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E-Collaboration of Research and Its impact on Academic Research

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Abstract: Nowadays universities are mostly focusing on the research collaboration at international level. The e-collaboration is promoted globally at various levels (institute\ industry\ university\ state\ international) for research collaboration. The research collaboration among researchers at different topographical locations, have been made possible through various e-collaboration technologies. The thousands of researchers are using these tools; for e-collaboration of research, to improve the quality of research. But there is need to study the efficacies of these sites for researchers. This survey based research is focused on the questions related to researchers like, what e-collaboration tools used. What social networking websites are used for research? Are they satisfied? What is its impact on research publications? This research provides a comparative study of the few social networking sites like google scholar, Mendeley, Research Gate and Academia.edu. This research helps and motivates the research scholars for using the e-collaboration technology for share research knowledge.

Keywords: Research collaboration, Knowledge Sharing, Academic Research, Information resources

I. Introduction

The 21st Century is known as an Information and Communication Technology (ICT) age, the ICT is an important media for all versed communication and collaboration of information. Nowadays world has become a global village. Every part of the human's life is having impact of the technology and advance computing. The research and innovations in different disciplines are playing very important and vital role in the human life. Due to these technological effects from last few decades the rate research is ignited with high speed. But always there is scope for the development and progress. The use of Internet and Communication Technology has made easy the collaboration in business, tourism, travelling, research, etc. at international level. Nowadays developing countries are also trying to progress in research and development field. The international level research collaboration is the key point for the quality oriented research. The research scholars are able to communicate and promote their research with various research communities nationally and internationally due to the ICT. The use of ICT tools and web applications are the important information resources for the research scholars. There are multiple types of resources are available for the e-collaboration like Portals, Blogs, Wikis, Social Networking Websites, Discussion Boards, and Instant Messaging video and audio tools (Fichter, D., 2005). The special Social Networking Websites (SNW) for research scholars are available Research Gate, Google Scholars, Mendeley Desktop, Academia.edu, etc. The researcher has specially focused on these social networking websites. These website are playing important role in the developing research community globally; thousands of research scholars are using these websites for the collaboration of research. But it's important to study that, how many research scholars are aware about and using these SNWs? Are they getting benefits from these tools? What is the impact of these SNW on the quality and quantity of the research publications? Are they satisfying the research scholars' needs as information resources? These and much more questions are there in the researchers mind. Hence this research study is focused on the research scholars' views about the available online research applications and their impact on the researchers (Dhananjay S. Deshpande et al., 2015).

This research study is survey based descriptive study of research scholar's opinions and views about the available online SNWs for research community. This research study explores the use of SNW in research community and their impact on research publications.

II. Literature Review

E-collaboration is generally defined as collaboration among individuals engaged in a common task using ICT tools and electronic technologies. This gives brief history of the evolution of e-collaboration technologies and its use in the research (Kock, N., Davison, R., Wazlawick, R., & Ocker, R., 2001).

The developments of new technologies and ICT, research organizations and teams have adopted the new forms of interaction and collaboration. The special emphasis has been give to the structuring of activities for balancing electronic communication during e-collaboration for example videoconference, email, chatting, distributed group support system (Rutkowski, A. F., Vogel, D. R., Van Genuchten, M., Bemelmans, T., & Favier, M., 2002) (Dhananjay S. Deshpande et al., 2015).

Collaborative efforts in the research are focus of great interest to academicians and practitioners. E-collaboration has developed an important area of research and application from many viewpoints. Integration of different forms of e-collaboration technology is remains as a major challenge, due to that a significant opportunity exists to advance the state of practice and research (Munkvold, B. E. & Zigurs, I., 2005).

The different forms of technology have their own limitations and issues in the e-collaboration. Hence there is scope for expanding the Boundaries of E-Collaboration. This article provides idea about the operational definition of e-collaboration with its historical review related academic research. That is followed by an introductory development of the notion of e-collaboration boundaries. (Kock, N., & Nosek, J., 2005). Hence there is need of a proper integration of these different technologies for the effective and fruitful e-collaboration of the research. Hence by these few articles and research papers, it is clear that e-collaboration in research having major role. The various technologies are used for the e-collaboration but nowadays the most popular social networking websites are used for the same. Different SNWs are made available for the research communities but how many of them are aware about this? That is important question should be unanswered. This research is a one attempt for giving answer for this question. Also provides outlook on - what is impact of these SNW on the research collaboration and publication quality and quantity.

