

# DEVELOPING A SCALE TO MEASURE STUDENTS' SOCIAL MEDIA ATTITUDE AND THEIR ACADEMIC PERFORMANCE

N. Boobalakrishnan<sup>1</sup>, R. Jayaseelan<sup>2</sup> and Malini Srinivasan<sup>3</sup>

<sup>1,3</sup>Department of Media and Communication, Central University of Tamil Nadu, India

<sup>2</sup>Department of Visual Communication, VLB Janakiammal College of Arts and Science, India.

## Abstract

*Information and Communication Technology has a clear impact on the students' knowledge, attitude and skill sets. Apart from traditional classroom teaching, ICT provides a virtual learning experience as it would enable technology mediated learning among teachers and students. When multimedia teaching aids are used in classrooms, it elicits student's attention, understanding capacity and memory. It helps them to understand the concept in depth and brings focus to the topic. Mobile phone and social media usage has become inevitable in today's life. The ubiquity of smartphones made easy access of multimedia teaching aids as it user friendly and convenient (anytime, anywhere learning). The extensive popularity of social media like whatsapp, facebook, twitter, youtube, google+, linkedin, instagram and others among college students has brought a major shift in their academic performance. Apart from classroom learning, these social media provide a platform for innovative and collaborative learning experience. Students opt these technologies to assist their academic-oriented communication with their fellow learners and teachers. The aim of the present study is to develop and standardize a questionnaire to measure the college students' attitude towards social media and their academic performance. List of 52 items were generated (with reference) from various studies and a survey was conducted among 119 respondents. Exploratory factorial analysis was performed and the result shows that there are four underlying factors—exposure, communication, addictiveness and accessibility in students' attitude towards social media which influences their academic performance in college.*

## Keywords:

*Social Media, Academic Performance, ICT and Education, Social Media Exposure, Scale Development*

## 1. INTRODUCTION

Technology plays a predominant role in today's world and it has invaded in human's life to a great extent. In India internet access becomes affordable to everyone; there is a significant increase in internet penetration every year. The primary access of internet is for social media usage and it helps the users to be in connected at every movement. According to Internet and Mobile Association of India (IAMAI), 66% of the 180 million Internet users in urban India regularly access social media platforms. Most of the internet user's access social media for maintaining their-Facebook account, to get more likes for their Facebook and Twitter posts and to share a friendly comment with their friends related to the posts. According to (IAMAI) survey indicates that among the total social media users, college students (33%) are the largest demographic of active social media users, whereas working and nonworking women consist of 7% and 11% respectively. Dadgarmehr *et al.* [26] study states that in recent days, social networking sites are progressively accessed by academicians and faculty members for communicating with their

fellow scholars, students for providing, sharing and exchanging for learning materials and contents.

Apart from formal learning, students have ample opportunities to acquire knowledge from social media. Thus, this study investigates the influence of social media on the academic performance of the college students. Many studies done in developed countries were included in the literature review. Most of the studies were focused on the moral behaviour of the youths. The primary focus of this research is to develop a scale to measure the student's attitude towards social media and their academic performance. Accessibility and usability of social media in higher education has become wider and popular nowadays among the students for communication especially with their teachers. The potentiality of social media in academic settings significantly improves peer interaction and enables collaborative learning environment. The present study attempts to develop and validate a scale to measure student's social media attitude and academic performance which is the prime necessity today because of this social media insurgence. Hypothetical intervention technique will be the suitable approach for scale development and thus the factorial analysis has been adopted and performed for the same. This will help us to identify the underlying factors and withholds the valid and reliable constructs to the scale.

## 2. REVIEW OF LITERATURE

Information and communication technology in school education has showed evident improvements in students' academic performance [1]. In traditional teaching methods, students and teachers are highly associated and students share high degree of personal contact with teachers. But with ICT, the socially oriented activity has become much students-centered learning and teacher-student relation is technologically mediated [2]. With the emergence of new technologies, education was amalgamated with technology to assist learning and acquisition of knowledge; teachers have to be given appropriate instructions and guidelines to make effective use of the technology mediated learning [3].

