

Availability And Persistency Of Web Resources On Assam Movement: A Study Of Scopus Indexed Research Articles

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Abstract: History claims that since ancient period that foreign nationals were improperly immigrated and added to electoral rolls of Assam which leads to the rapid population growth in the state. Assam movement is a well-known movement in assam history during post-colonial period started by All Assam Students Union(AASU) in 1979 to demand thorough revised of electoral rolls in Assam by boycotting 1980 Lok Sabha election. Research and study of historical events can open up new dimensions and offer better understanding about present. Present study focuses on understanding referencing behaviours of researchers in the field related to Assam Movement and accessibility of web references added on research articles related to this scope. Results shows that out of total 576 references, 369 are web references and 15% web references are inaccessible with 0.1695460259 correlation coefficient of missing references with time. However, archiving rate of missing links of web references related to this movement are not satisfactory which can be a great loss for the present and future society, especially the research community.

Keywords: Web References, Web Availability, URL persistency, DOI persistency, Assam Movement

Introduction

Assam, the rapidly population growing region of India with population 3.29 million in 1901, 6.70 million in 1941, 14.63 million in 1971 and 22.41 million in 1991. Assam is situated at North Eastern part of India surrounded by foreign countries and few Indian states, which is witnessing population growth since the middle decades of the 20th century. Many reports and researchers found that Immigration can be a major reason of sudden growth of Assam's population. Assam is welcoming migrants from all sides from the time immemorial. Various groups of peoples were brought to tea gardens to labour and educated some were brought to fill administrative and

professional positions during 19th century which is considered as the driving force of Immigration in Assam.

The Assam Movement which also called Anti-Foreigners Agitation of 1979 to 1985 was a popular movement in post-colonial India started at Assam led by All Assam Students Union (AASU) and All Assam Gana Sangram Parishad (AAGSP) to demand identification, disenfranchise and deport of illegal migrants of Assam. This long run movement of six-year period initiated with civil disobedience campaigns but later it turns to widespread ethnic violence. The movement ended in 1985 with the Assam Accord. In political history of Assam, Assam movement can be marked as most rigorous, influential, epoch-making mass movement of post-colonial period.

It is needless to mention that present reflections are always based on the continuous events of past. A society can't stand alone without evidence of past events. Studying historical events helps present and future generations to feel connection with past. Research on historical events, factors enable us to build better understanding about world and its relations with various factors. Building knowledge and understanding of historical events and trends, especially over the past century, enables us to develop a much greater appreciation for current events today. (2021)

Historical researches or researches on historical events are the asset for the present and future generation. Open Access Movement had accelerated the open access of research outputs with the blessing of ICT, which is like benison for scholarly community. Publishing companies are moving towards the online publishing over the print publishing which have merits as well as demerits. There is a bewilderment on availability and persistency of online resources for long run among the scholarly communities, preservation of online resources for long term is the major challenges of informational professionals at this moment.

This study was conducted to observe the missing rate of online resources related to 'Assam Movement' which have a greater possession on history of post-colonial India. Missing reference to scholarly literatures of 'Assam Movement' can lead to dilemma among research communities and may lead the budding researchers to wrong track.

Literature Review

In a study, **Parmar and Pateria (2019)** claimed that publishing companies have initiated e-publishing over print publications through which their contents become easily accessible over internet anytime from anywhere around the globe. Availability of e-resources on web is like a blessing window for scholar community to explore their required documents anytime from anywhere. So, it is obvious that use of e-resources for research purpose may increase use of web references. **Kumar and Kumar (2019)** reported that with the increasing rate of usage of electronic resources, use of web citations in scholarly communication is also increasing. Citations and references create a network among wide community of scholars of related field. According to the study, articles published in Library Hi-Tech Journal contains average 6.89% web citations per article. Study also found that out of 3912 web citations, 23.29% encountered errors in accessing.

Again, **Bansal and Parmar (2020)** found that a good number of web resources cited in the current Science Journal have moved from their original locations and it shows 404 File Not Found error message. The study found that average half-life for the missing URLs is 1.76 which means that it will take approximately 2 years for half of the URL citations to vanish. **Gossen, Demidva and Risse (2016)** stated that web archives play an important role in preserving web resources. Web archives are created and regularly updated by crawling the web to collect snapshots of contents of different websites. Users of web archive can search for any crawled webpage with effective tool or skill to access relevant information.

Objectives

Previous researches claimed about the inaccessibility of web address added with web references by researchers. To validate it, current study was carried out with following objectives:

1. To find out the research output related to Assam Movement.
2. To find out relationships between references used by research outputs through clustering technique.
3. To calculate the proportion of Web citations used and classify it.
4. To calculate the rate of accessibility of web references with Wayback Machine.

Scope and Limitations

Current Study was conducted with a dataset of research articles available on Scopus database with the selected search expression till 29 April, 2022. Study includes total 576 references of 15 articles related to Assam Movement. Studying and research on historical events can help in understanding how current social, political, economical and other factors are related with our past, and its evolution. Paper related to this historic event was selected because Assam movement have a greater impact on Assamese society, Assamese socio-cultural frame and on its eco-political field from very beginning to till now. Researches on this field are asset to the society. Since, referring article and referred articles have inter connections, all the references included in the selected papers were included in the study. However, study is confined to only research articles related with Assam Movement.

Methodology

Study examines the web addresses of web resources refereed in the research articles on 'Assam Movement' that is available on Scopus Database. For collecting data, following steps were followed.