III. Research Methodology and Objectives

The main aim of this research was to study the use of the available SNW in research community and is there any impact on the number of research publications, to study views about the available online web applications and SNWs for researchers as information resources. This research is an empirical study and descriptive research. This is a combination of qualitative and quantitative research and has been adopted to investigate the problems and issues related to the available research tools like Research Gate, Google Scholar, Mendeley Desktop and Academia.edu. The less literature is available for this study so it has been developed on the experiences and observations studied during the usage of these tools. The research study focused on specific objectives, this are as follows:

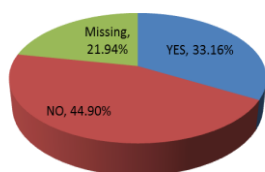
A. Research Objectives:

1. To study e-collaboration and the available online social networking websites for Research Community.
2. To study the awareness of online social networking websites in the research community for e-collaboration.
3. To study the relation between use of online social networking websites among the researchers for e-collaboration and their number of research publications.
4. To study research scholars satisfaction from these SNWs for the e-collaboration of research.

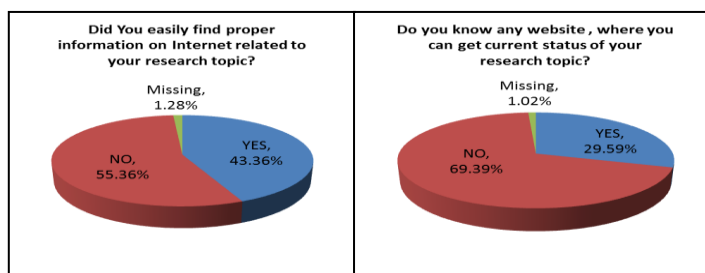
IV. Data Analysis and Interpretation

The data has been collected from 392 research scholars as respondents from different eight universities in all five regions of Maharashtra State in India. The data has been collected through web survey and direct survey methods. The data has been coded, entered in IBM SPSS ver. 21 for data analysis and interpretation.

In the survey questionnaire respondents were asked about the usage of internet for research collaboration and their satisfaction from the same. The Pie-Chart-I showing the response of the respondents - respondents were asked comment on whether they could easily find information on Internet using two options (YES/NO) and whether they know website where they can get current status of their research topic (YES/NO). From the Pie-chart it can be seen that 55% of respondents said than information could not be easily find on internet related to research topic. 43% said that they could easily find information. Pie-chart II it can be seen that 70% of the respondents said that they do not know any website that provides with current status of research topic where as 30% said "Yes". The through the observation it can be interpreted that the research scholars are using Internet to search information related to their research but they are not satisfied by the available online tools, missing means the respondents have not given any answer, hence it can be said that the most of the research scholars are unaware about the tools available for the e-collaboration of research knowledge or they are not using it.



Pie-Chart – I



Pie-Chart-II

Respondents were asked comment about their own Online Research Publications or uploaded publications on Internet (if any), then as per the given Pie Char-III it can be seen that only 33.16% of respondents said “Yes” and 90% respondents said “No” while 21.94%

Pie-Chart-III Showing Usage of Online tools for Research

Further the respondents were asked to tell whether they have uploaded publications on Internet for collaboration of their research using any tools given list, providing the following five response options:

- I. I have not uploaded any publications
- II. I am using Mendeley Desktop
- III. I am using Research Gate
- IV. I am using Google Scholar
- V. I am using Academia.edu

Respondents further asked to select whichever applicable. Hence the question was multiple responses ‘question; data were analyzed using multiple response analysis option in IBM SPSS-21.

Table 1- Have You Uploaded Your Publication on Internet				
		Responses		Percent of Cases
		N	Percent	
valid	Not uploaded any publications	155	32.9%	45.2%
	I am using Mendeley Desktop	21	4.5%	6.1%
	I am using Research Gate	103	21.9%	30.0%
	I am using Google Scholar	138	29.3%	40.2%
	I am using Academia.edu	54	11.5%	15.7%
Total		471	100.0%	137.3%

Table 1 - Research Publications uploaded on Internet (FDT)

From above table it can be seen that for this multiple choice options total 471 responses are recorded from 392 respondents, from which responses 45.2% account for not uploaded any publications, 6.1% account for Mendeley Desktop, 30 % for Research Gate, 40.2% account for Google Scholar and 15.7% account for Academia.edu. Hence from the above Frequency Distribution Table, it can be concluded that most respondents have not uploaded publications on the Internet.