Huang and Liaw [4] results shows two important factors perceived interaction and perceived self-efficacy that influence that influence perceived ease of use, motivation in learning and perceived usefulness. Use of multimedia in academic in the form of computer based tutorials provides edutainment and infotainment, this helps students to learn and grasp information quickly [5]. Deshpande and Hwang [6] states that virtual classroom learning allows live classroom experience for remote participant, it enables them to interact in live classroom session with audio and video with the help of new media technologies. Lessons taught through multimedia *i.e.* words, pictures, videos are

focused to foster learning [7]. E-learning helps remote learners and promotes learner-centered activity which in turn results better performance than traditional learning experience [8].

Dadgarmehr et al. [26] results states that the time spent on social media usage is negatively significant with the academic performance. The social media usage has no influence on the academic performance. The emergence of internet and inexpensive and affordable microprocessors has paved way for the maximum utility of smartphones, as it prompts the information access anytime and anywhere [9]. Being connected through in social media helps us to access information from anywhere at any time, and it also enhances our synchronous communication with our peers [10]. Cao et al. [11] mentioned about Athabasca University's comprehensive M-library system which provides anytime and anywhere learning compatibility for students.

Greenhow and Lewin [30] argued that social media through participatory digital cultures combines formal and informal learning. Majority of millennials adopt are consumers of social media rather than full participants. AlFaris et al. [27] study concerns about the usage of social media networks among medical college students could affect their academic performance. Interestingly the result of the study states that, almost all the students use social media, hardly very few of them use social media for their academic related purpose. Social media usage is not associated with academic performance of college students. Social media is omnipresent and unprecedented amount of social data is generated through persuasive social media usage [12]. Mobile computing enables students to involve content production and communication using digital media platform [13].

Al Subeh et al. [28] posits that, a substantial proportion of the pharmacy education students found Facebook as a well acceptable and adaptable tool in teaching and learning environment and presumed that pharmacy schools should formally encourage and support students to use and access Facebook for academic purposes. Rahmi et al. [29] study concludes that active participation in collaborative and innovative learning through social media enriches the learning atmosphere for students, as it facilitates collective learning, and hence usage of social media for the purpose of learning should be supported and encouraged in higher educational institution.

Social media communication and information exchange helps and prompts a platform for innovative and collaborative learning experience [14]. In higher educational settings, faculties look for technological assistance to conciliate and further enhancement of pedagogical approach, as to improve and promote active learning environment for students [15]. Social media promotes personal learning environment by collaborating informal and traditional learning experience; it supports student's self-regulated learning [16]. By integrating social media as an educational tool, it elicits student's attention, understanding capacity and memory. Selwyn [17] argued that social media goes hand in hand with knowledge acquisition and knowledge construction, but it does not follow traditional education principles. Greenhow and Lewin [18] argued that social media promotes participatory digital culture platform as it integrates formal and informal learning. In this task, the present investigation explores the development of scale to measure student's attitude towards social media and their academic performance. The present study assumes importance

and is being set to arrive at meaningful inferences and a conclusion.

## 2.1 OBJECTIVES

- To develop a scale to measure students' attitude towards social media.
- To develop a scale to measure students' academic performance.

## 3. METHODOLOGY

Based on the critical analysis of previous research studies based on this field, objectives were developed, which provides reliable and valid measures of the variables chosen for this study. The developed scale will offer scope to predict the psychometric properties in empirical terms. The items should be relevant to the concepts that is being measure. The items should also exhibit certain factorial composition. These guidelines were adopted to generate an initial pool of items. For the student's attitude towards social media and their academic performance measure, a set of descriptive questions were developed based on the extensive review of literature that extracts the nature of student's attitude towards social media and their academic performance.

### 3.1 SAMPLING

The samples for the present study were chosen as per the demands in objectives. The present investigation intends to include all college students in Coimbatore, Tamil Nadu, India. Importance has been accorded to those college students from various disciplines. However, considering the vastness of the area, multistage stratified random sampling method was adopted to choose the respondents, who are included in the sample for the present study.

