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Bibliometric Analysis of Open Access Digital Humanities Publications

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Abstract: The main purpose of this paper is to conduct a bibliometric analysis of the open access digital humanities scholarly literatures during 2001 to 2020. This paper examines the distribution of year wise growth, authorship pattern, identifies the most productive authors, countries, publication source and institutions and most trusted research areas. The bibliographic data required for this present study has been collected through the Lens database and analyzed on the basis of various indicators of bibliometrics assessment. The study found that digital humanities research on open access platforms is growing rapidly. The study showed that that the developed countries such as the United States, United Kingdom and Canada have played a leading role in digital humanities research. The output of this research paper could be of future use to researchers and faculties associated with digital humanities.

Keywords: Bibliometrics Analysis, Open Access, Digital Humanities, Humanities Computing.

Introduction: Digital humanities (DH) are an area of scholarly activity at the intersection of computing or digital technologies and the disciplines of the humanities. It includes the systematic use of digital resources in the humanities, as well as the analysis of their application (Terras, 2011). The digital humanities focused on designing standards to represent cultural heritage data such as the Text Encoding Initiative (TEI) for texts, and to aggregate, digitize and deliver data. In contrast to the traditional methods, the digital humanities allow to pose new research questions on cultural heritage datasets (Berry, 2012). Digital humanities includes both digitized and born-digital materials and combines the fields from traditional humanities disciplines such as history, philosophy, linguistics, literature, art, archaeology, music, and cultural studies and social sciences, with tools provided by computing such as hypertext, hypermedia, data visualization, information retrieval, data mining, text mining, digital mapping and digital publishing (Cambridge Digital Humanities, n.d). Therefore, it is important to monitoring the global research

trends on such an important and emerging topic, especially the open access publication status must be analyzed with the help of bibliometric techniques.

Review of Related Literatures: Many good quality research papers have been published in the past on digital humanities research trends and related topics. Wang and Inaba (2009) analyzed the structures and evolution of digital humanities based on correspondence analysis and co-word analysis based on two journals and four annual conference proceedings. The results of study showed that there is no clear sub discipline in digital humanities and the disciplinary representative nomenclature is changing from humanities computing to digital humanities. Leydesdorff and Salah (2010) did a comparative study of Leonardo and Art Journal in their research paper based on their citation. Sula (2012) presented visualizing social connections in the humanities and focused on bibliometrics and its limits for the humanities. Tang, Cheng and Chen (2017) conducted a longitudinal study of intellectual cohesion in digital humanities using bibliometric analyses during 1989 to 2014. Co-authorship, article co-citation, and bibliographic coupling were discussed in detail in the study and interdisciplinary pattern on digital humanities has been noticed. Gao, Nyhan, Duke-Williams, and Mahony, S. (2018) conducted a comparison study between citation network and social network on the basis of visualizing the digital humanities community. Wang (2018) carried out a bibliometric analysis of distribution features and intellectual structures of digital humanities indexed in Web of Science database. The study found that UK and USA were the leading countries, English was major language and history, literary and cultural heritage, and information and library science were highly trusted research areas. Münster (2019) studied digital heritage as a scholarly field, and the paper includes some key elements such as topics, researchers, and perspectives from a bibliometric point of view. In his dissertation, Shao (2020) compared the evolution of digital humanities in North America and East Asia during 1990 to 2018. Spinaci, Colavizza and Peroni (2020) studied on mapping digital humanities research indexed in several databases such as Web of Science, Scopus, Crossref and Dimensions. Su (2020) examined the structure, patterns and themes of cross-national collaborations in Digital Humanities research through social network analysis and visualization tools. This study was conducted with the Digital Humanities research articles indexed in the Web of Science Core collection and covered various aspects of international collaboration through ISI keywords, author keywords, title and abstracts. The results show that USA, Germany and