- **Data Extraction:** Scopus database was selected. Data available on Scopus database related to the scope was identified using search expression KEY (assam AND movement) AND (LIMIT TO (DOCTYPE, "ar")). 'AND' search operator was used so that any important research paper related to the scope does not

exclude from the study. Exclusion of relevant paper may lead to inaccurate and unreliable results. Dataset was extracted in comma separated values (csv) format.

- **Verification and Extraction of References:** Extracted data was verified manually and references of these papers were again extracted from the Scopus database in csv format.
- **Classification of References:** All references downloaded from Scopus was classified into two main groups, viz Print References and Web References. Web References group was again divided into three groups, i.e., Only URL, Only DOI and Both.
- **Checking Availability of Web Addresses:** Before checking the availability of web references, web addresses like links, DOIs were extracted and DOIs were resolve to URLs by using the syntax <https://doi.org/>. Availability of these addresses was checked with the help of W3C link checker (<https://validator.w3.org/checklink>), which is a part of W3C's validators and quality web tools. This link checker check issues in links, anchors and referenced objects in a web page, CSS style sheet, or recursively on a web site.
- **Checking Accessibility of Vanished Web Addresses:** After collecting all vanishing web addresses, accessibility of these web resources was checked through Wayback Machine (<https://web.archive.org/>) of Internet Archive. Internet Archive have started a project of digital archiving of World Wide Web in 1996 and it was launched to the public in 2001 which direct user to past and see how websites looked in the past.

All collected data were analysed thoroughly with different software's. VOS viewer was used for analysing bibliographic networks like co-authorship patter, Co-occurrence of Keywords etc. Google Sheet was use for tabulation and graphical representation of data.

Data Analysis and Interpretation

Year wise Distribution of Scopus Indexed Articles on Assam Movement

There is total 15 articles from 2008-2021 found in Scopus related to the Study which includes 14 English and 1 Chinese language papers. It is found all English papers were written by Indian researchers and another one was written by Chinese researcher. 6.6% articles of the study from each year, i.e., 2008, 2009, 2016 and 2021 is included in the study. 13.33% articles of the study from 2013 and 2017 is included in the study. However, 20% articles are from 2019, 26.6% articles published in 2020 is included in the study. It is found that an article, 'Climatology of columnar aerosol properties and the influence of synoptic conditions: First-time results from the north-eastern region of India' published in Journal of Geophysical Research Atmospheres Blackwell in 2009 have received 82. 'Crustal seismic anisotropy beneath Shillong plateau - Assam valley in North East India: Shear-wave splitting analysis using local earthquakes' published in Tectonophysics in 2017 have highest no of references, i.e., 80. 20% of articles included in study are published Sage Publications, 13.33% articles are published by Elsevier, 13.33% articles are published by International Journal of Scientific and Technology Research and remaining 53.33% articles are published by different well known publishers.

Table 1: Year wise Distribution of Scopus Indexed Articles on Assam Movement

Authors	Title	Paper Code	Year	Source title	Publisher	Language of Original Document	Cited by	Total References
Saikia A.	Forest land and peasant struggles in Assam, 2002-2007	Paper 1	2008	Journal of Peasant Studies	Taylor and Francis	English	11	17
Gogoi M.M., Krishna Moorthy K., Suresh Babu S., Bhuyan P.K.	Climatology of columnar aerosol properties and the influence of synoptic conditions: First-time results from the northeastern region of India	Paper 2	2009	Journal of Geophysical Research Atmospheres	Blackwell Publishing Ltd	English	82	48
Borkakoti J.	Demographic invasion, assamese identity and geopolitics	Paper 3	2013	Space and Culture, India	ACCB Publishing	English	1	19
Das M.	The Territorial Question in the Naga National Movement	Paper 4	2013	South Asian Survey	Sage Publications India Pvt. Ltd	English	N/A	75
Gupta T.D., Mukhopadhyay B., Dasgupta S., Roy S.	Neo-tectonic activity in Sarpang Re-entrant, frontal Bhutan Himalaya, Kokrajhar	Paper 5	2016	Indian Journal of Geosciences	Geological Survey of India	English	2	58

	District, Assam, India: Constrain from geological, geomorphological and GPS surveys							
Sapkal R.	Women's education, autonomy and their linkages with contraception use in india	Paper 6	2017	Indian Journal of Public Health Research and Development	Institute of Medico-Legal Publications	English	N/A	10
Sharma A., Baruah S., Piccinini D., Saikia S., Phukan M.K., Chetia M., Kayal J.R.	Crustal seismic anisotropy beneath Shillong plateau - Assam valley in North East India: Shear-wave splitting analysis using local earthquakes	Paper 7	2017	Tectonophysics	Elsevier B.V.	English	9	80
Nath M.K.	Muslim Politics in Assam: The Case of AIUDF	Paper 8	2019	Studies in Indian Politics	SAGE Publications Ltd	English	3	18
Borah S.M.	Autonomy movement and durable solution: A historical interpretation of bodo movement	Paper 9	2019	International Journal of Scientific and Technology Research	International Journal of Scientific and Technology Research	English	N/A	15
Sharma N.	Ethnic boundaries during and after the Assam agitation of 1979-1985	Paper 10	2019	International Journal of Scientific and Technology Research	International Journal of Scientific and	English	N/A	18

