A DECADE OF DISTANCE EDUCATION RESEARCH IN INDIA A BIBLIOMETRIC REVIEW

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ABSTRACT
Distance Education which is also considered as distance learning is the type of learning where students are not physically present in the classroom. Distance learning has become popular in last decade with the rise of the internet. This study focuses on the research outputs by the Indian authors in distance education. India has seen a surge in distance education in last decade and also experienced the rise in the research towards the distance education domain. The study has observed that the research in the field of distance education has almost doubled since 2020. The Covid-19 pandemic has made a positive impact in the research of distance education. So, the authors have done a bibliometric study on distance education for the decade. Bibliometric analysis gives us a trend of research on a particular topic. It is also useful for understanding the gap among the current research studies. This bibliometric study provides various research themes in distance learning which can be considered by the researchers for their future research.
Keywords: Distance Education, Distance Learning, Research in Distance Education, Bibliometric Review.

Introduction
Education field and the formal learning process remained the same for many decades. Knowledge transfer inside of the classroom from teacher to students was a common way of education. This method has been vastly used for decades by most of the countries. This method has various problems such as the need for physical availability of students in the classrooms, huge infrastructure requirements for schools and colleges, requirement of transportation for students, rigid timings etc.

Distance learning or distance education evolved as a solution. Various developing countries like India have accepted the distance learning mode of education. It is gaining popularity in India. The flexibility of learning provided by distance education is the key factor for the distance education.

The popularity of distance education in India has attracted various researchers to consider this domain of research. Indian researchers started contributing towards distance education research in the last decade. The last five years have seen a hike in the research in the field of distance education.

Bibliometric analysis is one of the popular research techniques which is useful for analyzing large volumes of research data. This is useful in finding the existing research stage and new research avenues in a particular domain. Performance analysis, mapping and network analysis etc. is done under the scope of bibliometric analysis. Data visualization is one of the popular outputs of bibliometric studies.

This bibliometric research is focused on identifying the current level of research in distance learning. It is useful for future researchers to see the current level of research and to easily find out the gap in existing research. This research can become a steppingstone for further research in the area of distance education.

Review of Literature:
Mubarak Al-Khatir and Al-Arimia (2014) studied the e-learning facility available for the students. E-learning have adaptability as per the need of the students. It has more variety in the teaching learning process. E-learning is suitable for distance education. The technology should be used significantly in distance education.

Joi. Moore, Deane and Galyen (2011) studied various environments for e-learning, online learning and distance learning. They have identified the differences between these learning methods. Distance learning is a platform where the educational material is transferred in the print as well as educational format.

Valentine (2012) discussed various possibilities and problems in distance education. The educational quality under distance learning is considered as a main issue. Various hidden costs involved in distance learning are considered a problem by the students. Attitude of students, faculty members and administration staff is also a problem in the adoption of distance learning.

Bubuselic (2012) explained various concepts in distance learning. Distance learning is a learning method where teaching-learning is not done in a classroom but done with the help of technology. Distance learning was initially done with the help of postal services. Today, the internet and electronic devices are used for distance learning. Preparedness of the student for the classes is a main issue identified by the researcher. Social isolation of the students is also an issue in distance learning.

Tibaná-Herrera, Fernández-Bajón, and Moya-Anegón (2018) has done a bibliometric analysis for e-learning. They have a year-wise research output and identification of top journals in the e-learning domain. The related keywords were identified and analyzed with the help of VOS viewer for getting meaningful output.

Abubakar, Harande, and Abubakar (2009) explained the process of e-learning as a teaching learning process with the electronic devices. E-learning has become popular in the world. It is widely accepted all over the world. It is used in developing countries.

Adeniji (2019) has done a bibliometric analysis of learning analytics. It has analyzed the data of various years and identified the list of most prolific authors, highly productive research institutes, highly productive journals, research themes etc. VOS viewer has been used as a tool in this bibliometric study.