England were identified as the major contributors and subjects include history, GIS, text mining, visualization, etc. Su, Zhang and Immel (2020) examined the structure, patterns and themes of interdisciplinary collaborations in the digital humanities research indexed in Web of Science core, through the application of social network analysis and visualization tools. The study showed that interdisciplinary collaboration is integrated across a number of disciplines, including computer science, library and information science, linguistics, and literature. Chung (2021) analyzed the research trends in digital humanities, based on papers from digital humanities conferences during 2019 and 2020. In this work 441 papers were analyzed based on network analysis of authors and keywords co-word and 11 dis-connected sub-networks were found from the co authorship network analysis. The author keywords also show that authors from Europe, North America, Japan and China had an active role in publishing digital humanities. The works mentioned in review of literature is very informative and gives a clear idea of the research trends in the digital humanities. However, the current work has been done with a specific focus on research growth of digital humanities on open access platform.

Objectives: the main objective of this study is to analyze the open access digital humanities literatures from the perspective of bibliometrics study to find out the research trend.

Methodology: The present work is based on bibliographic records obtained from the Lens database (<https://www.lens.org/>), which is an online patent and knowledge resource platform. In the Lens database, the subject of Digital Humanities is first selected in the Field of Study tag and there were 14,207 publications available. From these publications, 1303 publications are finally selected with open access tag and time range 2001 to 2020 [Filters: Year Published = (2001 - 2020) Field of Study = (Digital humanities) Open Access], with which the current work is done. Retrieved data is then collected from the retrieved papers based on bibliometric parameters such as year of publication, authorship pattern, publication source, country, open access color etc used for current work and stored in MS Excel. The stored data is then presented in Microsoft Word through tables and figures for further analysis. Based on the analysis, the final conclusion of the paper has been drawn which has completely fulfilled the objective of the study. Additionally, the VOSviewer software has also been used for sketching the authorship network visualization of these publications.

Data Analysis & Findings:

Year Wise Growth: In the twenty years from 2001 to 2020, 1303 research papers on digital humanities were published in open access. In the first decade, from 2001 to 2010, the growth rate of paper was very low, increasing eightfold in the next decade. This means that the number of research papers on digital humanities is increasing and if this rate increases (Tang, Cheng & Chen, 2017; Shao, 2020), digital humanities will take a better place in research publications around the world in the future. Looking at the year wise distribution, the highest number of articles was published in 2019, followed by 2016 and 2020, respectively. Overall, there are positive indications in the growth pattern ($R^2 = 0.83$), but the number of publications is not very high.

