SENTIMENT ANALYSIS OF OPEN EDUCATIONAL RESOURCES (OER) VIDEOS ON YOUTUBE: A STUDY

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

MANASHJYOTI DEKA
MZU REGISTRATION NO.: 1900187
Ph.D. REGISTRATION NO.: MZU/Ph.D./1431 of 23.07.2019

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE
SCHOOL OF ECONOMICS, MANAGEMENT AND INFORMATION SCIENCE
JUNE 2023

SENTIMENT ANALYSIS OF OPEN EDUCATIONAL RESOURCES (OER) VIDEOS ON YOUTUBE: A STUDY

BY

MANASHJYOTI DEKA

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE

NAME OF SUPERVISOR

DR. AMIT KUMAR

SUBMITTED

IN PARTIAL FULFILLMENT OF THE REQUIREMENT OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN LIBRARY AND INFORMATION SCIENCE OF MIZORAM UNIVERSITY, AIZAWL

MIZORAM UNIVERSITY

(A Central University)

Department of Library and Information Science

Tanhril, Aizawl – 796004

Gram: MZU, P.O Box: 190, Phone: (0389) 2331607, Email: mzut194@mzu.edu.in

CERTIFICATE

This is to certify that the thesis entitled **"Sentiment Analysis of Open Educational Resources (OER) Videos on YouTube: A Study"** submitted by **Manashjyoti Deka**, Ph.D. Scholar for the award of the Degree of Doctor of Philosophy in Library and Information Science is carried out under my supervision and incorporates the student bona-fide research and this has not been submitted for the award of any degree in this or any other university or institute of learning.

Place: Aizawl, Mizoram (DR. AMIT KUMAR)

Date: Supervisor

MIZORAM UNIVERSITY

Month: June **Year: 2023**

DECLARATION

I, **Manashjyoti Deka**, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/Institute.

This is being submitted to the Mizoram University for the degree of **Doctor of Philosophy in Library & Information Science.**

(MANASHJYOTI DEKA)
Research Scholar

(PROF. PRAVAKAR RATH)
Head of Department

(DR. AMIT KUMAR)
Supervisor

ACKNOWLEDGEMENT

I consider myself incredibly fortunate to have Dr. Amit Kumar, an esteemed Assistant Professor in the Department of Library and Information Science at Mizoram University, as my supervisor. I am profoundly grateful to him for his unwavering support, invaluable guidance, scholarly expertise, continuous encouragement, and heartfelt well-wishes throughout my research journey. Without his presence, this work would never have reached completion. Dr. Kumar has not only provided moral and spiritual support but has also been a pillar of strength in every aspect of my research endeavor.

In addition to my dedicated supervisor, I would like to extend my sincerest appreciation to Prof. Pravakar Rath, the Head of the Department of Library and Information Science at Mizoram University, Aizawl. His insightful contributions to my research have been truly invaluable, and he has consistently served as a reliable guide throughout the entirety of my research.

I am equally indebted to the esteemed faculty members of the department, including Prof. R. K. Ngurtinkhuma, Prof. S.N. Singh, Dr. Manoj Kumar Verma, Dr. Lalngaizuali, Dr. F. Chanchinmawia, and Dr. Manendra Kumar Singh, for their unwavering support and encouragement during my research work. Their guidance has been a constant source of motivation.

I am immensely grateful to my fellow lab mates, Mr. Dibanjyoti Buragohain and Mr. Yadukrishnan T A, who have not only provided moral and spiritual guidance but have also extended a helping hand whenever needed during my research work. I would also like to give special recognition to fellow Research Scholars Miss Bhagyashree Boro, Miss Anudha Lepcha, Mr. Abhishek Rai, Miss Maya Deori, and Mrs. Tribeni Pathak, for their unwavering support and invaluable guidance.

I am also grateful to the dedicated staff of our department office, especially Dr. Vanlalneia, Miss Kimi, and Anju Aunty, for their unwavering support and invaluable guidance.

Additionally, I would like to express my gratitude to Mr. Ranjan Jyoti Sarma and Miss Sweety Basumatary for their invaluable assistance in statistical analysis, which greatly contributed to the success of my research.

I extend my sincere appreciation to my beloved parents, Mr. Gopeswar Deka and Mrs. Rina Tahbildar Deka, as well as my elder brother, Mr. Nayanjyoti Deka, and sister-in-law, Jonamoni Hazarika. Their boundless love, prayers, care, and financial support have been instrumental in my research accomplishments. Without their unwavering backing, I would not have achieved this significant milestone.

Lastly, I would like to express my profound gratitude to the almighty God for granting me good health, strength, and unwavering determination throughout my research work. I am humbled by His blessings, which have enabled me to successfully complete my research.

Within the limited space of this acknowledgement, I strive to convey my deep appreciation to all those who have contributed to my research journey.

Place: Aizawl **(MANASHJYOTI DEKA)**

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

Abbreviated Term	Description
API	Application Programming Interface
AR	Augmented Reality
CC	Creative Commons
CNNs	Convolutional Neural Networks
GDPR	General Data Protection Regulation
GPT-4	Generative Pre-trained Transformer 4
HD	High Definition
IBM	International Business Machines
ICT	Information Communication Technology
LIS	Library and Information Science
MERLOT	Multimedia Educational Resource for Learning and Online Teaching
MIT	Massachusetts Institute of Technology
MOOCs	Massive Open Online Courses
NCERT	National Council of Educational Research and Training
NDLI	National Digital Library of India
NIOS	National Institute of Open Schooling
NLP	Natural Language Processing
NLTK	Natural Language Toolkit
NPTEL	National Programme on Technology Enhanced Learning
NROER	National Repository of Open Educational Resources
OCW	OpenCourseWare

ODL	Open and Distance Learning
OEC	Open Education Consortium
OEDb	Open Education Database
OER	Open Educational Resources
OEP	Open Educational Practices
OLI	Open Learning Initiative
RNNs	Recurrent Neural Networks
SD	Standard Definition
SD	Standard Deviation
SM	Social Media
SVM	Support Vector Machines
SYL	Standard YouTube License
VR	Virtual Reality
UNESCO	United Nations Educational, Scientific and Cultural Organization

CHAPTER - 1
INTRODUCTION

1.1 Introduction

Library and information science as a discipline attain its dignity and position because of the diverse nature of evolving the subject. The evolution of the subject has led to the development of new concepts and ideas in the academic community. It leads many researchers and academicians to undertake research activities to create and innovate the mindset of the people. The advancement of ICT has paved a new way for scholarly communication among the academic community. It also leads to the emergence of many new areas and to undertake the research activity. The emergence of ICT has also changed the scenario of information processing, storage, dissemination, and communications, and it facilitates researchers, academicians, and LIS professionals to move towards multi-disciplinary research. The LIS professionals of the contemporary time have developed a new environment where ICT tools are the main driving forces to carry out any operations in the library, and they got acquainted with the latest tools and techniques to perform their tasks which was made possible due to the prominent research in the respective fields. The emergence of Open Educational Resources (OER) has also changed and revolutionized the way library functions and operates in terms of access and usage when it comes to academia. The way information has found its new channels in reaching people is a fascinating area to look into. The information society and its constant adoptions and adaptations to avail information have fundamentally led to the proliferation of OER and its worldwide reach.

Social media is one of the important components of the modern information society. People from every walk of life have adopted and accepted social media as one of the important mediums to receive and send information. Social media has various utilities, and people use these for various purposes. It is found from the study that commercial firms and online shopping sites are connected with social media for the

promotion of products and services. Online shopping sites also retrieve information related to comments, opinions, or feedback from the consumer through social media.

YouTube is the most prominent social media platform which is widely used across the globe. This popular online video site possesses a huge collection of videos related to different areas. It consists of product descriptions, services, entertainment, news, tutorial educational videos, etc. Other than the number of views, one way to understand the engagement of the audience is to analyze what they have commented under the videos uploaded on YouTube with which the sentiment of the viewer can be understood. Many commercial firms and industries are undertaking sentiment analysis to understand the position of the services provided by the firms. The prime objective of sentiment analysis is to examine whether the text or sentence has positive or negative emotions. Sentiment analysis has attained a dignified position and gained rapid popularity in different study areas.

1.2 Sentiment Analysis

Sentiment Analysis is generally defined as the study of a person's opinion or sentiment towards something, be it a product, service, event, or political situation. It is the automated process of analyzing text data and sorting it into sentiments, positive, negative, or neutral. It is extremely helpful for social media monitoring since it gives us a broad picture of how the general population feels about particular issues. With the advancement of ICT and the popularity of web applications like social networks, blogs, forum discussions, and e-commerce sites, people sharing their opinions about products, services, or any topics has become common in today's world. Examples can be cited of Amazon collecting customer reviews about products or services, and social networks such as Twitter and Facebook allow users to publish their opinions on any topics, such as events, elections, products, or services. Both consumers and manufacturers can benefit from these viewpoints. The producers recognize the problems from the feedback from the customers, and they fix them to increase sales. From the customers' point of view, the opinion of the review documents about the products is useful to make decisions when purchasing the products in e-commerce sites where one can't physically

view and verify the quality of the products. Based on the customer's reviews, we purchase the products. However, it is a very difficult task to classify the review documents according to positive or negative sentiment manually because a greater number of reviews are posted on many sites.

Moreover, people are interested to know about the sentiment of the entities at the level of the aspect. Hence, it is necessary to construct a sentiment analyzer that classifies the review documents into positive or negative sentiment and also identifies the sentiment of the aspects of entities from the review documents automatically. In other words, Sentiment analysis is also known as opinion mining (Liu, 2012). In basic terms, it involves figuring out the emotional undertone of a string of words in order to comprehend the attitudes, opinions, and feelings conveyed in an online remark. The uses of sentiment analysis are numerous and effective. Organizations all over the world are using the capacity to extract insights from social data on a large scale.

1.2.1 Sentiment Analysis: Tools

A Sentiment analysis tool is software that analyzes text conversations and evaluates the tone, intent, and emotion behind each message. Various tools, both open and commercial, are available for sentiment analysis purposes. Some of the popular tools are as follows:

i. AYLIEN
ii. Mozdeh
iii. Sentiment Analyzer
iv. ParallelDots API
v. RapidMiner
vi. Social Mention
vii. Semantria
viii. Clarabridge
ix. Brandwatch

1.3 Open Educational Resources

All educational materials that are openly licensed for usage, access, reuse, modification, sharing, and resharing with others anywhere in the globe are referred to as "open educational resources." The phrase was first used in a gathering of nations from the developing world at the UNESCO Forum in 2002. In the forum, open educational resources were defined as “the open provision of educational resources, enabled by information and communication technologies, for consultation, use, and adaptation by a community of users for non-commercial purposes” (UNESCO, 2002). It is a trend that seeks to make education accessible to everyone at any time and anywhere in accordance with their requirements and convenience. The William and Flora Hewlett Foundation, the instrumental founder of this movement, defines OERs as “teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and repurposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials or techniques used to support access to knowledge” (The William and Flora Hewlett Foundation, 2015).

D. E. Atkins has also tried to define Open Educational Resources as “Teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or repurposing by others.”

The activities involved in OER can be understood with 5R activities proposed by David Wiley as follows:

(i) Retain - the right to design, develop, and control the content copies, including their downloading, replication, storage, and management;

(ii) Reuse - The power to change how content is used in a variety of contexts, such as in a video lecture, study group, or in class;

(iii) Revise - The power to adapt, modify, or change the scope of the content to suit convenience, such as by translating it into its native tongue;

(iv) Redistribute - the power to share the original copies of the unique creation, revision, or blending of the other elements.

(v) Remix - the power to create a new diagram by merging the various materials, both the original and new elements. (For instance, send a friend a copy of the content)

Open Educational resources have become one of the thrust areas of research for academicians and a prime concern of the nations because of their potential.

1.4 YouTube

YouTube is a video-sharing platform where users can upload their videos as well as watch those that are posted by other users. People see the videos that creators complete and then share, like, and comment on them. The service was launched in 2005 as a standalone website before being purchased by Google in 2006. Today, YouTube is the largest user-driven video content provider in the world. It has become a major platform for disseminating multimedia information. YouTube videos are posted by people from all over the world, from all types of backgrounds. Therefore, there is a wide range of videos available on YouTube. Some examples include amateur films, homemade music videos, sports videos, and other fun events caught on video. Additionally, YouTube serves as a platform for users to share informative resources, like step-by-step tutorials, do-it-yourself guides, and educational content. Some users have been able to make money off of YouTube since Google offers revenue sharing for ad clicks made on video pages. Now people use YouTube as an online learning tool. Its immense importance lies in gaining familiarity among the modern generation of users who depend on YouTube for educational purposes. There are varieties of content available on YouTube related to educational purposes, which has compelled the academic community to be dependent on it to clear their doubts and confusion and also to understand any new area of study. YouTube has not only fulfilled academic scholarly communication but also acts as a tool to promote open educational resources that can be accessed by anyone across the globe.

1.5 Significance of the Study

Librarianship is the profession of having an interest in measuring the sentiments of users so that an extreme level of satisfaction can be achieved. Sentiment Analysis can be considered useful in social media monitoring as it allows the researchers to gain an insight that leads the wider public opinion behind certain topics. The application of social media is wide and powerful as it has the power to extract insights from the data through social media platforms where organization across the globe is being practiced. In recent decades, studies and research on sentiment analysis have been conquering a significant place by using various social networking sites. Sentiment Analysis helps the researcher to analyze the opinions, suggestions, likes, dislikes, etc., of the public easily. Several studies were conducted by opting for Twitter, Facebook, and other websites, but it can be seen that so far, no studies have been conducted on YouTube with special emphasis on open educational resources, which is an emerging area in academics. The study will undertake several parameters to examine the sentiment of the users about open educational resources on YouTube. The study will also help the LIS professionals to evaluate the psychological aspects of the user by using social networking sites as a tool to measure. It will also help the LIS professionals to seek interest in this newly emerging area of research.

1.6 Scope of the Study

Sentiment analysis is considered one of the emerging branches of study to understand the sentiments of the people. People across the globe are using social media to communicate, share, disseminate, preserve, and retrieve information. It is seen from several studies that commercial firms and organizations are prominently adopting the culture of sentiment analysis to understand customers in a better way with the rapid application of social media platforms. The adoption of social media has led firms to promote their products and services in a new pattern. YouTube is one of the popular social media, which is a hub of different videos with different dimensions. It facilitates learning, research, and other academic activity. It also led to the emergence of open

educational resources, which provided a new forum for the academic community. There are huge numbers of videos on open educational resources (OER) available on YouTube.

The present study focuses primarily on evaluating the sentiment analysis of open educational resources (OER) videos made available or uploaded on YouTube during 2007 - 2022. The study also tends to identify the intention of comments given by the users, to evaluate the comments, whether it is positive or negative in nature, and to understand the emotions, including emojis forwarded by the users. The study was conducted for a period of sixteen years, i.e., from 2007- 2022.

1.7 Research gap

The research topic used for the study is depicted in the literature review. After going through the literature review, it is found that the area of sentiment analysis by Indian LIS professionals, especially in research, is still untouched. Further, a very limited number of papers/literatures is available. So, the present study fills this gap and paves the path for other scholars to undertake such an area of research.

1.8 Research Design

1.8.1 Statement of the Problem

Sentiment analysis is the systematic study to understand a person's opinions or sentiments towards anything, whether it may be a product, service, or even political situation, etc. It is an automated process where the evaluations of text mining are done, and then sorting is carried out wherein positive, negative, or neutral is marked. There is an ample amount of literature found on sentiment analysis by undertaking Twitter, YouTube, etc., mainly carried out by commercial firms. It is observed that so far, no studies on sentiment analysis have been conducted by considering Open educational resources on YouTube. The LIS community has felt the necessity to take up the imitative in investigating the sentiment analysis of people with regards to open educational resources on YouTube.

1.8.2 Objective of the Study

The following is the list of objectives that are laid down for the study:

i. To analyze the sentiments of the comments expressed as positive, negative, or neutral of the YouTube videos on OER;
ii. To identify the intention of a comment which are being expressed by the commenter;
iii. To find out the subjectivity of the comments;
iv. To determine the emotion which has been expressed by the user;
v. To find out the frequently used words in the comments.

1.9 Research Methodology

For the systematic and scientific study of any concept, the methodology is an important and indispensable step. The research is exploratory in nature and designed to analyze the sentiments of videos on open educational resources (OER) available on YouTube.

a) Parameters of Study: The sentiment analysis includes different indicators to measure the research. The study covered the count of total number of comments (English language only) on a video, no. of views and likes of the video, the resolution and license of the videos, top-viewed, top-liked, and top-commented videos on OER, and the sentiment of the comments, whether positive, negative, or neutral. Further, the intentions, emotions, along subjectivity of the comments were also analyzed. For a detailed understanding, a word cloud constituting the most commented words on the videos was also constructed.

b) Method of Data Collection and Analysis: The below listed are the various steps followed in the process of the collection of data and its analysis.

a. The videos were retrieved using search keywords “Open Educational Resources” and “OER” from Webometric Analyst 4.4 software.
b. After the retrieval videos were listed, they are gone through manual filtering.

c. All comments and video data from the specified videos were retrieved with the aid of the Webometric Analyst 4.4.
d. After listing in MS Excel, comments in languages other than English were carefully screened out.
e. Using the Parallel Dot API in Google Sheets, the sentiment, intention, and emotion of the comments were evaluated.
f. Using the OpenAI Text Classification Playground, the subjectivity of the comments was examined.
g. Mozdeh software was used to ascertain the words' frequency in the comments.

The data was collected in different time intervals with respect to the convenience of the study, and the final set of data was collected on the 15th of January, 2023.

c) Literature Search: Various primary and secondary sources of information, along with internet sources, were used for getting additional information and filling the gap in understanding the area. In addition to this, to maintain uniformity in citation and referencing, the latest version of the APA manual was used.

d) Data collection tools: Various tools that have been used to collect and interpret the data have been discussed below.

1. **Webomteric Analyst 4.4**: This software helps in conducting automatic web analyses on a large scale. Here we used this software to retrieve YouTube data on OER, such as video lists and video information such as views, likes, comments, licensing, resolution, etc. The comments under OER videos have been retrieved from the period 2007 to 2022 using this software.

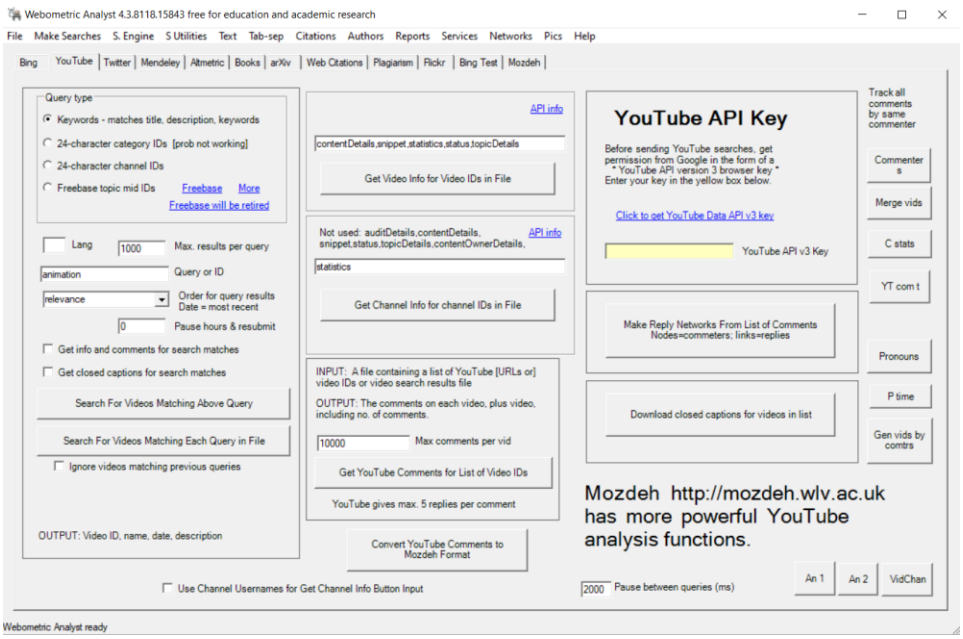

Figure 1.1: Webomteric Analyst

2. **ParallelDots API**: This is a Natural Language Processing platform that is used to extract insights from textual data. The comments retrieved using Webometric Analyst software have been analyzed using this NLP tool. The extension of this tool has been added to Google Sheets in order to analyze the sentiment, intention, and emotion of the comments of OER videos on YouTube.

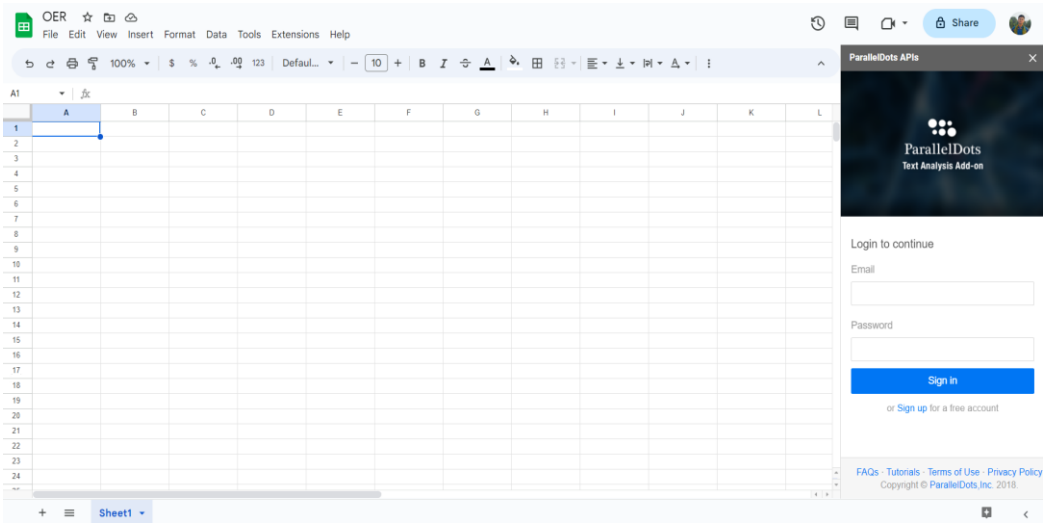

Figure 1.2: ParallelDots API Extension in Google Sheet

3. **Open AI Playground**: This is an interactive bot platform of Open AI that is used for various content generations. In this study, this GPT4 playground has been used to find the subjectivity of the comments of OER videos.

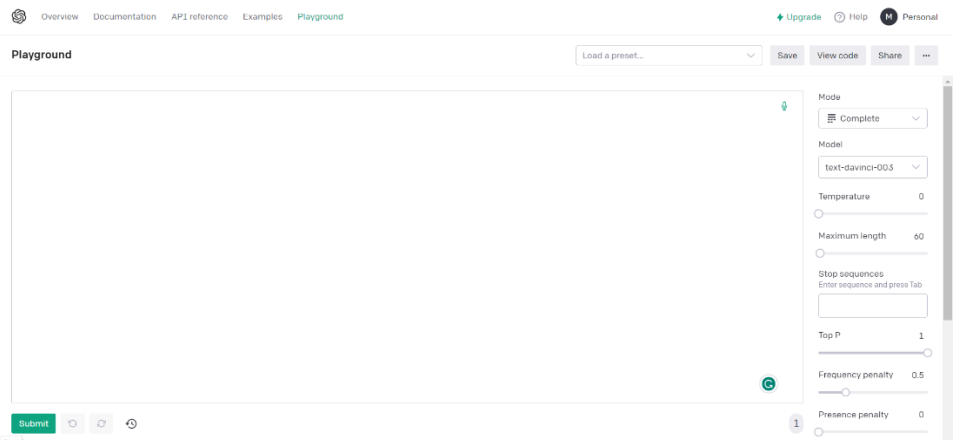

Figure 1.3: Open AI Playground

4. **Mozdeh**: This is a social media analysis software that is used to extract insights from social media platforms. Here, it has been used to identify the most frequently used terms in the comments on OER videos.

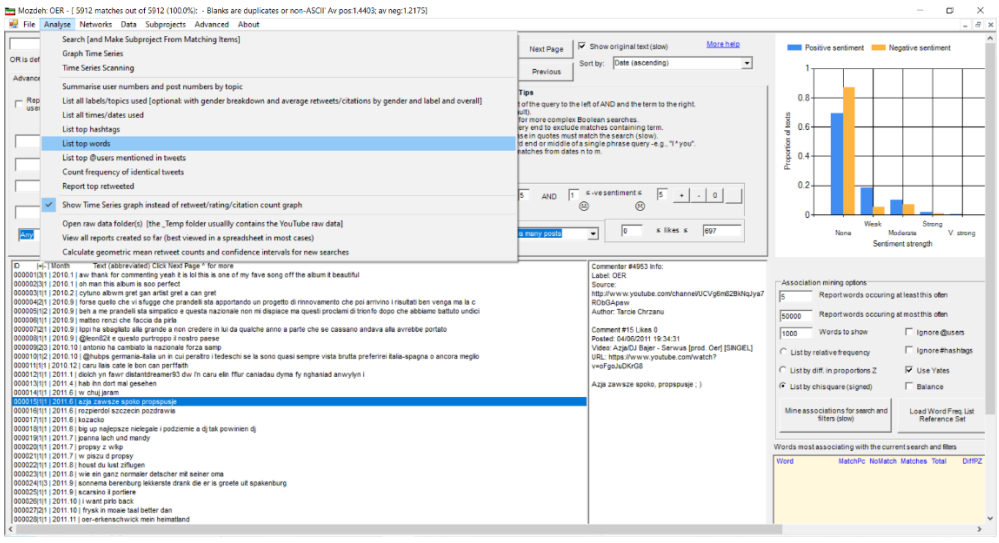

Figure 1.4: Mozdeh Software

5. **WordArt.com**: This is an online word-cloud generation tool (https://wordart.com/) that is used for the visualization of textual data in accordance with the word frequencies. A word cloud was generated using this online tool to visualize the frequency of terms used in comments of OER videos.

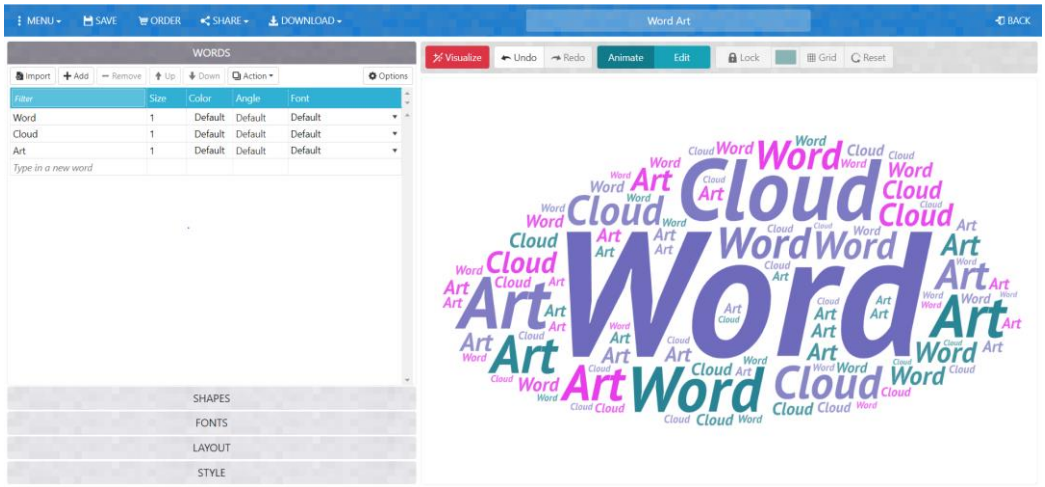

Figure 1.5: WordArt

1.10 Hypotheses

The hypotheses for the present study are as follows:

H_1 - Majority of the videos are available with positive sentiments rather than negative; and

H_2 - Majority of the learners prefer to show their opinion about the videos through likes and dislikes only.

1.11 Chapterization of the study:

The following chapters make up the current research area:

Chapter 1: Introduction

This chapter deals with the introductory part of the entire research. Various essential sections, such as significance, scope, objectives, hypotheses, research methods,

etc., that frame the pillars of the study have been discussed in detail, which guide the progression of this study.

Chapter 2: Review of Literature

This chapter gives a comprehensive analysis of the related literature collected from various sources. Sixty relevant studies have been identified and reviewed in this chapter to form foundational ideas to carry out the research and to substantiate the existing gap in the literature.

Chapter 3: Sentiment Analysis and Social Media Platforms: An Overview

This chapter discusses the core themes of the study, sentiment analysis, and social media in detail, emphasizing the concept and significance of sentiment analysis. The chapter also looks into various software and applications of sentiment analysis in libraries.

Chapter 4: Open Educational Resources (OER), Social Media and its Impact on Librarianship

In this chapter, the concept and importance of Open Educational Resources (OER) are explored. The proliferation of social media as a tool of OER, and different OER sources, particularly emphasizing the significance of YouTube as an effective open educational resource, has been discussed. Further, its implication and impact on librarianship have also been highlighted.