### 3.2 CRITERION VALIDITY

Extracted the statements and generated the items required for the study which are related to the students' attitude towards social media and their academic performance. 25 related studies were identified and included for review so as to prove that these criteria are valid for the instrument.

### 3.3 ITEM POOL

Students' attitude towards social media items were generated based on the above criteria and procedure, 21 items of the scale were measured in Likert scale (1=Strongly Agree, 2=Agree, 3=Disagree, 4=Strongly Disagree) which would provide reliable and valid measure of the construct under the study. Students' academic performance items were generated based on the above mentioned criteria and procedure, 14 items of the scale were measure in Likert scale (1=To a great extent, 2=Somewhat, 3=Very little, 4=Not at all) which would provide reliable and valid measure of the construct under the study. Besides, offering the scope to predict the psychometric properties in empirical terms. Further the scale was developed on mere descriptive assertions to obtain empirical measures.

### 3.4 CONTENT VALIDITY OF THE SCALE

In order to validate the scale developed in this study, the preliminary set of items generated was referred to the panel of experts. On the basis of the expert opinion and consequent structural and linguistic modifications, all the items referred to were included in the scale. The choice of selecting an item for the final format was decided based on the simplicity, brevity and content clarity.

### 3.5 RELIABILITY

In order to find out the reliability of the scale, a pilot study was carried out to measure the students' attitude towards social media and their academic performance. The pilot responses were collected from 119 respondents (students) whose score were subjected to scale reliability analysis to obtain Cronbach's alpha. The reliability coefficient for the scale was  $r = .703$  for social media attitude and  $r = .762$  for academic performance, which is an indication of care and effort in formulating the items of the items of the scale and the rapport established with the respondents and the sincerity with which the beneficiaries completed the questionnaire.

### 3.6 DATA ANALYSIS

With this available statements it was attempted to perform a principal axis factor analysis on the students' attitude towards social media and their academic performance variables. In this case, it is already believed that there are latent variables underlying the students' attitude towards social media items. With the assumption that students' attitude towards social media has potential to provide the following which underlies within these three constructs: exposure, communication, addictiveness and accessibility. Performing factor analysis can aid in validating the data: if it is believed that these constructs prevail and the data do fit, it gives us the support of construct validity of the social media attitude and academic performance scale in this sample.

## 4. PRINCIPAL COMPONENTS ANALYSIS ON SOCIAL MEDIA ATTITUDE VARIABLES

Table.1. Principal Component Analysis is used to see how the twenty-one items of social media attitude cluster

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.655
Bartlett's Test of Sphericity	Approx. Chi-Square	602.521
	df	210
	Sig.	0

Rotated Component Matrix <sup>a</sup>							
	1	2	3	4	5	6	7
SA1	0.257	-0.074	-0.046	0.749	0.03	0.072	-0.082
SA2	0.051	0.205	-0.137	0.156	0.736	0.05	-0.277
SA3	0.013	-0.26	-0.153	0.472	0.5	0.192	0.345

SA4	0.166	-0.016	0.042	0.046	0.221	0.681	0.3
SA5	-0.054	0.108	0.141	0.08	-0.042	0.758	-0.18
SA6	-0.209	0.269	0.386	0.604	0.197	0.065	0.06
SA7	-0.042	0.009	0.645	0.53	-0.186	-0.057	0.032
SA8	0.095	-0.068	0.586	0.066	0.057	0.274	0.273
SA9	0.065	-0.148	0.744	-0.053	-0.09	0.186	-0.069
SA10	0.129	0.104	0.595	-0.021	0.379	-0.202	-0.028
SA11	0.205	-0.235	0.237	-0.08	0.687	0.108	0.125
SA12	0.752	0.034	-0.011	-0.01	0.185	-0.01	0.203
SA13	0.807	0.139	0.042	0.104	-0.151	0.089	0.183
SA14	0.666	0.125	0.122	-0.108	0.124	0.369	-0.068
SA15	0.228	0.189	0.022	-0.079	-0.048	0.121	0.748
SA16	0.286	0.714	0.089	0.193	-0.006	0.006	
SA17	0.055	0.378	0.103	0.083	-0.038	-0.189	0.574
SA18	0.627	0.27	0.082	-0.05	0.2	-0.088	0.042
SA19	0.643	0.184	0.02	0.341	-0.01	-0.071	-0.005
SA20	0.135	0.612	-0.212	0.028	-0.014	0.052	0.204
SA21	0.165	0.74	-0.03	-0.18	-0.02	0.079	0.087
<i>Extraction Method:</i> Principal Component Analysis.							
<i>Rotation Method:</i> Varimax with Kaiser Normalization.							
a. Rotation converged in 11 iterations.							

