, however one hypothesis is statistically significant with negative impact on researcher's performance. On the other hand, two hypotheses are found to be statistically insignificant.

Discussion

This study is conducted in the Pakistani context with an aim to identify the perception of Pakistani students regarding the acceptance of new technologies of communication in their research work. As it is very much evident that OSNSs have shorten the distances, people located at dispersed locations can collaborate with each other, discuss the problems related to research projects, can collect data, may seek help from various subject matter experts in the analysis phase or in the development of the model etc. Hence we could say that OSNS may put a negative impact on the student's academic performance at school or high school level as many researches deduce ([Al-Rahmi et al., 2015](#); [Kirschner & Karpinski, 2010](#); [Mingle & Adams, 2015](#)) but as far as research work is concerned it may be said that OSNSs are playing a positive role and a researcher could perform well when he/she has an access to OSNSs ([Ebrahim, 2017](#); [Kenchakkanavar et al., 2016](#)).

However, it is to be noted that research students' in Pakistan perceived behavior towards the adoption of OSNSs is not very much encouraging and students are found to be reluctant in using the OSNSs for their research work nevertheless they are convinced that OSNSs are useful tools. Moreover facilitation support that these OSNSs offer is not very appreciable by research students in Pakistan.

Table 7
Factor analysis

Items	Factors					
	COL	PU	FS	PB	IQ	MS
The use of OSNS encourages the creation of academic groups (communities) of people with the same interests and needs.	0.794					
OSNS are an appropriate platform to exchange course related information.	0.792					
The use of OSNS improves discussions.	0.755					
I think that the questions of other researchers on the OSNS groups indicated deficiencies in my knowledge of the subject matter.		0.641				
The use of OSNS groups made it easier for me to access necessary literature for the preparation of my research work.		0.600				
By using OSNS groups I obtain information indicating important parts of the subject matter more easily.		0.594				
The use of OSNS groups enabled me an easier access to useful information concerning subject matter		0.504				
I find necessary resources to use OSNS with ease.			0.709			
I can get technical support by email if I have problems using OSNS.			0.688			
OSNS offers technical support when needed.			0.673			
Anyone can help me use OSNS.			0.671			
I can connect to OSNS wherever there is Internet connectivity.			0.657			
I consider OSNS to be good researching tools.				0.711		
I feel that I will miss out on useful course information if I do not engage in OSNS communication.				0.713		
I intend to improve my academic performance over the next year by effectively using OSNS as a researching tool.				0.699		
My professors expect me to use OSNS to communicate with them about course topics.				0.695		
I plan to use OSNS to more effectively manage my study time.				0.680		
I find it frustrating when my classmates/social group peers do not use OSNS to communicate information about course topics.				0.676		
OSNS helps me be productive in my research work.				0.633		
OSNS provide an effective mechanism for communicating about course topics with my professors/ supervisor.				0.644		
I know how to use OSNS as an effective researching tool.				0.652		
The OSNS provide good searching functions.					0.719	
The OSNS provide rich multimedia playback functions.					0.702	
The information provided in OSNS is useful to me.					0.693	
The OSNS provide functions for data access privileges management.					0.674	
The OSNS provide correct information.					0.658	
Share your own media files on social media.						0.805
Download media files from other people.						0.760

Table 8
Regression analysis

Variables	Coefficients	t- statistics	Probability	VIF
(Constant)	81.55	28.918	0.000	
COL	-0.874	-2.220	0.039*	1.963
PU	0.792	3.060	0.006**	2.633
FS	0.225	0.245	0.807	1.978
PB	-0.322	-0.306	0.760	2.903
IQ	0.370	1.756	0.079***	2.138
MS	0.846	2.157	0.033*	1.393
Adjusted R^2	0.224			
F-stats (probability)	6.614 (0.001)			

*P value < 0.05; ** P value < 0.01; ***P value < 0.1; VIF= Variance inflation factor.

The prime reason for these contradictory results of perceived usefulness and perceived behavior might be that, in Pakistan people do like to talk in person with their teachers/supervisor and peers to enhance the learning satisfaction. Technology acceptance is not much welcomed right away and people in Pakistan require time to get along with any new technology. Besides, research supervisors, subject matter experts or senior faculty members are not very active users of OSNs in Pakistan, another reason for this could be the differing levels of knowledge of these technology driven communication tools that supervisor and supervisee possess.

Therefore, regardless of the perceived usefulness of the OSNs, the trend of using these sites in research is not substantial. As a result collaboration is found significant but negatively impacting the researcher's performance as well. One possible reason for this might be the fear of ideas stealing and lack of trust by researchers on fellow researchers which make them collaborate less via OSNs. This contradictory result of the study may be understood in the light of [Cheol Shin et al. \(2013\)](#) who concluded in his work that the rate of collaboration among academics is higher in developed higher education systems as compared to developing higher education systems. Furthermore, research teacher may anticipate that collaborating via OSNs may bring workload to them due to the ease of access at any time.

Conclusion and Recommendations

This research is aimed to identify the impact of online social networking sites (OSNs) on researcher's performance in Pakistan in order to validate the theory of technology acceptance. A survey questionnaire consisting six variables is used to gather the data on the topic from 212 research students in Pakistan. After data is collected, various statistical tools are applied in order to analyze the data. First, reliability analysis is carried out to determine the data reliability, it then follows the Kaiser–Meyer–Olkin and Bartlett's test for testing the data adequacy, then total variance explained and factor analysis is performed, the final test conducted is regression analysis to test the hypothesis. It is found that perceived usefulness, information quality and media sharing are positively and significantly impacting the researcher's performance except collaboration which is significantly and negatively impacting the researcher's performance. On the basis of the output of this study, following recommendation are appropriate to make to assist future researchers in:

Researchers and their supervisors/teachers are suggested to use OSNs proficiently and constructively in different phases of research work, as researchers perceive OSNs useful in their work. Proficient use of OSNs includes establishing personal accounts on OSNs, joining and visiting relevant research groups and platforms frequently, uploading and exchanging the useful resources and knowledge with fellow researchers. It may also help to collaborate with international researchers, in tracing out grant opportunities and call for paper opportunities in international journals.

These OSNs may assist researcher in gathering the data, analyzing the data or finding the appropriate answer in case of any problem arise during research. Quality information is available on OSNs if searched rightly, hence supervisor and researchers may join various platforms that are available on such sites in order to access the quality information e.g. YouTube channels, Facebook groups etc. Besides, adopting the model presented in this study along with other demographical factors or by including some other constructs may be an avenue for future researches.

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