					Technology Research			
Bora D.	The political role of Bihu' in Assam movement (1979)	Paper 11	2020	Rupkatha Journal on Interdisciplinary Studies in Humanities	Aesthetics Media Services	English	N/A	7
Yuan D.-Y., Feng J.-G., Zheng W.-J., Liu X.-W., Ge W.-P., Wang W.-T.	Migration of large earthquakes in tibetan block area and discussion on major active region in the future	Paper 12	2020	Dizhen Dizhi	State Seismology Administration	Chinese	3	51
Saikia S.	Saffronizing the periphery: Explaining the rise of the Bharatiya Janata Party in contemporary Assam	Paper 13	2020	Studies in Indian Politics	SAGE Publications Ltd	English	1	38
Areendran G., Raj K., Sharma A., Bora P.J., Sarmah A., Sahana M., Ranjan K.	Documenting the land use pattern in the corridor complexes of Kaziranga National Park using high resolution satellite imagery	Paper 14	2020	Trees, Forests and People	Elsevier B.V.	English	4	44
Vasudev D., Goswami V.R., Srinivas N., Syiem B.L.N., Sarma A.	Identifying important connectivity areas for the wide-ranging Asian elephant across conservation landscapes of Northeast India	Paper 15	2021	Diversity and Distributions	John Wiley and Sons Inc	English	1	78

Co-Occurrence of keywords

Overly visualization of co- occurrence of keywords used in research articles related to Assam Movement was created with VoS viewer software. All coloured circles shown in figure 1 are representation of keywords and the links connecting these circles are represents the network between the keywords. Keywords which were occurred at least 2 times with was included in the analysis and out of total 202 keywords, 18 keywords met this threshold. Keywords were divided into 3 clusters containing 18 items, 56 links and 93 total link strength. Each cluster are of different colours. The first cluster contains 7 items, second cluster contains 6 items and cluster 3 contains 5 items in it.

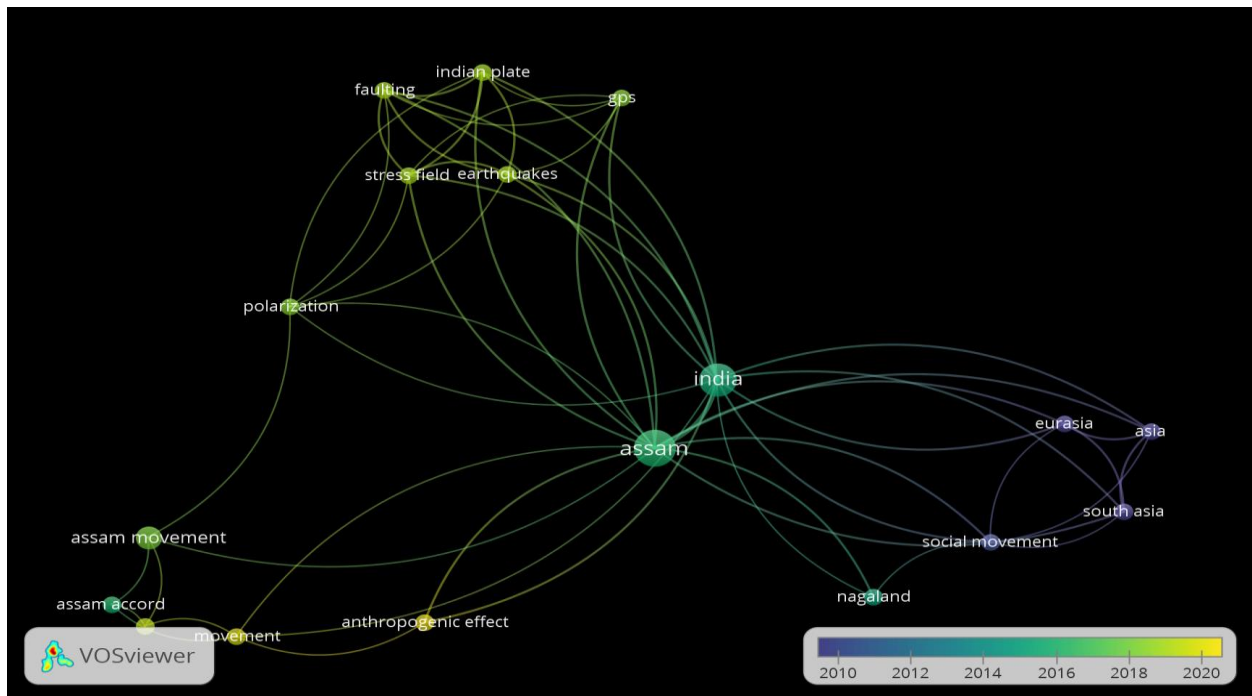


Figure 1: Overly visualization of co- occurrence of keywords

Co-authorship of cited documents

The interconnection between cited documents of articles published related to Assam movement was studied and network between authors were analysed. Co-authorship pattern of authors of cited documents were visualized with VoS viewer as given on figure 2 and figure 3. As mentioned earlier, circles represent the authors and links are representing their published papers, however links represents the networks between authors and the thickness of links represents the strength of their network. Authors with minimum 2 documents were selected for the network and density visualization. However, documents with more than 25 authors were ignored in the study. Out of 1274 authors, 162 authors met these criteria. These authors were again grouped into 13 clusters with total 587 links and 852 total link strength, where Cluster 1 is comprises of 21 authors, cluster 2 comprises of 20 authors, Cluster 3 comprises of 18 authors, cluster 4 have 16 authors, Cluster 5 have 15 authors, cluster 6 have 13 authors, Cluster 7, 8, 9 have 10 authors each, Clusters 10 and

11 have 8 authors each, Cluster 12 have 7 authors, cluster 13 have 6 authors. Figure 3 shows the density visualization of co-authorship network by highlighting strongly connected network of authors. The strength of the network of authors is measured by the number of papers published by authors.