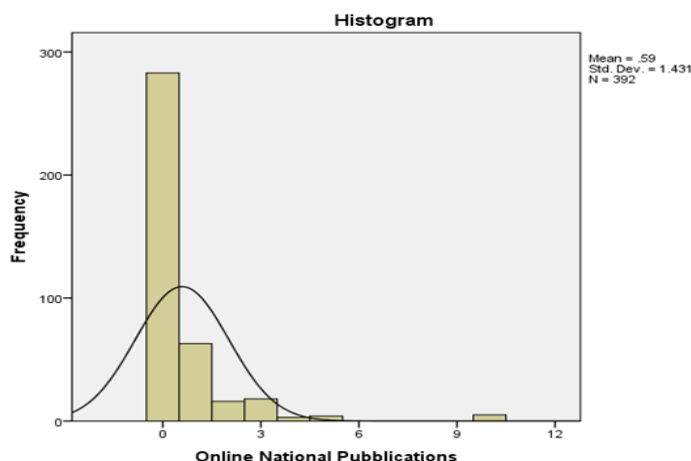
Further the respondents were asked to tell whether they have published any national publications on Internet for collaboration of their research, providing the options like, 0, 1, 2 up to 10+.

Descriptive statistics for Online National Publications of respondents

Table 2 - No. of Online National Publications				
		Frequency	Percent	Valid Percent
Valid	0	283	72.2	72.2
	1	63	16.1	16.1
	2	16	4.1	4.1
	3	18	4.6	4.6
	4	3	.8	.8
	5	4	1.0	1.0
	10	5	1.3	1.3
Total		392	100.0	100.0

Mean	0.59
Standard Deviation	1.43
Skewness	4.27
Kurtosis	22.88
1/3 of Mean	0.19
Coefficient of Variance	2.42
Minimum Value	0
Maximum Value	10

Interpretation:

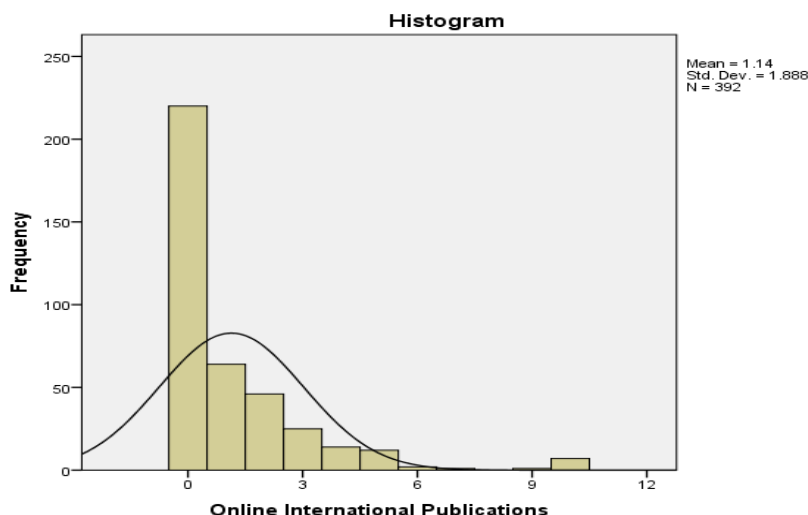


Mean = 0.59& S.D. = 1.43 since the Standard Deviation is more than mean, hence mean is not a representative value and interpretation is based upon Frequency Distribution Table. From Frequency Distribution it can be seen that 72.2% respondents do not have any national level online research publication and very few respondents have more than 2+ national level online research publications.