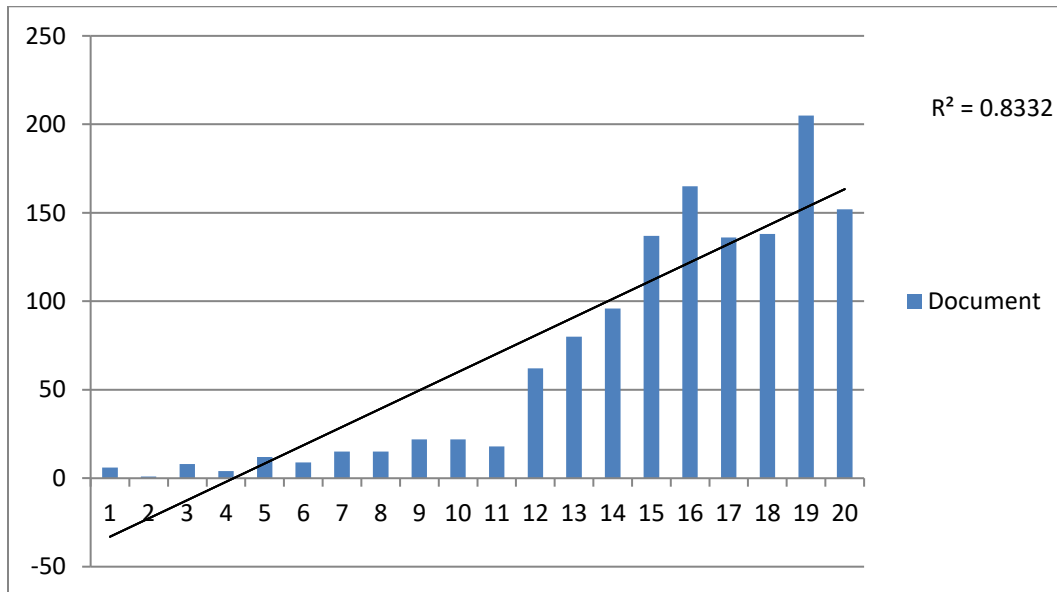


Fig 1: Year Wise Distribution of the Publications

Authorship Pattern: The authorship pattern table (Table 1) shows that more than half of the articles were published by single authors (52.95%) and the rest were published in joint authorship pattern. In other words, in the case of Digital Humanities, single and joint, these two authorship patterns have an almost equal abundance. Most of the writings in the Joint Authorship pattern have been published by two authors, followed by three and four authors respectively. The Authorship pattern shows that more collaborative research in digital humanities will increase the number of publications in the Joint authorship pattern.

Table 1: Authorship Pattern

Authorship Pattern	No of Publications	Percentage
One	690	52.95
Two	278	21.34
Three	162	12.43
Four	81	6.22
Five	43	3.30
More than Five	49	3.76
Total	1303	100

Subject: There are many research areas involved with Digital Humanities, or it can be said that it covers many topics. The current work also shows that various important subjects of Arts, Humanities, Computing and Social Sciences have been included in the list as most trusted area of research (Fig 2). Looking at the individual subjects, it can be seen that sociology (35.23%) has taken the first place in the list, followed by computer science, humanities and library science occupied the place one after the other. However, previous works (Wang & Inaba, 2009; Sula, 2012; Tang, Cheng & Chen, 2017; Wang, 2018; Münster, 2019; Shao, 2020; Spinaci, Colavizza & Peroni, 2020; Su, 2020; Su, Zhang & Immel, 2020; Chung, 2021) had subjects like sociology, library science etc., some of the subjects of which are also reflected in this work.

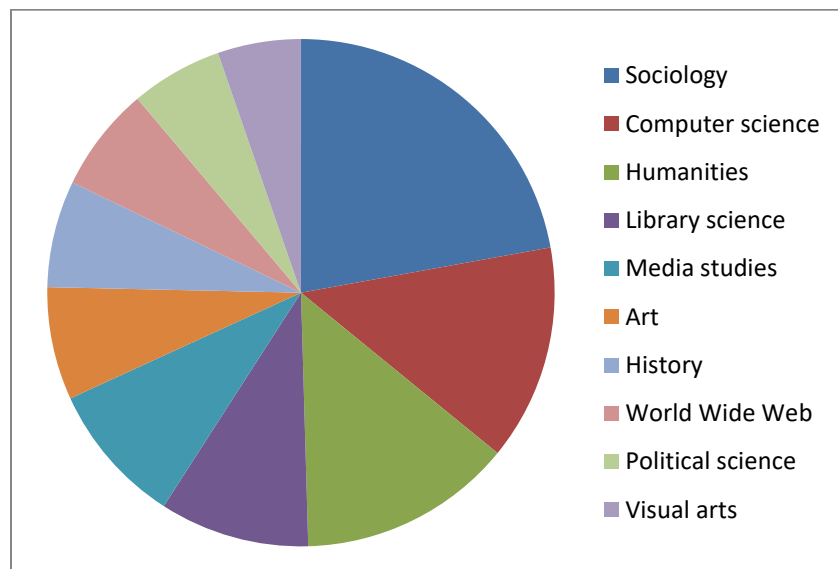


Fig 2: Distribution of Subjects

Publication Source & Publisher: Table 2 describes the highly productive source of publications with at least 10 papers. Digital Humanities research papers have been published in many good journals around the world. Digital Humanities Quarterly journal topped the list with the most published articles (6.37%) followed by Digital Studies (2.15%) and Scholarly and Research Communication (1.77%). The thirteen publication sources on the list contributed one-fifth to the entire publication, which is very creditable. Similarly, like the publication source, the articles have been published on the open access platform of the world's leading publishing house (Table 3). In the case of individual publishers, Informa UK Ltd (56) topped the list with the most articles followed by Oxford University Press and Open Library of the Humanities. Research papers on Digital Humanities have also been published by world renowned publishers like Springer, SAGE, and Wiley etc.