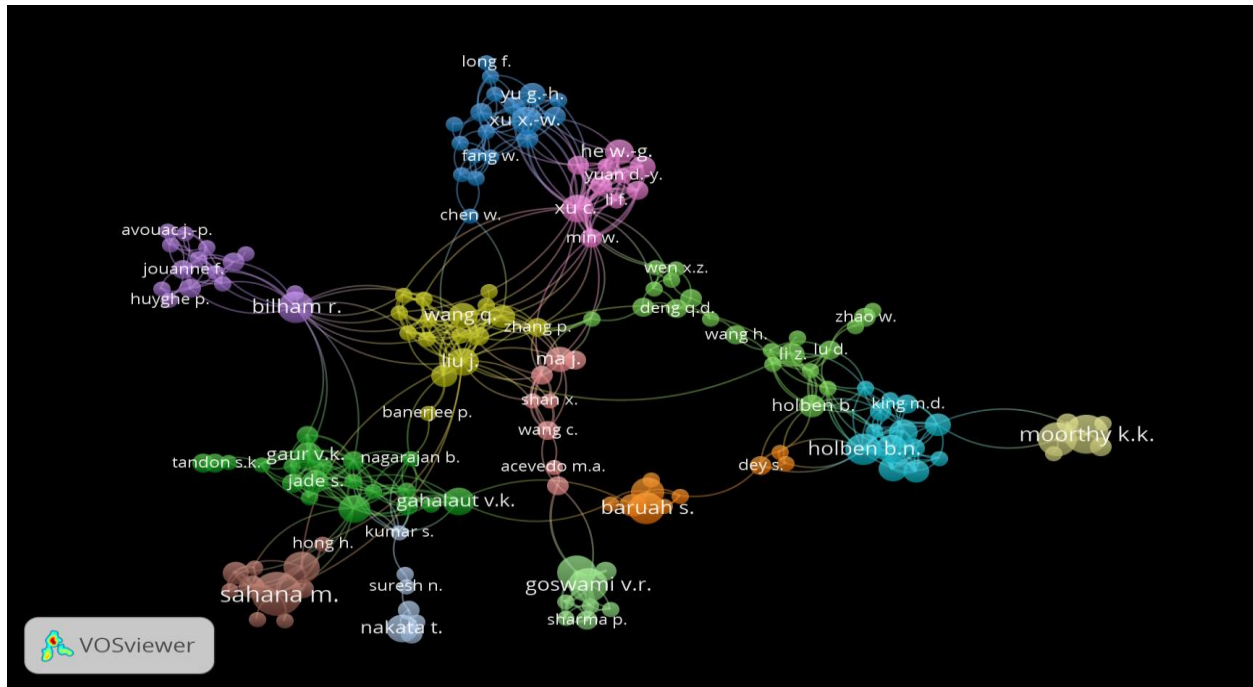


Figure 2: Network visualization of Co-authorship of cited documents

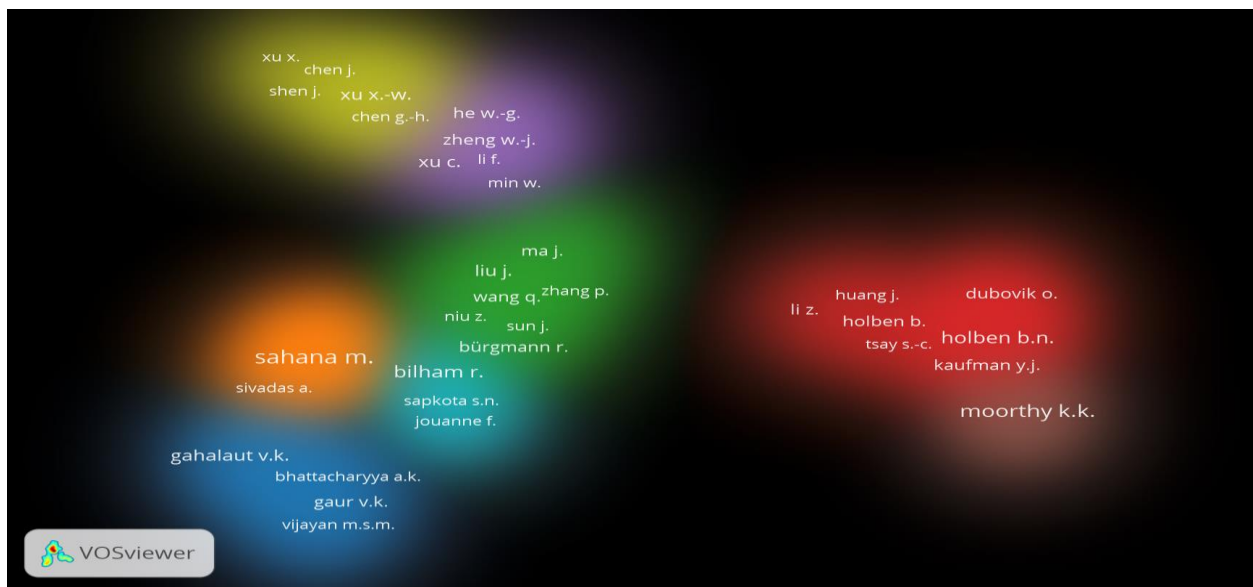


Figure 3: Cluster density visualization of co-authorship of cited documents

Rate of Print and Web References

A paper published in 2017 have highest number of references, i.e., 80 references which is 13.88% of total references included in the study. and followed by the only paper of 2021 with 13.54% of total references. The paper with highest number of references contains 81.25% web references of total references of that paper. It is found that a paper of 2013 contains highest no. i.e., 16.42% of the total print references of the study. The only paper of 2009 contains only 6 print references out of total 48 references, which means 87.5% are web references in that paper. Study found that only 35.93% of total references are print, remaining 64.06% are web references. From the results it can be assume that use of web resources over print resources for consultation during research work is increasing.