Amoozegar, Khodabandelou, and Ebrahim (2018) studied various trends in the research of distance education. The bibliometric study is focused on the available research data from 1980-2016. This research is a foundation for the future research in the field of distance education research.

Chiang, Kuo, and Yang (2010) did a bibliometric analysis on the e-learning topic with the help of SSCI database. It has considered research studies from 1967 to 2009. It found out that the research output in the field of e-learning is increasing. The majority of research output in the field of e-learning is by multiple authorship papers

Djeki, Degila, and Bondiombouy, Alhassan (2022) did a bibliometric study on the e-learning topic. It has considered the research from 2015 to 2022. The research identified the USA, Spain, England, and China as most productive countries in the field of e-learning.

Yin (2022) presented a model of virtual reality based on artificial intelligence. It concludes that the learning will be enhanced when it is tested with a multidimensional approach by the learner.

Babacan & Yuvarlakbas (2022) studied the impact of Covid-19 pandemic on digitalization in education. Digitalization of education has various advantages like flexibility of time, time saving etc. It has few drawbacks which includes less attention and student preference is for classroom teaching more than digitized form of teaching.

Zabolotska & Bakhov (2022) discussed the effectiveness of distance education. According to the investigation's findings, both the number of educational websites visited on public platforms and the degree of student autonomy when completing assignments are dramatically rising.

Objectives:
1. To find out research publication trend in Distance Education
2. To identify popular articles in the field of Distance Education
3. To find out various research themes in the Distance Education research for future research

Research Methodology:

Availability of data is essential for any research. Researchers have used Scopus database for this study. Scopus is one of the best databases with high quality research papers. Hence, this research is based on the research articles indexed by Scopus.

The researchers made a search query for 'Distance Education' on the Scopus database in January 2023. The search with the 'Distance Education' keyword was done with filters like title, abstract, keywords, publication year, publication stage, country/territory etc. Research in India is only considered from 2013 to 2022 for this study. Researchers finally collected data of 959 research articles which were used for the study.

The data was exported in the 'CSV' format and analysis was done with the help of MS-Excel software. A data visualization tool, VOS viewer was used for data visualization in graphical format.
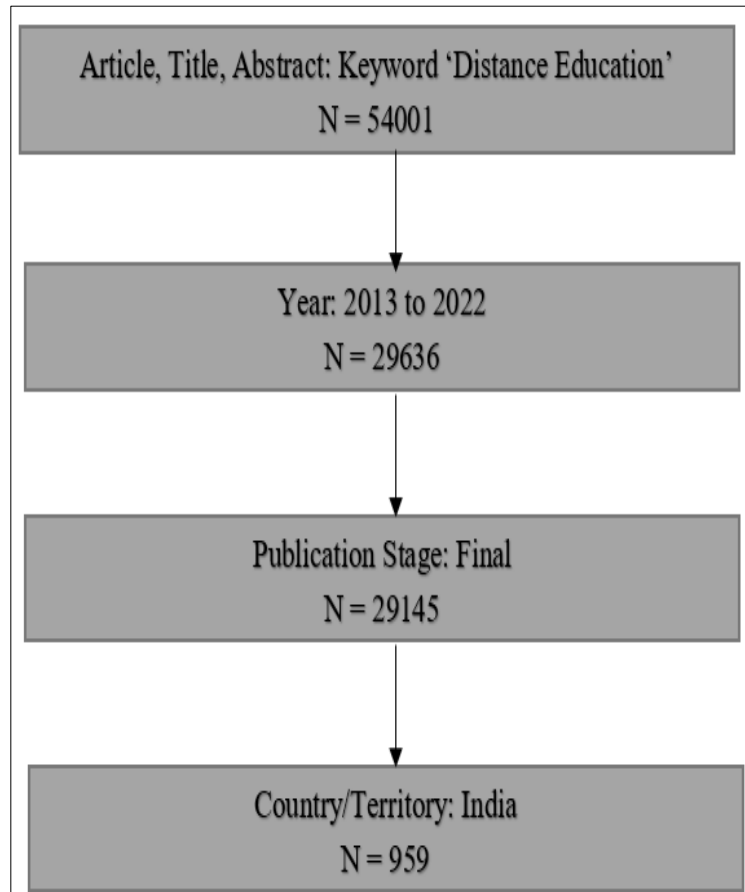