Table 2: Most Active Publication Source

Source Title	Publications	Percentage	Rank
Digital Humanities Quarterly	83	6.37	1
Digital Studies	28	2.15	2
Scholarly and Research Communication	23	1.77	3
Digital Scholarship in the Humanities	21	1.61	4
Liinc em Revista	14	1.07	5
Postmedieval	14	1.07	5
Literary and Linguistic Computing	12	0.92	6
Postmedieval: a journal of medieval cultural studies	12	0.92	6
College & Research Libraries	10	0.77	7
College & Undergraduate Libraries	10	0.77	7
Hybrid Pedagogy	10	0.77	7
Journal of Cultural Analytics	10	0.77	7
Libreas : Library Ideas	10	0.77	7

Table 3: World Leadings Publishers

Name of the Publisher	Publications	Percentage	Rank
Informa UK Limited	56	4.30	1
Oxford University Press (OUP)	46	3.53	2
Open Library of the Humanities	40	3.07	3
Springer Science and Business Media LLC	38	2.92	4
OpenEdition	33	2.53	5
SAGE Publications	29	2.23	6
CISP Journal Services	27	2.07	7
Springer International Publishing	24	1.84	8
American Library Association	22	1.69	9
Wiley	21	1.61	10

Open Access Colour: The Open Access models of Digital Humanities shows that (Fig 3) almost half of the publications have been published in Gold Open Access. Green OA, Hybrid OA and Bronze OA ranked second, third and fourth respectively in the rest of the publications. But the dominance of Gold Open Access among the published articles is good news for Digital Humanities.

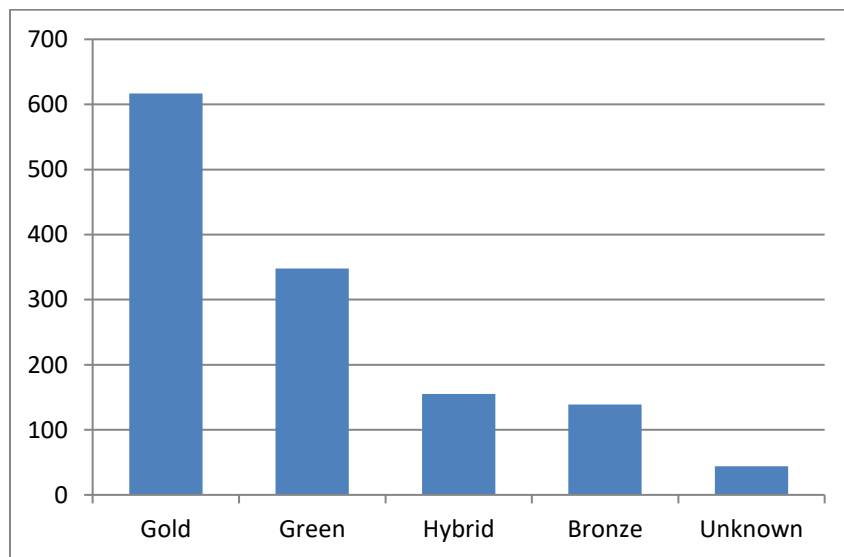


Fig 3: Open Access Colours

Country: Developed countries have published a good number of research papers on digital humanities around the world (Table 4). In line with previous studies (Wang, 2018; Münster, 2019; Shao, 2020; Su, 2020; Chung, 2021), countries like USA, UK, and Canada etc. are at the top of the list. In terms of country wise contributions, United States topped the list with the most articles, followed by the United Kingdom and Canada in second and third place, respectively. However, based on the contributions of the publications, it can be said that the dominance of European countries has been revealed here.