Table.2. Factor Analysis Table for Social Media attitude

Items	Loadings				Communality
	F1	F2	F3	F4	
Social media helps in getting clarifications of academic exercises from friends	0.807	0.139	0.042	-0.151	0.748
Social media helps in preparing for the seminar well	0.752	0.034	-0.011	0.185	0.642
All academic related information can be shared very easily in social media	0.666	0.125	0.122	0.124	0.642
Social media helps to know about the latest academic trends	0.643	0.184	0.02	-0.01	0.569

Apart from classroom, social media provides opportunities for innovative learning experience.	<b>0.627</b>	0.27	0.082	0.2	0.525
Social media helps me to score more marks in my academics.	0.165	<b>0.74</b>	-0.03	-0.02	0.622
Social media can be used to communicate with teachers for academic purposes	0.286	<b>0.714</b>	0.089	-0.006	0.642
Sharing information to friends through social media helps and facilitates collaborative learning	0.135	<b>0.612</b>	-0.212	-0.014	0.483
Social media usage during exams makes one to score poor marks	0.065	-0.148	<b>0.744</b>	-0.053	0.631
By spending more time on social media students fail to complete their academic assignments on time.	-0.042	0.009	<b>0.645</b>	0.53	0.738
It is very difficult to limit the usage of social media activities	0.129	0.104	<b>0.595</b>	-0.021	0.567
Instant message chatting via social media apps worsens spelling/writing skills and ability.	0.095	-0.068	<b>0.586</b>	0.066	0.515
The accessibility to social media (like Whatsapp, Facebook, twitter, etc.) has become much easier nowadays.	0.013	-0.26	-0.153	<b>0.5</b>	0.72
Internet access (via smartphones, tabs, laptops etc..)	0.051	0.205	-0.137	<b>0.736</b>	0.709

has become affordable nowadays					
Social media makes to spend more time than intended	0.205	-0.235	0.237	<b>0.687</b>	0.659
Eigenvalues	3.97	2.42	1.78	1.29	
% of Total Variance	13.65	9.74	9.67	7.91	
Total Variance				40.97%	

Twenty-one questions relating to student's attitude towards social media usage were factor analysed using principal component analysis with Varimax (orthogonal) rotation. The analysis yielded four factors explaining a total of 40.97% of the variance for the entire set of variables. Factor 1 was labeled exposure due to the high loadings by the following items: clarification in academic exercise, preparing for seminar, sharing academic related information, knowing latest trends in academics, innovative learning experience. The first factor explained 13.65% of the variance. The second factor derived was labeled as communication. This factor was labeled as such due to the high loadings by the following factors: social media helps me to score more marks in my academics, social media can be used to communicate with teachers for academic purposes, and sharing information to friends through social media helps and facilitates collaborative learning. This second factor explained 9.74% of the variance. The third factor derived was labeled addictiveness to social media usage. This factor was labeled as such due to the high loadings by the following factors: social media usage during exams makes one to score poor marks, by spending more time on social media students fail to complete their academic assignments on time, difficult to limit the usage of social media activities, instant message chatting via social media apps worsens spelling/writing skills and ability. The variance explained by this factor was 9.67%. The fourth factor derived was labeled accessibility and usage of social media. This factor was labeled as such due to the high loading by the following factors: accessibility to social media has become much easier nowadays, internet access has become affordable nowadays, social media makes to spend more time than intended. The variance explained by this factor was 7.91%.