Figure 1. Search Query for Data Collection

Data Analysis & Discussion:

Figure 2. Year Wise Research Output

Figure 2 shows the research output for 'Distance Learning' from India over the decade. It clearly shows that the research from the year 2013 to 2018 was at a low pace which was doubled from the year 2020. This indicates the interest of Indian researchers towards research in 'Distance Learning' field.

Sr. No	Document	Citations
1	palvia s. (2018)	237
2	gope p. (2018)	117
3	kaup s. (2020)	110
4	agarwal s. (2020)	107
5	gao w. (2017)	107
6	yang d. (2018)	96
7	singh k. (2020)	94
8	dror d.m. (2016)	77
9	goel a. (2020)	78
10	momtazmanesh s. (2020)	73

Table 1. Top 10 Cited Articles on 'Distance Learning'

Table 1 indicates the top 10 cited research articles on 'Distance Learning' theme. Highest cited research paper has 237 citations.

Figure 3 indicates the linking between various keywords considered in 'Distance Learning' studies. Figure 4 indicates the year wise research output in 'Distance Learning' studies. Figure 5 indicates the density of keywords in the 'Distance Learning' studies. The size of color patches indicates the frequency of keywords.
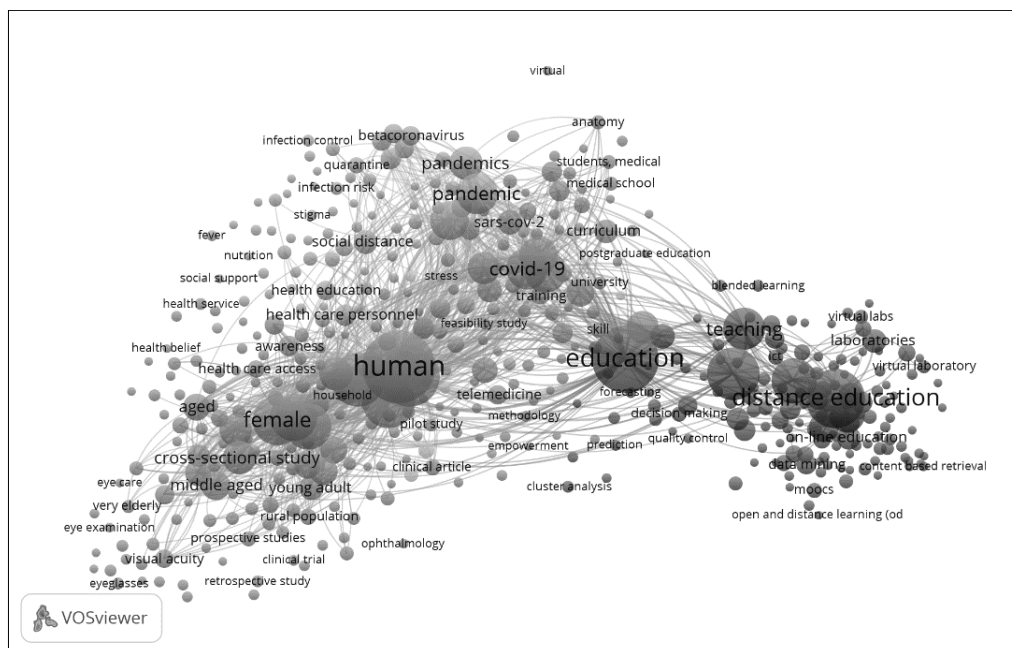