Table 4: Country

Name of the Country	Publications	Percentage
United States	205	15.73
United Kingdom	105	8.06
Canada	66	5.07
Netherlands	36	2.76
Germany	32	2.46
Spain	26	2.00
Brazil	24	1.84
Italy	24	1.84
Australia	22	1.69
Belgium	14	1.07
Ireland	14	1.07
Switzerland	13	1.00
Sweden	13	1.00
France	12	0.92
Austria	11	0.84
Finland	10	0.77

Most Productive Institutes: Since the developed countries of the world have topped the list of Digital Humanities research, the educational and research institutions of those countries have occupied important place in this list (Fig 4). As a single institution, University College London topped the list of institutions, followed by University of Victoria, King's College London and the University of Amsterdam. The way these world renowned educational institutions have published research papers on Digital Humanities is undoubtedly good news for the future.

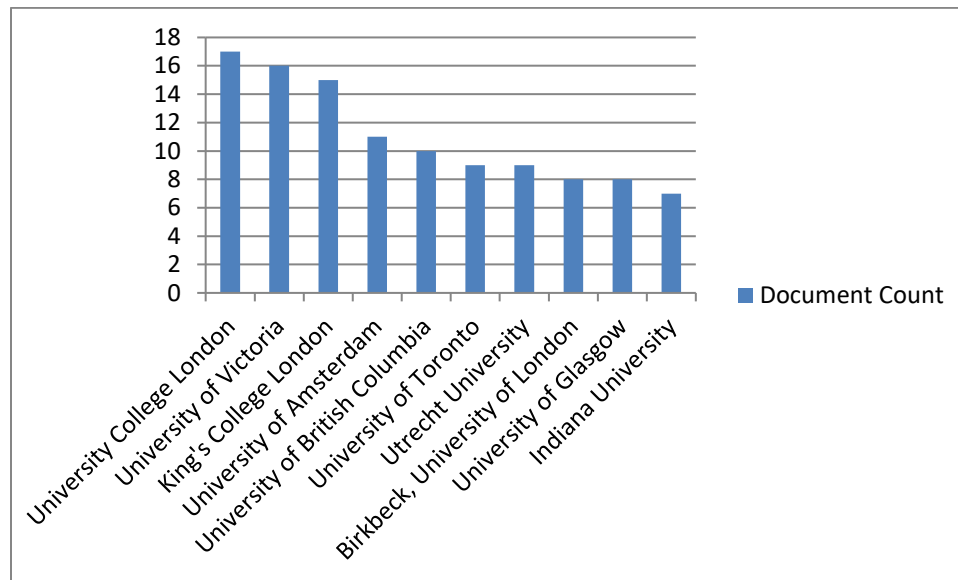


Fig 4: Most productive Institutes

Most Productive Authors: Scholars from around the world have done research on digital humanities, as can be seen from the names of the authors' countries or organizations. Melissa Terras topped the list of most productive authors, followed by Claire Clivaz and Julianne Nyhan. Co-authorship network visualization shows that a strong network of authors has been found as in previous works (Tang, Cheng & Chen, 2017; Gao, Nyhan, Duke-Williams & Mahony, 2018; Wang, 2018; Chung, 2021). Data analysis through VOSviewer shows that there are 16 clusters in the Co-authorship network visualization.