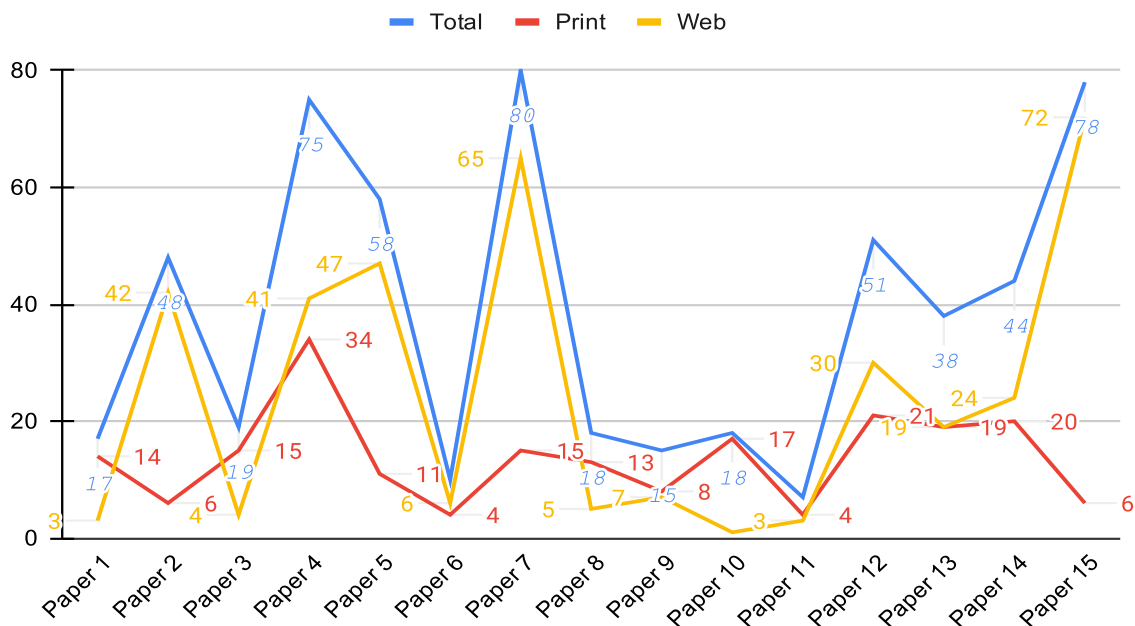


Figure 4: Proportion of Print and Web References in Articles

Classification of Web References

Web references of the articles were classified into three groups. Group 1 is Only URL, all web references that contains only Uniform Resource Locator (URL) are group in this group. All those web references, that contains only Digital Object Identifier (DOI) are classified in Group 2, i.e., Only DOI and the references that contains both forms of references are included in the Group 3, i.e., Both. However, a paper of 2013 contains 54.66% web references, where 68.29% web references are from Group 1, i.e., from the group which contains only URL, which is considered as highest percentage of that group. A paper of 2017 contains highest number of web reference with Only DOI, i.e., 52.30%. The only paper of 2021 contains highest number of web references with Both URL and DOI in it. It is found that 24.11% references have only URL, 33.6% references have only DOI and 42.27% references have used both URL and DOI. On the basis of the reference,

it can be assumed that use of DOI over URL is increasing for research purpose in last few years, however, there is still scope of improvement in case of using web addresses in reference section.

Table 2: Classification of References						
Paper Code	Year	Total References	Print References	Web References		
				Only URL	Only DOI	Both
Paper 1	2008	17	14	1	2	0
Paper 2	2009	48	6	4	16	22
Paper 3	2013	19	15	2	1	1
Paper 4	2013	75	34	28	9	4
Paper 5	2016	58	11	6	23	18
Paper 6	2017	10	4	0	4	2
Paper 7	2017	80	15	4	34	27
Paper 8	2019	18	13	5	0	0
Paper 9	2019	15	8	5	1	1
Paper 10	2019	18	17	0	1	0
Paper 11	2020	7	4	1	1	1
Paper 12	2020	51	21	2	12	16
Paper 13	2020	38	19	16	0	3
Paper 14	2020	44	20	3	3	18
Paper 15	2021	78	6	12	17	43

Growth of Web and Print References

In 2008, there were only 1 research article where 14 were print and 3 web references were found. Similarly in 2009, 2016, 2021 with 6, 11, 6 print references and 42, 47, 72 web references respectively. On the other hand, in 2013 and 2017 there were two articles found from each year in the dataset with 24.5 and 9.5 average print references and 22.5 and 35.5 average web references

respectively. In 2019, there are 3 articles with 12.6 average print references and 4.3 web references each article. 2020 have highest no. of articles, i.e., 4 research articles with average 16 print references and 19 web references. Figure 5 shows the linear trendline of growth of print and web references in research articles related to ‘Assam Movement’. R^2 value of growth of web references is 0.099 and Correlation Coefficient is 0.3143075686, which can be considered as a positive correlation between growth of web references with time. On the other hand, R^2 value of growth of print references is 0.013 and correlation coefficient is -0.1152441378, which shows a negative relation of growth of print references with time. Trendlines for web references showing an uptrend with time.