**The reason why we are taking minimum 3 items for a construct:** Preferably 3 and above, so as "to provide minimum coverage of the construct's theoretical domain" [19]. The communalities of the variables included are higher than 0.3% of variance. This may indicate that the variables chosen for this analysis are strongly related with each other. However, the KMO and Bartlett's Test of Sphericity both indicate that the set of variables are at least adequately related for factor analysis. Substantively, this means that we have identified four clear patterns of response among the college students in Coimbatore-exposure of students, communication, addictiveness of social media usage, and accessibility and usage of social media. These four components are independent of one another (i.e. they are not correlated). The Cronbach's Alpha value of the items is 0.703.

- **Factor scores:** As outlined previously, factor scores were saved for each identified factor.

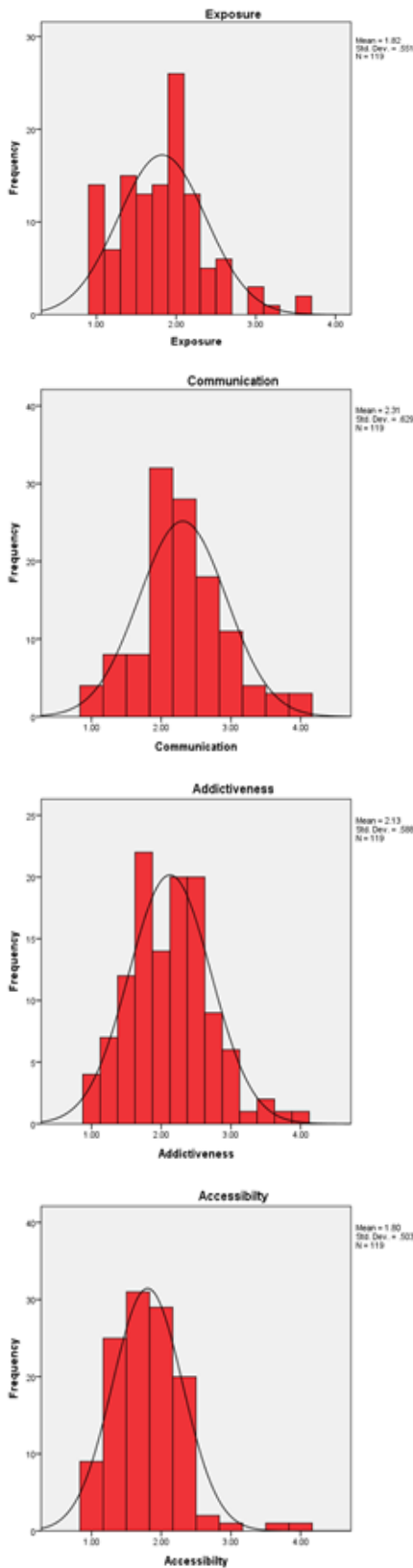


Fig.1. Histograms of four topic factors

As shown in Fig.1, each of the four topic factors were approximately normally distributed, with a mean of zero and standard deviation of 1.

Table.3. Principal Components Analysis on Academic Performance Variables

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.724
Bartlett's Test of Sphericity	Approx. Chi-Square	342.25
	df	91
	Sig.	0

Component Matrix <sup>a</sup>				
	1	2	3	4
AP1	0.412	-0.464	-0.31	0.331
AP2	0.582	0.005	-0.161	0.444
AP3	0.542	-0.435	-0.056	0.132
AP4	0.508	-0.421	0.01	0.238
AP5	0.503	0.037	0.403	0.076
AP6	0.569	-0.328	0.062	-0.426
AP7	0.713	0.066	0.028	-0.197
AP8	0.718	0.21	0.082	0.033
AP9	0.549	0.255	-0.199	-0.077
AP10	0.569	0.187	0.36	-0.326
AP11	0.149	0.419	0.388	0.697
AP12	0.328	0.579	-0.396	-0.019
AP13	0.645	0.197	-0.351	-0.182
AP14	0.202	-0.086	0.657	-0.096
Extraction Method: Principal Component Analysis.				
a. 4 components extracted.				