Table 3- Online International Publications				
		Frequency	Percent	Valid Percent
Valid	0	220	56.1	56.1
	1	64	16.3	16.3
	2	46	11.7	11.7
	3	25	6.4	6.4
	4	14	3.6	3.6
	5	12	3.1	3.1
	6	2	.5	.5
	7	1	.3	.3
	9	1	.3	.3
	10	7	1.8	1.8
Total		392	100.0	100.0

1. Descriptive statistics for Online International Publications of respondents.

Mean	1.14
Standard Deviation	1.88
Skewness	2.55
Kurtosis	7.94
1/3 of Mean	0.38
Coefficient of Variance	1.65
Minimum Value	0
Maximum Value	10



Interpretation:

Mean = 1.14& S.D. = 1.88 since the Standard Deviation is more than mean, hence mean is not a representative and interpretation is based upon Frequency Distribution Table. From Frequency Distribution it can be seen that 56.1% respondents don't have any International level online research publications and very few respondents have more than 2+ International level online research publications.

Hypothesis 1: There is a significant relationship between use of Social Networking Websites and number of online research publications.

To test this hypothesis the following Online Research Applications were offered to the respondents:

- I. I am using Mendeley Desktop
- II. I am using Research Gate
- III. I am using Google Scholar
- IV. I am using Academia.edu

The each option was measured using two point scale (YES/NO). "Number of online National and International Publications was measured using a continuous scale "responses range from 0 to 10+" the casting scale was latter converted to ordinal scale using Visual Beaning option in IBM SPSS. Hence the new variable "Number of online National & International Publications" had three options that is, 1-No Publications, 2 – (1 to 3) Publications and 3 - More than 2 Publications.

Statistical Test: Chi Square Test

Variables and Measurements:

- I am using Mendeley Desktop / Research Gate / Google Scholar / Acdemia.edu using two options – **Yes / No**
- Number of Online National / International Publications – (Three categories)
 1. No Publications
 2. (1 to 3) Publications
 3. More than 3 Publications

H₁: There is no relationship between use of social networking websites available for researchers and Online Research Publications.

H₀: There is significant relationship between use of social networking websites available for researchers and Online Research Publications. **Level of Significance (α) = 0.05**

Table 4.1 Cross Relationship Table – 1

Cross Relationship	Category (No. of National Publications)	Using Online Research tool?				Pearson Chi Square	P-Value
		Yes		No			
		Count	Percent	Count	Percent		
Mendeley	0 (No any)	8	2.80%	275	97.00%	16.635a	0.000
	1 to 3	13	13.40%	84	86.60%		
	More than 3	0	0.00%	12	100.00%		
Research Gate	0 (No any)	59	20.80%	224	79.20%	17.724a	0.000
	1 to 3	37	38.10%	60	61.30%		
	More than 3	7	58.30%	5	41.70%		
Google Scholar	0 (No any)	80	28.30%	203	71.70%	24.268a	0.000
	1 to 3	49	50.50%	48	49.50%		
	More than 3	9	75.00%	3	25.00%		
Academia.edu	0 (No any)	32	11.30%	251	88.70%	15.312a	0.000
	1 to 3	16	16.50%	81	83.50%		
	More than 3	6	50.00%	6	50.00%		

Interpretation: For all the relationships P - values are less than level of significance, hence null hypothesis is rejected. Hence it is concluded that there is a relationship between the following:

- A. Use of Mendeley & Online National Publications.
- B. Use of Research Gate & Online National Publications.
- C. Use of Google Scholar & Online National Publications.
- D. Use of Academia.edu & Online National Publications.

Table 4.2 Cross Relationship Table – 2

Cross Relationship	Category (No. of International Publications)	Using Online Research tool?				Pearson Chi Square $\chi^2(2)$	P- Value
		Yes		No			
		Count	Percent	Count	Percent		
Use of Mendeley	No any	8	3.60%	212	96.40%	3.359a	0.186
	1 to 3	11	8.10%	124	91.90%		

	More than 3	2	5.40%	35	94.60%		
	Total	21		371			
Use of Research Gate	No any	41	18.60%	179	81.40%	16.365 ^a	0.000
	1 to 3	46	34.10%	89	65.90%		
	More than 3	16	43.20%	21	56.80%		
Use of Google Scholar	No any	51	23.20%	169	76.80%	33.399 ^a	0.000
	1 to 3	65	48.10%	70	51.10%		
	More than 3	22	59.50%	15	40.50%		
Use of Academia.edu	No any	26	11.80%	194	88.20%	6.202 ^a	0.045
	1 to 3	18	13.30%	117	86.70%		
	More than 3	10	27.00%	27	73.00%		

Level of Significance (α) = 0.05

Interpretation: Relationship – “Use of Mendeley & Online International Publications” is not having relationship because p-values are more than level of significance. But other all relationship’s P - values are less than level of significance, hence it is concluded that there is a relationship between the following:

- Use of Research Gate & Online International Publications.
- Use of Google Scholar & Online International Publications.
- Use of Academia.edu & Online International Publications.