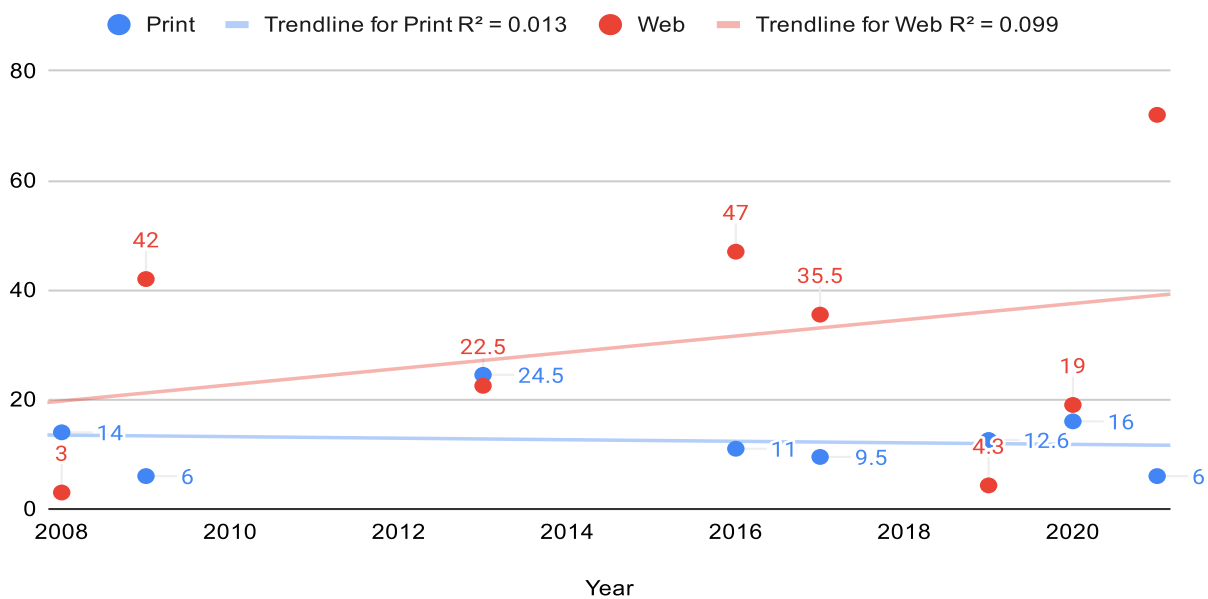


Figure 5: Linear trendline of growth of print and web references with time

Use of different web addresses

The only research article of 2018 contains 1 URL and 2 DOI. Similarly, article of 2009, 2016, 2021 contains 26, 24, 55 URLs and 38, 41, 60 DOI respectively. Articles of 2013 and 2017 contains 17.5 and 16.5 URLs and 7.5 and 33.5 DOI respectively on average. In 2019, there are 3 articles which contains 3.6 URLs and 1 DOI each article. Articles published in 2020 contains average 15 URLs and 13.5 DOI. It is found that articles published in 2021 contains highest number of URLs and DOIs. Figure 6 shows the linear trendline of growth of URL and DOI in research articles related to ‘Assam Movement’. R^2 value of growth of URL is 0.145 and Correlation Coefficient is 0.3803552168 whereas R^2 value of growth of DOI is 0.079 with correlation coefficient 0.2804155742. From the correlation analysis it can be assume that there is a positive correlation between growth of URL and DOI with time. However, positivity is higher in case of URLs. Trendlines for growth of URL and DOI both shows an uptrend with time.