Chapter 5: Data Analysis and Interpretation

The chapter deals with the representation, analysis, and interpretation of the collected data. The findings have been elaborately and carefully examined and analyzed for further discussion and generalizations.

Chapter 6: Findings, Conclusions and Suggestions

In this chapter, the conclusions derived from the findings of the study have been discussed along with various constructive suggestions and scope for the advancement of further research developments in the proposed area. The major limitations of the study have also been mentioned in this chapter.

References

Ashraf, N. & Jamal, S. (2019). Perception of Teacher Educators towards Usage of Open Educational Resources. *In* Rai, P., Singh, A. & Bakhshi, S. I. (*Eds.*), *Bridging Educational Divides MOOCs and OERs* (pp. 140-148). Delhi: National Law University Delhi.

Asghar, M. Z., Ahmad, S., Marwat, A. & Kundi, F. M. (2015). Sentiment Analysis on YouTube: A Brief Survey. Retrieved on the 10th of February, 2020 from https://www.researchgate.net/publication/284724207_Sentiment_Analysis_on_YouTube_A_Brief_Survey

Barretto, M. C. & Morajkar, S. (2017). Sentiment Analysis Tools and Techniques: A Comprehensive Survey. *International Journal for Research in Applied Science & Engineering Technology,* 5(XI), pp.3030-3035.

Basani, Y., Sibuea, H. V., Sianipar, S. I. P. & Samosir, J. P. (2019). Application of Sentiment Analysis on Product Review E-Commerce. *Journal of Physics: Conference Series*, pp.1-8.

Bhuiyan, H., Ara, J., Bardhan, R., Islam, R. (2017). Retrieving YouTube Video by Sentiment Analysis on User Comment. *2017 IEEE International Conference on Signal and Image Processing Applications* (pp. 474-478). Malaysia. Retrieved on the 6th of February, 2020 from https://www.researchgate.net/publication/321408074_Retrieving_YouTube_video_by_sentiment_analysis_on_user_comment

Choudhury, S. & Breslin, J. G. (2010). User Sentiment Detection: A YouTube Use Case. *21st National Conference on Artificial Intelligence and Cognitive Science.* Galway, Ireland. Retrieved on the 6th of February, 2020 from https://www.researchgate.net/publication/316898473_User_Sentiment_Detection_A_YouTube_Use_Case

Cunha, A. A. L., Costa, M. C. & Pacheco, M. A. C. (2019). Sentiment Analysis of YouTube Video Comments Using Deep Neural Networks. *In* Rutkowski, L., Scherer, R., Korytkowski, M., Pedrycz, W., Tadeusiewicz, R. & Zurada, J. (*Eds.*) *Artificial Intelligence and Soft Computing* (pp. 561-570). ICAISC 2019. Springer, Cham. Retrieved on the 5th of February, 2020 from https://link.springer.com/chapter/10.1007/978-3-030-20912-4_51

Godbole, N., Srinivasaiah, M. & Skiena, S. (2007). Large-Scale Sentiment Analysis for News and Blogs. *ICWSM 2007- International Conference on Weblogs and Social Media*, (pp.219-222). Retrieved on the 8th of February, 2020 from https://www.researchgate.net/publication/215470709_Large_Scale_Sentiment_Analysis_for_News_and_Blogs

Halevi, G. & Schimming, L. (2018). An Initiative to Track Sentiments in Altmetrics. *Journal of Altmetrics,* 1(1), pp.1-7.

Iarmolenko, I. (2017). Effectiveness and Transparency of Sentiment Analysis Tools for Academic Purposes. *13th International Conference on ICT in Education, Research and Industrial Applications,* (pp.273-280). Kyiv, Ukraine. Retrieved on 5th February, 2020 from https://www.ceur-ws.org>Vol-1844

Kumar, A., Buragohain, D. & Deka, M. (2019). Open Educational Resources (OER) Issues and Recommendations. *In* Rai, P., Singh, A. & Bakhshi, S. I. (*Eds.*), *Bridging Educational Divides MOOCs and OERs* (pp. 90-98). Delhi: National Law University Delhi.

Lamba, M. & Madhusudhan, M. (2018). Application of sentiment analysis in libraries to provide temporal information service: a case study on various facets of productivity. *Social Network Analysis and Mining*, 8(1). Retrieved on the 5th of February, 2020 from https://www.researchgate.net/publication/328265550_Application_of_Sentiment_Analysis_in_Libraries_to_Provide_Temporal_Information_Service_A_Case_Study_on_Various_Facets_of_Productivity

Lawrence, L. P. (2014). Reliability of Sentiment Mining Tools: A comparison of Semantria and Social Mention. *3rd IBA Bachelor Thesis Conference-2014* (pp.1-13). Enschede, Netherlands. Retrieved on the 5th of February, 2020 from https://www.semanticscholar.org/paper/Reliability-of-Sentiment-Mining-Tools%3A-A-comparison-Lawrence/4ed0b086959d44610c776482d2f70821b39a203b

Liu, B. (2012). Sentiment analysis and opinion mining. *Synthesis lectures on human language technologies*, 5(1), 1-167.

Mozdeh Big Data Text Analysis. (n.d.). Mozdeh Big Data Text Analysis. http://mozdeh.wlv.ac.uk/

Novielli, N., Girardi, D. & Lanubile, F. (2018). A Benchmark Study on Sentiment Analysis for Software Engineering Research. *15th International Conference on Mining Software Repositories (MSR 2018)* (pp.1-12). Gothenburg, Sweden. Retrieved on the 6th of February, 2020 from https://www.semanticscholar.org/paper/A-Benchmark-Study-on-Sentiment-Analysis-for-Novielli-Girardi/6f58d8b98c652897842afddo23c535f9724b4eb2

OpenAI Platform. (n.d.). OpenAI Platform. https://platform.openai.com

Parabhoi, L. & Saha, P. (2018). Sentiment Analysis of YouTube Comments on Koha Open Source Software Videos. *International Journal of Library and Information Studies, 8*(4), pp. 96-102. Retrieved on the 10th of February, 2020 from https://www.researchgate.net/publication/330619821_Sentiment_Analysis_of_YouTube_Comments_on_Koha_Open_Source_Software_Videos

ParallelDots APIs - Google Workspace Marketplace. (n.d.). ParallelDots APIs - Google Workspace Marketplace. https://workspace.google.com/u/0/marketplace/app/paralleldots_apis/729052469457

Sarmah, H. (2019). 7 Sentiment analysis tools to understand what customers are feeling about your brand. Retrieved on the 5th of February, 2020 from https://analyticsindiamag.com/7-sentiment-analysis-tools-to-understand-what-customers-are-feeling-about-your-brand/

Tanesab, F. I., Sembiring, I. & Purnomo, H. D. (2017). Sentiment Analysis Model Based on YouTube Comment Using Support Vector Machine. *International Journal of Computer Science and Software Engineering (IJCSSE)*, 6(8), pp.180-185.

The William and Flora Hewlett Foundation (2015). *Open Educational Resources: Advancing Widespread Adoption to Improve Instruction and Learning.* Retrieved on the 10th of February, 2020 from https://hewlett.org/strategy/open-educational-resources/

UNESCO (2002). Forum on the Impact of Open Courseware for Higher Education in Developing Countries: Final report. Retrieved on the 10th of February, 2020 from https://unesdoc.org/ark:/48223/pf0000128515

Webometric Analyst: altmetrics, web citation analyis, alternative indicators, link analysis, social web. (n.d.). Webometric Analyst: Altmetrics, Web Citation Analyis, Alternative Indicators, Link Analysis, Social Web. http://lexiurl.wlv.ac.uk/

Wikipedia (2020). *YouTube*. Retrieved on the 10th of February, 2020 from https://en.m.wikipedia.org/wiki/YouTube

Wiley, D. (2009). *Open Educational Resources (OER).* Retrieved on the 10th of February, 2020 from https://opencontent.org/definition/

Word Cloud Generator. (n.d.). Word Cloud Generator - WordArt.com. https://wordart.com/

CHAPTER - 2
REVIEW OF LITERATURE

2.1 Introduction

A literature review is an extensive and systematic evaluation of the existing literature on a particular topic or research question. It includes searching and synthesizing relevant studies, books, articles, and other sources of information to give an eye view in a comprehensive and latest understanding of the present field of knowledge in a particular way.

The literature review serves several important purposes in research. It helps researchers to identify what has been studied in the field, the key concepts and theories that have been explored, and the research methodologies that have been used. By synthesizing previous research, researchers can identify gaps in knowledge and develop hypotheses that can be tested in their research. The literature review also provides a theoretical framework that guides the research design and analysis.

A well-executed literature review requires a systematic and thorough approach to searching and evaluating the literature. This involves identifying relevant databases, developing search terms, screening the literature for relevance, and critically evaluating the quality and relevance of the studies included in the review.

A literature review is considered to be one significant part of any research process. To develop a comprehensive understanding of the research problem and to form further ideas and gain insights, a researcher must conduct an evidence-based literature review in the primary stage of research. It involves critical evaluation of the related studies where the researcher, gathers and synthesizes relevant works that support to substantiate the validity of the research and its present status. A literature review has no particular source or type. It can be any piece of literature such as journal articles, conference proceedings, books, reports, etc. as long as it beholds relevant information that helps gain knowledge regarding the proposed topic.

Once the researcher has formed a foundation regarding the choice of the research question, they can identify and define the terminologies in relation to the research question. A review of literature is conducted in a systematic manner where the search is carried out in a variety of sources such as databases (Scopus, Web of Science, PubMed, etc.) as the primary step after the identification of significant key terms. There are various methods to filter down the important data and tools to carry out effective searching. Once the literature is identified, it can be filtered, sorted, and synthesized. It is essential that the researcher evaluate the credibility of the sources, literature, and authors.

Researchers should carry out a thorough evaluation of each work in the synthesizing process and note down the methodologies and significant findings of that research. It is important to keep an unbiased approach during the process as the literature review should be done in a critical but unbiased manner. The literature synthesis can help the researcher understand the strengths, weaknesses, importance, and issues associated with related research by means of which the current status of the knowledge can be understood and thereby identify the existing gaps to carry out the research. Identification of research gaps can help the researcher form new research questions and hypotheses and frame out how the study can be carried out effectively. At this stage, the researcher can format a theoretical framework regarding how they are going to carry out the overall research. Hence the review of literature ultimately guides the researcher on how to navigate their overall research. The researcher has consulted various sources with specific references for comprehensive coverage of the research area. For a better understanding and evaluation of literature related to the specific topic, the researcher has divided the literature into the following heads:

a) Studies related to Open Educational Resources
b) Studies related to Sentiment Analysis
c) Studies related to YouTube

2.2 Studies related to Open Educational Resources

In their study, **Baas et al. (2022)** examined the process by which teachers evaluated "large" OERs collectively and determined whether this process led to changes in teachers' opinions of OER. Content, design, usability, engagement, and readability were the five key topics that emerged from the research. They found changes in the teachers' attitudes related to their awareness, perspective, and practical concerns regarding open educational resources (OER). Furthermore, the study suggests that to increase the use of open educational resources, higher education institutions should promote discussion about OER among teacher teams during curriculum revisions and offer assistance in adapting resources to meet the instructional needs of teachers and the unique contexts in which they are taught.

The study by **Marin et al. (2022)** in their paper investigates faculty opinions and the usability of open educational resources (OER) and their repositories in various countries through different case studies to discover similarities and differences in academics' understanding, perceptions, and use of OER, as well as analyzing related aspects of institutional policy and quality that might influence individual views. The data were gathered through nine expert reports on each country evaluated (Australia, Canada, China, Germany, Japan, South Africa, South Korea, Spain, and Turkey) and evaluated using theme coding. The findings demonstrate the impact on individual OER adoption of faculty members' control of different elements; institutional regulations and quality measurements on externally determined factors (by the institution); and institutional professional development. It was found that incentives in more internally determined factors (decided by faculty members themselves). It also indicates that more implications for higher education institutions across the world seeking to increase OER adoption among faculty members.

Midha and Kumar (2022) in their study have examined the user's awareness and usage of OER among the central universities of North India. The research's conclusions show that the academic community at central universities (CU) in North India is fully aware of

open educational resources. They found that E PG -PathSala is the most well-known and frequently utilized OER, which is followed by NPTEL and YouTube. Most users make use of OERs as and when they are needed. Creating class notes is the main reason why OERs are used, according to the majority of respondents. The study reveals that OERs are used by the majority of professors and research scholars to increase their professional competencies. It also reveals that most respondents thought that the universities should offer free Wi-Fi and internet access on campus, as well as regular updates regarding open educational resources (OER).

The study by **Lo, Tlili, and Huang (2022)** tends to show how to better understand their school rules and guidelines on OERs, as well as teachers' experiences using OER during times of lockdown. The ultimate purpose is to make suggestions on the future development and use of open educational resources (OERs) in relation to primary school mathematics education. The study used a qualitative method and interviewed 13 primary school mathematics teachers. The findings imply that during the pandemic, teachers relied more on OERs than before. In online lessons, the user used OERs to educate mathematics and enhance class discussions. However, not all schools had OER rules and guidelines in place. Some teachers also found difficulties when adopting OERs, such as discovering that the resources were inappropriate for school settings and lower primary schools. The results of the research also address several potential improvement measures like guaranteeing the applicability of OERs by developer-teacher conversations.

In a study published in **2022** by **Hettige, Dasanayaka, and Ediriweera**, the authors examined the learning strategies employed by medical students at the University of Kelaniya in Sri Lanka. The survey had 257 responses, with an overall response percentage of 89.5 percent. OER and SM were used for instructional purposes by 96.1 percent of students and 88.3 percent of students, respectively. The survey found no gender differences in OER and social media usage. The availability of information at all times (36.1%) and the ease of information access (31.5%) were the two key arguments for adopting OER. It was found that Wiki sites (84.4%) and Facebook (79.5%) were the most widely used OER and SM platforms, respectively. A greater number of the

students in the study relied on open educational resources and social media for their knowledge, but only a small percentage were able to find trustworthy information. Many students did not verify the credibility of sources found on Wiki sites and general web searches. Additionally, they did not often use e-journals. Distractions of academic work and difficulties in finding accurate information were major issues when using social media. Overall, this study underlines the significance of uplifting information literacy among medical students.

The study by **Li and Wong (2021)** found that the institutions of higher learning's primary function is as OER users rather than distributors. The advantages of participating in OER for institutions included improved student learning performance, easier access and use of learning materials, cost reduction and removal of learning barriers, and sharing and collaboration of learning resources. On the other side, there were other hurdles, including technological infrastructure constraints, intellectual property rights issues, insufficient policy and support, a lack of learning objectives, and language barriers. According to the case studies, good practices for successful usage of OER included customizing the contents of resources, developing policy support, and facilitating tight cooperation among the appropriate units. The case studies were gathered from Scopus and Google Scholar and were published between 2009 and 2018.

Datt and Singh (2021), in their paper, highlighted the significance of Open Educational Resources (OERs), their stages of awareness, and the challenges they face in Indian higher education, particularly in the State of Uttarakhand. This study looks more closely at the challenges to OER adoption in higher education's teaching and learning processes and makes recommendations for how to get through them. Acceptance and barriers of open educational resources in Indian higher education have been studied using questionnaire responses from 204 participants (students) in the state of Uttarakhand who are either admitted to ODL or the traditional system of education (India). The results of this study showed that students in post-graduate programs are more aware of how to access OERs, and a greater number of students felt that training sessions or workshops based on OERs were helpful to them.

In their paper, **Kumar et al. (2021)** defined the fundamental qualities of the researcher and examined how their use of open educational resources and the difficulties they encountered while using social media and other digital platforms have affected their future research. In this study, 350 research scholars from Tamil Nadu's state universities took part, and they all used open educational resources. Respondents indicated they found a solution to their day-to-day difficulties on social media. The result of the study reveals that the researchers found social networking sites are more effective for gathering resources than causal websites. Researchers have noted that the audio and video quality of open educational resources on social networks is superior to that of websites.

The study carried out by **Upneja (2020)** investigates the role of Library Professionals and Libraries in dealing with OERs in India. For the purpose of random data collection, a self-designed structured questionnaire was sent online among library professionals, academics, and students via blogs, discussion forums, social media groups, and personal e-mails. The present study's findings show that, while the majority of library professionals (93%) are aware of the concept of OER, they are not able to drive the OER movement as the parent institution (70%) lacks policy regulations on the design and development of OERs. The most important duties for library professionals in working with OERs are promotion (15.63%) and identification (14.02%). According to the study, 25.48 percent of library professionals seek that by using OERs, users gain access to high-quality learning materials. While 21.3 percent of library professionals believe that the main difficulty they encounter is a lack of awareness about the presence of OERs as a result of rapid technological innovation. According to the survey, there is an emergency necessary to educate universities about the beneficial aspects of OER.

Alkhasawneh (2020) in his study examined the hurdles, incentives, and benefits of OER from the perspective of academic staff. Data were gathered through an online survey conducted at the University of Bisha in Saudi Arabia during the 2018-2019 academic year. The findings revealed that the majority of academic staff members have a good attitude towards posting their material on OER; yet, they have also emphasized the issue

of some existing obstacles. One of the most significant impediments to academic staff embracing OER is a lack of technical equipment and technical support. The study concluded that there is a need to increase OER acceptance and remove all impediments to its use.

In the study, **Zhang et al. (2020)** carried out the research wherein a further review of 31 papers to provide in-depth into functional variety within OER and OEP. The results of the study show that access to OER is still in its baby stage and it is also to remark that the four accessibility principles such as perceivable, operable, comprehensible, and resilient need to be paid attention for the research community while offering OER. Furthermore, while some academics have put importance on various concerns linked to accessibility within OER, less attention has been paid to assistive technologies that utilize OER. The study makes numerous recommendations to improve various approaches within OER and to help the students and the academic community in the development of different approaches to OER with diverse functionality.

The study carried out by **Shams, Haq & Waqar (2020)** found that there are a lot of beneficial aspects of using Open Educational Resources (OERs) that have sparked widespread interest in establishing baselines and reporting on how OERs are used in poor nations. The study was a preliminary approach to establish trends in OER use among students studying in Pakistan Universities and to highlight the achieved benefits of OER use for academic challenges, collaborative learning, and enriching their educational experience. The results show that data were gathered from university students representing five distinct academic areas and degree programs. OERs were reported to have been used by 91% of respondents. However, the achievements of OER use varied dramatically between students at various educational levels and across fields. It was found in the study that Social sciences students and female students perceive OER more positively than other academic disciplines and their male equivalents. The post hoc analysis found that MPhil/Ph.D. students were the most likely to select mental liveliness and collaborative learning as an advantage of OERs. The primary hurdle identified by

respondents to effective OER use is lacuna Internet access, followed by a lack of time to learn to use OERs.

The study carried out by **Rodés, Gewerc-Barujel & Llamas-Nistal (2019)** found that there is a necessity for standardizing experience and evaluation for the usage of open educational resources. However, both globally and in Latin America, in the case of Higher Education OER adoption was not an option for the dominant paradigm. This paper provides the findings of a study that examined social representations of OER development, usage, and reuse by university professors in their pedagogical practices. The researcher used Grounded Theory to undertake a study of 12 instances from Latin American colleges. The findings indicate a lack of public and institutional policies governing the usage and reuse of OER. Teachers grouped in teams that facilitate OER adoption are the primary agents. The motivations for creating OER are both intrinsic, such as the pleasure obtained from producing and sharing, and external, such as professional development needs derived from reflection on one's educational practice. Educators believe that evaluating the materials developed is critical so that they can be utilized in continuous improvement activities. Two of the major issues noted are commercial use and misuse of the works. Most behavior in OER adoption in educational institutions is guided by the community component of teaching, which is presented as an integral part of curriculum development and change.

In the study carried out by **Pounds & Bostock (2019),** the goal of the research was to observe whether the educators and students of aquaculture and fisheries industries could exert the beneficial aspects of OER in their domain area. The usage of open educational resources (OERs) has seen the potential to improve teaching efficiency, and quality, and decrease economic and geographic obstacles to education. Academic competition between institutions and instructors, lack of awareness and availability of OERs and copyright policies, mistrust in OER quality, and technological restrictions around adaptation and sharing are the main barriers to adoption. The study primarily used the online questionnaire among the students and educators from aquaculture and fisheries to evaluate perspectives and attitudes towards OERs and other online learning platforms.

Data from questionnaires revealed that there is a need necessity for OERs both educators and students for those who are already using online materials for the learning and teaching process. Furthermore, it was seen that the students were more likely to enroll in respected institutions that provided OERs, even if they were unwilling to pay higher tuition rates. In a demanding environment such as the contemporary times, there is no OER content for higher education in the aquaculture and fisheries sector, owing to a lack of awareness, support from the institution, and technological framework, all of which are common challenges in other industries. This research finds that open educational resources (OER) programs linked with higher education institutions in aquaculture and fisheries subjects have the ability, in theory, to help the development of a trained workforce to fulfill the growing worldwide necessity for seafood production.

The study by **Tlili et al. (2019)** laid a brief review of the literature conducted in this study to assess the relevant situation in the case of OER and OEP in China. According to the results of the study, it was seen that many governmental, organizational, and institutional initiatives had been launched in China to facilitate OER implementation. They also demonstrate that, even though various OEPs have been adopted, there is a continuing need to improve these practices and further research their effects on behavior and learning outcome as far as no such studies has been reviewed so far. It was noticed that a generic framework of OER and OEP difficulties is offered, along with solutions to increase OER and OEP acceptance in China.

The study by **Thompson and Muir (2019)** sought to discover Scottish University libraries disseminating Open Educational Resources about how and why they support such services as well as their abilities to provide support services to the student community in the higher learning institution. It was seen that there was minimal research on the role of academic libraries in supporting open educational resources in Scotland, and existing research depicts a lack of awareness of them in Scottish higher education institutions, as well as a lack of an open educational resource policy. As a result, the case study approach included two Scottish university libraries that provide open educational resources services. The library's motivations include assisting with teaching and

learning, as well as the development of educators' digital skills and expertise. However, a variety of obstacles, mainly a lack of human resources, limit the services that libraries can provide. The study validated prior research findings about the relevance of institutional commitment, educator engagement incentives, and educators' and library staff's grasp of copyright and licensing issues.

The study by **Pande (2018)** has found that including OER practices in the construction of SLM improves the study material quality. When compared to the standard course development approach, it was found that it saves 91.69% on development costs and cuts development time by 87.27%. Aside from the benefits mentioned above, OERs are important in teaching students with individual characteristics. OERs provide personalized learning by providing a variety of learning resources. As a result, the study's findings imply that acceptance and further progress on the OER path will continue to have a favorable and bright effect on higher education in the near future. This paper seeks to look into the impact of implementing OER practices for the creation of SLM at Uttarakhand Open University, specifically the implications of on-time development, cost development, and SLM quality.

In his study, **Cheung (2018)** examined students' perceptions of the usefulness of open educational resources (OER) at the Open University of Hong Kong in comparing perceived usefulness between full-time and distance-learning students in the academic session 2017-18. From the study, it has been discovered that both full-time and distance learners generally find open educational resources (OER) to be helpful for educational purposes, especially while using the resources to complement the course materials already available and to obtain more resources for completing assignments and projects. Open courseware, course materials, and e-books are the most common types of OER that both full-time and distance learners find to be very useful or useful. However, it was found from the study that distance-learning students than full-time students also find open online courses, tutorials, and open online learning tools and platforms to be very useful for course study. From the study, it is found that accuracy and comprehensiveness

are the two main issues with adopting OER for educational purposes for both full-time and distance learning students.

Mwinyimbegu (2018) in the study had emphasized the importance and responsibilities of libraries and librarians in open educational resources (OER) in a few Tanzanian public university libraries. The study specifically attempted to determine librarians' awareness of OER and the part libraries and librarians played in OER in Tanzania. The survey also noted difficulties faced by librarians in encouraging OER use and access. This survey included 52 librarians from four public university libraries, representing a variety of ranks and educational backgrounds. These were chosen by straightforward random sampling methods. Data were gathered using a self-administered questionnaire and a perusal of the supporting documentation. With the help of Excel and SPSS version 18.0, data was analyzed. The findings demonstrate that librarians are well- aware of the concept of OER and play a variety of roles in raising awareness of OER and integrating it into university websites to enable access and use. The survey also indicated that librarians have significant hurdles in promoting access and usage of OER due to a lack of awareness about current OER and a lack of policy guidelines on their use. The report suggests increased OER awareness efforts and the creation of institutional OER policies.

Cheung (2017) in his study had evaluated the significance of Open- educational resources for distance learners especially for educational purposes. The study adopted a survey method among the distance learning undergraduate students studying at the Open University of Hong Kong. The study's result reveals that OER is often utilized and generally regarded as useful as a complementary learning material for gaining relevant knowledge and completing assignments and projects by distance-learning students. It was also found that among other OER, open-access textbooks, reference materials, and freely available lecture notes and videos are seen to be particularly helpful. Compared to small-scale mobile learning modules, massive open online courses and tutorials are seen to be more useful. Furthermore, the study reveals that there are three main concerns i.e. reliability, quality, and comprehensiveness of OER among the distance learner who wishes to pursue such a mode of study.

2.3 Studies related to Sentiment Analysis

Kumar (2023) in their study has given an in-depth analysis of using Sentiment Analysis as one of the prominent methods for approaching user studies although there are various methods such as surveys, interviews, focused group interviews, and ethnographic observation. These several approaches help the LIS professional in understanding the impact of their services and resources. As per the study, it was noticed that Sentiment Analysis can be applied to understand users' perceptions and opinions about library services, resources, and facilities. The study has also listed some of the core areas under which Sentiment Analysis can be applied such as user studies. Further, it was also seen that several studies related to Sentiment Analysis and their application to libraries have been reviewed. The limitations and challenges in the case of implementation of Sentiment Analysis in library core areas are also being discussed.

Malhotra & Goyal (2021) focused their study primarily on the sentiments among the general public about the National Educational Policy, 2020(NEP-2020) that was announced in 2020 based on the Twitter information flow. The study primarily took the hashtag #Neweducationpolicy and the sentiment was evaluated on the software RStudio. The report of the study reveals that there was a list of misinformation and the flow of information on Twitter about NEP, 2020 was relevant, reliable, and accurate. The study identified some of the most relevant and accurate sentiments about NEP and also noticed that there is a spread of skepticism in the context of the future of the New Education Policy in India.

Deori, Kumar, and Verma (2021) in their paper tried to evaluate some videos that were based on Koha and DSpace software which were present on the YouTube Platform. The basic study purpose is to understand the sentiment analysis of the viewer's opinions on the video being uploaded. The authors employed Webometric Analyst to obtain a dataset to evaluate the attributes of Koha and DSpace films by building a YouTube API. The result of the study reveals that the increasing rate of videos on Koha has decreased dramatically as compared to DSpace videos in the last 10 years. It was

also noticed from the findings that most of the videos posted were of high-definition with standard YouTube license and English was used as a major language. The study also reveals that there are 2043 and 862 comments that are extracted from Koha and DSpace respectively and their comments were positive and were found with happy emotions. It was also found that the top word frequency denotes that both the software use the comment section of the YouTube videos for providing any kind of troubleshooting assistance to the patrons. One of the significant features of the study is that it is the first of a kind to analyze the features and sentiment of Koha and DSpace Software.

Deori, Verma, and Kumar (2021) in their study tried to demonstrate the sentiment of the text that was posted on five Hindi news channels including AajTak, ABP News, India TV, NDTV India, and Republic Bharat on YouTube taken into consideration. All the channels are investigated based on the Mozdeh software to investigate the viewers' sequential temperament by measuring happy and negative emotions. The study also says that it is confined to data retrieved and reviewed by Mozdeh. The study analyzed sentiment in each of the channels with the top word frequencies and showed the time-series graph. The study reports that the channel India TV has the maximum average positive and average negative sentiment and the category of female is higher as compared to male and at the same time the unidentified gender was the highest range. The report of the time analysis shows that the year 2020 is the most productive as compared to the other years. It was also found that most of the comments in the users were attentive toward the political and entertainment world.

Patra (2019) in their study had attempted to analyze the frequency of words and sentiment analysis of some selected libraries in the Indian context. It was noticed that 18 libraries were considered wherein 5 libraries of each category such as academic libraries, government libraries, school libraries, and 3 public libraries for the study. The study was analyzed and evaluated using R software. The study reports that libraries in India are less interactive on Twitter platforms. The frequency of the word “CLOUD” is the most commonly occurring word on Twitter and it also depends from library to library. The

study also shows that Sentiment studies of Tweets from libraries are favorable in nature. The study also recommended that librarians in India should be more active and use Twitter to market their collections and services.

Basani et al. (2019) in their study used a sentiment analysis technique in order to classify reviews of the product in terms of positive, negative, and neutral orientation. They also produced a product review summary that helped the reading process, product review, and decision-making based on the product features. Using double propagation and deciding sentiment orientation, researchers carried out the data collection, pre-processing, and feature extraction. They have used the Naïve Bayes Classifier and SupportVector Machine for the classification and have used summary generation in terms of product features.