Table.4. Factor Analysis Table for Academic Performance Variables

Items	Loadings				Comm unality
	F1	F2	F3	F4	
I actively and enthusiastically participate in most of the classroom activities (i.e. presentations, discussions)	0.718	0.21	0.082	0.033	0.567
I always want to be regarded as the best student in my class	0.713	0.066	0.028	-0.197	0.552

For me, faculty members are more supportive for my academic betterment.	<b>0.645</b>	0.197	-0.351	-0.182	0.611
I enjoy uncertain situations in college where I can find out how capable I am	<b>0.582</b>	0.005	-0.161	0.444	0.562
I am willing to work hard to succeed for my exams	<b>0.569</b>	-0.328	0.062	-0.426	0.617
I regularly ask for feedback on my performance from the faculty members	<b>0.569</b>	0.187	0.36	-0.326	0.594
I often love to work in groups as it helps to learn many things from others	<b>0.549</b>	0.255	-0.199	-0.077	0.412
I always put necessary effort to reach my goals	<b>0.542</b>	-0.435	-0.056	0.132	0.504
I always desire to perform better in class than others	<b>0.508</b>	-0.421	0.01	0.238	0.492
I am afraid of failing in exams	<b>0.503</b>	0.037	0.403	0.076	0.423
Eigenvalues	3.874				
% of Total Variance	27.671				
Total Variance	27.67%				

Fourteen question relating to academic performance of college students were factor analysed using principal component analysis with Varimax (orthogonal) rotation. The analysis yielded one factor explaining a total of 27.671% of the variance for the entire set of variables. Factor 1 was labeled as Academic performance to measure the academic performance of college students due to the high loadings by the following items: active and enthusiastic participation in most of the classroom activities, always want to be regarded as the best student in my class, support of faculty members for better academic performance, uncertain situations in college to find out the capability, willing to work hard to succeed for my exams, regularly ask for feedback on my performance from the faculty members, often love to work in groups as it helps to learn many things from others, always put necessary effort to reach my goals, always desire to perform better in class than others, fear of failing in exams. The variance explained by this factor was 27.671%. The communalities of the variables included are higher than 0.3% of variance. This may indicate that the variables chosen for this analysis are strongly related with each other. However, the KMO and Bartlett's Test of Sphericity both indicate that the set of variables are at least adequately related for factor analysis. Substantively, this means that we have identified one clear patterns of response among the college students in

Coimbatore- academic performance. The Cronbach's Alpha value of the items is 0.789.

- **Factor score:** As outlined previously, factor score was saved for identified factor.

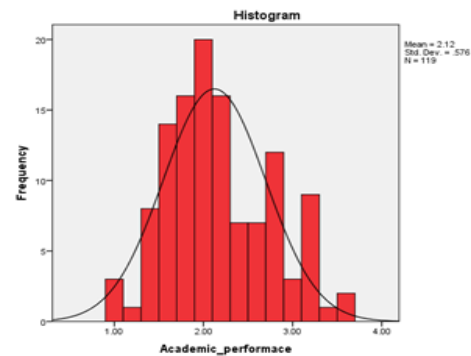


Fig.2. Histograms of one topic factor

As shown in Fig.2, the factor was approximately normally distributed, with a mean of zero and standard deviation of 1.

## 5. DISCUSSION AND CONCLUSION

In order to enhance the accessibility in the communication system, the institution should take initiatives for the development and support of information and communication technology infrastructure. ICT enabled activities has to be reinforced among the students and teachers in the institution [25]. The study found that college student's social media usage during their exams helps in clarifying their hesitancy in classrooms has been made clear with their classmates. Also, social media provides a platform for sharing their ideas and examination questions in an informal space. Sharing their exam materials to prepare also made possible with the support from this internet and social media [20] - [22]. Students engaged in group discussions through social media to share their ideas and disseminate information which are academic related to their peers and also using it to communicate with their teachers [23]. In an outlook Social media makes students unconsciously addicted whereas many students intend to spend few minutes online especially with social media networks to check for updates. But the reality in involving for these activities always ends up with gluing more hours on to it and also many studies also reported this [24]. Addictiveness towards social media makes people to spend more time than intended and in turn it affects their academic performance negatively. By spending more time on social media activities, students fail to complete their academic performance. On one hand social media networking helps students to get clarification from friends, teachers and other sources, and at the same time the instant message and chatting facilities worsens spelling/writing skills and ability. Social media aids help students to prepare for the seminar and other presentation well. It helps in building collaborative and innovative learning experience. In this technological era, the accessibility to social media application are much easier and the access to internet via smartphones, tablets, laptops etc., are becoming more affordable nowadays. Interaction through social media facilitates collaborative learning and it helps students to participate more in discussions and presentation. The academic performance of the students is evaluated on the basis of their urge