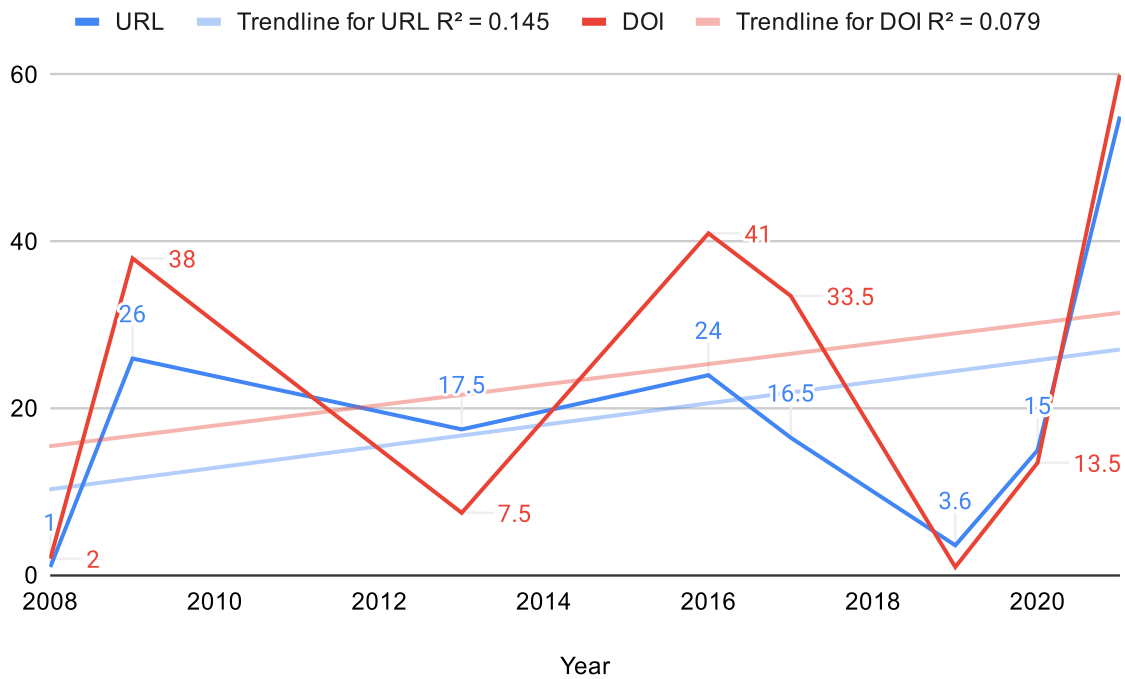


Figure 6: Linear trendline of growth of URL and DOI with time

Rate of accessibility of web references

All web references used in 2008 are active. On average, 73.80%, 80%, 68%, 94%, 82%, 83.20%, and 95% web references out of total web references of 2009, 2013, 2016, 2017, 2019, 2020, and 2021 respectively are active till the date of data collection. It is observed that web references of 2016 are showing highest missing rate, i.e., 32%. On average, 15% web references out of total web references used in scholarly articles related to Assam movement is missing now, which can be track breaker of network of research and researchers. The correlation coefficient of missing references with time is 0.1695460259.