Cunha, Costa & Pacheco (2019) in their study highlight the significance of YouTube as an important medium for communication where users use comments to express their opinions. Using a deep neural network, they proposed a "Sentiment analysis model of YouTube comments". They experimented on the comments of two videos which were further classified using the proposed model and compared it with an alternative statistical model and by humans. The proposed model achieved more accuracy in comparison with the statistical model with a classification accuracy ranging from 60%-80%.

Parabhoi (2019) examined Twitter comments using sentiment analysis for 10 University libraries for the period 2013(January 1) - 2019(September 1) and 15850 tweets were collected and further analyzed using Twitter API. The study findings revealed a score of 0.4115 for average positive – average negative. The author recommends university libraries make use of social networking sites and their user interactions in the post comments, feedback, reviews, etc., by means by which they can achieve better decision-making and solve problems more efficiently.

Halevi & Schimming (2018) in their study mentions the importance of initiating the tracking and labeling of large-scale social and news mentions in positive, negative, or

neutral terms using sentiment analysis. They underline how such an initiative can help researchers achieve an overall understanding regarding the social/news media mentions of scientific publications' content.

Lamba & Madhusudan (2018) examined how sentiment analysis can be an effective tool for conducting social media library marketing. They mention how social media has become a space for individuals to share their opinions views and choices. They collected Twitter data on 20 different queries with the help of the RapidMiner platform and using ATLIEN text analysis software, sentiment analysis was performed over 13 days. The study was aimed at observing the economic productivity with respect to the gradual introduction of new library user services.

Novielli, Girardi & Lanubile (2018) in their article put forward a study for the assessment of 3 sentiment analysis tools in terms of performance and reliability. They mentioned how the researchers have only recently started to develop tools for the domain of software engineering, trying to overcome the limitations of off-the-shelf sentiment analysis tools. They also highlight the open challenges emerging from misclassified texts' qualitative analysis.

Parabhoi and Saha (2018) in their study had examined the comments by applying Sentiment Analysis on Koha- ILS Software. It was found that there are 404 comments related to Koha were collected and analyzed. The study analyzed the comments on some parameters such as subjectivity, emotion, intention, word frequency, and Sentiment.

Barretto & Morajkar (2017) in their study present a comprehensive survey of sentiment analysis techniques that are recent with some comparisons. In their study, they have highlighted the newer approaches in various tools and techniques for sentient analysis such as sentiment analysis using LDA. They mention how it can be used to derive significant patterns and conclusions in various domains and disciplines.

Bhuiyan et al. (2017) in their study highlight YouTube as one of the most proliferating and comprehensive platforms for video information on the web. To bring out clarity in a context where sometimes irrelevant or low-quality videos get higher rankings they

present an approach of sentiment analysis that is based on natural language processing (NLP) to find out the most popular and relevant using user comments. The proposed approach was further proved by a data-driven experiment and accuracy has been achieved in determining the videos of relevancy, popularity, and higher quality.

Iarmolenko (2017) in their study emphasizes sentiment analysis and its importance in different domains of knowledge mining and studies. They define sentiment analysis and its different applications for text processing. In their article, they have given a comparison of two open-source tools in terms of their effectiveness, usability, and computing time which provide insights on drawing conclusions regarding tool developments and future opportunities.

Tanesab, Sembiring & Purnomo (2017) in their study use sentiment analysis as an opinion-mining tool for the evaluation of attitudes and opinions. With the help of Support Vector Machine, they classified opinions on the performance of Ahok as a governor, in terms of positive, negative, and neutral classes, with 1000 recorded data as the sample. To determine the percentage of class sentiment, a Lexicon-based approach was used. The results show the percentages in terms of precision 91%, accuracy 84%, recall 80%, TN rate 44.8% and TP rate 91.1%.

Asghar et al. (2015) in their study highlight a brief survey emphasizing techniques used to examine and analyze user opinion on a particular video. In their article, they also explain how social media advancement has drawn more users towards video-sharing platforms such as YouTube and how the users express their sentiments and opinions on the video sites. They have also mentioned the relevance of opinion mining and sentiment analysis as a field of study in this context.

Lawrence (2014) in their study evaluates two sentiment mining tools; Sematria and Social Mention in terms of reliability and features. They analyze the sentiment of 12 different models of cars using both sentiment analysis tools for outputs from three social media platforms. The results reveal the major differences in the outputs of both tools in terms of both statistical and observational outputs. The author underscores the

implications of this study for both theoretical and practical means in various domains that can help in future research and decision-making.

Choudhury & Breslin (2010) in their study; highlight a lexicon-based approach that is unsupervised, to detect the sentiment polarity of user-generated comments on YouTube. They mention why polarity detection is a challenging process and how both the existing limitations within the sentiment dictionaries and the informal linguistic styles of users make it a struggle. To address this, they put forward a data-driven approach by preparing a social media-specific list of phrases and terms that convey user opinions and sentiments. The study highlights the potential of this approach as a successful one. They also discuss various challenges involved in the research on social media sentiment analysis.

Godbole, Srinivasaiah & Skiena (2007) discussed newspapers and blogs that express the opinion of news entities. It is found from the study that they developed a system that shows scores in the text corpus, demonstrating positive or negative opinions of each distinct entity. With each relevant entity, the system they developed performs an identification phase in terms of expressed opinions followed by an aggregation of sentiment and a phase of scoring for each entity that is relative to others in the same class. The researcher also evaluates the importance of large corpus (news, blogs, etc.) scoring techniques.

2.4 Studies related to YouTube

Azak et al. (2022) in their paper, evaluated YouTube videos as a source of information for children on COVID-19 regarding their dependability, audience engagement, and material quality. A descriptive design was used to carry out this investigation. Following an assessment of the contents of the 57 videos, it was concluded that 43.9% (n = 25) were misleading and 56.1% (n = 32) were informative. The study reveals that the mean GQS, CCC scores, and DISCERN of videos classified as informative were found to be of higher statistical level. The study also revealed the DISCERN mean score of academic /ministry/physician/ hospital channel videos was significantly higher than

entertainment/individual channel videos' means scores. Furthermore, it was found that though videos explaining the information on COVID-19 to children show a viewing rate that is significantly higher, and in terms of quality and reliability; some videos are lower.

Lee and Chang (2022) have assessed the YouTube videos with the highest views that discussed the effects of vitamin C on COVID-19 in terms of their quality, reliability, and accuracy. They evaluated the 50 most viewed videos using the Global Quality Scale (GQS) and the mDISCERN scale. The study reveals that 54% of the 50 most viewed videos showcasing how vitamin C affects COVID-19 were unreliable. Additionally, 62% of the content of the videos was of poor quality, and 74% was misleading or neither accurate nor misleading. The study found that the 50 most-viewed videos on YouTube on the impact of vitamin C on COVID-19 did not have a very high level of reliability, quality, or accuracy. The study suggests that video creators, particularly medical professionals, should make an effort to ensure that users receive reliable content with high-quality and accurate information.

In their paper, **Vins, Aldecoa, and Hines (2022)** evaluated the content of videos on the Brave Wilderness YouTube channel. This channel has posted 662 videos so far, and its outreach on wildlife and conservation has received more than 4 billion views overall. Interactions with many species, including venomous critters, charismatic megafauna, and uncommon taxa, are among the most popular video content on the Brave Wilderness YouTube channel. The study found that examining the content of popular videos, such as those that go viral, can help conservationists plan their future outreach initiatives by revealing the pictures and ideas that appeal to a broad audience. The study suggests that since wildlife videos on YouTube are becoming more and more popular, they can be used as an effective tool for spreading awareness of conservation efforts and teaching the public about wildlife issues.

In their paper, **Breslyn and Green (2022)** investigate the use of online educational YouTube chemistry videos by students and teachers in the context of the COVID-19 pandemic. The analysis reveals that during the pandemic, students' individual use of

YouTube videos for learning science significantly increased. For the majority of teachers, however, the usage of video to assist online learning throughout the pandemic either stayed the same or decreased. It also found that students intend to continue watching YouTube science videos for educational purposes after the pandemic, and they want their teachers to use them too.

Shukla (2021) examined the features of popular COVID-19 outbreak-related YouTube videos in his study. For this study, 93 YouTube videos were examined. The analysis shows that the majority of the videos were educational (44.1%) and 32.3% of videos were of Covid-19 news updates. The study found that 45.7% of YouTube videos about COVID-19 had a positive sentiment-based title whereas a negative sentiment-based title was present in 53.2% of them. The comments of viewers were divided into nine different categories and it was found that the most common category for comments was sarcastic/humorous (21.5%). Furthermore, the findings show that audience behavior varied in response to videos of different kinds, particularly those with sentiment-based titles There are a lot of educational COVID-19 videos on YouTube, and the study suggests that adding certain features might boost the popularity of those videos.

Karadia (2021), in his article, conducted a content analysis of the Open Educational Resources videos on YouTube that are the most viewed. The study aimed to gain a deeper understanding of the content and sharing patterns of these videos. The findings revealed that all of the videos were on similar concepts and ideas related to the use and integration of Open Educational Resources, and also highlighted the growth of OER videos on YouTube.

In their study, **Curran et al. (2020)** presented an overview of the efficacy, usefulness, and validity of YouTube video resources for medical education. YouTube has become a more popular educational tool for medical students and teachers. The study's findings reveal that 31 of the 113 articles found met the inclusion requirements and were focused on using YouTube for medical education. Only six publications, or 19.4% of the total articles, discussed the evaluations that came from using YouTube as a teaching tool.

Finally, it also provides suggestions and recommendations for enhancing the quality and utility of YouTube videos as a teaching tool for medical education.

Alobaid (2020) has examined in his article the impact of utilizing YouTube on enhancing learners' language fluency and written communication skills in their daily life. This research's results indicate that there is a significant statistical difference in certain aspects of writing fluency of the learners, specifically the organization ideas and accuracy as qualitative dimensions, when exposed to YouTube for five months, provided that enhancement, engagement, and intelligibility are included in the multi-mediated input. The research suggests that using multimedia educational tools like YouTube, which are developed by Information and Communications Technology (ICT), can be more effective for language learning compared to other sources available in the learners' environment. Therefore, it is strongly recommended that both language learners and teachers use these tools to improve writing fluency.

In their article, **Moghavvemi et al. (2018)** examined students' perceptions of using YouTube for learning, their usage habits, and the underlying causes that motivate them to utilize YouTube. The study's findings showed that entertainment, obtaining information, and academic purposes are some of the major reasons for using YouTube. The research suggests that for enhancing learning when the videos are relevant to the subject, YouTube can be an effective tool. The study also suggested that instructors incorporate YouTube into their course curriculum to take advantage of its benefits in learning and teaching.

Lee et al. (2018) examined the effectiveness of YouTube videos as teaching aids for four shoulder physical examinations: Hawkins, Neer, empty can, and drop arm tests. The research found that video-based education, in combination with text-based education, can be an effective method of learning medical skills. Many medical students and trainee doctors frequently utilize YouTube videos as a source of educational content in the field. For the study purpose, 400 videos were evaluated and 200 were chosen based on specific criteria. Of the 200 selected videos, 51 were considered highly useful and 32 were

deemed misleading. According to the study's findings, there were strong connections between the usefulness of a video and the source it was uploaded from, as well as the viewers' preferences like the number of views, daily likes, and views. The study's result reveals that videos uploaded by physicians had the highest percentage (58.6%) of being labeled as "very useful" while videos from individuals had the lowest (12.7%). Videos from individuals had lower scores for viewer preferences compared to videos from physicians. The study found that YouTube videos can be a good source that can help in learning about shoulder physical tests if correct screening procedures are used, such as evaluating the upload source and viewers' preferences.

Asmiarti and Winangun (2018) in their paper, investigated the utilization of YouTube, a video-based platform, by parents to enhance their children's cognitive development during the early years. The study employed a qualitative method with a phenomenological approach, using interviews and observations of parents who use YouTube to optimize their children's development in areas such as imagination, curiosity, language, and concentration. The results suggest that YouTube can be effectively utilized as a means to enhance cognitive development during early childhood.

Adhikari et al. (2016), in their study, assessed the quality of information on cervical cancer available on YouTube. For the study, 172 videos were analyzed using the keyword "Cervical cancer." The study found that there were videos covering personal experiences, risk factors, and the significance of screening, but videos that comprehensively covered all aspects of cancer were lacking. Despite a large number of videos on cervical cancer, there was a lack of content from reputable organizations such as the Center for Disease Control and Prevention, the American Cancer Society, and the World Health Organization. The study recommended that high-quality videos from these organizations on YouTube could help reduce the impact of the disease.

Hassona et al. (2016), in their paper, evaluated the content of YouTube videos related to oral cancer and determined their effectiveness in encouraging early detection. A total of

188 videos were analyzed, which included 36 testimonial videos and 152 educational videos. The study found that the most informative videos were not the most viewed ones, and there was no significant correlation between the video's usefulness and its viewing rate, viewer engagement, and video length. The study also reveals that uploaded videos by individual users were less helpful compared to those uploaded by professional organizations or healthcare professionals. Furthermore, the study recommends that healthcare professionals and organizations have the responsibility of improving the quality of oral cancer-related content on YouTube by uploading useful videos and also directing patient information sources that are credible.

In their article, **Abedin et al. (2015)** assessed the effectiveness of diabetes foot care-related videos on YouTube as a source of information. Two physician reviewers analyzed the videos and categorized them into four categories: very useful (11.2%), moderately useful which constitutes 14.6%, somewhat-useful (24.7%), and not useful (49.4%). The study found that the quality of the information provided in diabetes foot care videos on YouTube is inconsistent, with some videos being highly informative while others are not useful.

Basch et al. (2015) in their research, evaluated the content of the most popular professional and consumer videos about skin cancer on YouTube. The research analyzed 140 videos that were uploaded between 2007 and 2014. The findings revealed that a majority of the videos focused on providing information about screening. The study also found that despite the lack of evidence supporting its effectiveness, several consumer videos gave information on home remedies for skin cancer using black salve. The study recommends further research to determine which video characteristics are most likely to attract views and to improve the credibility of communications about skin cancer.

In their study, **Mukhopadhyay, Kruger, and Tennant (2014)** tried to investigate the use of dental-related YouTube videos as a free learning tool. For the study purpose, a collection of 40 videos, mainly focused on dental anatomy and local anesthesia, for a duration of 18 months were uploaded and made available, from March 2012 to

September 2013. During this time, the videos were viewed over 71,000 times, with the anatomy channels accounting for over 58,000 views. The majority of viewers were from the United States Australia, and developing countries with an increasing number of viewers. The study suggests that YouTube can be used as an additional tool for dental education as it is easily accessible online. YouTube offers various sources of information that can be accessed by individuals working in or preparing for the dental field, including students, practitioners, or those in remote locations.

In their study, **Chtouki et al. (2012),** This paper presents the findings of a research project on using YouTube videos to improve students' learning in an introduction to computers course for non-computer science students. The study compared two groups of students, the first one was a test group that received a set of videos from YouTube to supplement their learning, and the second one was a control group that received only traditional resources such as textbooks, in-class lectures, and handouts. The results showed that students in the test group had a better understanding and retention of complex concepts when presented with visual explanations through videos. Additionally, students were more likely to watch short videos than read textual content. One of the major benefits of YouTube is that it is a free online platform that provides short, specific content that can be easily accessed and reviewed by educators to supplement their teaching. Furthermore, the study found that watching YouTube videos motivated students to search for similar videos and develop a habit of using YouTube as an educational tool.

In his study, **Jaffar (2012)** examined medical students' opinions and utilization habits of YouTube as a tool for anatomy education and evaluated the usefulness of YouTube videos in a problem-based learning curriculum. The study included 91 participants and they were provided with video links during the academic year. The Human Anatomy Education Channel was created on YouTube to complement in-class teaching by featuring videos that focused on the practical application of anatomy. The findings showed that 98% of students used YouTube as a source of online information but with varying frequency. Out of the 86% who visited the HAE Channel, 92% reported that the

channel aided in their anatomy education. The study also examines the extent of popularity and recognition of YouTube as both a social media platform and an educational tool. According to the results, YouTube can be a valuable tool in improving anatomy education as long as the videos are carefully chosen, varied, and aligned with course goals. The study recommended that faculty with average computer proficiency should be equipped to create videos on their own YouTube channels to promote self-directed learning and integration into a problem-based learning curriculum.

Kousha, Thelwall, and Abdoli (2012) in their article examined how frequently YouTube videos are mentioned in academic articles and whether there are major disciplinary distinctions in this practice. For this investigation, they took the YouTube video URL citations from scholarly articles included in the Scopus database. The study found that at least one YouTube video was cited by 1,808 Scopus publications. Between 2006 and 2011, there was a continuous increase in the number of academic publications that cited online videos. Citations to YouTube video citations were most prevalent in the field of social sciences and the arts and humanities. Furthermore, the content analysis of 551 YouTube videos that were cited in the research articles revealed that the majority of videos in the field of science (78%) and medicine and health sciences (77%) had direct scientific content like laboratory experiments or scientific-related content such as academic lectures or education. In contrast, the majority of videos in the arts and humanities (80%) were related to art, culture, or history, and in social sciences (63%), the videos primarily dealt with news, politics, advertisements, and documentaries.

Majid et al. (2012) in their paper, evaluated the information literacy videos available on YouTube. YouTube is becoming a popular and interactive way of teaching information literacy skills. The study found that many libraries, especially academic ones, are utilizing YouTube videos to educate their users on various information literacy skills. However, a concern arises as many of these videos are of low quality, likely created by amateurs lacking proper video production techniques. The analysis reveals that these videos have issues such as inappropriate backgrounds, poor picture quality, insufficient lighting, and subpar sound recording. While many other videos on YouTube are

produced by amateurs and are of low quality, libraries must exercise caution when uploading their videos as it can affect their image and the quality of services they offer. The study recommends that it would be ideal for libraries to either seek professional assistance in creating their YouTube videos or train their staff for this purpose. The communication abilities of presenters also require consideration. Several presenters in information literacy videos have not shown adequate communication skills. It is important for library professionals to recognize that to fully harness the power of audio-visual media, they must put forth extra effort to develop the necessary skills for effective video communication. Furthermore, the study suggests that library and information schools should consider incorporating audio-video production skills into their curriculum for students.

2.5 Research Gap

After going through the literature review, it is found that the area of sentiment analysis by Indian LIS professionals especially in research is still untouched. Further very limited number of papers/literatures is available only. So, the present study shall fill this gap and pave the path for other scholars to undertake such an area of research.

Though various studies have been conducted exploring the various literature related to Open Educational Resources both nationally and internationally they have retrieved various elements related to OER. However, no studies so far have been conducted to understand the sentiment analysis of YouTube videos in the area of Open Educational Resources.

References

Abedin, T., Ahmed, S., Al Mamun, M., Ahmed, S. W., Newaz, S., Rumana, N., & Turin, T. C. (2015). YouTube as a source of useful information on diabetes foot care. *Diabetes Research and Clinical Practice*, 110(1), e1–e4. https://doi.org/10.1016/j.diabres.2015.08.003

Adhikari, J., Sharma, P., Arjyal, L., & Uprety, D. (2016). YouTube as a source of information on cervical cancer. *North American Journal of Medical Sciences*, 8(4), 183-186

Alkhasawneh, S. (2020). Perception of academic staff toward barriers, incentives, and benefits of the open educational resources (OER) Network (SHMS) at Saudi universities. *Italian Journal of Sociology of Education*, *12*(1).

Alobaid, A. (2020). Smart multimedia learning of ICT: role and impact on language learners' writing fluency— YouTube online English learning resources as an example. *Smart Learning Environments*, 7(1). https://doi.org/10.1186/s40561-020-00134-7

Asghar, M. Z., Ahmad, S., Marwat, A. & Kundi, F. M. (2015). Sentiment Analysis on YouTube: A Brief Survey. Retrieved on 10th February, 2020 from https://www.researchgate.net/publication/284724207_Sentiment_Analysis_on_YouTube_A_Brief_Survey

Asmiarti, D., & Winangun, G. (2018). The Role of YouTube Media as a Means to Optimize Early Childhood Cognitive Development. In *MATEC Web of Conferences* (Vol. 205, p. 00002). EDP Sciences.

Azak, M., Şahin, K., Korkmaz, N., & Yıldız, S. (2022). YouTube as a source of information about COVID-19 for children: Content quality, reliability, and audience participation analysis. *Journal of Pediatric Nursing*, 62, e32–e38. https://doi.org/10.1016/j.pedn.2021.06.024

Baas, M., van der Rijst, R., Huizinga, T., van den Berg, E., & Admiraal, W. (2022). Would you use them? A qualitative study on teachers' assessments of open

educational resources in higher education. *The Internet and Higher Education*, 54, 100857.

Barretto, M. C. & Morajkar, S. (2017). Sentiment Analysis Tools and Techniques: A Comprehensive Survey. *International Journal for Research in Applied Science & Engineering Technology,* 5(XI), pp.3030-3035.

Basani, Y., Sibuea, H. V., Sianipar, S. I. P. & Samosir, J. P. (2019). Application of Sentiment Analysis on Product Review E-Commerce. *Journal of Physics: Conference Series,* pp.1-8.

Basch, C. H., Basch, C. E., Hillyer, G. C., & Reeves, R. (2015). YouTube Videos Related to Skin Cancer: A Missed Opportunity for Cancer Prevention and Control. *JMIR Cancer*, 1(1). https://doi.org/10.2196/cancer.4204

Bhuiyan, H., Ara, J., Bardhan, R., Islam, R. (2017). Retrieving YouTube Video by Sentiment Analysis on User Comment. *2017 IEEE International Conference on Signal and Image Processing Applications* (pp. 474-478). Malaysia. Retrieved on 6th February, 2020 from https://www.researchgate.net/publication/321408074_Retrieving_YouTube_video_by_sentiment_analysis_on_user_comment

Breslyn, W., & Green, A. E. (2022). Learning science with YouTube videos and the impacts of Covid-19. *Disciplinary and Interdisciplinary Science Education Research*, 4(1). https://doi.org/10.1186/s43031-022-00051-4

Cheung, S. K. (2017). Distance-learning students' perception on the usefulness of open educational resources. In *International Conference on Blended Learning* (pp. 389-399). Springer, Cham.

Cheung, S.K.S. (2018). Perceived usefulness of open educational resources between full-time and distance-learning students. In *International Conference on Blended Learning* (pp. 357-367). Springer, Cham.

Choudhury, S. & Breslin, J. G. (2010). User Sentiment Detection: A YouTube Use Case. *21st National Conference on Artificial Intelligence and Cognitive Science.* Galway, Ireland. Retrieved on 6th February, 2020 from

https://www.researchgate.net/publication/316898473_User_Sentiment_Detection_A_YouTube_Use_Case

Chtouki, Y., Harroud, H., Khalidi, M., & Bennani, S. (2012). The impact of YouTube videos on the student's learning. In *2012 international conference on information technology based higher education and training (ITHET)* (pp. 1-4). IEEE.

Cunha, A. A. L., Costa, M. C. & Pacheco, M. A. C. (2019). Sentiment Analysis of YouTube Video Comments Using Deep Neural Networks. *In* Rutkowski, L., Scherer, R., Korytkowski, M., Pedrycz, W., Tadeusiewicz, R. & Zurada, J. (*Eds*.) *Artificial Intelligence and Soft Computing* (pp. 561-570). ICAISC 2019. Springer, Cham. Retrieved on 5th February, 2020 from https://link.springer.com/chapter/10.1007/978-3-030-20912-4_51

Curran, V., Simmons, K., Matthews, L., Fleet, L., Gustafson, D. L., Fairbridge, N. A., & Xu, X. (2020). YouTube as an Educational Resource in Medical Education: a Scoping Review. *Medical Science Educator*, 30(4), 1775–1782. https://doi.org/10.1007/s40670-020-01016-w

Datt, G., & Singh, G. (2021). Acceptance and Barriers of Open Educational Resources in the Context to Indian Higher Education. *Canadian Journal of Learning and Technology*, 47(3). https://doi.org/10.21432/cjlt28028

Deori, M., Kumar, V., & Verma, M. K. (2021). Analysis of YouTube video contents on Koha and DSpace, and sentiment analysis of viewers' comments. *Library Hi Tech.* https://doi.org/10.1108/lht-12-2020-0323

Deori, M., Verma, M. K., & Kumar, V. (2021). Sentiment Analysis of Users' Comments on Indian Hindi News Channels Using Mozdeh: An Evaluation Based on YouTube Videos. *Journal of Creative Communications*, 09732586211049232.

Godbole, N., Srinivasaiah, M. & Skiena, S. (2007). Large-Scale Sentiment Analysis for News and Blogs. *ICWSM 2007- International Conference on Weblogs and Social Media*, (pp.219-222). Retrieved on 8th February, 2020 from https://www.researchgate.net/publication/215470709_Large_Scale_Sentiment_Analysis_for_News_and_Blogs

Halevi, G. & Schimming, L. (2018). An Initiative to Track Sentiments in Altmetrics. *Journal of Altmetrics,* 1(1), pp.1-7.

Hassona, Y., Taimeh, D., Marahleh, A., & Scully, C. (2016). YouTube as a source of information on mouth (oral) cancer. *Oral Diseases*, 22(3), 202–208. https://doi.org/10.1111/odi.12434

Hettige, S., Dasanayaka, E., & Ediriweera, D. S. (2022). Student usage of open educational resources and social media at a Sri Lanka Medical School. *BMC Medical Education*, 22(1). https://doi.org/10.1186/s12909-022-03106-2

Iarmolenko, I. (2017). Effectiveness and Transparency of Sentiment Analysis Tools for Academic Purposes. *13th International Conference on ICT in Education, Research and Industrial Applications,* (pp.273-280). Kyiv, Ukraine. Retrieved on 5th February, 2020 from https://www.ceur-ws.org>Vol-1844

Jaffar, A. A. (2012). YouTube: An emerging tool in anatomy education. *Anatomical Sciences Education*, 5(3), 158–164. https://doi.org/10.1002/ase.1268

Karadia, A. (2021). Content Analysis of Top View YouTube Videos on Open Educational Resources. *Library Philosophy and Practice (e-journal)*, 5474, 1-14.

Kousha, K., Thelwall, M., & Abdoli, M. (2012). The role of online videos in research communication: A content analysis of YouTube videos cited in academic publications. *Journal of the American Society for Information Science and Technology*, 63(9), 1710–1727. https://doi.org/10.1002/asi.22717

Kumar, K. S., Mahendraprabu, M., Kalaiyarasan, G., Ramnath, R., Kumar, N. S., & Mani, M. (2021). Social Media as an Open Educational Practice Tools and Challenges. *Library Philosophy and Practice*, 1-24.

Kumar, V. (2023). Exploring the Use of Sentiment Analysis in Library User Studies: Approaches and Challenges. In A. Tripathi, M. K. Verma, & A. K. S. Yadav (Eds.), *Changing Landscape of LIS Education and Research* (Prof. H.N. Prasad Festschrift Volume) (pp. 446-457). Shree Publishers and Distributors.

Lamba, M. & Madhusudhan, M. (2018). Application of sentiment analysis in libraries to provide temporal information service: a case study on various facets of

productivity. *Social Network Analysis and Mining*, 8(1). Retrieved on 5th February, 2020 from https://www.researchgate.net/publication/328265550_Application_of_Sentiment_Analysis_in_Libraries_to_Provide_Temporal_Information_Service_A_Case_Study_on_Various_Facets_of_Productivity

Lawrence, L. P. (2014). Reliability of Sentiment Mining Tools: A comparison of Semantria and Social Mention. *3rd IBA Bachelor Thesis Conference-2014* (pp.1-13). Enschede, Netherlands. Retrieved on 5th February, 2020 from https://www.semanticscholar.org/paper/Reliability-of-Sentiment-Mining-Tools%3A-A-comparison-Lawrence/4ed0b086959d44610c776482d2f70821b39a203b

Lee, H., & Chang, M. C. (2022). YouTube as a source of information regarding the effect of vitamin C on coronavirus disease. *Complementary Therapies in Medicine*, 67, 102827. https://doi.org/10.1016/j.ctim.2022.102827

Lee, H., Choi, A., Jang, Y., & Lee, J. I. (2018). YouTube as a learning tool for four shoulder tests. *Primary Health Care Research & Development*, 20(e70), 1-7. https://doi.org/10.1017/s1463423618000804

Li, K. C., & Wong, B. T. M. (2021). A review of the use of open educational resources: the benefits, challeng es and good practices in higher education. *International Journal of Innovation and Learning*, 30(3), 279. https://doi.org/10.1504/ijil.2021.118189

Lo, C. K., Tlili, A., & Huang, X. (2022). The Use of Open Educational Resources during the COVID-19 Pandemic: A Qualitative Study of Primary School Mathematics Teachers in Hong Kong. *Education Sciences*, *12*(11), 744. https://doi.org/10.3390/educsci12110744

Majid, S., Khine, W. K. K., Oo, M. Z. C., & Lwin, Z. M. (2012). An analysis of YouTube videos for teaching information literacy skills. In *Advanced Information Technology in Education* (pp. 143-151). Springer, Berlin, Heidelberg.