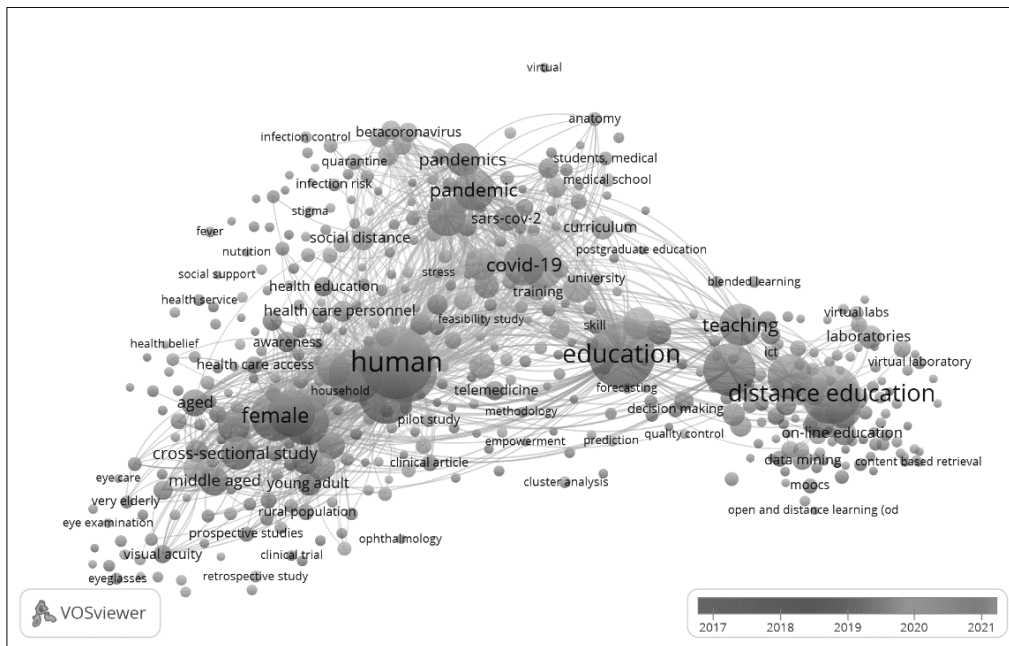Figure 3. Network Visualization for Distance Learning

Figure 4. Distance Education Overlay Visualization

Figure 5. Distance Education Density Visualization

The entire keyword data is analyzed and visual interpretation gives six clusters of keywords. Figure 6 indicates the biggest cluster 1 with 149 items. This includes academic performance, active learning, application programs, artificial intelligence, augmented reality, big data, blended learning, capacity building, cloud computing, cluster analysis, collaborative learning, distance education, distance e-learning, data mining, decision making, distance education system, e-leaning, education, education system, engineering education, higher education, intelligent computing, internet of things, laboratory education, learning management, machine learning, mobile learning, online learning, online education, open and distance learning etc.
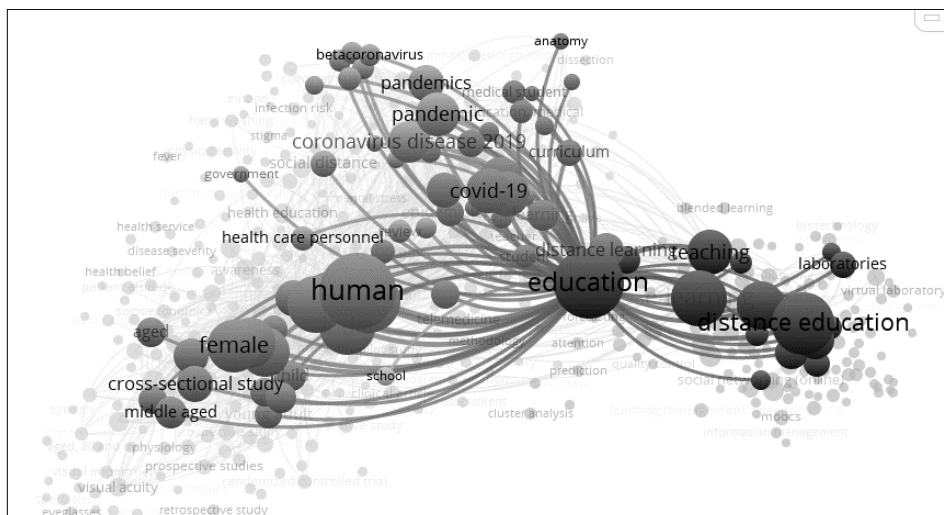
Figure 6. Network Visualization for Cluster 1