From above interpretations the null hypothesis is rejected.

Hence the Hypothesis – “There is significant relationship between use of social networking websites available for researchers and Online research Publications.” stands proved.

H2 Research scholars are unable to get current status of their research topic on Internet.

To test this hypothesis the following question were offered with two options (YES/NO) to the respondents:

- Do you know any website, where you can get current status of research related to your topic? (Yes / No)**

Statistical Test: Sign Binomial Test.

Level of Significance: 0.05

Test Proposition: Test proportion was as 50% since more than 50% respondents to a particular category show more agreement towards this category. Hence test proposition was 50%.

H₀: Proportion of the response indicating “unable to get current status of their research topic on Internet” is less than or equal to 0.5 ($p \leq 0.5$).

H₁: Proportion of the response indicating “unable to get current status of their research topic on Internet” is greater than 0.5 ($p > 0.5$).

Table 5 - Sign Binomial Test

		Category	N	Observed Prop.	Test Prop.	P Value
Do you know any website, where you can get current status of research related to your topic?	Group1	No	272	.70	.50	0.000
	Group 2	yes	116	.30		
	Total		388	1.00		

Level of Significance: 0.05

Observed Proposition (NO) = 0.70,

Test Proposition = 0.50, $P = 0.000$

Interpretation: more than 50% of respondents agree that “unable to get current status of their research topic on Internet.” Hence the null hypothesis rejected.

Hence Hypothesis “Research scholars are unable to get current status of their research topic on Internet.” - Stands proved

H 3 There is need of online system to help research scholars in their research process and to improve the quality and quantity of the research.

To test this hypothesis, respondents were offered following question:

- Do you think, the effective use of the online system for research process would be helpful for researchers and to improve the quality and quantity of research publications?

Agreement to this question was recorded by three options (1. YES, 2. NO and Can’t Say)

H₀: The proportion of the respondents indicating that “There is no need of online system to help research scholars in their research process and to improve the quality and quantity of the research.” is less than or equal to 0.75 ($P \leq 0.75$)

H₁: The proportion of the respondents indicating that “There is no need of online system to help research scholars in their research process and to improve the quality and quantity of the research.” is greater than 0.75 ($P > 0.75$)

Table 6 - Sign Binomial Test

		Category	N	Observed Prop.	Test Prop.	P - Value
Do you think, the effective use of the online system with the above given features would be helpful to researchers and to improve the quality and quantity		Yes	335	.95	.75	0.000
		No	16	.05		
	Total		351	1.00		

Statistical Test: Sign Binomial Test

Level of Significance =0.05

Observed Proposition (YES) = 0.95, **Test Proposition** = 0.75, **P** = 0.000

Interpretation: In both cases it can be observed that more than 75% of the respondents agree that the “There is need of online system to help research scholars in their research process and to improve the quality and quantity of the research.” The P - Value is less than level of significance hence reject null hypothesis.

Hence the Hypothesis – “There is need of online system to help research scholars in their research process and to improve the quality and quantity of the research.” stands proved.

V. Conclusion:

This study is specifically focused on the use of social networking website as an e-collaboration tool by the research scholars. The research study provides idea that most of the research scholars are not aware about it or they are not using it. As per the data analysis and interpretation 69% of research scholars are saying that they are no any website showing current status of specific research topic. 55% of the research scholars are saying that they cannot find proper and appropriate information related to their research topic on internet and 45% of the research scholars are saying that they have not used any e-collaboration tool for the research.

The researcher has given empirical evidences through the data analysis, descriptive statistics and hypothesis. The relationship between the uses of SNWs like Google scholar, Mendeley, Research Gate and Academia.edu by researchers and their online publications has been proved by using statistical testing tools. It proves that the research scholars using the social networking websites for research are having more online research publications. Hence we can conclude that the e-collaboration is playing crucial role in the research. But these available tools are having limitations so it could be extended to proper extent to provide a integrated platform for the research collaboration at international level for the growth of the high quality and impactful research.

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