Malhotra, N., & Goyal, T. (2021). SENTIMENT ANALYSIS USING TWITTER INFORMATION FLOW ABOUT THE NEW EDUCATION POLICY INTRODUCED IN INDIA IN 2020. *INTERNATIONAL JOURNAL OF MANAGEMENT*, 11(12). https://doi.org/10.34218/ijm.11.12.2020.228

Marín, V. I., Zawacki-Richter, O., Aydin, C. H., Bedenlier, S., Bond, M., Bozkurt, A., Conrad, D., Jung, I., Kondakci, Y., Prinsloo, P., Roberts, J., Veletsianos, G., Xiao, J., & Zhang, J. (2022). Faculty perceptions, awareness and use of open educational resources for teaching and learning in higher education: a cross-comparative analysis. *Research and Practice in Technology Enhanced Learning*, *17*(1). https://doi.org/10.1186/s41039-022-00185-z

Midha, M., & Kumar, J. (2022). Users' Awareness and Usage of Open Educational Resources in Central Universities of North India. *DESIDOC Journal of Library & Information Technology*, 42(1).

Moghavvemi, S., Sulaiman, A., Jaafar, N. I., & Kasem, N. (2018). Social media as a complementary learning tool for teaching and learning: The case of youtube. *The International Journal of Management Education*, 16(1), 37–42. https://doi.org/10.1016/j.ijme.2017.12.001

Mukhopadhyay, S., Kruger, E., & Tennant, M. (2014). YouTube: A New Way of Supplementing Traditional Methods in Dental Education. *Journal of Dental Education*, 78(11), 1568–1571. https://doi.org/10.1002/j.0022-0337.2014.78.11.tb05833.x

Mwinyimbegu, C. M. (2018). The role of libraries and librarians in open educational resources in Tanzania: the case of selected public university libraries. *Library Philosophy and Practice*, 0_1-15.

Novielli, N., Girardi, D. & Lanubile, F. (2018). A Benchmark Study on Sentiment Analysis for Software Engineering Research. *15th International Conference on Mining Software Repositories (MSR 2018)* (pp.1-12). Gothenburg, Sweden. Retrieved on 6th February, 2020 from https://www.semanticscholar.org/paper/A-Benchmark-Study-

Pande, J. (2018). Opportunities and challenges in the adoption of open educational resources for course development: a case study of Uttarakhand Open University. *International Journal of Information Technology*, *10*(3), 339–347. https://doi.org/10.1007/s41870-018-0126-z

Parabhoi, L. & Saha, P. (2018). Sentiment Analysis of YouTube Comments on Koha Open Source Software Videos. *International Journal of Library and Information Studies*, *8*(4), pp. 96-102. Retrieved on 10th February, 2020 from https://www.researchgate.net/publication/330619821_Sentiment_Analysis_of_YouTube_Comments_on_Koha_Open_Source_Software_Videos

Parabhoi, L. (2019). Twitter sentiment analysis: a case study of ten university libraries. *12th International CALIBER-2019* (pp.179-191). Bhubaneswar, Odisha: INFLIBNET. Retrieved on 10th February, 2020 from https://www.researchgate.net/publication/337812660

Patra, S. K. (2019). How Indian libraries tweet? Word frequency and sentiment analysis of library tweets. *Annals of Library and Information Studies (ALIS)*, *66*(4).

Pounds, A., & Bostock, J. (2019). Open educational resources (OER) in higher education courses in aquaculture and fisheries: opportunities, barriers, and future perspectives. *Aquaculture International*, 27(3), 695–710. https://doi.org/10.1007/s10499-019-00355-9

Rodés, V., Gewerc-Barujel, A., & Llamas-Nistal, M. (2019). University Teachers and Open Educational Resources: Case Studies from Latin America. The International Review of Research in Open and Distributed Learning, 20(1). https://doi.org/10.19173/irrodl.v20i1.3853

Shams, S., Haq, M. A. U., & Waqar, Y. (2020). Open educational resources (OER) usage trends among university students of Pakistan. *Education and Information Technologies*, 25(6), 5637–5654. https://doi.org/10.1007/s10639-020-10195-3

Shukla, A. (2021). COVID-19 pandemic: An analysis of popular YouTube videos as an alternative health information platform. *Health Informatics Journal*, 27(2), 146045822199487. https://doi.org/10.1177/1460458221994878

Tanesab, F. I., Sembiring, I. & Purnomo, H. D. (2017). Sentiment Analysis Model Based on YouTube Comment Using Support Vector Machine. *International Journal of Computer Science and Software Engineering (IJCSSE)*, 6(8), pp.180-185.

Thompson, S. D., & Muir, A. (2019). A case study investigation of academic library support for open educational resources in Scottish universities. *Journal of Librarianship and Information Science*, *52*(3), 685–693. https://doi.org/10.1177/0961000619871604

Tlili, A., Huang, R., Chang, T. W., Nascimbeni, F., & Burgos, D. (2019). Open Educational Resources and Practices in China: A Systematic Literature Review. *Sustainability*, *11*(18), 4867. https://doi.org/10.3390/su11184867

Upneja, S. K. (2020). Contribution of Library Professionals and Libraries in Open Educational Resources in Indian Scenario. *DESIDOC Journal of Library & Information Technology*, *40*(02), 445–451. https://doi.org/10.14429/djlit.40.02.15339

Vins, M., Aldecoa, M., & Hines, H. N. (2022). Sharing wildlife conservation through 4 billion views on YouTube. *Global Ecology and Conservation*, 33, e01970. https://doi.org/10.1016/j.gecco.2021.e01970

Zhang, X., Tlili, A., Nascimbeni, F., Burgos, D., Huang, R., Chang, T. W., Jemni, M., & Khribi, M. K. (2020). Accessibility within open educational resources and practices for disabled learners: a systematic literature review. *Smart Learning Environments*, *7*(1). https://doi.org/10.1186/s40561-019-0113-2

CHAPTER - 3
SENTIMENT ANALYSIS AND SOCIAL MEDIA PLATFORMS: AN OVERVIEW

3.1 Introduction

In the era of modernization and the latest Information technology development, there are several ways in which Library and Information Science education and research are moving forward. Many new concepts have led to the emergence of the latest technology. As technology are advancing, people's opinions and sentiments are becoming important in today's society. New emerging concepts such as Sentiment Analysis and other related themes are growing in popularity in the field of research.

In the general sense, Sentiment Analysis is considered a branch of study wherein the analysis of people's opinions, sentiments, appraisals, attitudes, and emotions toward entities and their attributes that are seen in the form of written text. However, it is to be noted that the entities include products, services, organizations, individuals, events, issues, or topics. Though the different researchers and academic community have identified several terms such as sentiment analysis, opinion mining, opinion analysis, opinion extraction, sentiment mining, subjectivity analysis, affect analysis, emotion analysis, and review mining, it is known that all the terminology falls under the term "Sentiment Analysis".

Sentiment analysis has been a popular area of research in natural language processing (NLP) since sentiment analysis applications and current research have mainly dealt with written text. However, because many researchers in these domains work with text data, the subject has also been extensively investigated in data mining, web mining, and information retrieval.

Sentiment analysis is a computational technique, also known as opinion mining (Liu, 2012), that is used to identify the sentiment expressed in textual pieces, such as a review, social media post, or customer feedback. It involves analyzing the subjective

information present in the text to classify it as positive, negative, or neutral. The goal of sentiment analysis is to extract and understand the underlying sentiment or emotion conveyed by the author.

Sentiment analysis involves more than just counting positive and negative words or basic keyword matching. In order to understand the context, tone, and degree of the emotions expressed in the text, it makes use of natural language processing (NLP) techniques. Sentiment analysis automates this process so that businesses and researchers may learn important things from massive amounts of unstructured text data. This information can then be utilized for a variety of things, such as market research, brand monitoring, reputation management, and public opinion analysis.

3.2 Importance and Applications of Sentiment Analysis

Sentiment analysis has gained significant importance due to the exponential growth of online content and the need to understand customer opinions and public sentiment (Wankhade et al., 2022). Here are some key reasons why sentiment analysis is important:

1. **Customer Insights:** Sentiment analysis helps businesses gain a deep understanding of customer opinions, preferences, and satisfaction levels. By analyzing customer feedback from various sources, such as reviews, surveys, and social media, organizations can identify patterns and trends, make data-driven decisions, and improve their products or services accordingly.
2. **Brand Monitoring and Reputation Management:** Sentiment analysis enables companies to monitor their brand reputation in real-time. By analyzing the sentiment associated with their brand mentions on social media and other platforms, organizations can identify potential PR crises, manage customer complaints, and take proactive steps to maintain a positive brand image.
3. **Market Research:** Sentiment analysis is a valuable tool for market research. It allows businesses to gauge consumer sentiment toward specific products, services,

or features. By understanding the sentiment of their target audience, companies can tailor their marketing strategies, identify market gaps, and make informed business decisions.

4. **Social Listening:** Sentiment analysis provides a way to listen and analyze social media conversations about a particular topic or event. It helps organizations identify emerging trends, understand public opinion, and assess the impact of their marketing campaigns or public initiatives.

5. **Political Analysis:** Sentiment analysis plays a crucial role in analyzing public sentiment towards political figures, parties, or policies. It helps political campaigns understand voter sentiment, track public opinion during elections, and adjust their strategies accordingly.

6. **Customer Support and Feedback Analysis:** Sentiment analysis can be used to automatically categorize and prioritize customer support tickets based on sentiment. It allows organizations to identify urgent issues, address customer concerns promptly, and improve overall customer satisfaction.

3.3 Sentiment Analysis Approaches

Sentiment analysis employs various approaches to classify the sentiment expressed in text. These approaches can be broadly categorized into lexicon-based approaches, machine-learning approaches, and deep-learning approaches.

3.3.1 Lexicon-based Approaches:

Lexicon-based approaches are techniques that rely on sentiment lexicons that contain phrases or words that are associated with specific sentiments. Each word or phrase in the lexicon is assigned a sentiment score, such as positive or negative. The sentiment score of the entire text is computed by aggregating the scores of individual words or phrases. Lexicon-based approaches are relatively simple and computationally efficient, but they may struggle with context-dependent sentiment and the handling of negations and sarcasm.

3.3.2 Machine Learning Approaches:

Machine learning approaches involve training a model on labeled data to learn the relationship between text features and sentiment labels. These models can be 1. supervised, 2. unsupervised, or 3. semi-supervised. Supervised machine learning algorithms, such as Naive Bayes and Support Vector Machines (SVM), learn from labeled training data that categorize sentiment in new, unseen texts. Unsupervised approaches, such as clustering or topic modeling, identify patterns or topics associated with sentiment without pre-existing labels. Semi-supervised approaches combine labeled and unlabeled data to improve sentiment classification performance.

3.3.3 Deep Learning Approaches:

Deep learning approaches, particularly neural networks, have shown remarkable success in sentiment analysis. These models leverage neural architectures, such as Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs), to capture complex relationships and semantic structures in text data. Deep learning models can automatically learn features and representations from raw text, making them effective in sentiment classification tasks. However, they typically require large amounts of labeled training data and computational resources for training.

3.4 Sentiment Analysis Challenges and Limitations

Despite the progress made in sentiment analysis, several challenges and limitations persist (Hussein, 2018):

1. **Subjectivity and Context:** Interpreting sentiment is subjective and context-dependent. Different individuals may interpret the same text differently, leading to inconsistencies in sentiment classification. Additionally, understanding the context, sarcasm, irony, and cultural nuances poses challenges for sentiment analysis algorithms.
2. **Data Availability and Quality:** Sentiment analysis models heavily rely on labeled training data. Creating high-quality labeled datasets can be time-consuming and

expensive. Moreover, sentiment analysis models trained on one domain may not perform well in another domain due to differences in language usage and sentiment expression.

3. **Handling Negations and Modifiers:** Negations, modifiers, and comparative language can significantly affect the sentiment expressed in text. Capturing the correct sentiment polarity in the presence of such linguistic elements is a complex task for sentiment analysis models.

4. **Sarcasm and Irony:** Sarcasm and irony pose challenges to sentiment analysis as they involve expressing the opposite sentiment of what is explicitly stated. Detecting sarcasm and irony requires a deeper understanding of the underlying context and the ability to recognize linguistic cues.

5. **Sentiment Subjectivity and Intensity:** Sentiment analysis often involves categorizing sentiment into discrete labels (positive, negative, neutral). However, sentiment is a continuous spectrum, and capturing the intensity or strength of sentiment can be challenging. A text can have varying degrees of positive or negative sentiment.

6. **Multilingual and Cross-cultural Challenges:** Sentiment analysis becomes more complex when dealing with multiple languages and cross-cultural contexts. Different languages and cultures express sentiment differently, and sentiment analysis models need to be adapted and trained on diverse datasets to handle such variations.

7. **Ethical and Bias Concerns:** Sentiment analysis models can inherit biases present in the training data, leading to biased predictions. This can have implications in sensitive domains, such as automated decision-making or social profiling. Ensuring fairness and ethical considerations in sentiment analysis is an ongoing concern.

Despite these challenges, ongoing research and advancements in sentiment analysis techniques aim to address these limitations and improve the accuracy and reliability of sentiment analysis models.

3.5 Sentiment Analysis Tools

There are numerous tools available for sentiment analysis, catering to different needs and preferences. These tools offer a range of functionalities, from lexicon-based approaches to machine learning and deep learning techniques. Listed below are some of the sentiment analysis tools available in the field of natural language processing. These tools encompass a wide range of functionalities and approaches, allowing researchers and practitioners to effectively analyze sentiment in textual data. With these tools at their disposal, analysts can gain valuable insights and unlock the power of sentiment analysis in their projects (Rogalski, 2023).

1. **Natural Language Toolkit (NLTK):** NLTK is a popular Python library for natural language processing. It provides various sentiment analysis modules and tools, making it a comprehensive resource for text analysis tasks.
2. **TextBlob**: TextBlob is a Python library that offers a simple and intuitive API for sentiment analysis and other NLP tasks. It provides a sentiment analysis module and allows easy access to sentiment polarity and subjectivity scores.
3. **Stanford CoreNLP:** Stanford CoreNLP is a suite of NLP tools developed by Stanford University. It includes a sentiment analysis module that employs deep learning techniques for accurate sentiment classification at both sentence and document levels.
4. **IBM Watson Natural Language Understanding:** IBM Watson Natural Language Understanding is a cloud-based platform with sentiment analysis capabilities. It utilizes advanced machine learning algorithms to analyze sentiment in text data and provides an API for integration into applications.

5. **RapidMiner:** RapidMiner is a data science platform that offers sentiment analysis and text mining capabilities. It provides a visual interface for building sentiment analysis workflows, feature extraction, and model training.

6. **Google Cloud Natural Language API:** Google Cloud Natural Language API is a cloud-based service with sentiment analysis functionalities. It employs machine learning models to classify sentiment and provides sentiment scores for both sentence-level and document-level analysis.

7. **Microsoft Azure Text Analytics:** Microsoft Azure Text Analytics is a cloud-based service that offers sentiment analysis features. It uses machine learning models to classify sentiment in text data and provides sentiment scores at various levels.

8. **ParallelDots' API:** ParallelDots' API is an NLP API that includes sentiment analysis capabilities. It leverages deep learning models and offers multilingual support, making it suitable for a wide range of sentiment analysis tasks.

9. **Mozdeh:** Mozdeh is a sentiment analysis tool designed specifically for Twitter and YouTube data. It combines machine learning and rule-based techniques to capture sentiment in tweets, including handling negations and emoticons.

10. **R Language** (tm and Sentiment Analysis packages): R, a programming language, has sentiment analysis capabilities through packages such as "tm" for text mining and "Sentiment Analysis" for sentiment classification.

These tools offer a wide range of features, approaches, and language support, catering to various needs in sentiment analysis tasks. Users can choose the tool that best suits their requirements and preferences.

3.6. Understanding Intention, Emotion, and Subjectivity Analyses

Sentiment analysis in social media goes beyond the analysis of positive and negative sentiments. It also involves examining other important aspects such as intention, emotion, and subjectivity. These additional analyses provide deeper insights into the nuances of user-generated content. Let's explore each of these analyses:

1. **Intention Analysis:** Intention analysis aims to uncover the underlying intent or purpose behind a user's statement. It involves identifying whether the user's expression conveys a suggestion, a question, a complaint, or any other intention. Understanding the intentions expressed by users on social media allows organizations to respond appropriately and address their needs effectively. It helps in providing personalized and tailored responses, enhancing customer satisfaction, and fostering meaningful engagement.
2. **Emotion Analysis:** Emotion analysis delves into the emotions conveyed by users in their posts or comments. It involves identifying emotions such as happiness, sadness, anger, surprise, and more. By analyzing emotions, organizations can gain insights into how users feel about certain topics, products, or experiences. This understanding enables businesses to empathize with users' emotional responses, tailor their communication strategies, and address concerns or issues that evoke strong emotions. Emotion analysis plays a crucial role in reputation management, customer experience enhancement, and sentiment-driven decision-making.
3. **Subjectivity Analysis:** Subjectivity analysis focuses on determining the subjectivity or objectivity of a statement. It involves identifying whether a statement expresses a subjective opinion or an objective fact. Understanding subjectivity helps organizations interpret the level of bias, personal perspective, or factual information present in user-generated content. This analysis is particularly valuable in domains such as social media monitoring, news analysis, and market research. Subjectivity analysis enables businesses to assess the credibility of information, detect misleading or biased content, and provide accurate and objective insights to their audience.

Intention analysis, emotion analysis, and subjectivity analysis are essential components of sentiment analysis, allowing organizations to gain a deeper understanding of user behavior, preferences, and needs. By harnessing these analytical approaches, businesses can enhance customer engagement, optimize marketing strategies, improve products and services, and make data-driven decisions that align with user sentiments and expectations.

3.7 Rise of Social Media Platforms

The rapid advancement of social media platforms has transformed the way we connect, communicate, and consume information. These platforms, starting with the likes of Friendster and MySpace in the early 2000s, have gradually evolved into global phenomena that permeate nearly every aspect of our lives. With the advent of Facebook, Twitter, Instagram, and other popular platforms, social media has become an integral part of our daily routines. The impact of social media on worldly affairs cannot be overstated. These platforms have revolutionized the way information is shared, disseminated, and accessed. News and events that once relied on traditional media outlets now spread like wildfire through social media networks. It has democratized information, empowering individuals to voice their opinions, mobilize communities, and participate in discussions on a global scale. Social media has given a platform to marginalized voices, allowing them to challenge traditional power structures and influence public discourse.

Furthermore, social media has transcended geographic boundaries, enabling instantaneous communication and connection among individuals from different parts of the world. It has reshaped the concept of friendship and networking, making it easier to connect with people who share similar interests or backgrounds. From personal relationships to professional collaborations, social media has opened up new avenues for interaction and collaboration.

The influence of social media extends beyond personal connections. It has significantly impacted various industries, including marketing, advertising, journalism,

and politics. Businesses now harness the power of social media to reach wider audiences, promote their products and services, and engage with customers in real time. Journalists use social media platforms to gather news, crowdsource information, and connect with sources. Politicians leverage these platforms to communicate their agendas, mobilize supporters, and engage in political debates.

3.7.1 Sentiment Analysis and Social Media

Sentiment analysis plays a crucial role in understanding and analyzing social media data. In the vast sea of user-generated content, sentiment analysis enables us to decipher the emotions, opinions, and attitudes expressed by individuals across various social media platforms. By automatically categorizing posts, comments, and reviews as positive, negative, or neutral, sentiment analysis provides valuable insights into public sentiment and helps gauge the overall perception of brands, products, events, or societal issues. It allows businesses to understand customer sentiment, tailor their marketing strategies, and address customer concerns promptly. Moreover, sentiment analysis enables researchers to study public opinion trends, track sentiment shifts, and identify emerging patterns in real time. By harnessing the power of sentiment analysis in social media, organizations, and individuals can make informed decisions, engage effectively with their audience, and adapt their strategies to align with public sentiment, ultimately fostering better relationships and outcomes. Listed below are some key features of social media and how can it be an effective platform for sentiment analysis.

i. Social Media as a Rich Source of Textual Data

Social media platforms, such as Twitter, Facebook, and Instagram, have revolutionized communication and information sharing. They provide a vast amount of user-generated content, making social media an abundant source of textual data for sentiment analysis. Users express their opinions, emotions, and experiences on social media, making it an ideal platform for capturing real-time sentiments.

ii. Unique Characteristics of Social Media Text

Sentiment analysis in social media comes with its own set of challenges due to the unique characteristics of social media text. These include limited text length (e.g., Twitter's 280-character limit), informal language, presence of abbreviations, hashtags, emojis, and domain-specific jargon. These factors require specialized preprocessing techniques and models tailored to handle these characteristics.

Two major social media platforms where sentiment analysis is commonly carried out are Twitter and YouTube;

1. Twitter

Twitter, a popular microblogging platform, has become a significant source of public opinion and sentiment. Sentiment analysis on Twitter involves analyzing the sentiments expressed in tweets, categorizing them as positive, negative, or neutral, and capturing the overall sentiment trends. This analysis provides valuable insights into public sentiment on various topics, events, products, or services. Researchers, businesses, and policymakers can leverage sentiment analysis on Twitter to gauge sentiment in real time, track trends, and understand the pulse of the online community. It allows businesses to monitor brand perception, promptly respond to customer concerns, and assess the success of marketing campaigns. Politicians and political analysts can utilize sentiment analysis on Twitter to understand public sentiment toward political events, policies, or candidates. By identifying influential users, sentiment dynamics, and overall sentiment surrounding specific issues or hashtags, sentiment analysis on Twitter offers a comprehensive view of public sentiment and enables data-driven decision-making.

2. YouTube

As the largest video-sharing platform, YouTube generates a vast amount of user-generated content, making sentiment analysis on this platform valuable for understanding viewer sentiments, feedback, and reactions. Sentiment analysis on YouTube involves analyzing comments and video reactions to gauge the sentiment

expressed by viewers. Content creators benefit from understanding audience sentiments and preferences, enabling them to tailor their video content to better engage with the target audience. Marketers can assess the effectiveness of their video campaigns, identify trends, and refine their strategies based on sentiment analysis on YouTube. Researchers can study audience responses to specific video content, evaluate social campaigns, and gain insights into user behavior and preferences. Sentiment analysis on YouTube allows for the identification of influential users, sentiment dynamics within video communities, and the overall sentiment surrounding a particular theme or topic. By addressing concerns or issues raised by viewers and amplifying successful content strategies, sentiment analysis on YouTube helps content creators improve user experience and enhance their video performance.

3.7.2 Sentiment Analysis in Real-world Applications Using Social Media

1. Social Media Platform Analysis

Social media platforms have become an important source of user-generated content, making sentiment analysis a valuable tool for understanding public sentiment. Social media analysis using sentiment analysis techniques allows organizations to monitor and analyze conversations, trends, and opinions expressed by users on various platforms. By examining sentiment patterns, businesses can gain insights into customer preferences, identify emerging trends, and tailor their marketing strategies accordingly.

2. Customer Reviews and Feedback Analysis

Sentiment analysis plays a crucial role in understanding customer satisfaction and feedback. By analyzing sentiment in customer reviews, comments, and feedback on social media platforms, businesses can gauge customer sentiment toward their products or services. This enables companies to identify areas for improvement, address customer concerns promptly, and enhance customer experience.

3. Brand Monitoring and Reputation Management

Social media has given consumers a powerful platform to express their opinions about brands. Sentiment analysis allows companies to monitor and analyze sentiment toward their brand in real-time. By tracking brand mentions, sentiment trends, and sentiment intensity, organizations can proactively manage their online reputation, address negative sentiment, and leverage positive sentiment for brand promotion.

4. Political Sentiment Analysis

Political sentiment analysis on social media has gained significant attention in recent years. By analyzing sentiment expressed on platforms like Twitter and Facebook, political analysts can gain insights into public opinion, track sentiment shifts during election campaigns, and monitor sentiment towards political leaders or policies. This information can help political parties shape their strategies, understand voter sentiment, and tailor their messaging to resonate with the public.

5. Sentiment Analysis in Financial Markets

Sentiment analysis has found applications in financial markets, where understanding market sentiment can be crucial for making informed investment decisions. By analyzing sentiment expressed on social media platforms, news articles, and financial forums, traders and investors can gauge market sentiment, identify market trends, and make timely investment decisions. Sentiment analysis in financial markets provides an additional dimension for assessing market sentiment alongside traditional financial indicators.

6. Ethical and Legal Implications of Sentiment Analysis

The increasing use of sentiment analysis in real-world applications raises ethical and legal considerations. Privacy concerns, bias in sentiment analysis models, and the potential for misinterpretation of sentiments are important ethical considerations. Additionally, legal issues related to data protection, user consent, and compliance with regulations such as GDPR (General Data Protection Regulation) must be carefully

addressed when conducting sentiment analysis using social media data. It is essential for organizations and researchers to ensure the responsible use of sentiment analysis techniques and uphold ethical standards to maintain user trust and privacy.

3.7.3 Sentiment Analysis on YouTube

YouTube, the popular video-sharing platform, presents a unique opportunity for sentiment analysis. Although YouTube primarily consists of video content, sentiment analysis can be applied to the comments and textual metadata associated with the videos. Here are some key aspects of sentiment analysis on YouTube:

a. Comment Sentiment Analysis

YouTube videos attract a significant number of comments from viewers. Sentiment analysis can be performed on these comments to gain insights into the sentiment expressed towards the video or the content creator. Analyzing comment sentiment can help content creators understand audience reactions and engagement, and identify potential areas for improvement.

b. Video Metadata Analysis

In addition to comments, sentiment analysis can be applied to the textual metadata associated with YouTube videos. This includes video titles, descriptions, and tags. Analyzing the sentiment expressed in these metadata elements can provide insights into the overall sentiment associated with a video, and aid in video search optimization, and content recommendation systems.

c. YouTube Influencer Analysis

Sentiment analysis can be used to evaluate the sentiment associated with YouTube influencers. By analyzing the sentiment expressed in comments, video likes, and dislikes, sentiment analysis models can provide an overview of audience sentiment toward a particular influencer. This information can be valuable for influencer marketing campaigns, brand collaborations, and reputation management.

3.7.3.1 Challenges

Sentiment analysis on YouTube poses its own set of challenges due to the specific nature of the platform and the content it hosts (Thelwall, 2017). Some of the key challenges include:

1. **Video Content:** Unlike text-based social media platforms, YouTube primarily consists of video content. Sentiment analysis models need to be able to extract sentiment from video transcripts, comments, and video metadata to capture the sentiment expressed by users accurately.
2. **Multimodal Data:** YouTube content includes not only textual comments but also visual and auditory elements, such as gestures, facial expressions, and tone of voice. Integrating and analyzing multimodal data poses a challenge for sentiment analysis, as it requires advanced techniques to extract sentiment from different modalities effectively.
3. **Sparsity of User Comments:** YouTube videos often have a large number of views but a relatively small number of comments. Sparse comment data can impact the accuracy of sentiment analysis, as there may be limited textual information available to capture the sentiment of the viewers accurately.
4. **Comment Quality and Relevance:** YouTube comments vary widely in quality, relevance, and sentiment expression. The presence of spam comments, irrelevant discussions, or comments that contain offensive language can affect the accuracy of sentiment analysis models and require preprocessing or filtering techniques to improve the quality of data.
5. **Video Context:** Understanding the sentiment expressed in YouTube comments requires considering the context of the video being commented on. Sentiment analysis models need to be able to incorporate the video content and its specific topic or theme to provide accurate sentiment classification.

6. **Sentiment Ambiguity:** Like other social media platforms, YouTube comments can contain ambiguous sentiment expressions, sarcasm, or irony. Identifying and accurately classifying these nuanced sentiments is a challenge for sentiment analysis models.

7. **Language and Cultural Variations**: YouTube has a global user base, leading to comments in different languages and cultural contexts. Sentiment analysis models need to account for language variations, dialects, and cultural nuances to ensure accurate sentiment classification across diverse YouTube content.

Addressing these challenges requires the development of advanced sentiment analysis techniques that can handle multimodal data, context, and linguistic variations effectively. It also necessitates considering the specific characteristics of YouTube as a platform and adapting sentiment analysis models accordingly to provide valuable insights into the sentiment expressed by users.

3.8. Sentiment Analysis: Application in Libraries

Applications of sentiment analysis in libraries offer valuable insights for improving services, understanding patrons, and making data-driven decisions. Leveraging sentiment analysis empowers librarians to enhance the library experience and support the educational goals of the community (Deo, et al., 2020; Kumar, 2023). Listed below are some of the key applications of sentiment analysis in libraries;

1. **Book Selection**: Sentiment analysis can help librarians analyze user reviews and feedback on books and other materials, aiding in the selection of highly rated and popular books to enhance the library's collection.
2. **Social Media Monitoring**: Sentiment analysis allows librarians to monitor and analyze social media posts related to the library, helping them understand patrons' opinions and respond to any negative feedback or concerns.
3. **Feedback Collection**: Sentiment analysis enables librarians to analyze feedback from patrons, such as surveys, emails, and phone calls. This helps in understanding

patron satisfaction, identifying areas that need improvement, and making data-driven decisions to enhance library services.