Figure 7 indicates cluster 2 with 140 items. It includes clinical trial, age distribution, attitude to health, awareness, child, child preschool, clinical article, controlled study, demography, distance, human, education, teaching, educational status, financial management, follow-up, health belief, group by age, health service, human, patient care, prescription, priority journal, primary medical care, quality of life, retrospective study, telemedicine, treatment outcome etc.
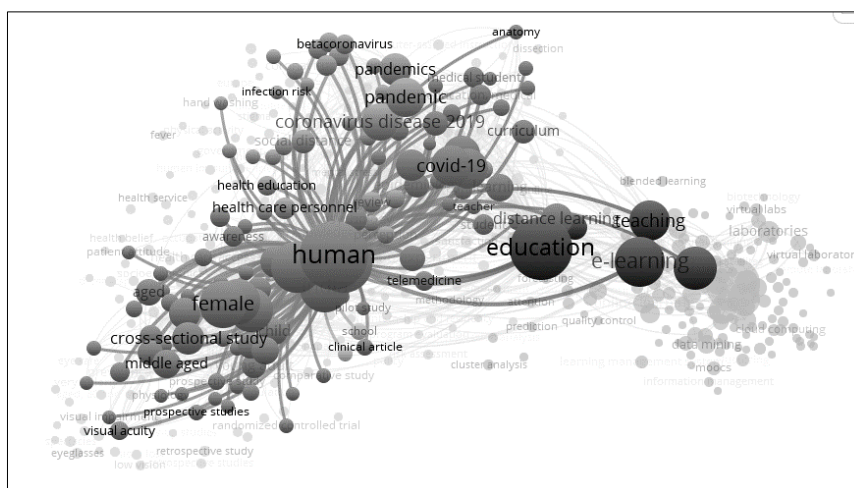

Figure 7. Network Visualization for Cluster 2

Figure 8 indicates cluster 3 with 82 items. This mainly includes pandemic, pandemics, beta coronavirus, coronavirus, coronavirus infection, developing countries, economic aspect, economics, fever, global health, government, health care facility, health care personnel, health education, health promotion, health survey, infection control, isolation, leadership, lockdown, medical research, mental health, mortality rate, parental care, public health, public health care, social distance, social isolation, vaccination etc.
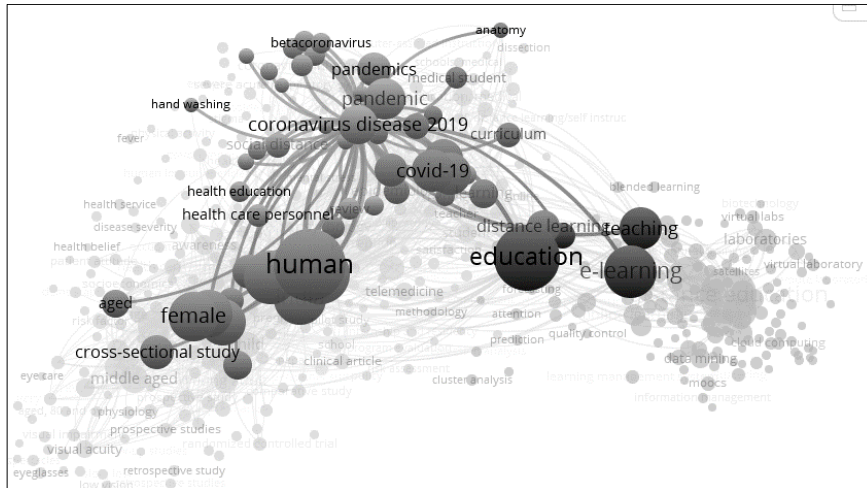
Figure 8. Network Visualization for Cluster 3