to be regarded as the best student in the class, support from faculty members for their academic betterment, handling of uncertain situation, willingness to work hard to succeed in exams, willingness to work in groups for collaborative learning, and their fear of failing in exams. In the context of student's attitude towards social media usage, four factors-social media exposure, communication, addictiveness and accessibility of social media plays a major role. Social media usage and attitude affects the academic performance of college students. Thus, it is essential for any research on academic performance of college students should also focus on the students' social media attitude.

## ACKNOWLEDGEMENT

The project on which the present report is based was funded by the Indian Council of Social Science Research. However, the responsibility for the facts stated, opinions expressed, and conclusions reached is entirely that of the project director or author and not of the Indian Council of Social Science Research.

## REFERENCES

- [1] S. Livingstone, "Critical Reflections on the Benefits of ICT in Education", *Oxford Review of Education*, Vol. 38, No. 1, pp. 9-24, 2012.
- [2] R. Oliver, "The Role of ICT in Higher Education for the 21st century: ICT as a Change Agent for Education", Available at: <http://bhs-ict.pbworks.com/f/role%20of%20ict.pdf>, Accessed on 2007.
- [3] M. Koehler and P. Mishra, "What is Technological Pedagogical Content Knowledge", *Contemporary Issues in Technology and Teacher Education*, Vol. 9, No. 1, pp. 60-70, 2009.
- [4] H.M. Huang and S.S. Liaw, "An Analysis of Learners' Intentions Toward Virtual Reality Learning Based on Constructivist and Technology Acceptance Approaches", *The International Review of Research in Open and Distributed Learning*, Vol. 19, No. 1, pp. 32-39, 2018.
- [5] L.J. Najjar, "Multimedia Information and Learning", *Journal of Educational Multimedia and Hypermedia*, Vol. 5, No. 2, pp. 129-150, 1996.
- [6] S.G. Deshpande and J.N. Wang, "A Real-Time Interactive Virtual Classroom Multimedia Distance Learning System", *IEEE Transactions on Multimedia*, Vol. 3, No. 4, pp. 432-444, 2001.
- [7] R.E. Mayer, "Multimedia Learning", *Psychology of Learning and Motivation*, Vol. 41, pp. 85-139, 2002.
- [8] D. Zhang, J.L. Zhao, L. Zhou and J.F. Nunamaker, "Can E-Learning Replace Classroom Learning?", *Communications of the ACM*, Vol. 47, No. 5, pp. 75-79, 2004.
- [9] M. Milrad and D. Spikol, "Anytime, Anywhere Learning Supported by Smart Phones: Experiences and Results from the MUSIS Project", *Educational Technology and Society*, Vol. 10, No. 4, pp. 62-70, 2007.
- [10] K.A. Hummel and H. Hlavacs, "Anytime, Anywhere Learning Behavior using a Web-Based Platform for a University Lecture", *Proceedings of International Conference on Advances in Infrastructure for Electronic Business, Science, and Education on the Internet*, pp. 231-247, 2003.
- [11] Y. Cao et al., "The Athabasca University Mobile Library Project: Increasing the Boundaries of Anytime and Anywhere Learning for Students", *Proceedings of International Conference on Wireless Communications and Mobile Computing*, pp. 1289-1294, 2006.
- [12] P. Gundecha and H. Liu, "Mining Social Media: A Brief Introduction", *Proceedings of International Conference on New Directions in Informatics, Optimization, Logistics, and Production*, pp. 1-17, 2012.