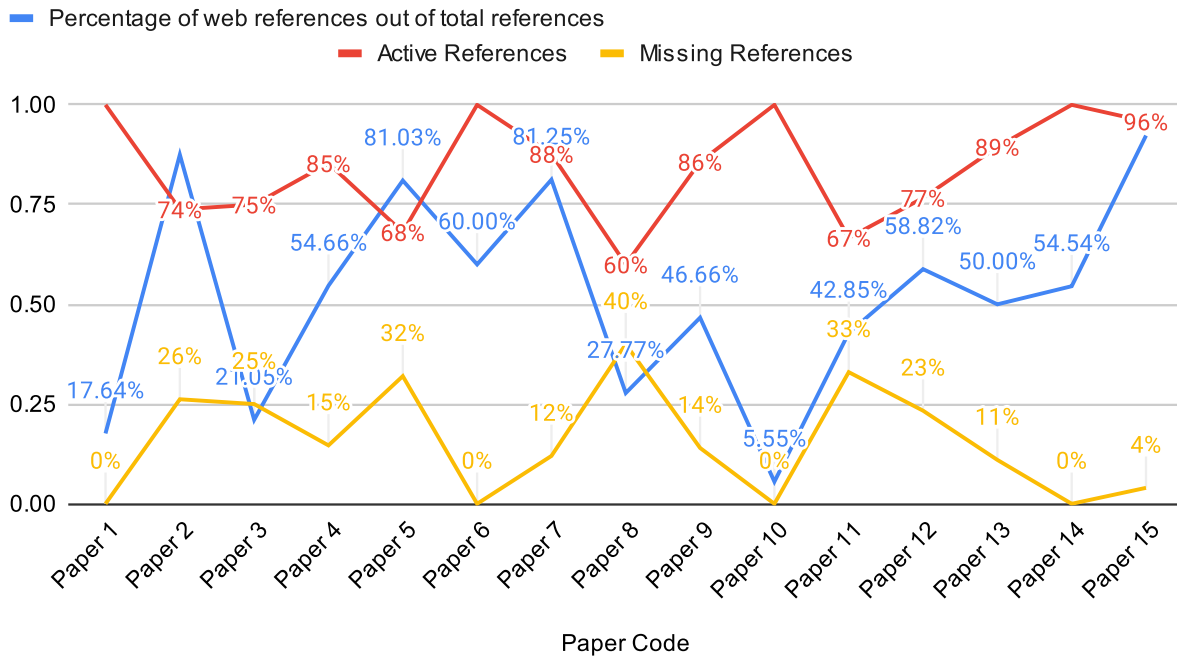


Figure 7: Paper wise accessibility of web references

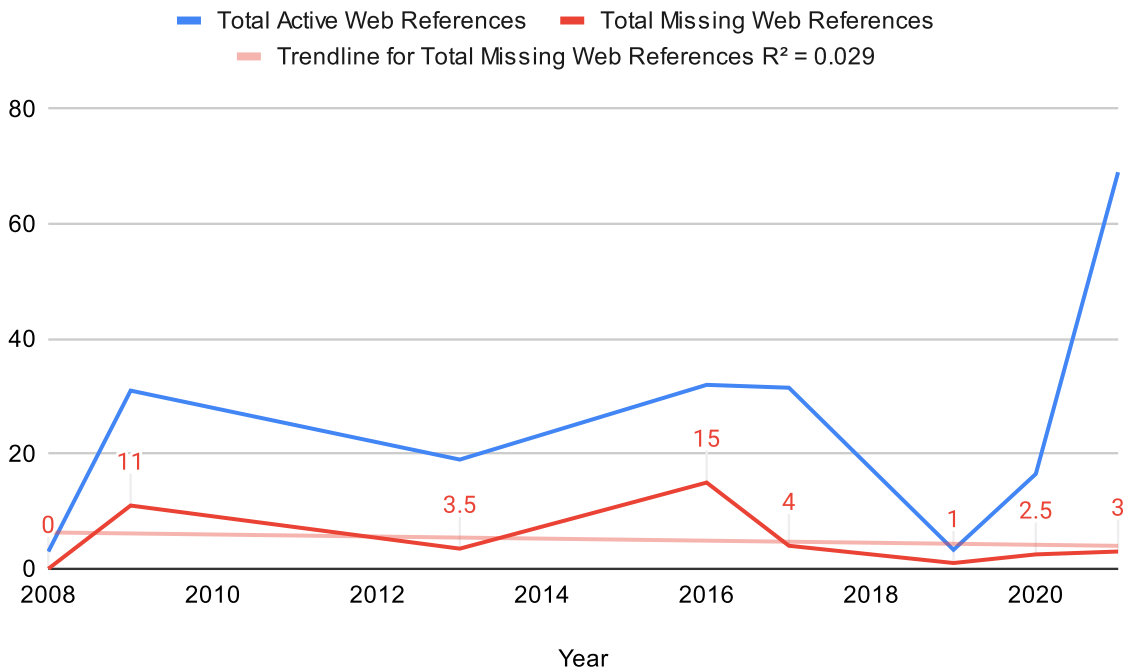


Figure 8: Linear trendline of growth of missing web references with time

Status of Archiving of Missing Links

Status of archiving of missing links were checked and found that 27% missing links of 2009, 71.42% missing links of 2013, 26.66% missing links of 2016, 25% missing links of 2017, and 33.33% missing links of 2021 are archived in Wayback Machine of Internet Archive till the period of data collection. However, it is found that 100% missing links of 2019 and 2020 are archived and it can be retrieved through Internet Archive. 55% missing links of total missing links are archived and can access. However, remaining links can't be access with archive because it is not archived. It is found that there is need of using web archives for preservation of scholarly literatures.

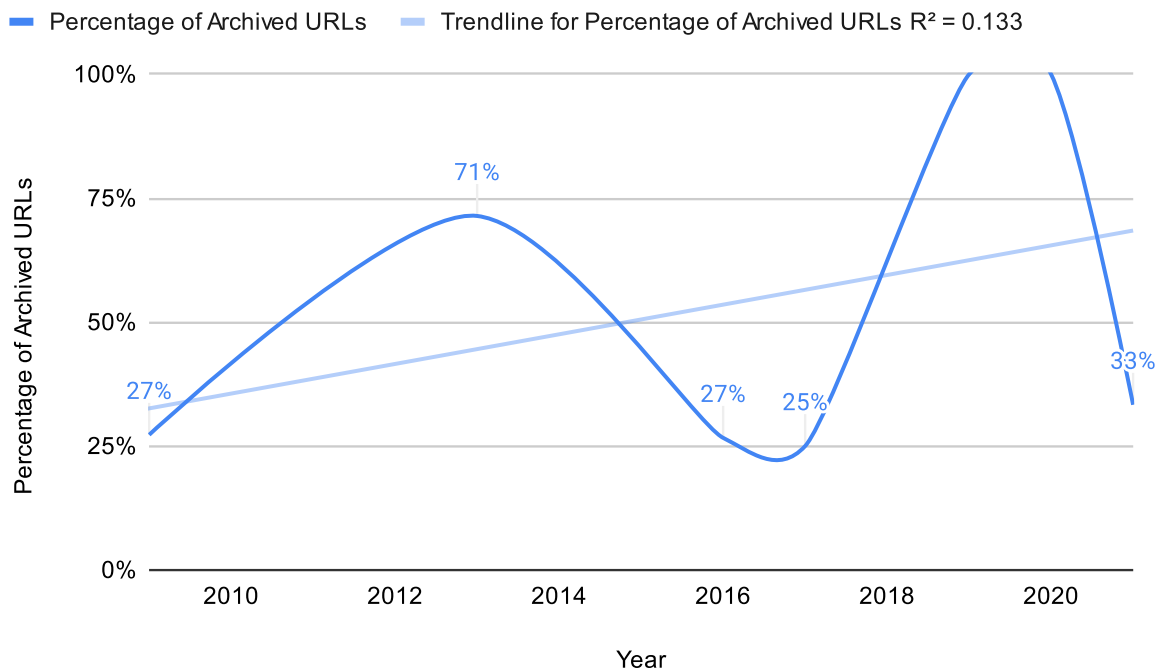


Figure 9: Linear trendline of archiving web resources

Conclusion and Suggestions

Human beings are now acclimated to technology, experiencing new adventures on daily basis. It is plain to see that use of web resources for research and other academic will never fall off, rather it can be expecting that e-resources will totally sway over print resources after few years. Consequently, use of web references in research outputs will increase. As mentioned earlier, loss of a reference can impacts on a fresh researcher and also on an experienced researcher. While observing minutely, it can be assumed that unavailability and inaccessibility of research data can affect on fresh researchers while will directly reflect on that field of research and its research quality. Similarly, while the quality research data vanishes, it will loss its worldwide visibility and it will directly impact on citation received by the work. Therefore, as content managers, information professionals should knuckle down to this derelict area of knowledge preservation for

the upliftment of research community. On the basis of that, some major suggestions are mentioned below:

- Research community should emphasise on web archives.
- Informational professionals should take responsibility of preserving web links of important documents in web archives for future use.
- Information creators, providers, and users should be aware of the use of web archives.
- Higher educational institutes should initiate web archive projects and pioneers should encourage brand new information creators to use web archive for preserving knowledge.
- Self-Archiving should be promoted to self-web archiving and it should be openly accessible for global visibility.

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