4. **Identifying Trends**: By applying sentiment analysis to patron feedback and reviews, librarians can identify common themes, patterns, and emerging trends. This information helps in understanding patrons' preferences and tailoring library services and offerings accordingly.
5. **Identifying Popular Topics**: Sentiment analysis allows librarians to identify popular topics among patrons. This information helps in curating a diverse collection of resources and ensuring the library has adequate materials on trending subjects.
6. **Understanding Patron Needs**: By analyzing sentiment in feedback and reviews, librarians can gain insights into patrons' needs and preferences. This helps in providing relevant resources, services, and programs that cater to the specific requirements of the community.
7. **Identifying Service Issues**: Sentiment analysis helps identify potential issues with library services. By monitoring sentiment expressed in feedback and reviews, librarians can promptly address service-related concerns and ensure a positive library experience for patrons.
8. **Identifying Areas of Improvement**: Sentiment analysis enables librarians to pinpoint areas of improvement within the library. By understanding patrons' sentiments and identifying recurring issues, librarians can implement necessary changes and enhancements to enhance the overall service quality.
9. **Supporting Data-Driven Decision Making**: Sentiment analysis provides librarians with valuable data and insights, enabling them to make informed decisions regarding resource allocation, service improvements, program planning, and strategic initiatives. It ensures that library operations are guided by evidence-based approaches.

3.9. Conclusion

Sentiment analysis in social media platforms, including YouTube, offers valuable insights into public sentiment, customer feedback, brand reputation, political landscapes, financial markets, and more. By analyzing sentiment patterns and trends, businesses or organizations can tailor their strategies, enhance customer experiences, and make informed decisions. However, challenges such as noisy language, contextual ambiguity, and ethical considerations must be addressed. The responsible and effective use of sentiment analysis in social media, including YouTube, requires advanced techniques, user privacy protection, and adherence to ethical standards to unlock its full potential for understanding and leveraging public sentiment in today's digital world.

References

Anand, T., Singh, V., Bali, B., Sahoo, B. M., Shivhare, B. D., & Gupta, A. D. (2020, June). Survey paper: sentiment analysis for major government decisions. In *2020 International Conference on Intelligent Engineering and Management (ICIEM)* (pp. 104-109). IEEE.

Birjali, M., Kasri, M., & Beni-Hssane, A. (2021). A comprehensive survey on sentiment analysis: Approaches, challenges and trends. *Knowledge-Based Systems*, *226*, 107134. https://doi.org/10.1016/j.knosys.2021.107134

Cambria, E., Das, D., Bandyopadhyay, S., & Feraco, A. (Eds.). (2017). A practical guide to sentiment analysis.

Deo, G. S., Mishra, A., Jalaluddin, Z. M., & Mahamuni, C. V. (2020). Predictive analysis of resource usage data in academic libraries using the vader sentiment algorithm. In *2020 12th International Conference on Computational Intelligence and Communication Networks (CICN)* (pp. 221-228). IEEE.

Devika, M. D., Sunitha, C., & Ganesh, A. (2016). Sentiment analysis: a comparative study on different approaches. *Procedia Computer Science*, *87*, 44-49.

Feldman, R. (2013). Techniques and applications for sentiment analysis. *Communications of the ACM*, *56*(4), 82-89.

Hussein, D. M. E. D. M. (2018). A survey on sentiment analysis challenges. *Journal of King Saud University-Engineering Sciences*, *30*(4), 330-338.

Illia, F., Eugenia, M. P., & Rutba, S. A. (2021). Sentiment analysis on pedulilindungi application using textblob and vader library. In *Proceedings of The International Conference on Data Science and Official Statistics* (Vol. 2021, No. 1, pp. 278-288).

Keramatfar, A., & Amirkhani, H. (2019). Bibliometrics of sentiment analysis literature. *Journal of Information Science*, *45*(1), 3-15.

Kumar, V. (2023). Exploring the Use of Sentiment Analysis in Library User Studies: Approaches and Challenges. In A. Tripathi, M. K. Verma, & A. K. S. Yadav (Eds.), *Changing Landscape of LIS Education and Research* (Prof. H.N. Prasad Festschrift Volume) (pp. 446-457). Shree Publishers and Distributors.

Liu, B. (2012). *Sentiment Analysis and Opinion Mining*.

Medhat, W., Hassan, A., & Korashy, H. (2014). Sentiment analysis algorithms and applications: A survey. *Ain Shams engineering journal*, *5*(4), 1093-1113.

Mejova, Y. (2009). Sentiment analysis: An overview. *University of Iowa, Computer Science Department*.

Misuraca, M., Forciniti, A., Scepi, G., & Spano, M. (2020). Sentiment Analysis for Education with R: packages, methods and practical applications. *arXiv preprint arXiv:2005.12840*.

Pahwa, B., Taruna, S., & Kasliwal, N. (2018). Sentiment analysis-strategy for text pre-processing. *Int. J. Comput. Appl*, *180*(34), 15-18.

Papachristopoulos, L., Ampatzoglou, P., Seferli, I., Zafeiropoulou, A., & Petasis, G. (2019). Introducing sentiment analysis for the evaluation of library's services effectiveness. *Qualitative and Quantitative Methods in Libraries*, *8*(1), 99-110.

Patra, S. K. (2019). How Indian libraries tweet? Word frequency and sentiment analysis of library tweets. *Annals of Library and Information Studies (ALIS)*, *66*(4).

Pokharel, B. P. (2020). Twitter sentiment analysis during covid-19 outbreak in nepal. *Available at SSRN 3624719*.

Rogalski, K (2023). The 17 Best AI Sentiment Analysis Tools. *Brand24 Blog*. https://brand24.com/blog/best-sentiment-analysis-tools/

Thelwall, M. (2017). Social media analytics for YouTube comments: potential and limitations. *International Journal of Social Research Methodology*, *21*(3), 303–316. https://doi.org/10.1080/13645579.2017.1381821

Wankhade, M., Rao, A. C. S., & Kulkarni, C. (2022). A survey on sentiment analysis methods, applications, and challenges. *Artificial Intelligence Review*, *55*(7), 5731–5780. https://doi.org/10.1007/s10462-022-10144-1

Whitelaw, C., Garg, N., & Argamon, S. (2005, October). Using appraisal groups for sentiment analysis. In *Proceedings of the 14th ACM international conference on Information and knowledge management* (pp. 625-631).

Yousif, A., Niu, Z., Tarus, J. K., & Ahmad, A. (2019). A survey on sentiment analysis of scientific citations. *Artificial Intelligence Review*, *52*, 1805-1838.

Zahidi, Y., El Younoussi, Y., & Al-Amrani, Y. (2021). Different valuable tools for Arabic sentiment analysis: a comparative evaluation. *International Journal of Electrical & Computer Engineering (2088-8708)*, *11*(1).

Zahoor, S., & Rohilla, R. (2020, June). Twitter sentiment analysis using lexical or rule based approach: a case study. In *2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO)* (pp. 537-542). IEEE.

Zhang, L., Wang, S., & Liu, B. (2018). Deep learning for sentiment analysis: A survey. *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery*, *8*(4), e1253.

CHAPTER - 4
OPEN EDUCATIONAL RESOURCES (OER), SOCIAL MEDIA AND ITS IMPACT ON LIBRARIANSHIP

4.1 Introduction

The emergence of Open Educational Resources (OER) and the widespread use of social media platforms have revolutionized the field of education, ushering in a new era of accessibility, collaboration, and information sharing. OER refers to educational materials that are freely accessible and openly licensed and can be used, modified, and shared by educators and learners worldwide. According to UNESCO, "Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under the copyright that has been released under an open license, that permits no-cost access, re-use, re-purpose, adaptation and redistribution by others". These resources encompass a wide range of digital content, including textbooks, videos, lectures, lesson plans, quizzes, and more (UNESCO, 2012; Oblinger & Hawkins, 2006). The open nature of OER allows for the democratization of education, removing barriers to access and fostering collaborative learning environments. Simultaneously, social media platforms have transformed the way people collaborate, communicate, and share information (Hewlett Foundation, 2018). Platforms like Twitter, Facebook, YouTube, LinkedIn, and Instagram have become integral parts of daily life, connecting individuals across the globe and providing avenues for interaction and knowledge exchange. These platforms enable users to share their thoughts, ideas, and resources in real time, creating a virtual community that transcends geographical boundaries. Librarians, traditionally seen as custodians of information, have now embraced new responsibilities as facilitators and curators of educational resources. They play a vital role in navigating the vast landscape of OER and harnessing the power of social media to enhance learning opportunities for educators and learners alike. Librarians have become pivotal in bridging the gap between learners and OER. As repositories of knowledge, they possess the expertise to

curate, evaluate, and disseminate OER materials effectively (Bachalapur & Hugar, 2021). Librarians carefully curate OER collections, ensuring that educators and learners have access to reliable, high-quality resources that align with educational objectives. Their ability to navigate various OER platforms and evaluate the credibility of resources helps users save time and effort in searching for relevant materials. Additionally, librarians play a crucial role in educating users about licensing and copyright issues related to OER, helping them navigate the complexities of open licensing and ensure compliance with usage rights.

Social media platforms have provided librarians with powerful tools to amplify their impact and reach a wider audience. Librarians utilize social media channels to promote and advocate for OER, raising awareness about the benefits of open education and inspiring educators to embrace these resources. They engage in discussions, share success stories, and provide practical guidance on integrating OER into teaching practices (Oblinger & Hawkins (2006). By leveraging social media platforms effectively, librarians can influence educational policies and practices, foster collaboration among educators, and cultivate a community of learners passionate about open education. Moreover, librarians are instrumental in providing instruction and support to educators and learners in the realm of OER. They design workshops and training sessions to empower educators with the knowledge and skills to effectively find, evaluate, and integrate OER into their teaching practices. Librarians assist learners in navigating OER platforms, guiding them to discover relevant resources that enhance their learning experiences. Social media platforms further extend the reach of librarians' instructional efforts, allowing them to disseminate resources, answer queries, and provide ongoing support to a broader audience.

This chapter explores the significance of OER and social media in the context of librarianship, examining how these advancements have impacted the role of librarians in the digital age.

4.2. Proliferation of OER

The proliferation of OER has been driven by several factors. Firstly, advancements in digital technology have made it easier than ever to create, distribute, and discover educational content. The internet has become a vast repository of knowledge, allowing educators to publish and share their materials online. This accessibility has empowered a global community of learners and educators to collaborate and contribute to the development of OER (Wiley & Green, 2012). Another factor contributing to the proliferation of OER is the rising cost of traditional educational resources, such as textbooks. As educational expenses continue to escalate, OER provides a cost-effective alternative. By eliminating the need for expensive textbooks, OER promotes equitable access to education, particularly in underprivileged communities where financial constraints often hinder learning opportunities. Moreover, the open licensing framework of OER encourages collaboration and innovation. Educators can adapt and customize OER to suit their teaching styles and the needs of their students. This flexibility empowers teachers to create personalized learning experiences and tailor educational content to individual learners, fostering a more engaging and effective educational environment.

4.3 Benefits of Open Educational Resources

Open Educational Resources are a transformative concept revolutionizing education. It empowers learners, leverages technology, and fosters collaboration with its wide-ranging advantages. Below listed are some major benefits of Open Educational Resources. (Luo et al., 2020)

1. **Accessibility**: OER is freely available to anyone, removing financial barriers and increasing access to educational materials for students, teachers, and learners worldwide.
2. **Affordability**: OER helps reduce the financial burden of education by eliminating or significantly reducing the costs associated with traditional textbooks and educational resources.

3. **Customization**: OER can be adapted, modified, and customized to suit the specific needs of learners, teachers, and educational institutions, allowing for personalized and tailored learning experiences.
4. **Localization**: OER can be translated into different languages and adapted to local cultures and contexts, making education more inclusive and relevant to diverse communities.
5. **Collaboration**: OER encourages collaboration and the sharing of knowledge and best practices among educators and learners, leading to the creation of a collective body of knowledge that can enhance teaching and learning.
6. **Quality improvement**: OER can be created and shared by experts in various fields, contributing to the dissemination of best practices and fostering continuous improvement in the quality of education.
7. **Resource variety**: OER encompasses a wide range of materials, including textbooks, lesson plans, assessments, videos, audio recordings, and software, providing diverse resources for teaching and learning.
8. **Supportive initiatives**: Various organizations and initiatives, such as the Open Education Consortium, the William and Flora Hewlett Foundation, and the UNESCO Open Educational Resources initiative, provide resources, support, and advocacy for the creation, adaptation, and use of OER.
9. **Global impact**: OER has the potential to benefit learners worldwide, particularly those in low-income areas and developing countries, by increasing access to quality educational resources and opportunities.
10. **Future potential**: As digital technologies continue to advance and the availability of high-quality OER grows their usage and importance are expected to increase, leading to further advancements in access to education and improvements in its quality.

4.4 Limitations of OER

While Open Educational Resources (OER) undoubtedly bring numerous benefits to education, it is important to acknowledge their limitations as well. Understanding these limitations helps us navigate the OER landscape more effectively and make informed decisions. Below are some of the limitations of OER that need to be taken into consideration. (Datt & Singh, 2021)

1. **Limited availability**: There may be a lack of high-quality OER in certain subjects or at specific levels of education, limiting the range of resources available for educators and learners.
2. **Quality concerns**: The quality and accuracy of OER materials can vary, and it may be challenging to ensure the reliability and credibility of the content, especially when anyone can create and share OER.
3. **Teacher support and training**: Educators may require support and training to effectively integrate OER into their teaching practices. Without adequate guidance, some teachers may struggle to utilize OER to their full potential.
4. **Technical requirements**: Accessing and using OER often requires digital infrastructure, such as computers, internet connectivity, and compatible devices. In areas with limited technological resources, the adoption of OER may be challenging.
5. **Intellectual property and licensing issues**: OER often utilizes open licenses, such as Creative Commons, which allow for sharing and adaptation. However, navigating different licenses and understanding copyright restrictions can be complex and time-consuming.
6. **Sustainability and maintenance**: OER projects require ongoing maintenance and updates to remain relevant and accurate. Without dedicated resources and funding, some OER initiatives may become outdated or cease to exist.

7. **Fragmentation and organization**: The vast quantity and decentralized nature of OER can make it challenging to locate specific resources or establish comprehensive and cohesive educational materials across different topics or subjects.

8. **Pedagogical alignment**: Adapting OER to align with specific curricula and pedagogical approaches may require additional time and effort from educators, as OER might not seamlessly integrate with existing teaching frameworks.

9. **Language and cultural considerations**: While OER can be translated and adapted to different languages and cultures, there may still be a lack of localized content that accurately reflects the specific needs and contexts of diverse communities.

10. **Resistance to change**: Some educators and institutions may be resistant to adopting OER due to a preference for traditional educational resources or a lack of familiarity with open licensing and collaborative approaches to knowledge sharing.

4.5. Sources of OER

A vast multitude of Open Educational Resources (OER) sources are readily available worldwide, encompassing a wealth of knowledge and information. India, as a nation, has actively embraced the OER movement, boasting a considerable array of initiatives and sources within its borders (Shukla, 2020). Presented below are a selection of notable examples, both international and national, that exemplify the rich tapestry of OER endeavors in India and beyond.

4.5.1. OER- International Examples

1. **OpenCourseWare (OCW) Consortium**: The Open Courseware (OCW) Consortium is a collaboration of educational institutions and organizations that aim to make educational materials freely available online. Its main goal was to promote education and learning through the open sharing of knowledge.

2. **MERLOT** (Multimedia Educational Resource for Learning and Online Teaching): MERLOT is a digital library and online international community that provides access to a wide range of resources, including online textbooks, videos, tutorials, and interactive learning modules, covering various disciplines and subjects.

3. **Khan Academy**: Khan Academy is a non-profit educational organization providing free online courses and educational resources in subjects like math, science, and humanities.

4. **Project Gutenberg**: Project Gutenberg is a digital library offering free access to a vast collection of public-domain books and written works. Project Gutenberg's goal is to digitally preserve and archive books that are no longer protected by copyrights so that anyone can read, download, and use them for free.

5. **The Open Textbook Library:** The Open Textbook Library is a collection of peer-reviewed open textbooks for teaching and learning. It is a project that was created to encourage the usage of open educational resources (OER) in higher education to combat the rising costs of traditional textbooks.

6. **The Free Library**: A comprehensive collection of literature, articles, and written works available online for free.

7. **YouTube EDU**: It is a collection of educational videos from universities and educational organizations. To make it simpler for people to search and access educational videos on a variety of themes, YouTube established this dedicated platform for educational content.

8. **Wikiversity**: A Wikimedia Foundation project offering free learning materials and activities.

9. **The Open Learning Initiative (OLI)**: It Provides free online courses and resources from Carnegie Mellon University. It seeks to offer top-notch, freely available educational materials and programs that are intended to improve learning outcomes.

10. **MIT OpenCourseWare**: Massachusetts Institute of Technology launched MIT OpenCourseWare as a project to make its educational resources freely accessible to the general public. It shares course materials, including lectures, assignments, and syllabi.

11. **The Open Education Consortium (OEC)**: The Open Education Consortium (OEC) is a global network of educational institutions, businesses, and people dedicated to developing and promoting open education and providing access to OER.

12. **The Open University**: A UK-based distance education institution offering free access to course materials. The open university provides a diverse range of undergraduate and graduate courses.

13. **The European Schoolnet Academy**: It provides online professional development courses and resources for teachers, school leaders, and other educators. The courses included here are a wide variety of topics similar to educational technology, digital pedagogy, and innovative teaching methods.

14. **OpenStax**: A non-profit organization offering high-quality, peer-reviewed textbooks that are free to use and customize. OpenStax provides various subject materials including science, mathematics, social sciences, humanities, etc.

15. **The Open Education Database (OEDb**): A directory of free online college courses and resources. It offers more than 8,000 free online college courses from various universities.

16. **The OpenSesame e-Learning Marketplace**: An e-learning marketplace with over 20,000 courses on various topics.

17. **Coursera**: An online learning platform offering courses, specializations, and degree programs in partnership with universities and organizations. Its primary goal is to deliver high-quality education, allowing learners to enroll in courses and

complete them at their own pace through video lectures, multiple-choice questions, and assignments with set deadlines.

18. **edX:** A non-profit online learning platform offering courses from top universities and organizations. edX offers various subjects including computer science, business, engineering, humanities, data science, etc.

19. **ALISON**: A free online learning platform with courses in various subjects, including business, IT, and personal development. It was established in 2007 to provide free, high-quality education everywhere.

20. **The Open Education Europa**: A portal by the European Commission providing access to information and resources on open education, including OER and MOOCs. The platform offers access to Open Educational Resources (OER), including textbooks, courses, and learning materials, which are freely available for use across the globe.

4.5.2. OER-National Examples

1. **National Repository of Open Educational Resources (NROER)**: A government-funded initiative with a wide range of resources in multiple languages. Its aim mission is to store, preserve, and provide access to various online resources for students and teachers.

2. **Swayam**: A government-funded MOOC platform offering courses in various disciplines in multiple languages. It is a platform that provides tutorials from class 9 till post-graduation that is easily accessible to anyone.

3 **SAKSHAT**: The portal provides free lifetime learning opportunities for students, teachers, and employed individuals, distributing content for the National Mission on Education through ICT.

4. **SWAYAM PRABHA**: A government initiative broadcasting educational content on 32 DTH channels. It covers lectures on higher education, school education (9-

12), and curriculum-based courses and assist students from class 11th & 12th in preparing for competitive exams.

5. **The National Council of Educational Research and Training (NCERT)**:. NCERT is a government organization with the aim of providing qualitative improvement of school education in India. The NCERT develops and publishes textbooks, teacher guides, and multimedia materials to create a common education system.

6. **IGNOU'S E-GYANKOSH**: Indira Gandhi National Open University is India's biggest open university and offers education to its students in an open-access format. E-GYANKOSH is an archive of varied text study materials from all of the courses it offers and is open to everyone.

7. **e-PGPathshala**: The e-PG Pathshala Project was started by the University Grants Commission (UGC) to offer free access to standardized electronic textbooks for postgraduate programs at various universities.

8. **The National Programme on Technology Enhanced Learning (NPTEL)**: NPTEL is a government-funded online learning initiative by IITs and IISc, aimed at providing high-quality online educational resources and courses in various technical and scientific fields.

9. **The National Digital Library of India (NDLI):** NDLI is a digital library with educational resources, including books, articles, and videos.

10. **The National Institute of Open Schooling (NIOS)**: An open school providing education through distance learning and offering OERs.

4.6. The Role of Social Media in OER

Social media platforms, with their vast user bases and interactive features, have played a significant role in the dissemination and utilization of OER (Hewitt & Forte, 2006). The following subsections explore the impact of social media on OER and its implications for librarianship.

4.6.1 Increased Accessibility and Reach

One of the primary advantages of social media platforms, such as Facebook, Twitter, and LinkedIn, is their ability to reach a wide audience (Kimmons, 2016). These platforms have billions of active users worldwide, making them ideal for sharing and promoting OER. Librarians can leverage social media to raise awareness about OER initiatives, disseminate educational materials, and engage with learners and educators on a global scale. By utilizing social media, librarians can extend the reach of OER and promote equitable access to educational resources.

4.6.2 Collaboration and Community Building

Social media platforms facilitate collaboration and community building among educators and learners. Online communities and groups dedicated to OER have emerged on platforms like Reddit and Facebook. These communities provide spaces for educators to share their OER creations, seek feedback, and collaborate on new projects. Librarians can actively participate in these communities, sharing their expertise, curating relevant resources, and fostering meaningful connections with fellow educators (Rolfe, 2012). Through social media, librarians can contribute to the growth and development of OER communities, strengthening the collaborative nature of open education.

4.6.3 Real-time Communication and Support

Social media platforms offer real-time communication channels that enable instant interaction and support. Librarians can utilize platforms like Twitter or LinkedIn to engage in conversations with educators and learners, address queries, and guide OER-related topics. By actively participating in these online conversations, librarians can establish themselves as valuable resources and advocates for OER (West & Victor, 2011). Additionally, social media platforms can serve as platforms for librarians to curate and share relevant OER materials, keeping educators updated with the latest resources and developments in the field.

4.7. YouTube as an Open Educational Resource

YouTube, a prominent social media platform known for its vast collection of video content, has emerged as a significant medium for Open Educational Resources (OER) (Yaacob & Md Saad, 2020). With its extensive library of educational videos, tutorials, lectures, and documentaries, YouTube provides a wealth of educational content that can be freely accessed and utilized by educators and learners worldwide. This section explores the unique characteristics and significance of YouTube as an OER platform, shedding light on its impact on education and the opportunities it presents for both educators and learners.

4.7.1. Accessibility and Diversity of Content

One of the key strengths of YouTube as an OER platform is its unparalleled accessibility and diverse range of content. YouTube hosts an immense variety of educational videos covering a wide range of subjects, from science and mathematics to literature and history. Educators can find videos that align with their curriculum, enhancing their teaching materials and providing visual and interactive resources to supplement their lessons. Learners, on the other hand, can explore different learning styles and preferences through the diverse content available on YouTube, enabling them to engage with the material in a way that best suits their needs (Smith, 2020). YouTube's user-friendly interface and search functionalities make it easy for educators and learners to discover relevant OER content. With just a few clicks, educators can find instructional videos, documentaries, and expert-led lectures that enrich their teaching. Learners, too, can access educational videos that help them grasp complex concepts, reinforce their understanding, and explore new areas of interest. The accessibility and diversity of content on YouTube empower both educators and learners, making education more engaging, interactive, and personalized.

4.7.2. Visual and Interactive Learning Experiences

YouTube's audio-visual format provides a unique advantage for delivering OER content. Educational videos on YouTube offer visual demonstrations, animations, and

real-life examples that enhance the learning experience. This visual component can be particularly beneficial for subjects that require a visual understanding, such as science experiments, art techniques, or geographical concepts. Additionally, YouTube's interactive features, such as the comment section, allow learners to engage in discussions, ask questions, and provide feedback, creating an interactive learning environment and facilitating peer-to-peer learning (Brown, 2019). Educators can also leverage YouTube's interactive features to foster engagement and active learning in their classrooms. They can assign videos as pre-class materials, encouraging students to watch and reflect on the content before the lesson. In-class discussions can then be centered around the video, allowing students to share their thoughts and engage in critical thinking. The combination of visual and interactive elements on YouTube enriches the learning process, making it more dynamic, immersive, and memorable.

4.7.3. Personalized and Self-paced Learning

YouTube's vast library of educational content caters to learners' diverse needs and allows for personalized and self-paced learning experiences. Learners have the flexibility to explore topics of interest, choose from different explanations or perspectives, and control the pace at which they consume the content. They can rewind, pause, or replay sections of a video to reinforce their understanding or review challenging concepts (Johnson, 2022). This self-directed learning approach promotes autonomy and empowers learners to take ownership of their education. Educators can harness the power of YouTube's personalized and self-paced learning by curating playlists and recommending specific videos to their students. They can provide resources that align with individual learning styles, cater to different levels of understanding, and accommodate varying preferences. YouTube's recommendation algorithms also suggest related videos, allowing learners to explore a broader range of content and discover new educational resources aligned with their interests.

4.7.4. Challenges and Considerations

While YouTube offers significant benefits as an OER platform, some challenges and considerations need to be addressed. One challenge is the quality control of the content available on the platform. Due to its open nature, YouTube hosts a vast array of videos, ranging from professionally produced educational content to user-generated videos of varying accuracy and reliability. Educators and learners must exercise critical thinking skills and evaluate the credibility and accuracy of the content they encounter on YouTube (National OER Center, 2018). Another consideration is the issue of copyright and fair use. YouTube's policies and guidelines on copyright can be complex, and educators need to ensure that they adhere to copyright laws when utilizing videos as part of their instructional materials. They should be mindful of using content that is appropriately licensed, properly attributed, or falls under fair use exemptions.

Moreover, accessibility can be a concern for learners with disabilities. While YouTube provides closed captioning and auto-generated subtitles for many videos, not all content is fully accessible to individuals with visual or hearing impairments (Johnson, 2022). Educators should be aware of these accessibility limitations and strive to provide alternative accessible resources to accommodate all learners. Despite these challenges and considerations, YouTube remains a powerful platform for accessing and sharing OER. Its vast collection of educational videos, visual and interactive learning experiences, personalized learning opportunities, and ease of accessibility make it an invaluable resource for educators and learners alike.

4.8. OER: A Lifeline during the COVID-19 Pandemic

During the COVID-19 pandemic, the use of Open Educational Resources (OER) has experienced a significant increase and demonstrated its immense significance in supporting remote learning and educational continuity (Huang et al., 2020). With widespread school closures and the shift to online education, educators and learners turned to OER as a valuable resource for accessible and quality learning materials. OER, which is freely available and can be adapted to suit various educational needs, became a

lifeline for individuals facing disruptions in traditional classroom settings. The pandemic highlighted the significance of OER in addressing the challenges of remote learning (Kabugo, 2020). OER provided an opportunity for educators to access a wide range of educational materials, including textbooks, lectures, videos, and interactive activities, without financial barriers. Learners, regardless of their geographic location or socioeconomic background, were able to access high-quality resources and continue their education.

Social media platforms, particularly YouTube, played a vital role in the increased utilization of OER during the pandemic. YouTube emerged as a major source of OER, offering a vast collection of educational content across diverse subjects. Its user-friendly interface, interactive features, and extensive community of content creators made it an attractive platform for both educators and learners. YouTube facilitated easy discovery, engagement, and collaboration around OER (Serdaroglu, 2020). Educators could share their instructional videos, tutorials, and lectures, while learners could access these resources, engage in discussions, and benefit from peer learning. The significance of YouTube as an OER medium lies in its ability to provide engaging and dynamic learning experiences. Video content allows for visual and auditory learning, enhancing comprehension and retention. The platform's interactive features, such as comments, likes, and shares, enable learners to actively participate, seek clarification, and connect with other learners. YouTube also offers accessibility features like closed captions, making OER content more inclusive for individuals with hearing impairments. Furthermore, YouTube's recommendation algorithm and personalized content suggestions help learners discover relevant and related OER materials, fostering a continuous learning experience (Zhang et al., 2020). The platform's popularity and widespread usage make it a convenient and accessible medium for educators to reach a global audience and share their knowledge.

4.9. The Impact on Librarianship

The rapid expansion of Open Educational Resources (OER) alongside the pervasive influence of social media platforms has brought about a profound shift in the role of librarians in the digital era. Traditionally perceived as guardians of knowledge, librarians have now assumed the dynamic roles of facilitators and curators of educational resources. In the ensuing subsections, we will explore the specific implications of this transformation in the field of librarianship within the realm of OER and social media. Within the context of OER, librarians play an indispensable and versatile role (Deshmukh, 2018). They actively engage with diverse key areas, thereby making substantial contributions and undertaking a wide range of activities. The subsequent section outlines several noteworthy responsibilities that librarians effectively fulfill in the domain of OER.