- [13] J. Gikas and M.M. Grant, "Mobile Computing Devices in Higher Education: Student Perspectives on Learning with Cellphones, Smartphones & Social Media", *The Internet and Higher Education*, Vol. 19, pp. 18-26, 2013.
- [14] M. Moran, J. Seaman and H. Tinti-Kane, "Teaching, Learning, and Sharing: How Today's Higher Education Faculty Use Social Media", Available at: <https://files.eric.ed.gov/fulltext/ED535130.pdf>.
- [15] P.A. Tess, "The Role of Social Media in Higher Education Classes (Real and Virtual)-A Literature Review", *Computers in Human Behavior*, Vol. 29, No. 5, pp. 60-68, 2013.
- [16] N. Dabbagh and A. Kitsantas, "Personal Learning Environments, Social Media, and Self-Regulated Learning: A Natural Formula for Connecting Formal and Informal Learning", *The Internet and Higher Education*, Vol. 15, No. 1, pp. 3-8, 2012.
- [17] N. Selwyn, "Social Media in Higher Education", *The Europa World of Learning*, Vol. 1, pp. 1-10, 2012.
- [18] C. Greenhow and C. Lewin, "Social Media and Education: Reconceptualizing the Boundaries of Formal and Informal Learning", *Learning, Media and Technology*, Vol. 41, No. 1, pp. 6-30, 2016.
- [19] J. Hair et al., "Multivariate Data Analysis", 7<sup>th</sup> Edition, Prentice Hall, 2010.
- [20] W. Al-Rahmi, M. Othman and L. Yusuf, "The Role of Social Media for Collaborative Learning to Improve Academic Performance of Students and Researchers in Malaysian Higher Education", *International Review of Research in Open and Distributed Learning*, Vol. 16, No. 4, pp. 1-14, 2015.
- [21] G. Kirkup, "Academic Blogging: Academic Practice and Academic Identity", *London Review of Education*, Vol. 81, No. 1, pp. 75-84, 2010.
- [22] C.D. Tiene, "Online Discussions: A Survey of Advantages and Disadvantages Compared to Face-to-Face Discussions", *Journal of Educational Multimedia and Hypermedia*, Vol. 9, No. 4, pp. 371-384, 2000.
- [23] M. Salvation and N.A. Adzharuddin, "The Influence of Social Network Sites (SNS) upon Academic Performance of Malaysian Students", *International Journal of Humanities and Social Sciences*, Vol. 4, No. 10, pp. 131-137, 2014.
- [24] O.N. David et al., "Model of Perceived Influence of Academic Performance using Social Networking", *International Journal of Computers and Technology*, Vol. 2, No. 2, pp. 24-29, 2012.
- [25] N. Boobalakrishnan and C. Pichandy, "ICT and Higher Education: Teachers Technological Driven Ecosystem and A Paradigm Shift in Learning Environment", *ICTACT Journal on Management Studies*, Vol. 2, No. 4, pp. 377-383, 2016.

- [26] M. Dadgarmehr, E. Safari and M. Gharekhani, "Proposing a Model for Analysing Impact of Social Media on Academic Performance of Students: A Case Study of Allameh Tabatabai University", *Journal of Soft Computing and Decision Support Systems*, Vol. 5, No. 2, pp. 9-15, 2018.
- [27] E. Al Faris et al., "The Pattern of Social Media Use and its Association with Academic Performance among Medical Students", *Medical Teacher*, Vol. 40, No. 1, pp. 1-6, 2018.
- [28] Z. Al Subeh, F. Alali and A. Awaisu, "Pharmacy Students' Informal Use of Facebook and its Perceived Role in Pharmacy Education in Jordan", *Innovations in Pharmacy*, Vol. 9, No. 1, pp. 1-15, 2018.
- [29] W.M. Al-Rahmi et al., "A Model of Factors Affecting Learning Performance Through the Use of Social Media in Malaysian Higher Education", *Computers and Education*, Vol. 121, pp. 59-72, 2018.
- [30] C. Greenhow and C. Lewin, "Social Media and Education: Reconceptualizing the Boundaries of Formal and Informal Learning", *Learning, Media and Technology*, Vol. 41, No. 1, pp. 6-30, 2016.