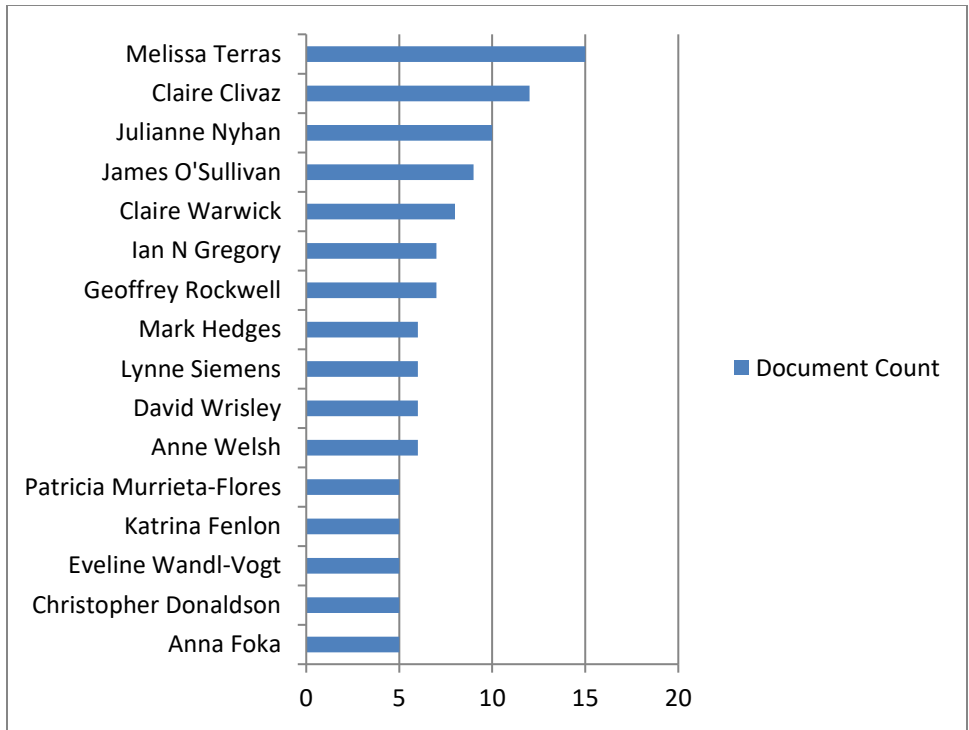


Fig 5: Most Productive Authors

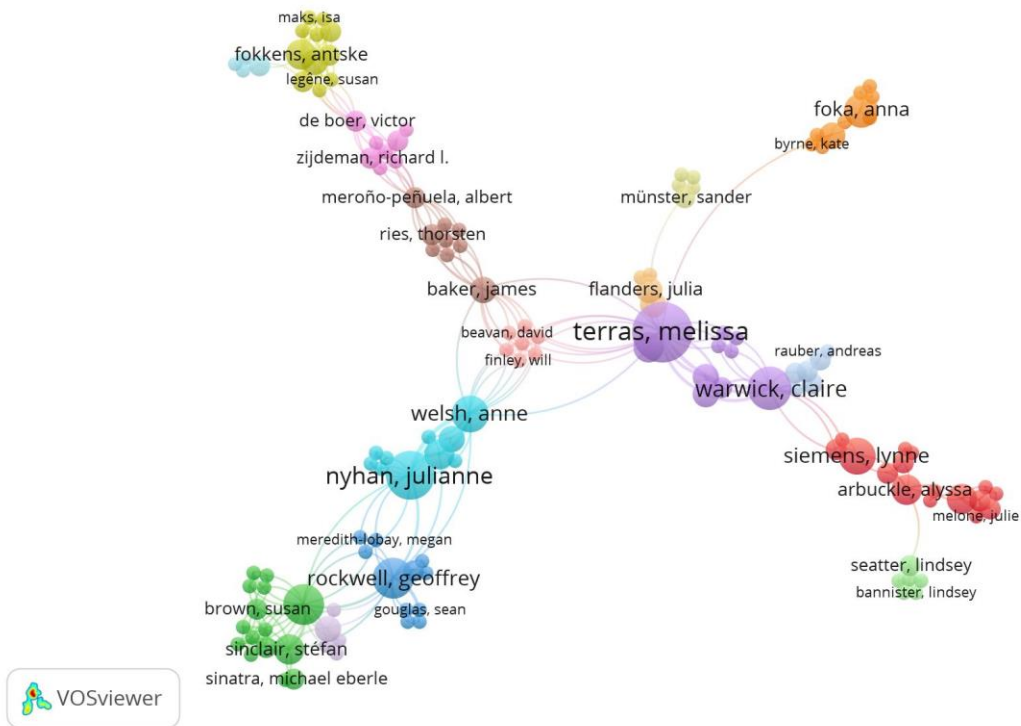


Fig 6: Co-authorship network visualization

Co-occurrence of Keywords: Fig shows the visualization of Co-occurrence of keywords in titles and abstracts of the publications. Co-occurrence of keywords can easily be used to analyze what types of keywords have been used in Digital Humanities research (Wang & Inaba, 2009; Wang, 2018; Münster, 2019; Su, Zhang & Immel, 2020; Chung, 2021). The current visualization process shows that keywords are located in three main clusters and a very strong relationship is evident between these clusters. The term “humanity ” is the most common term for individual keywords (979), as well as keywords such as humanities (799), practice (261), university (195), scholar (168), library (158), information (155) and knowledge (152) have also been found.