Figure 9 indicates cluster 4 with 73 items. This mainly includes academic achievement, clinical competence, computer assisted instructions, dental education, curriculum, distance learning, education program, distance education, medical education, educational measurement, human experiment, medical education, medical student, methodology, pilot project, pilot experience, residency education etc.
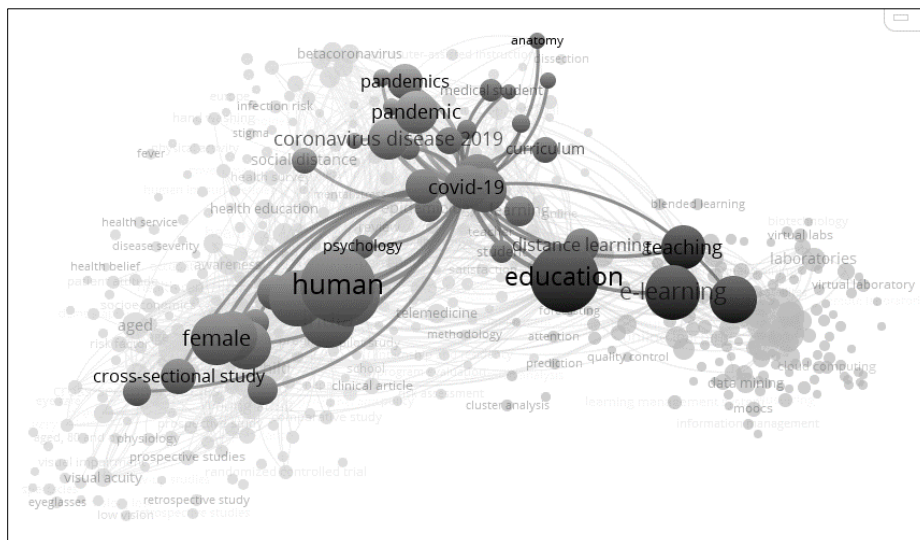

Figure 9. Network Visualization for Cluster 4.

Figure 10 indicates cluster 5 with 11 items. This mainly includes attitude, barriers, Covid-19, exercise, healthcare, interpersonal communication, mental stress, online, school, schools, stress etc.
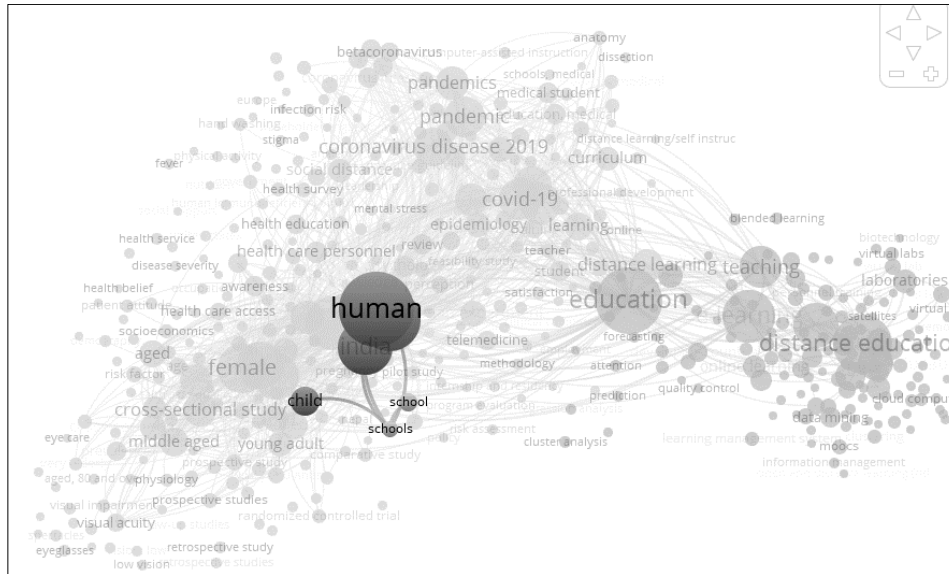
Figure 10. Network Visualization for Cluster 5