1. **Create OER course bundles**: Librarians can curate and organize OER resources aligned with specific course objectives, saving time for educators and ensuring relevance and alignment with learning goals.
2. **Provide copyright and intellectual property guidance**: Librarians can help educators understand the legal and ethical use of OER materials, ensuring compliance with licenses and copyright laws.
3. **Assess and measure OER effectiveness**: Librarians can evaluate student learning outcomes and retention rates to identify areas for improvement and best practices in utilizing OER.
4. **Provide OER for non-traditional learners**: Librarians can ensure OER resources are accessible to diverse learners by offering materials in multiple formats, such as audio or large print, and providing resources in multiple languages.
5. **Build a community of OER practitioners**: Librarians can foster collaboration among educators and stakeholders, organizing events, conferences, and online discussion groups to encourage the sharing of ideas and resources.

6. **Participate in OER initiatives and grants**: Librarians can actively engage in OER initiatives and apply for grants to secure funding for the development and implementation of high-quality OER resources
7. **Develop open pedagogy practices**: Librarians can assist educators in integrating open pedagogy strategies, such as incorporating student-created content and collaborative learning activities, to enhance engagement and personalize the learning experience.
8. **Support technology integration**: Librarians can provide training and support for educators in using learning management systems, creating interactive OER resources, and ensuring digital accessibility.
9. **Offer consulting services for OER**: Librarians can act as consultants, offering recommendations for OER resources, creating customized OER course bundles, and providing guidance on effective OER adoption and integration.
10. **Stay current with OER trends and developments**: Librarians can stay informed through professional development, research literature, and participation in OER communities of practice to provide the most up-to-date resources and support for OER.

By embracing these roles and responsibilities, librarians can contribute to the effective utilization and promotion of OER, supporting learners and educators in their quest for quality educational resources in the digital age.

4.9.1. Challenges

The integration of social media and OER presents challenges that librarians must address:

- **Quality Control**: Curating and evaluating OER from social media platforms can be complex due to varying accuracy and reliability.
- **Copyright Compliance**: Navigating copyright laws and fair use policies on social media platforms can be challenging.

- **Information Overload**: The abundance of OER on social media requires librarians to help educators and learners find relevant and reliable resources.
- **Accessibility**: Ensuring OER on social media platforms are accessible to all learners, including those with disabilities, is a challenge.
- **Misinformation and Bias**: Librarians must empower users to critically evaluate information on social media and distinguish reliable sources.
- **Platform Reliability and Longevity**: Librarians must consider the stability and longevity of social media platforms when curating and recommending OER.

Despite these challenges, librarians can address them by developing quality assurance guidelines, promoting copyright awareness, providing information literacy instruction, advocating for accessibility, and adapting strategies to ensure continued access to valuable OER resources.

4.10. Conclusion

Open Educational Resources (OER) and social media platforms have revolutionized librarianship and education. OER makes high-quality educational resources more widely available, and social media makes it easier to share, collaborate, and engage with content. During the COVID-19 pandemic, social media, especially YouTube, became vital for accessing OER. YouTube's extensive educational content and interactive features enhanced accessibility and fostered collaboration and community building. Librarians have adapted their roles to become curators, advocates, and facilitators of OER, leveraging social media to extend their impact. Embracing these changes, librarians contribute to the open education movement, promoting equitable access to education in the digital age, despite challenges such as quality control, copyright compliance, information overload, accessibility, misinformation, and platform reliability.

References

Bachalapur, M. M., & Hugar, J. G. (2021). *The role of libraries and librarians in open educational resources in ...* Librarian's Awareness on Open Educational Resources in India. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=5467&context=libphilprac

Brown, A. B. (2019). YouTube and Open Education: Exploring the Potential. Oxford University Press.

Datt, G., & Singh, G. (2021). Acceptance and Barriers of Open Educational Resources in the Context to Indian Higher Education. *Canadian Journal of Learning and Technology*, 47(3). https://doi.org/10.21432/cjlt28028

Deshmukh, U. B. (2018). Open educational resources and the role of Librarians. *International Journal of Science and Research*, 9(2).

Hewitt, J., & Forte, A. (2006). Crossing boundaries: Identity management and student/faculty relationships on the Facebook. In Proceedings of the 2006 20th Anniversary Conference on Computer Supported Cooperative Work (pp. 463-472). Association for Computing Machinery. https://doi.org/10.1145/1180875.1180942

Hewlett Foundation. (2018). Open Educational Resources. Retrieved from https://hewlett.org/strategy/open-educational-resources/

Huang, R., Liu, D., Tlili, A., Knyazeva, S., Chang, T. W., Zhang, X., ... & Holotescu, C. (2020). Guidance on open educational practices during school closures: Utilizing OER under COVID-19 pandemic in line with UNESCO OER recommendation. *Beijing: Smart Learning Institute of Beijing Normal University*.

Johnson, K. (2022). YouTube for Open Educational Resources: A Comprehensive Guide. OER World. Retrieved from https://www.oerworld.com/youtube-oer-guide

Kabugo, D. (2020). Utilizing open education resources to enhance students' learning outcomes during the COVID-19 Schools Lockdown: A case of Kolibri by selected government schools in Uganda. *Journal of Learning for Development*, *7*(3), 447–458. https://doi.org/10.56059/jl4d.v7i3.465

Kimmons, R. (2016). Open educational resources: Learning and teaching in the digital age. WISE Words, 5(1), 17-22. https://repository.wcsu.edu/jcps/vol5/iss1/3/

Luo, T., Hostetler, K., Freeman, C., & Stefaniak, J. (2020). The power of open: benefits, barriers, and strategies for integration of open educational resources. *Open Learning: The Journal of Open, Distance and e-Learning*, *35*(2), 140–158. https://doi.org/10.1080/02680513.2019.1677222

National OER Center. (2018). Integrating YouTube into Open Educational Resources: Best Practices and Challenges. UNESCO. Retrieved from https://unesco.org/report/youtube-oer-integration

Oblinger, D., & Hawkins, B. L. (2006). The myth about e-learning: Is technology transforming education? EDUCAUSE Review, 41(2), 14-16. Retrieved from https://er.educause.edu/-/media/files/article-downloads/erm0621.pdf

Rolfe, V. (2012). Open educational resources: Staff attitudes and awareness. Research in Learning Technology, 20(0). https://doi.org/10.3402/rlt.v20i0.14495

Serdaroglu, E. (2020). Exploring the use of YouTube by Symphonic Orchestras as an educational platform during the pandemic of covid-19. *European Journal of Social Science Education and Research*, *7*(3), 59. https://doi.org/10.26417/770wga72a

Smith, J. D. (2020). Leveraging YouTube as an Open Educational Resource. *Journal of Open Education*, 8(2), 123-145.

Shukla, P. (2020). Open Educational Resources: Initiatives in India. *Library Philosophy and Practice (e-journal)*. 3876. https://digitalcommons.unl.edu/libphilprac/3876

The William and Flora Hewlett Foundation. (2002). The Cape Town Open Education Declaration. Retrieved from http://www.capetowndeclaration.org/read-the-declaration

UNESCO. (2012). Paris OER Declaration. Retrieved from https://en.unesco.org/sites/default/files/paris-oer-declaration_2012_en.pdf

Unesco. (n.d.). *Open educational resources*. Open Educational Resources. https://www.unesco.org/en/open-educational-resources#:~:text=Open%20Educational%20Resources%20(OER)%20are,adaptation%20and%20redistribution%20by%20others.

Veletsianos, G., & Kimmons, R. (2013). Scholars and faculty members' lived experiences in online social networks. *The Internet and Higher Education*, 16, 43-50. https://doi.org/10.1016/j.iheduc.2012.04.004

West, R., & Victor, L. (2011). Open educational resources and social media in global education. *Journal of Global Literacies, Technologies, and Emerging Pedagogies*, 1(3), 244-261. https://doi.org/10.5151/9788521206301-028

Wiley, D., & Green, C. (2012). Why openness in education? In J. M. Spector, D. Ifenthaler, P. Isaias, & S. Sampson (Eds.), Proceedings of the IADIS International Conference on e-Learning (pp. 49-55). Retrieved from https://opencontent.org/docs/why_openness_in_education.pdf

Yaacob, Z., & Md Saad, N. H. (2020). Acceptance of YouTube as a learning platform during the COVID-19 pandemic: The moderating effect of subscription status. *TEM Journal*, 1732–1739. https://doi.org/10.18421/tem94-54

Zhang, X., Tlili, A., Huang, R., Chang, T., Burgos, D., Yang, J., & Zhang, J. (2020). A case study of applying open educational practices in higher education during COVID-19: Impacts on learning motivation and perceptions. *Sustainability*, *12*(21), 9129. https://doi.org/10.3390/su12219129

CHAPTER -5
DATA ANALYSIS AND INTERPRETATION

5.1 Introduction

This chapter offers an extensive account of the data analysis and interpretation process conducted in the study on sentiment analysis of Open Educational Resources (OER) videos on YouTube. The primary objective was to thoroughly describe the steps involved in data processing, analysis, and interpretation. The focus of the analysis was to comprehend the emotional responses and attitudes expressed by users towards OER videos. By utilizing sentiment analysis techniques, the researchers aimed to gain a comprehensive understanding of learners' perceptions and engagement levels. Extensive efforts were made to identify patterns, trends, and significant findings related to the sentiments expressed in the OER videos, examining sentiment, distribution, and fluctuations over time. Data visualization techniques, including charts, graphs, and word clouds, were employed to present a comprehensive overview of the findings. To sum up, this chapter is dedicated to examining data analysis, interpretation, and the findings derived from the research objectives.

5.2 Data Analysis and Interpretation

Analyzing gathered data represents a crucial facet of a proficient researcher's responsibilities. This requires meticulous attention and adherence to a specific set of methodologies and data analysis guidelines. This chapter provides a detailed exploration of the data analysis and interpretation process, contributing to a deeper understanding of learners' perceptions and the impact of OER in the realm of digital education.

5.3 Growth Pattern of OER Videos Posted on YouTube

The growth pattern in OER video uploads on YouTube from 2007 to 2022 is shown in Table 5.1. 1030 videos about open educational resources were available on YouTube. The distribution of these videos across the selected period reveals that 258 and 216 OER videos, respectively, were posted in 2020 and 2021 number. The number

of videos fell to 161 in 2022. Intriguingly, 2020 had the most OER videos—258 in total—while 2021 came in second with 216. It's vital to note that the number of OER videos on YouTube has not grown consistently over time, but rather has fluctuated.

Table 5.1: **Growth pattern of the YouTube videos on OER**

Published Year	No. of Videos	Percentage (%)
2007	2	0.19
2008	3	0.29
2009	8	0.78
2010	13	1.26
2011	10	0.97
2012	29	2.82
2013	31	3.01
2014	25	2.43
2015	40	3.88
2016	51	4.95
2017	61	5.92
2018	60	5.83
2019	62	6.02
2020	258	25.05
2021	216	20.97
2022	161	15.63
Total	**1030**	

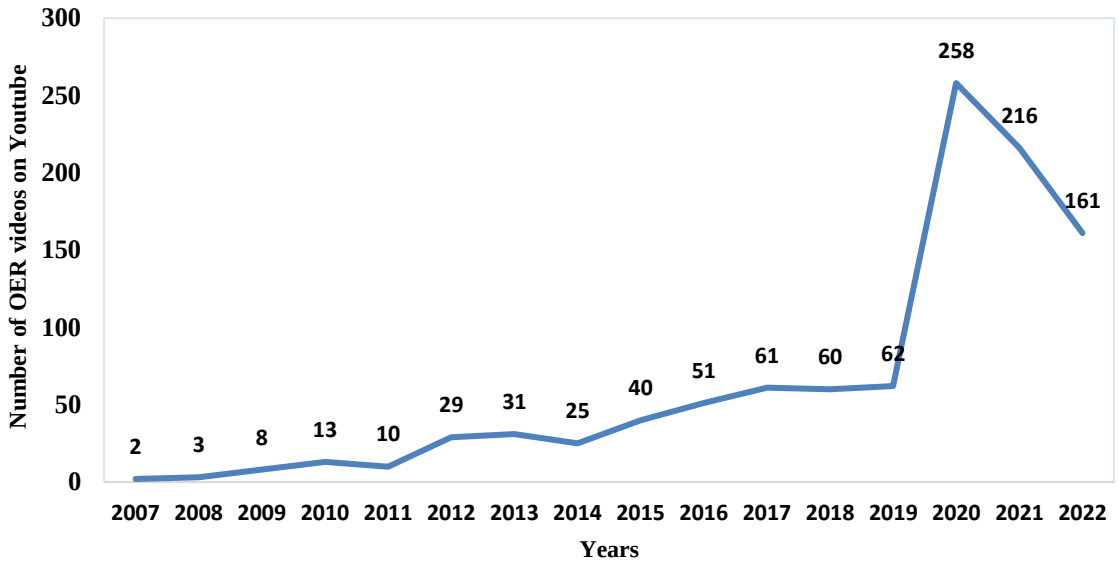

Figure 5.1: Growth pattern of the YouTube videos on OER

Table 5.2: Month-wise counts of OER videos on YouTube from 2007-2022, their annual growth rate (AGR) and compound annual growth rate (CAGR)

Month Years	January	February	March	April	May	June	July	August	September	October	November	December	Total	AGR	CAGR
2007	0	0	0	0	0	1	1	0	0	0	0	0	2	-	
2008	0	0	0	2	0	0	1	0	0	0	0	0	3	50	
2009	0	0	0	0	1	0	0	0	0	0	7	0	8	**166.67**	
2010	0	1	1	1	5	1	1	0	0	1	1	1	13	**62.5**	
2011	0	0	0	1	2	2	0	2	2	1	0	0	10	-23.08	
2012	0	2	5	1	1	5	2	4	4	1	2	2	29	**190**	
2013	3	3	5	0	1	3	1	2	1	2	7	3	31	6.9	
2014	3	2	2	1	1	2	1	2	2	5	3	1	25	-19.35	
2015	1	2	5	4	6	2	3	1	3	8	3	2	40	**60**	
2016	9	1	9	2	4	1	3	3	6	3	3	7	51	27.5	4.03
2017	1	2	6	8	4	2	5	3	6	15	5	4	61	19.61	
2018	4	5	3	4	6	6	7	5	6	4	7	3	60	-1.64	
2019	4	3	6	2	4	4	8	7	2	8	5	9	62	3.33	
2020	3	6	9	29	50	43	31	25	18	17	14	13	258	**316.13**	
2021	15	8	17	10	17	23	16	45	27	12	13	13	216	-16.28	
2022	16	20	25	21	9	11	14	10	10	12	6	7	161	-25.46	

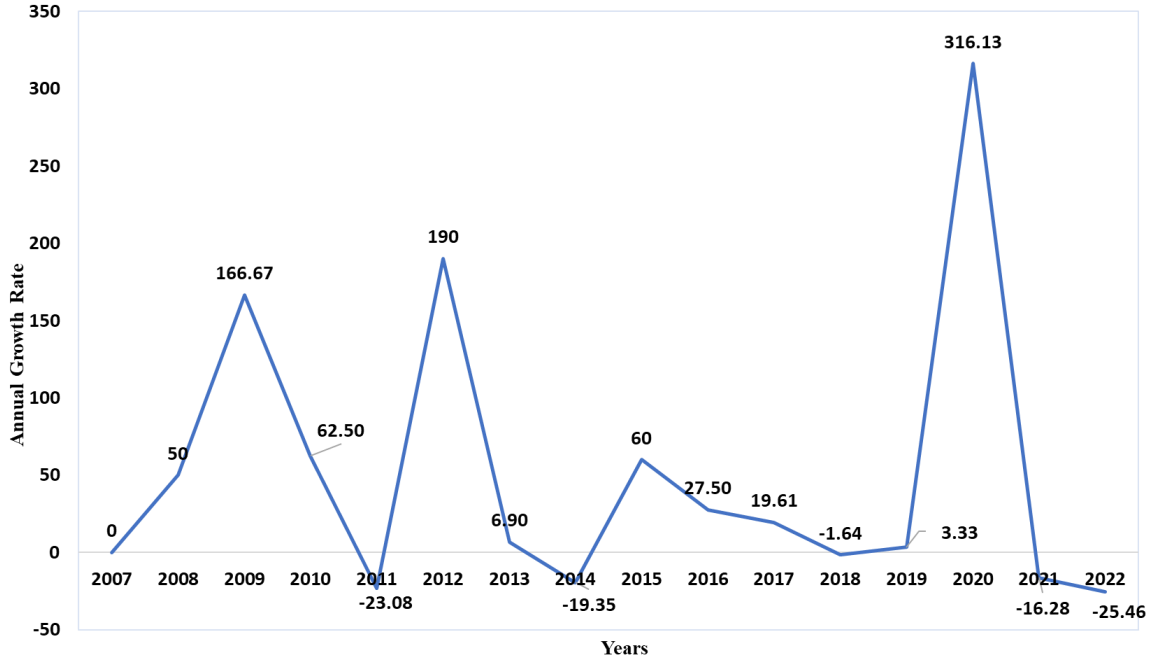

Figure 5.2: Annual Growth Rate of OER YouTube Videos

Table 5.3: Descriptive statistics performed on the counts of the OER videos of all the months from 2007-2022.

Years	No. of Videos	Mean	Median	Mode	SD	Kurtosis	Skewness	Min	Max
2007	2	0.17	0	0	0.39	2.64	2.06	0	1
2008	3	0.25	0	0	0.62	6.24	2.56	0	2
2009	8	0.67	0	0	2.02	11.36	3.35	0	7
2010	13	1.08	1	1	1.31	8.73	2.72	0	5
2011	10	0.83	0.50	0	0.94	**-1.93**	**0.38**	0	2
2012	29	2.42	2	2	1.68	**-1.08**	**0.45**	0	5
2013	31	2.58	2.50	3	1.93	**1.41**	**1.08**	0	7
2014	25	2.08	2	2	1.16	2.76	1.47	1	5
2015	40	3.33	3	2	2.10	**0.81**	**1.09**	1	8
2016	51	4.25	3	3	2.83	**-0.74**	**0.73**	1	9
2017	61	5.08	4.50	2	3.70	4.53	1.85	1	15
2018	60	5.00	5	4	1.41	**-1.28**	**0**	3	7
2019	62	5.17	4.50	4	2.41	**-1.28**	**0.24**	2	9
2020	258	21.50	17.50	N/A	14.56	**-0.20**	**0.75**	3	**50**
2021	216	18.00	15.50	17	10	4.72	2.02	8	45
2022	161	13.42	11.50	10	5.95	**-0.42**	**0.75**	6	25

**SD- Standard Deviation; Min- Minimum; Max- Maximum*

It has been observed that the annual growth rate (AGR) of more than 50% occurred in the years 2009, 2010, 2012, 2015, and 2020. The compound annual growth rate (CAGR) was found to be 4.03 (Table 5.2). The highest positive AGR was observed in 2020 and it was 316.13 (Figure 5.2). Month-wise counts of the OER videos were also analyzed and it was revealed that the counts of the OER videos from January to December in the years 2011, 2012, 2013, 2015, 2016, 2018, 2019, 2020, and 2022 were normally distributed. A maximum of 50 videos were published in a month in a year (2020) compared to the rest of the years (Table 5.3).

5.3.1 Growth Forecast of OER YouTube Videos

Forecast analysis performed in MS Excel v2019 has revealed that the number of OER videos is expected to grow in the next eight years (Table 5.4) at a linear fashion with an upper bound of 339.20 (average of next years from 2023-2030) and lower bound of 129.91 (average of next 8 years from 2023-2030).

Table 5.4: Growth Forecast of OER YouTube Videos

Timeline	Forecast	Lower Confidence Bound	Upper Confidence Bound
2023	188.89	94.13	283.65
2024	201.94	104.24	299.63
2025	214.99	114.41	315.56
2026	228.03	124.64	331.42
2027	241.08	134.93	347.24
2028	254.13	145.26	363.00
2029	267.18	155.64	378.72
2030	280.22	166.06	394.39

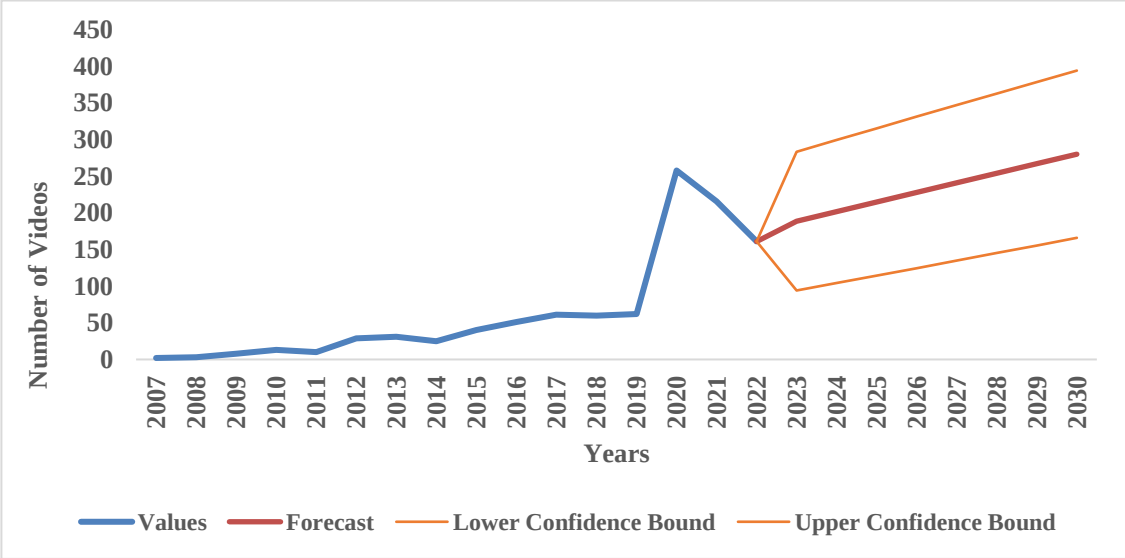

Figure 5.3: Growth Forecast of OER YouTube Videos

5.4 YouTube channel with the highest number of videos on OER

Table 5.5 shows the number of OER videos uploaded on each of the YouTube channels. The channels with 5 or more OER videos are tabulated below. The channel 'Educational Technology Unit' had the most number of videos i.e., 23 followed by 'Open Education Global' with 13 videos.

Table 5.5: YouTube channel with the highest number of videos on OER

Channel Title	No. of Videos
Educational Technology Unit	23
Open Education Global	13
Sacwc BBA Department	9
UNESCO	9
CEMCA COL	8
Open Education Network	8
NCERT OFFICIAL	7
DON BOSCO COLLEGE - TURA	6
OERinForm Beratung zu offenen Bildungsmaterialien	6
Sarah Morehouse	6
The Michelson 20MM Foundation	6
The University of British Columbia	6
COERLL	5
pijipvideo	5

5.5 Duration of videos of OER on YouTube

The duration of OER YouTube videos from 2007 to 2022 is shown in Table 5.6. To make analysis easier, the video durations have been methodically categorized. The data shows that 471 (42.29%) of the total number of videos fall into the 0–10 minute group. Furthermore, 109 (21.15%) of the videos are between 10-20 minutes long. The study also found a total of 190 videos with a duration exceeding 60 minutes.

Table 5.6: Time duration of videos of OER on YouTube

Duration of Video	No. of Videos	%
0-10 min	471	45.73
11-20 min	109	10.58
21-30 min	73	7.09
31-40 min	57	5.53
41-50 min	42	4.08
51-60 min	88	8.54
>60 min	190	18.45
Total	**1030**	

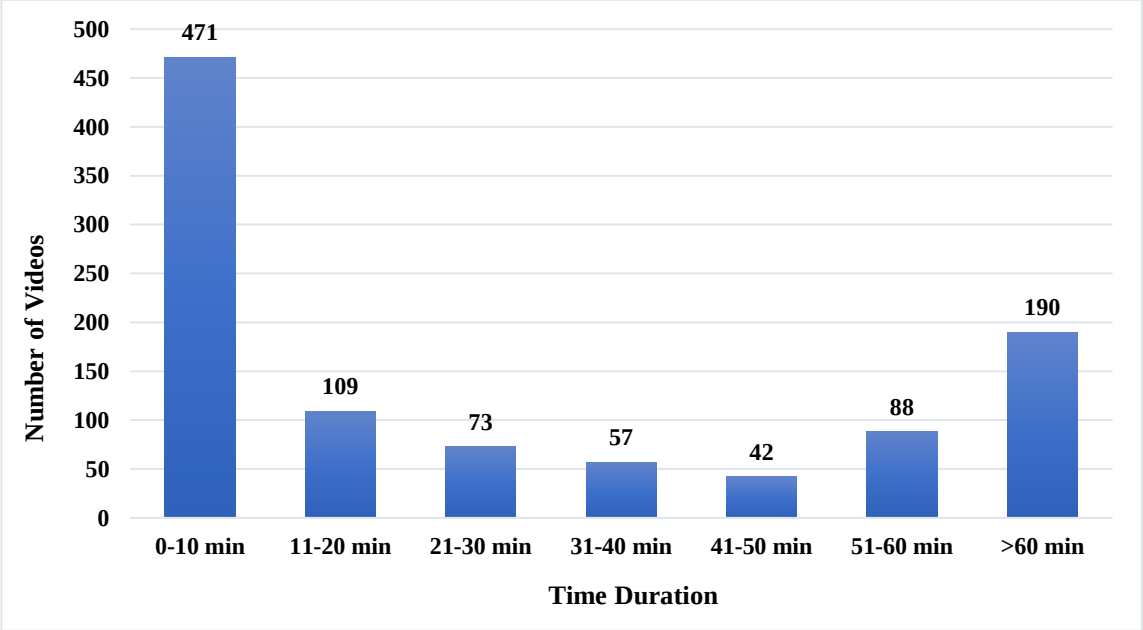

Figure 5.4: Time duration of videos of OER on YouTube

5.5.1 Year-wise Time duration of videos of OER on YouTube

The duration of the videos has been analyzed in Table 5.7 and Figure 5.5 below for the period 2007 to 2022. It can be seen that with the development of the period, most commonly uploaded videos are of the length of 0-10 minutes. In the year, 2021, 93 videos were found to be uploaded, which is the highest number in the 0-10 minutes category.

Table 5.7: Year-wise Time Duration (in Minutes) of videos of OER on YouTube

Year	0-10	11-20	21-30	31-40	41-50	51-60	>60
2007	1	0	0	0	0	1	0
2008	1	1	1	0	0	0	0
2009	6	1	0	0	1	0	0
2010	5	3	0	2	2	1	0
2011	7	2	0	0	0	0	1
2012	18	4	3	0	1	0	3
2013	12	4	4	2	1	3	5
2014	15	2	2	1	0	3	2
2015	25	3	0	4	0	4	4
2016	26	4	2	6	1	5	7
2017	40	3	3	3	2	5	5
2018	45	3	4	0	1	2	5
2019	32	9	4	1	3	5	8
2020	84	37	21	14	15	16	71
2021	93	18	19	12	6	25	43
2022	61	15	10	12	9	18	36
Total	**471**	**109**	**73**	**57**	**42**	**88**	**190**

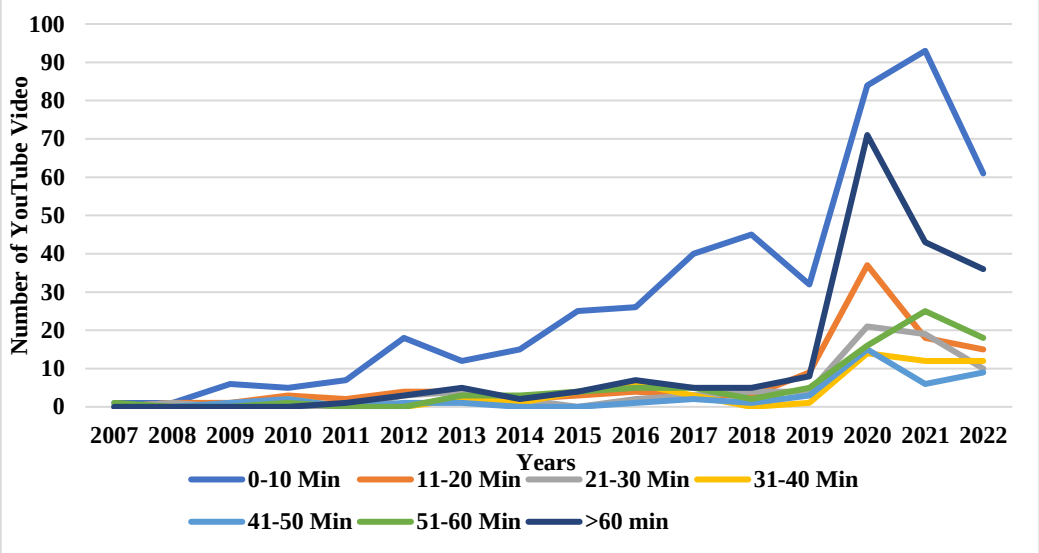

Figure 5.5: Year-wise Time duration of videos of OER on YouTube

5.6 Resolution of the Videos

The degree of clarity and detail in images and videos displayed on electronic devices is determined by resolution. It refers to the quantity of pixels in an image or video, usually expressed as width and height. There are two main standards for visual quality: High Definition (HD) and Standard Definition (SD). SD has fewer pixels, which results in a lower resolution. This implies that there are fewer pixels per inch, which ultimately results in a less sharp and detailed image or video. When watched on larger screens, SD content may seem a little distorted or lackluster. HD, on the other hand, provides a higher pixel density, resulting in a noticeably better resolution.