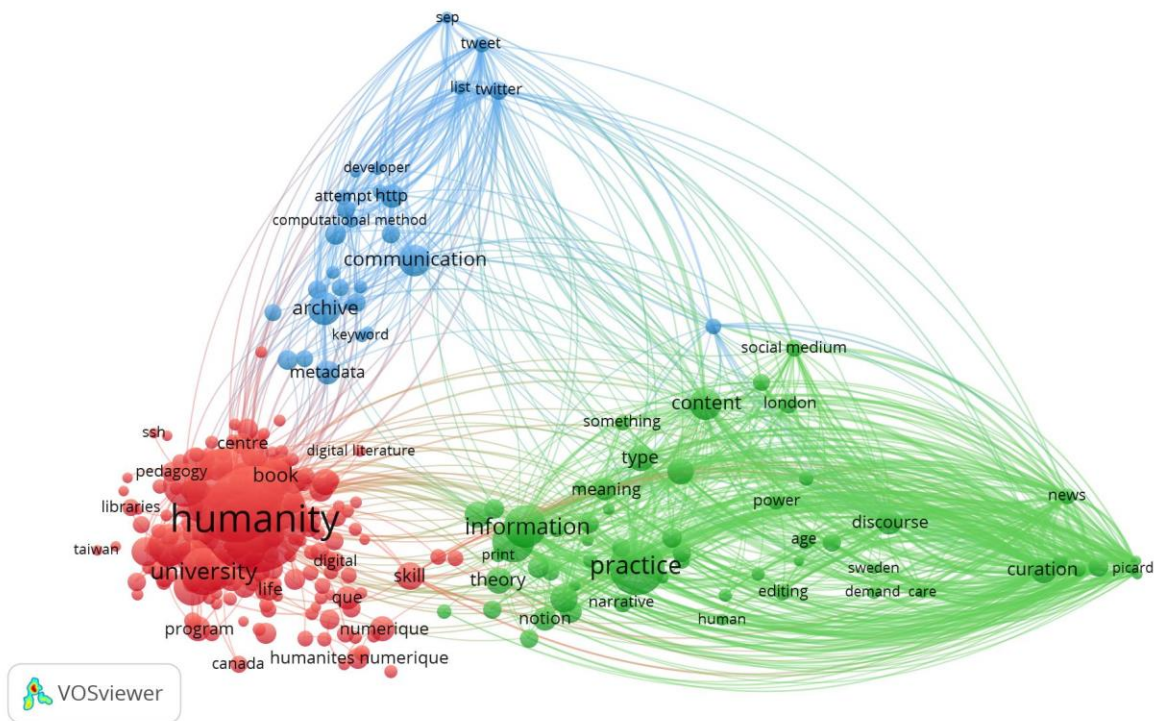


Fig 7: Co-occurrence of Keywords

Conclusions: Digital Humanities is one of the emerging research topics in the world at present time because there are many topics associated with this subject and it will open the way for many more studies in the future. On the open access platform, the growth of digital humanities scholarly publications has been quite good over the last 20 years i.e. from 2001 to 2020. Authorship pattern shows that there are two types of authorship trends such as single and joint authorship trends here at proportional rates and strong relationships have been found between authors from the Co-authorship network. Researchers from developed countries around the world and their established educational institutions have published research papers on digital humanities. Research articles have been published in reputed open access journals, published by world-renowned publishing houses. Analyzing the subjects and keywords, it is understood that work has been done on various issues related to digital humanities, which is establishing this subject as an interdisciplinary domain. The current work is done only on the basis of publications available in the Lens database which is a limitation of this work. However, in the future, if we analysis the scholarly data of Web of Science, Scopus or Directory of Open Access Journals, the research trend of digital humanities in open access will be better understood. In conclusion, if educational and research institutions encourage their scholars to conduct research on digital humanities and to publish those research outputs on open access platforms, the number of publications on this subject will increase in the future.

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