Figure 11 indicates cluster 6 with only 2 items. This cluster includes program evaluation and social network.
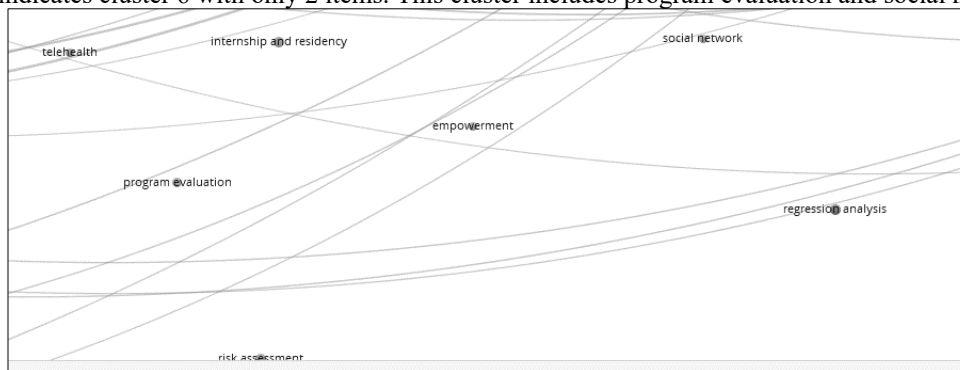

Figure 11. Network Visualization for Cluster 6

Findings:

The researchers found various insights through this study. Following are the findings.

- The research in the field of Distance Learning is increasing. The pandemic has made a positive impact on the research in the field of 'Distance Education'. The researchers have mainly found out the impact of pandemic on education.
- The researchers found various clusters which are the key themes used by the earlier researchers. Clusters are important to understand the future scope of the research.
- Cluster one is mainly about the impact of Covid-19 pandemic on education. It considers various aspects of education during the pandemic. It also considered the role of health care professionals during pandemic.
- Cluster two mainly focuses on medical education and pandemic. It is focused on medical treatment, age, attitude in education etc.
- Cluster three is focused on cross sectional studies done. It focuses on social distancing, health services, mental health etc. during the Covid-19 pandemic.
- Cluster four is focused on the psychological aspects of the Covid-19 pandemic on the learning process. It is focused on students, medical students, medical education etc. It considers the teaching and teachers point of view.
- Cluster five is focused on the attitude of students, online education, online schools, mental stress faced by the students etc. Cluster six is the smallest cluster which is focused on evaluation of educational programs and impact of social networks.

Conclusion:

The research in the field of 'distance education' is increasing rapidly. The research was steady for the initial period but has taken a plunge since 2020. The study has identified six clusters which can be considered as themes of study. The existing research on the topic of distance education mainly revolves around education,

distance education, e-learning, Covid-19 pandemic etc. The Covid-19 pandemic has made an impact on the studies conducted towards distance education. The researchers mainly focused on the need, availability and situation of 'distance education' because of the pandemic. Future research should be conducted for finding the effectiveness and drawbacks of 'distance education'. Future researchers can consider social networking, problems in distance learning, impact of online learning, effectiveness of online learning, mobile learning and blended learning etc. as the themes for their research. The research in the field of distance learning will keep on growing as the distance learning field grows.

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