Table 5.8 and Figure 5.6 shows the resolutions of the retrieved videos and whether they are in SD or HD. There are more HD videos than SD videos on OER; there are 900 HD videos available overall, compared to 130 SD videos posted.

Table 5.8: Resolution of videos of OER on YouTube

Resolution of Video	No. of Videos	%
HD	900	87.38
SD	130	12.62
Total	**1030**	

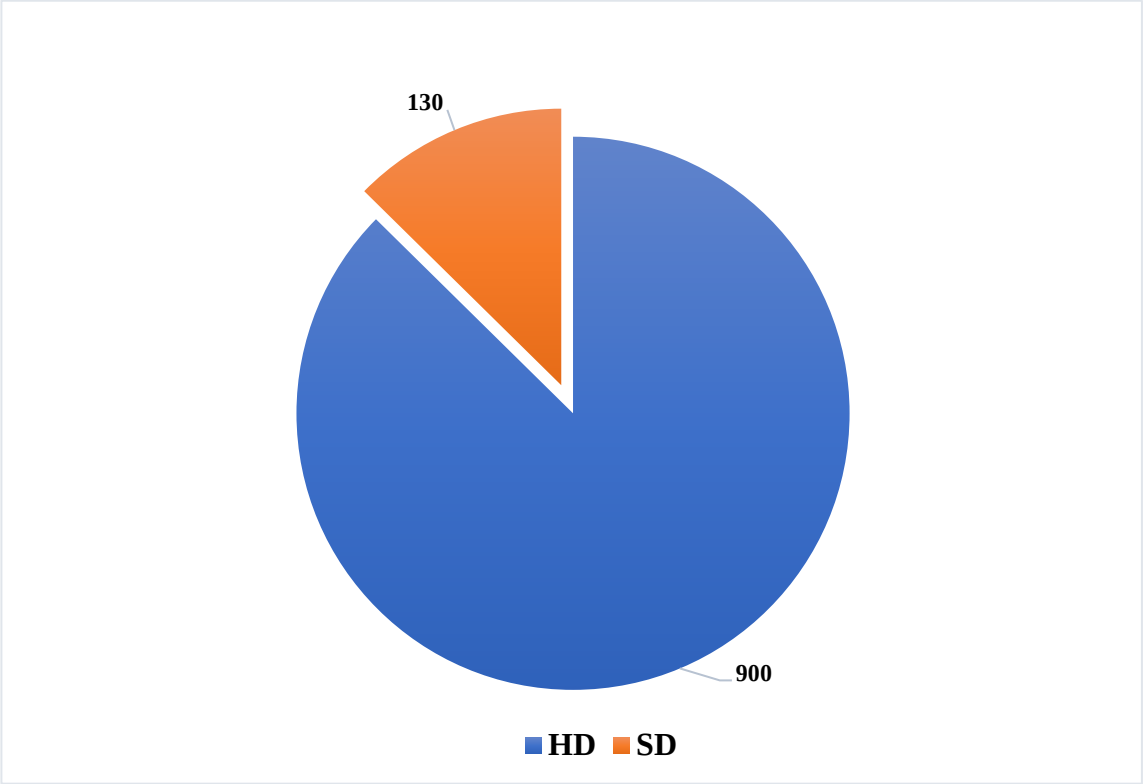

Figure 5.6: Resolution of videos of OER on YouTube

5.6.1 Year-wise distribution of resolution of OER videos on YouTube

The resolution of the OER videos has also been analyzed for each video for the period i.e., 2007-2022. From Table 5.9 and Figure 5.7, it can be seen that HD videos are higher in number in comparison to SD videos. Amongst these sixteen years, the year 2020 has the highest number of HD (233) and SD (25) videos.

Table 5.9: Year-wise distribution of resolution of OER videos on YouTube

Year	HD	SD
2007	0	2
2008	0	3
2009	0	8
2010	9	4
2011	3	7

2012	18	11
2013	21	10
2014	18	7
2015	33	7
2016	46	5
2017	54	7
2018	53	7
2019	58	4
2020	233	25
2021	197	19
2022	157	4
Total	**900**	**130**

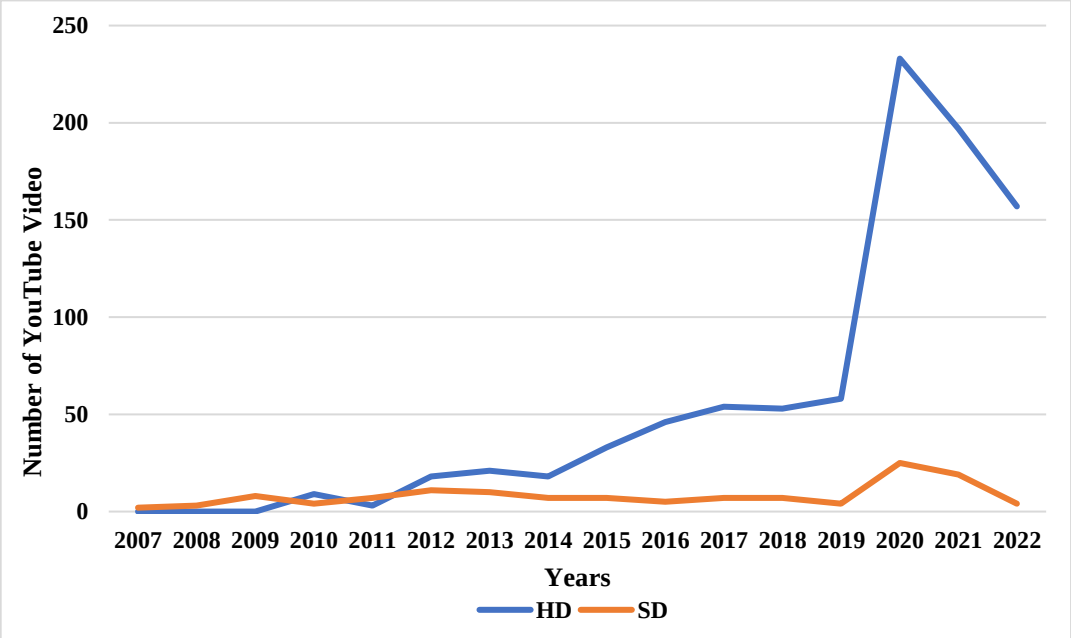

Figure 5.7: Year-wise distribution of resolution of OER videos on YouTube

5.7 Licenses for the Videos

The Standard YouTube License and the Creative Commons (CC) license are the two licensing terms that YouTube offers for videos. The Standard YouTube License

places limitations on the reuse, replication, and distribution of videos outside the YouTube platform to safeguard the rights of artists and their content. In contrast, the Creative Commons license allows for modifying, re-creation, copying, and sharing across numerous platforms while still acknowledging the original creator of the work.

Table 5.10 shows that the Standard YouTube License is chosen by the majority of OER video creators as opposed to the Creative Commons license. As a result, only 317 of the total number of OER (Open Educational Resources) videos are accessible under the Creative Commons license, while the remaining 713 videos are made available for viewing under the Standard YouTube License.

Table 5.10: Licenses for the videos of OER on YouTube

License of Video	No. of Videos	%
YouTube (SYL)	713	69.22
Creative Commons (CC)	317	30.78
Total	**1030**	

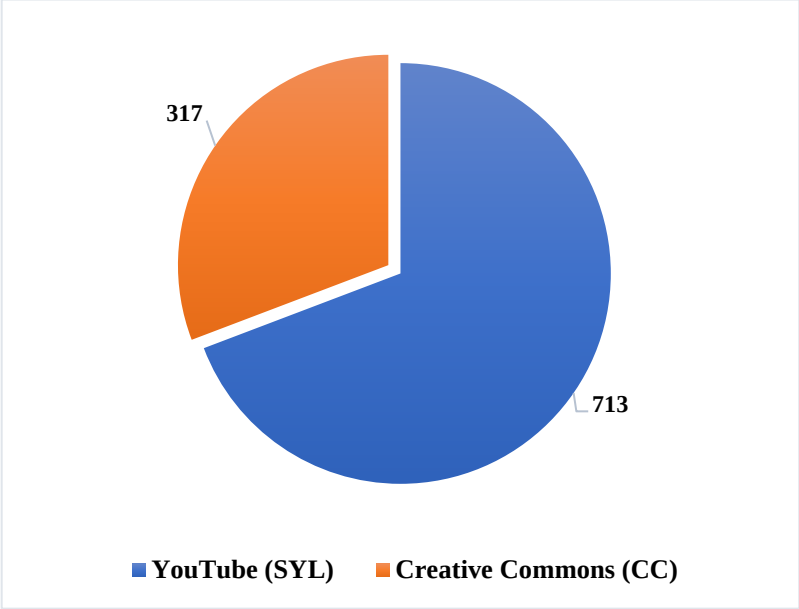

Figure 5.8: Licenses for the videos of OER on YouTube

5.7.1 Year-wise distribution of licenses for the videos of OER on YouTube

The licenses adopted for the OER videos have also been analyzed for each video for the selected period i.e., 2007-2022 Two types of licenses, the Standard YouTube License (SYL) and the Creative Commons (CC) have been observed among which the mostly used license for the videos have been identified. From Table 5.11 and Figure 5.9, it can be seen that SYL is the most commonly preferred license, and can be seen that it has been increasing over the years.

Table 5.11: Year-wise distribution of Licenses for the videos of OER on YouTube

Year	YouTube (SYL)	Creative Commons (CC)
2007	2	0
2008	3	0
2009	7	1
2010	12	1
2011	6	4
2012	8	21
2013	20	11
2014	9	16
2015	20	20
2016	32	19
2017	31	30
2018	32	28
2019	42	20
2020	195	63
2021	175	41
2022	119	42
Total	**713**	**317**

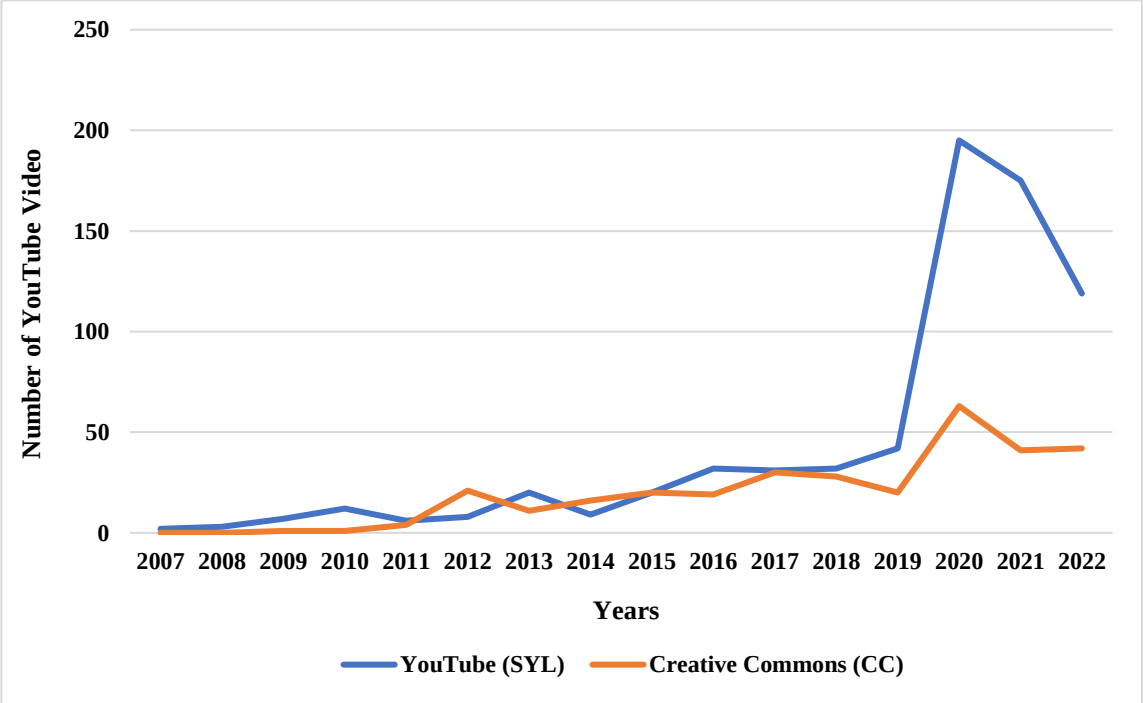

Figure 5.9: Year-wise distribution of Licenses for the videos of OER on YouTube

5.8 Top Viewed Videos of OER on YouTube

A comprehensive overview of the hierarchical distribution of all YouTube views for OER videos from 2007 to 2022 is provided in Table 5.12. Notably, the "Get to know OER Project" video garnered the most views, with a total of 10,64,325. With a total of 2,68,946 views, the "[Webinar] Developing Learning Management System (LMS) and Open Educational Resources (OERS) 22 May" took the next spot in the ranking.

Table 5.12: Top Viewed Videos of OER on YouTube

Rank No.	View Count	Title
1	10,64,325	Get to know OER Project
2	2,68,946	[Webinar] Developing Learning Management System (LMS) and Open Educational Resources (OERS) 22 May
3	1,03,391	OER Proficiency Program (Part 2) (11/5/2020)
4	77,294	OER Proficiency Program (Part 3)

5	73,906	Open Education Matters: Why is it important to share content?
6	67,424	Open Educational Resources 2 (Dr. Nikhil Rajput)
7	65,162	Open Education Resources (OER) - Advanced Webinar (Session 1)
8	64,759	Open Educational Resources 1 (Dr. Nikhil Rajput)
9	60,720	Open Educational Resources (OER) - Advanced OER Program
10	60,142	Webinar Sessions on Open Educational Resources for all ALS Teachers Part 2

5.8.1 Year-wise distribution of top viewed OER videos

The following analyses illustrate the year-wise distribution of top-viewed YouTube videos on OER. For each year, the top viewed videos with the number of views and the title of the video have been analyzed for the understanding of the ranking of the distribution.

5.8.1.1 Top Viewed Videos of OER on YouTube in 2007

Table 5.13: Top Viewed Videos of OER on YouTube in 2007

Rank No.	View Count	Title
1	422	Open source, open culture, open educational resources
2	393	C.Sidney Burrus - Open Educational Resources: educational aspects

5.8.1.2 Top Viewed Videos of OER on YouTube in 2008

Table 5.14: Top Viewed Videos of OER on YouTube in 2008

Rank No.	View Count	Title
1	4,152	'Open Educational Resources: Unlocking Knowledge to the Glob
2	2,047	Richard Muller - 'Open Educational Resources'
3	1,203	Creating open educational resources with OpenLearn (5/8)

5.8.1.3 Top Viewed Videos of OER on YouTube in 2009

Table 5.15: Top Viewed Videos of OER on YouTube in 2009

Rank No.	View Count	Title
1	1,660	Open Educational Resources at Otago Polytechnic
2	1,024	Open Educational Resources part 1/6
3	570	Creating Open Educational Resources: A Presentation to School of Public Health Faculty
4	265	Open Educational Resources part 2/6
5	247	Open Educational Resources part 3/6
6	209	Open Educational Resources part 6/6
7	130	Open Educational Resources part 4/6
8	113	Open Educational Resources part 5/6

5.8.1.4 Top Viewed Videos of OER on YouTube in 2010

Table 5.16: Top Viewed Videos of OER on YouTube in 2010

Rank No.	View Count	Title
1	51,350	TEDxNYED - David Wiley - 03/06/10
2	4,332	Learning About OER - Open Educational Resources
3	763	OER IPR Support - Good Practice in Rights Clearance

		& Licensing
4	697	Open education resources
5	379	Open Educational Resources: Challenges and Perspectives
6	319	EDUCON_1:OCW-Universia Special Session: OCW and Open Educational Resources
7	177	Open Educational Resources Challenges and Perspectives A Project Supported by the Open Society Institute
8	141	The Orange Grove Repository: open educational resources
9	125	Evaluating Open Educational Resources
10	121	Why do you love Open Educational Resources - OpenEd09

5.8.1.5 Top Viewed Videos of OER on YouTube in 2011

Table 5.17: Top Viewed Videos of OER on YouTube in 2011

Rank No.	View Count	Title
1	10,198	Open Educational Resources: The Value of Use
2	608	What is the benefit of Open Educational Resources?
3	423	Interview with Dr Sue Bickerdike about producing Open Educational Resources for Microbiology
4	188	[L3T] Grainne Conole about Open Educational Resources
5	187	Shared OER (Open educational resource) video editing FCP server
6	182	Open Spires - Open Educational Resources from the University of Oxford

7	177	Earth Science Week 2011: Educational resources overview
8	151	Open Educational Resources Project
9	107	Free Stuff! Finding and Reusing Open Educational Resources
10	85	Open Educational Resources: An innovative approach to education - Michael Trucano

5.8.1.6 Top Viewed Videos of OER on YouTube in 2012

Table 5.18: Top Viewed Videos of OER on YouTube in 2012

Rank No.	View Count	Title
1	73,906	Open Education Matters: Why is it important to share content?
2	46,102	The OERs - Open Educational Resources
3	22,280	Creating OER and Combining Licenses - Full
4	18,591	How to Search OER Commons
5	13,303	Turning a Resource into an Open Educational Resource (OER)
6	11,628	Game Changer: Open Education is Changing the Rules
7	7,469	Creating OER and Combining Licenses Part 1
8	5,526	Open Education Week: Finding Open Educational Resources
9	3,167	Overview of Achieve OER Evaluation Rubrics
10	2,480	Explanation of the Creative Commons for Open Educational Resources

5.8.1.7 Top Viewed Videos of OER on YouTube in 2013

Table 5.19: Top Viewed Videos of OER on YouTube in 2013

Rank No.	View Count	Title
1	54,240	OER (Open Educational Resources) Introduction
2	19,474	OER (Open Educational Resources) Introduction II
3	7,812	Open Educational Resources in Africa
4	5,681	Module 4 Introduction to Open Educational Resources
5	5,036	OER - Open Educational Resources Overview | Educational Technology | E-Learning Development
6	3,736	Open Educational Resources: Adopting an Open Course
7	3,241	Open Educational Resources
8	2,900	How to Create a Profile on OER Commons
9	2,280	SpeakApps Open Educational Resources (OER) - English
10	1,654	Introduction to Open Educational Resources

5.8.1.8 Top Viewed Videos of OER on YouTube in 2014

Table 5.20: Top Viewed Videos of OER on YouTube in 2014

Rank No.	View Count	Title
1	4,763	Subject Teacher Forum (STF) and Karnataka Open Educational Resources (KOER) - Gurumurthy,ITfC
2	4,252	Faculty Members' Experiences Using Open Educational Resources
3	3,569	How Students Benefit from Using Open Educational Resources
4	1,704	Open Educational Resources (OER): Digital Materials for Today's Knowledge Ecology
5	1,168	what are open education resources (OER)

6	846	Introduction to Finding Open Educational Resources
7	822	The Case for Open Educational Resources
8	797	OER Remix Activity Demonstration
9	660	Why OER?
10	481	Handbook for Interactive Open Educational Resources

5.8.1.9 Top Viewed Videos of OER on YouTube in 2015

Table 5.21: Top Viewed Videos of OER on YouTube in 2015

Rank No.	View Count	Title
1	8,126	OER Basics
2	5,524	3 Minute Teaching With Technology Tutorial - Open Educational Resources
3	4,185	David Wiley: The Financial Potentials of Open Educational Resources
4	1,766	Open Educational Resources (OER) and Adult Education
5	1,227	Open Educational Resources
6	996	The Power of Open: OER STEM for Adult Education
7	783	Open Educational Resources by Nicole Allen, Director of Open Education, SPARC
8	660	Searching Google for OER
9	653	OER by Christina Kaleiwahea
10	572	Open Educational Resources: Working Together to Evaluate and Promote High Quality Resources

5.8.1.10 Top Viewed Videos of OER on YouTube in 2016

Table 5.22: Top Viewed Videos of OER on YouTube in 2016

Rank No.	View Count	Title
1	40,527	What is OER?
2	24,915	A Review of the Effectiveness & Perceptions of Open Educational Resources As Compared to Textbooks
3	17,027	Why OER?
4	10,044	High Impact Practices for Integrating Open Educational Resources (OER) into University Courses
5	6,640	Open Educational Resources
6	6,605	How can I find OER?
7	2,664	Open education resources (AE)
8	2,291	Teaching Tips from AE - Web 2.0 Tools Part 1- Open Educational Resources
9	1,871	Online-Kurs zu Open Educational Resources (COER16) - Mooctrailer
10	1,323	Open Educational Resources

5.8.1.11 Top Viewed Videos of OER on YouTube in 2017

Table 5.23: Top Viewed Videos of OER on YouTube in 2017

Rank No.	View Count	Title
1	36,645	An Introduction to Open Educational Resources
2	26,443	OER kompakt – Was sind Open Educational Resources?
3	25,476	Open Educational Resources: Some Basics
4	9,763	Open Up Resources and Office 365 Education
5	9,697	Digital Learning Resources and Open Educational Resources | Dr. Primo G. Garcia
6	7,706	[COER MOOC] Video 2 - OER, Warum und Wozu?

7	7,488	Creating Open Educational Resources: Tips for New Creators
8	6,387	1.3.1 Open educational resources
9	3,401	What is OER or Open Educational Resources?
10	3,112	Open up your classroom with OER

5.8.1.12 Top Viewed Videos of OER on YouTube in 2018

Table 5.24: Top Viewed Videos of OER on YouTube in 2018

Rank No.	View Count	Title
1	39,155	What is Open Educational Resource | Examples of OER | Types of OER | e-Learning
2	32,187	OPEN EDUCATION RESOURCES मुक्त शैक्षणिक संसाधन OER
3	15,823	OER Open Educational Resources
4	10,603	लिखित परीक्षा शिक्षक भर्ती हेतु शैक्षिक तकनीकी मे O E R का महत्व।
5	9,446	Open Educational Resources (OER): Where to Find Videos and Images
6	8,753	WHAT IS OER
7	7,965	Open Educational Resources: A Brief Explanation
8	6,742	Open Educational Resources (OER) Repositories and Collections
9	6,661	OER Was sind OER (Open Educational Resources)?
10	4,974	Open educational resources(O.E.R.) , Information Technology

5.8.1.13 Top Viewed Videos of OER on YouTube in 2019

Table 5.25: Top Viewed Videos of OER on YouTube in 2019

Rank No.	View Count	Title
1	19,130	What is the OER Project? | OER Project
2	9,246	Understanding OER
3	8,610	Overview QGIS for Hydrological Applications Open Educational Resources
4	4,588	28 Open Educational Resources
5	4,570	OER | Katie Gosa | TEDxUTA
6	3,310	Helpyourmath Open Educational Resources (OER) Introduction - BMCC English Version
7	3,118	Open Educational Resources (OER)
8	2,750	Support for Open Educational Resources
9	2,736	An Introduction to Open Educational Resources (OER) & Open Licensing
10	2,592	MOOCs und OER – ein Post Mortem

5.8.1.14 Top Viewed Videos of OER on YouTube in 2020

Table 5.26: Top Viewed Videos of OER on YouTube in 2020

Rank No.	View Count	Title
1	2,68,946	[Webinar] Developing Learning Management System (LMS) and Open Educational Resources (OERS) 22 May
2	1,03,391	OER Proficiency Program (Part 2) (11/5/2020)
3	77,294	OER Proficiency Program (Part 3)
4	67,424	Open Educational Resources 2 (Dr. Nikhil Rajput)
5	65,162	Open Education Resources (OER) - Advanced Webinar (Session 1)
6	64,759	Open Educational Resources 1 (Dr. Nikhil Rajput)

7	60,720	Open Educational Resources (OER) - Advanced OER Program
8	57,709	Open Educational Resources (OER) - Advanced OER Program
9	55,898	Open Educational Resources 3 (Dr. Nikhil Rajput)
10	40,451	Open Educational Resources (OER) - Advanced OER Program (Part 4)

5.8.1.15 Top Viewed Videos of OER on YouTube in 2021

Table 5.27: Top Viewed Videos of OER on YouTube in 2021

Rank No.	View Count	Title
1	60,142	Webinar Sessions on Open Educational Resources for all ALS Teachers Part 2
2	37,358	Webinar Sessions on Open Educational Resources for all ALS Teachers Part 1
3	29,534	VIRTUAL INSET 2.0 ANSWER KEY|Advantage of using Open Educational Resources (OER)
4	17,252	INTERNET AND ONLINE LEARNING RESOURCES || E-LIBRARY || WEBSITES || WEB 2.O TECHNOLOGY || OERs ||
5	6,999	Understanding OER Course Registration
6	6,214	Open Educational Resources 2.1 (Morning Session)
7	5,438	PM Session OER Part 2
8	5,411	open education, objectives of open education, merits and demerits of open education..
9	4,623	VINSET DAY 1// ANSWER KEY// ADVANTAGE OF USING OPEN EDUCATIONAL RESOURCES (OER)
10	4102	Open Educational Resources

5.8.1.16 Top Viewed Videos of OER on YouTube in 2022

Table 5.28: Top Viewed Videos of OER on YouTube in 2022

Rank No.	View Count	Title
1	10,64,325	Get to know OER Project
2	53,483	Get to Know OER Project | Celebrating 10 Years of OER Project
3	21,301	OER/open Education Resource/सूचना तकनीकी सुपर टेट क्लास 4/exam master
4	13,533	Online training session: Open Educational Resources (OER): Policy Perspectives
5	6,054	Online Training Sessions : Open Educational resources (OER) and Licenses
6	5,907	OER open for social justice
7	5,806	Live Interaction Webinar : Open Education Resources (OER): Identifying and Contributing Quality OER
8	5,771	OPEN EDUCATION RESOURCES(OER) #COMMON LICENCES #UNIT-8 #UGC NET (EDUCATION)
9	4,076	Open Educational Resources (OER)
10	2,532	Discuss about E-learning || OER(Open Educational Resources)

5.9 Top Liked Videos of OER on YouTube

The measurement of likes is a helpful metric for assessing the success and viewership of YouTube videos. Table 5.29 displays the OER videos in hierarchical order according to the number of times each video has been liked. Top of the list is the video "Teaching with DepEd Commons and Open Educational Resources with Mr. Mark Anthony Sy," which has received a noteworthy total of 3,830 likes. "Open Educational

Resources (OER) - Advanced OER Programme" and "OER Proficiency Programme (Part 3)" are closely behind, gaining 3,125 and 2,644 likes, respectively.

Table 5.29: Top Liked Videos of OER on YouTube

Rank No.	Like Count	Title
1	3,830	Teaching with DepEd Commons and Open Educational Resources with Mr. Mark Anthony Sy
2	3,125	Open Educational Resources (OER) - Advanced OER Program
3	2,644	OER Proficiency Program (Part 3)
4	2,445	Open Educational Resources (OER) - Advanced OER Program
5	2,308	[Webinar] Developing Learning Management System (LMS) and Open Educational Resources (OERS) 22 May
6	2,012	OER/open Education Resource/सूचना तकनीकी सुपर टेट क्लास 4/exam master
7	1,794	Open Educational Resources (OER) _ Basic Program - May Webinar
8	1,790	Open Education Resources (OER) - Advanced Webinar (Session 1)
9	1,747	Webinar Sessions on Open Educational Resources for all ALS Teachers Part 1
10	1,690	Open Educational Resources (OER) - Advanced OER Program (Part 4)

5.9.1 Year-wise distribution of top liked OER videos

Given below are the analyses of year year-wise distribution of top liked YouTube videos on OER in detail. For each year, the top liked videos with the number of likes and

the title of the video have been tabulated for the identification of the ranking of the distribution.

5.9.1.1 Top Liked Videos of OER on YouTube in 2007

Table 5.30: Top Liked Videos of OER on YouTube in 2007

Rank No.	Like Count	Title
1	2	Open source, open culture, open educational resources

5.9.1.2 Top Liked Videos of OER on YouTube in 2008

Table 5.31: Top Liked Videos of OER on YouTube in 2008

Rank No.	Like Count	Title
1	15	'Open Educational Resources: Unlocking Knowledge to the Glob
2	12	Richard Muller - 'Open Educational Resources'
3	2	Creating open educational resources with OpenLearn (5/8)

5.9.1.3 Top Liked Videos of OER on YouTube in 2009

Table 5.32: Top Liked Videos of OER on YouTube in 2009

Rank No.	Like Count	Title
1	8	Open Educational Resources at Otago Polytechnic
2	2	Open Educational Resources part 1/6

5.9.1.4 Top Liked Videos of OER on YouTube in 2010

Table 5.33: Top Liked Videos of OER on YouTube in 2010

Rank No.	Like Count	Title
1	245	TEDxNYED - David Wiley - 03/06/10
2	113	OER IPR Support - Good Practice in Rights Clearance &

		Licensing
3	10	Learning About OER - Open Educational Resources
4	2	Open education resources
5	1	Evaluating Open Educational Resources
5	1	Open Educational Resources Challenges and Perspectives A Project Supported by the Open Society Institute

5.9.1.5 Top Liked Videos of OER on YouTube in 2011

Table 5.34: Top Liked Videos of OER on YouTube in 2011

Rank No.	Like Count	Title
1	82	Open Educational Resources: The Value of Use
2	3	What is the benefit of Open Educational Resources?
2	3	[L3T] Grainne Conole about Open Educational Resources
3	2	Interview with Dr Sue Bickerdike about producing Open Educational Resources for Microbiology
4	1	Open Educational Resources Project

5.9.1.6 Top Liked Videos of OER on YouTube in 2012

Table 5.35: Top Liked Videos of OER on YouTube in 2012

Rank No.	Like Count	Title
1	458	Open Education Matters: Why is it important to share content?
2	147	Creating OER and Combining Licenses - Full
3	127	The OERs - Open Educational Resources
4	75	Turning a Resource into an Open Educational Resource (OER)
5	42	Creating OER and Combining Licenses Part 1
6	32	Game Changer: Open Education is Changing the Rules

7	25	How to Search OER Commons
8	20	Open Education Week: Finding Open Educational Resources
9	9	Explanation of the Creative Commons for Open Educational Resources
10	5	Copyright for Open Educational Resources

5.9.1.7 Top Liked Videos of OER on YouTube in 2013

Table 5.36: Top Liked Videos of OER on YouTube in 2013

Rank No.	Like Count	Title
1	225	OER (Open Educational Resources) Introduction
2	59	OER (Open Educational Resources) Introduction II
3	57	OER - Open Educational Resources Overview | Educational Technology | E-Learning Development
4	16	Open Educational Resources in Africa
5	12	SchoolNet South Africa Conference - The OER Movement | The Fuse School
6	10	The role of open educational resources in personal learning environments
7	9	Open Educational Resources: Adopting an Open Course
8	6	Open Educational Resources
9	5	Creative Commons and Open Educational Resources: An Introduction
10	4	How to Create a Profile on OER Commons
10	4	SpeakApps Open Educational Resources (OER) - English

5.9.1.8 Top Liked Videos of OER on YouTube in 2014

Table 5.37: Top Liked Videos of OER on YouTube in 2014

Rank No.	Like Count	Title
1	15	Subject Teacher Forum (STF) and Karnataka Open Educational Resources (KOER) - Gurumurthy,ITfC
2	14	Open Educational Resources (OER): Digital Materials for Today's Knowledge Ecology
3	12	How Students Benefit from Using Open Educational Resources
4	10	The Case for Open Educational Resources
5	8	Faculty Members' Experiences Using Open Educational Resources
6	7	what are open education resources (OER)
7	6	How to Use Open Educational Resources (OER) in Class
8	5	Introduction to Finding Open Educational Resources
9	4	StartUP - Open Educational Resources for students and teachers
10	3	Open Educational Resources (OER) promo USM

5.9.1.9 Top Liked Videos of OER on YouTube in 2015

Table 5.38: Top Liked Videos of OER on YouTube in 2015

Rank No.	Like Count	Title
1	31	David Wiley: The Financial Potentials of Open Educational Resources
2	30	OER Basics
3	21	3 Minute Teaching With Technology Tutorial - Open Educational Resources

5.9.1.10 Top Liked Videos of OER on YouTube in 2016

Table 5.39: Top Liked Videos of OER on YouTube in 2016

Rank No.	Like Count	Title
1	140	A Review of the Effectiveness & Perceptions of Open Educational Resources As Compared to Textbooks
2	139	High Impact Practices for Integrating Open Educational Resources (OER) into University Courses
3	81	What is OER?
4	52	Open Educational Resources
5	47	Open education resources (AE)
6	38	Why OER?
7	27	How can I find OER?
8	22	Homeschooling for Free: Open Educational Resources
9	21	Teaching Tips from AE - Web 2.0 Tools Part 1- Open Educational Resources
10	16	eTwinning Online Seminar - Open Educational Resources: Start creating your own OERs

5.9.1.11 Top Liked Videos of OER on YouTube in 2017

Table 5.40: Top Liked Videos of OER on YouTube in 2017

Rank No.	Like Count	Title
1	223	An Introduction to Open Educational Resources
2	172	How Open Educational Resources OER can change education forever! Why I love OER.
3	123	Digital Learning Resources and Open Educational Resources | Dr. Primo G. Garcia
4	66	Creating Open Educational Resources: Tips for New Creators

5	54	Open Educational Resources: Some Basics
6	52	Open Up Resources and Office 365 Education
7	51	OER kompakt – Was sind Open Educational Resources?
8	38	What is OER or Open Educational Resources?
9	37	1.3.1 Open educational resources
10	23	Affordable Learning Georgia: Student Perspectives on Open Educational Resources

5.9.1.12 Top Liked Videos of OER on YouTube in 2018

Table 5.41: Top Liked Videos of OER on YouTube in 2018

Rank No.	Like Count	Title
1	604	OPEN EDUCATION RESOURCES मुक्त शैक्षणिक संसाधन OER
2	519	What is Open Educational Resource | Examples of OER | Types of OER | e-Learning
3	188	लिखित परीक्षा शिक्षक भर्ती हेतु शैक्षिक तकनीकी मे O E R का महत्व।
4	113	WHAT IS OER
5	94	Open Educational Resources: A Brief Explanation
6	66	Open educational resources(O.E.R.) , Information Technology
7	54	OER Open Educational Resources
8	48	Tacoma Community College & Canvas - Open Educational Resources for All
9	42	Open Educational Resources (OER): Where to Find Videos and Images
10	40	OER, The 5Rs of Open, and Creative Commons Licenses

5.9.1.13 Top Liked Videos of OER on YouTube in 2019

Table 5.42: Top Liked Videos of OER on YouTube in 2019

Rank No.	Like Count	Title
1	202	28 Open Educational Resources
2	194	OER | Katie Gosa | TEDxUTA
3	175	Helpyourmath Open Educational Resources (OER) Introduction - BMCC English Version
4	106	Overview QGIS for Hydrological Applications Open Educational Resources
5	93	OPEN EDUCATIONAL RESOURCES
6	61	MOOCs und OER – ein Post Mortem
7	43	What is the OER Project? | OER Project
8	42	Open Educational Resources (OER): Dr Ajay Semalty at FDC, HNB Garhwal University Srinagar garhwal
9	34	Open Educational Resources (OER)
10	32	An Introduction to Open Educational Resources (OER) & Open Licensing

5.9.1.14 Top Liked Videos of OER on YouTube in 2020

Table 5.43: Top Liked Videos of OER on YouTube in 2020

Rank No.	Like Count	Title
1	3,830	Teaching with DepEd Commons and Open Educational Resources with Mr. Mark Anthony Sy
2	3,125	Open Educational Resources (OER) - Advanced OER Program
3	2,644	OER Proficiency Program (Part 3)
4	2,445	Open Educational Resources (OER) - Advanced OER Program

5	2,308	[Webinar] Developing Learning Management System (LMS) and Open Educational Resources (OERS) 22 May
6	1,794	Open Educational Resources (OER) _ Basic Program - May Webinar
7	1,790	Open Education Resources (OER) - Advanced Webinar (Session 1)
8	1,690	Open Educational Resources (OER) - Advanced OER Program (Part 4)
9	1,647	OER Proficiency Program (Part 2) (11/5/2020)
10	1,437	Open Educational Resources (OER) _ Basic Program - May Webinar 2

5.9.1.15 Top Liked Videos of OER on YouTube in 2021

Table 5.44: Top Liked Videos of OER on YouTube in 2021

Rank No.	Like Count	Title
1	1,747	Webinar Sessions on Open Educational Resources for all ALS Teachers Part 1
2	1,167	Webinar Sessions on Open Educational Resources for all ALS Teachers Part 2
3	524	INTERNET AND ONLINE LEARNING RESOURCES || E-LIBRARY || WEBSITES || WEB 2.O TECHNOLOGY || OERs ||
4	287	Open educational Resources - OER
5	225	open education, objectives of open education, merits and demerits of open education..
6	206	OER Proficiency Part 2 PM Session
7	196	VIRTUAL INSET 2.0 ANSWER KEY|Advantage of using Open Educational Resources (OER)

8	143	Understanding OER Course Registration
9	97	VINSET DAY 1// ANSWER KEY// ADVANTAGE OF USING OPEN EDUCATIONAL RESOURCES (OER)
10	89	Open Educational Resources 2.1 (Morning Session)

5.9.1.16 Top Liked Videos of OER on YouTube in 2022

Table 5.45: Top Liked Videos of OER on YouTube in 2022

Rank No.	Like Count	Title
1	2,012	OER/open Education Resource/सूचना तकनीकी सुपर टेट क्लास 4/exam master
2	446	Get to know OER Project
3	444	Online training session: Open Educational Resources (OER): Policy Perspectives
4	224	Online Training Sessions : Open Educational resources (OER) and Licenses
5	131	OPEN EDUCATION RESOURCES(OER) #COMMON LICENCES #UNIT-8 #UGC NET (EDUCATION)
6	124	Live Interaction Webinar : Open Education Resources (OER): Identifying and Contributing Quality OER
7	81	Open Educational Resource (OER) || Meaning, Definition and important of OER
8	74	OPEN EDUCATIONAL RESOURCES AND CREATIVE COMMONS
9	59	Open Educational Resources (OER)
10	49	Use of Open Educational Resources in Teaching Research and Learning

5.10 Top Commented Videos of OER on YouTube

The ranking of the Open Educational Resources (OER) videos with the most comments is shown in Table 5.46's tabulated data. Notably, with 665 comments, the video titled "Teaching with DepEd Commons and Open Educational Resources with Mr. Mark Anthony Sy" received the most comments. Following is the video titled "Webinar Sessions on Open Educational Resources for all ALS Teachers Part 2," which garnered 246 comments followed by the video titled "[OER Proficiency Programme (Part 2) (11/5/2020)]" which received 189 comments. (189).

Table 5.46: Top Commented Videos of OER on YouTube

Rank No.	No. of Comments	Title
1	665	Teaching with DepEd Commons and Open Educational Resources with Mr. Mark Anthony Sy
2	246	Webinar Sessions on Open Educational Resources for all ALS Teachers Part 2
3	189	OER Proficiency Program (Part 2) (11/5/2020)
4	182	Open Education Resources (OER) - Advanced Webinar (Session 1)
5	172	OER | Katie Gosa | TEDxUTA
6	167	How Open Educational Resources OER can change education forever! Why I love OER.
7	161	28 Open Educational Resources
8	142	OER Proficiency Program (Part 3)
9	139	[Webinar] Developing Learning Management System (LMS) and Open Educational Resources (OERS) 22 May
10	132	OER IPR Support - Good Practice in Rights Clearance & Licensing

5.10.1 Year-wise analysis of Top commented videos on OER

The following analyses demonstrate the year-wise distribution of top commented videos on OER in detail. For each year, the top commented videos with the number of comments and the title of the video have been tabulated for the understanding of the ranking of the distribution.

5.10.1.1 Top Commented Videos of OER on YouTube in 2007

Table 5.47: Top Commented Videos of OER on YouTube in 2007

Rank No.	No. of Comments	Title
1	3	Open source, open culture, open educational resources

5.10.1.2 Top Commented Videos of OER on YouTube in 2008

Table 5.48: Top Commented Videos of OER on YouTube in 2008

Rank No.	No. of Comments	Title
1	4	Richard Muller - 'Open Educational Resources'

5.10.1.3 Top Commented Videos of OER on YouTube in 2009

Table 5.49: Top Commented Videos of OER on YouTube in 2009

Rank No.	No. of Comments	Title
1	5	Open Educational Resources at Otago Polytechnic

5.10.1.4 Top Commented Videos of OER on YouTube in 2010

Table 5.50: Top Commented Videos of OER on YouTube in 2010

Rank No.	No. of Comments	Title
1	132	OER IPR Support - Good Practice in Rights Clearance & Licensing
2	11	TEDxNYED - David Wiley - 03/06/10
3	3	Learning About OER - Open Educational Resources
4	1	Open education resources

5.10.1.5 Top Commented Videos of OER on YouTube in 2011

Table 5.51: Top Commented Videos of OER on YouTube in 2011

Rank No.	No. of Comments	Title
1	1	Open Educational Resources: An innovative approach to education - Michael Trucano
2	1	Interview with Dr Sue Bickerdike about producing Open Educational Resources for Microbiology

5.10.1.6 Top Commented Videos of OER on YouTube in 2012

Table 5.52: Top Commented Videos of OER on YouTube in 2012

Rank No.	No. of Comments	Title
1	24	Open Education Matters: Why is it important to share content?
2	10	Creating OER and Combining Licenses - Full
3	9	The OERs - Open Educational Resources
4	6	Class Size = 1 Billion | Cecilia D'Oliveira + More | Talks at Google

5	5	Explanation of the Creative Commons for Open Educational Resources
6	5	Turning a Resource into an Open Educational Resource (OER)
7	3	Game Changer: Open Education is Changing the Rules
8	1	Open Education Week: Finding Open Educational Resources

5.10.1.7 Top Commented Videos of OER on YouTube in 2013

Table 5.53: Top Commented Videos of OER on YouTube in 2013

Rank No.	No. of Comments	Title
1	9	OER (Open Educational Resources) Introduction
2	6	OER - Open Educational Resources Overview | Educational Technology | E-Learning Development
3	3	Open Educational Resources: Adopting an Open Course
4	2	Open Educational Resources
4	2	SchoolNet South Africa Conference - The OER Movement | The Fuse School
4	2	Creative Commons and Open Educational Resources: An Introduction
5	1	Open Educational Resources in Africa
5	1	Evaluating OER Quality
5	1	OER (Open Educational Resources) Introduction II

5	1	Finding and evaluating open educational resources

5.10.1.8 Top Commented Videos of OER on YouTube in 2014

Table 5.54: Top Commented Videos of OER on YouTube in 2014

Rank No.	No. of Comments	Title
1	1	Open Educational Resources (OER): Digital Materials for Today's Knowledge Ecology
2	1	what are open education resources (OER)
3	1	Open Educational Resources (OER) promo USM

5.10.1.9 Top Commented Videos of OER on YouTube in 2015

Table 5.55: Top Commented Videos of OER on YouTube in 2015

Rank No.	No. of Comments	Title
1	1	3 Minute Teaching With Technology Tutorial - Open Educational Resources
2	1	OER Basics
3	1	Open Educational Resources (OER) and Adult Education
4	1	Manche Rechte vorbehalten - Stiftungen und Open Educational Resources (Teil 1/2)

5.10.1.10 Top Commented Videos of OER on YouTube in 2016

Table 5.56: Top Commented Videos of OER on YouTube in 2016

Rank No.	No. of Comments	Title
1	4	A Review of the Effectiveness & Perceptions of Open Educational Resources As Compared to Textbooks

2	3	Open Educational Resources
3	2	Open education resources (AE)
4	1	Open Educational Resources

5.10.1.11 Top Commented Videos of OER on YouTube in 2017

Table 5.57: Top Commented Videos of OER on YouTube in 2017

Rank No.	No. of Comments	Title
1	167	How Open Educational Resources OER can change education forever! Why I love OER.
2	57	An Introduction to Open Educational Resources
3	18	Digital Learning Resources and Open Educational Resources | Dr. Primo G. Garcia
4	12	Open Educational Resources
5	11	Teacher Benefits using Open Educational Resources at Bay College
6	9	Affordable Learning Georgia: Student Perspectives on Open Educational Resources
7	6	Creating Open Educational Resources: Tips for New Creators
8	5	Open Up Resources and Office 365 Education
9	4	Copyright and Licensing Issues on Open Educational Resources Peter A Okebukola
10	2	Towards a National Policy on Open Educational Resources by Peter A. Okebukola

5.10.1.12 Top Commented Videos of OER on YouTube in 2018

Table 5.58: Top Commented Videos of OER on YouTube in 2018

Rank No.	No. of Comments	Title
1	99	What is Open Educational Resource | Examples of OER | Types of OER | e-Learning
2	40	OPEN EDUCATION RESOURCES मुक्त शैक्षणिक संसाधन OER
3	26	Open Educational Resources: A Brief Explanation
4	12	लिखित परीक्षा शिक्षक भर्ती हेतु शैक्षिक तकनीकी मे O E R का महत्व।
5	10	Getting Started with Open Educational Resources
6	8	WHAT IS OER
7	6	Open educational resources(O.E.R.) , Information Technology
7	6	Open Educational Resources in Behavior Analysis
8	4	Open Educational Resources (OER) in Psychology
9	3	OER, The 5Rs of Open, and Creative Commons Licenses
10	2	OPEN EDUCATIONAL RESOURCES REPOSITORY

5.10.1.13 Top Commented Videos of OER on YouTube in 2019

Table 5.59: Top Commented Videos of OER on YouTube in 2019

Rank No.	No. of Comments	Title
1	172	OER | Katie Gosa | TEDxUTA
2	161	28 Open Educational Resources
3	21	Open Educational Resources (OER)
4	13	MOOCs und OER – ein Post Mortem
5	9	Helpyourmath Open Educational Resources (OER) Introduction - BMCC English Version
6	7	Open Educational Resources (OER): Dr Ajay Semalty at FDC, HNB Garhwal University Srinagar garhwal
7	6	What is the OER Project? | OER Project
8	5	SI2019 S S015 Development of Open Educational Resources Repository
9	4	Overview QGIS for Hydrological Applications Open Educational Resources
10	3	An Introduction to Open Educational Resources (OER) & Open Licensing

5.10.1.14 Top Commented Videos of OER on YouTube in 2020

Table 5.60: Top Commented Videos of OER on YouTube in 2020

Rank No.	No. of Comments	Title
1	665	Teaching with DepEd Commons and Open Educational Resources with Mr. Mark Anthony Sy
2	189	OER Proficiency Program (Part 2) (11/5/2020)
3	182	Open Education Resources (OER) - Advanced Webinar (Session 1)

4	142	OER Proficiency Program (Part 3)
5	139	[Webinar] Developing Learning Management System (LMS) and Open Educational Resources (OERS) 22 May
6	100	Open Educational Resources (OER)- Part 1
7	93	Open Educational Resources (OER) - Advanced OER Program
8	91	Open Educational Resources (OER)- Part 2
9	89	Open Educational Resources (OER) - Advanced OER Program
9	89	Open Education Resources (OER) - Advanced Webinar (Session 1) Part 2
10	86	Open Educational Resources OER Film and Media

5.10.1.15 Top Commented Videos of OER on YouTube in 2021

Table 5.61: Top Commented Videos of OER on YouTube in 2021

Rank No.	No. of Comments	Title
1	246	Webinar Sessions on Open Educational Resources for all ALS Teachers Part 2
2	44	INTERNET AND ONLINE LEARNING RESOURCES || E-LIBRARY || WEBSITES || WEB 2.O TECHNOLOGY || OERs ||
3	24	Webinar Sessions on Open Educational Resources for all ALS Teachers Part 1
4	23	PM Session OER Part 2
5	21	VIRTUAL INSET 2.0 ANSWER KEY|Advantage of using Open Educational

		Resources (OER)
6	18	Understanding OER Course Registration
7	17	Open Educational Resources (OER): A boon for Education (Part- 1).... Please like and subscribe
8	14	Open Educational Resources (Part-2)..... Please like and subscribe
9	10	open education, objectives of open education, merits and demerits of open education..
10	9	Open Educational Resources 2.1 (Morning Session)

5.10.1.16 Top Commented Videos of OER on YouTube in 2022

Table 5.62: Top Commented Videos of OER on YouTube in 2022

Rank No.	No. of Comments	Title
1	90	OER/open Education Resource/सूचना तकनीकी सुपर टेट क्लास 4/exam master
2	12	Discuss about E-learning || OER(Open Educational Resources)
3	10	Open Educational Resource (OER) || Meaning, Definition and important of OER
4	8	OPEN EDUCATION RESOURCES(OER) #COMMON LICENCES #UNIT-8 #UGC NET (EDUCATION)
5	7	||Open education resources||Creative common||Massive open online courses||
5	7	What is OER and MOOC? Full explanation for B.ed second Sem CSJMU by #englishदुनियाँ707#viralvideos

6	4	A Talk on Open Educational Resources (OER) with Dr. Sanjay Mishra
6	4	Open Educational Resources
6	4	Africa ELTA Open Educational Resource (OER) Project Training - Part 1, May 13, 2022
7	3	Open Educational Resources OER

5.11 Correlation between duration, likes and comment counts on OER Videos

Pearson's correlation was performed in Microsoft Excel v2019 to look for relationships between the variables Duration, Views, Likes, and Comments (Table 5.63). There was a moderate positive correlation between Duration and Likes (r=0.29), Duration and Comments (r=0.16), Views and Likes (r=0.27), and Views and Comments (r=0.15). A strong positive correlation was found between Likes and Comment (r=0.74). No variables were negatively correlated with each other.

Table 5.63: Pearson's correlation between duration, likes and comment counts on OER Videos

	Duration	**Views**	**Likes**	**Comments**
Duration	1			
Views	0.04	1.0		
Likes	0.29	0.27	1	
Comments	0.16	0.15	0.74	1

The column values represent the Pearson's correlation coefficient (r).

5.12 Total number of YouTube Comments on OER videos

The study collected comments from YouTube videos on Open Educational Resources (OER) spanning the period from 2007 to 2022. A substantial number of 4,667 comments were retrieved, with 3,955 comments written in English and 712 comments in other languages (Table 5.64; Figure 5.10). To streamline the analysis process, the study

focused exclusively on the English language comments, ensuring a consistent and standardized approach to the analysis of OER video feedback.

Table 5.64: Total number of YouTube Comments on OER videos

Sl. No.	Published Year	English Language Comments	Other Language Comments	Total Number of Comments
1	2007	3	0	3
2	2008	4	0	4
3	2009	5	0	5
4	2010	147	0	147
5	2011	2	0	2
6	2012	52	11	63
7	2013	29	0	29
8	2014	3	0	3
9	2015	3	1	4
10	2016	10	0	10
11	2017	293	4	297
12	2018	202	32	234
13	2019	394	17	411
14	2020	2331	486	2817
15	2021	379	73	452
16	2022	98	88	186
Total		**3955**	**712**	**4667**

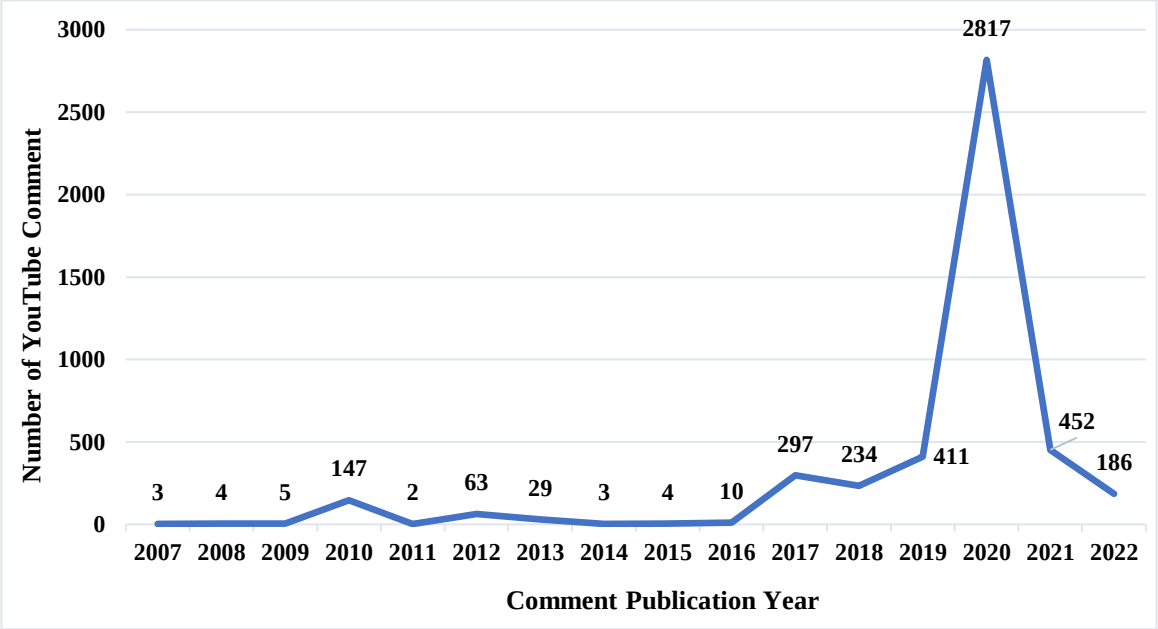

Figure 5.10: Overall comment frequency per year for the period of study.

5.13 Sentiment Analysis of Comments

Sentiments can be evaluated using three output categories: positive, neutral, and negative. A total of 4667 comments were collected from 1030 OER videos selected from the years 2007 and 2021. Among these comments, 712 were found to be in languages other than English, leaving us with 3955 English-language comments for sentiment analysis. Among the 3955 comments, 2779 were found to be positive, 1014 were neutral, and 162 were found to be negative (Table 5.65; Figure 5.11). These results indicate that the majority of viewers are pleased with the content of the OER videos on YouTube.

Table 5.65: Sentiments of viewers' comments

Sentiment	No. of Comments	%
Positive	2779	69.56
Negative	162	4.06
Neutral	1014	25.38
Total	**3955**	

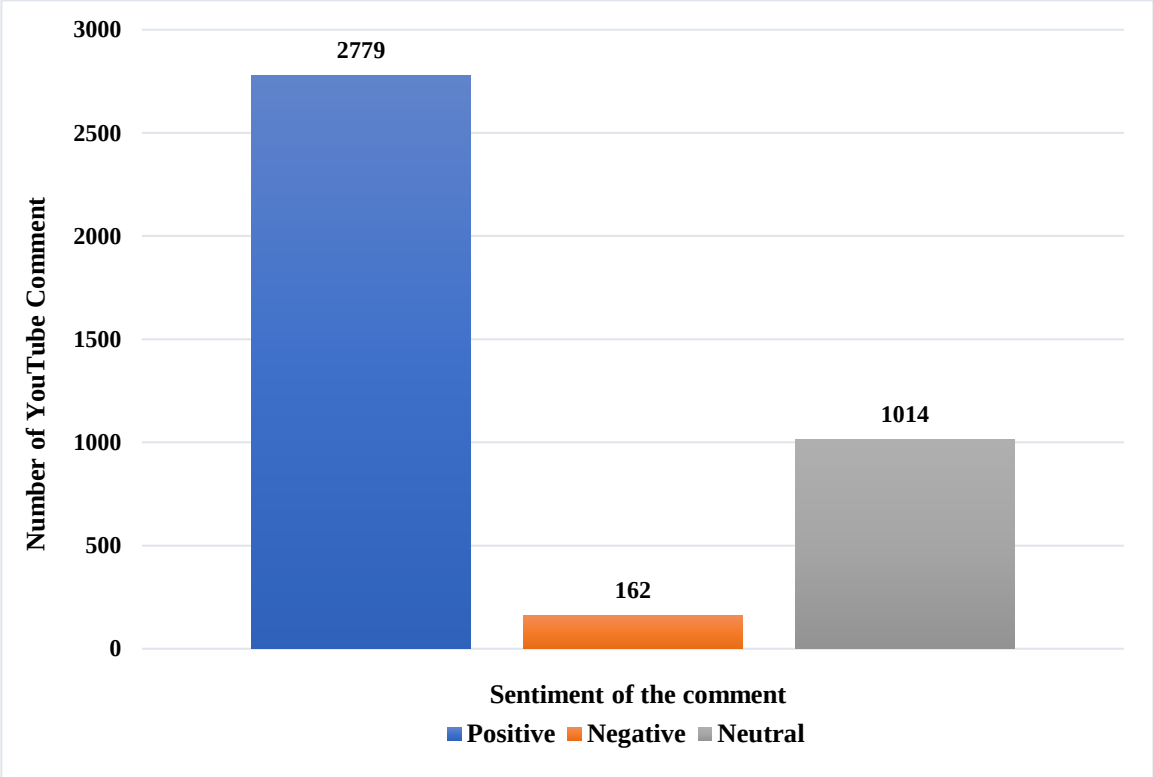

Figure 5.11: Sentiments of viewers' comments

5.13.1 Year-wise Sentiment analysis of comments

Table 5.66: Year-wise Sentiment analysis of comments

Year	Positive	Negative	Neutral
2007	0	1	2
2008	4	0	0
2009	3	1	1
2010	121	5	21
2011	2	0	0
2012	35	5	12
2013	17	5	7

2014	2	1	0
2015	3	0	0
2016	8	0	2
2017	233	14	46
2018	158	9	35
2019	332	3	59
2020	1508	76	747
2021	291	10	78
2022	62	32	4
Total	**2779**	**162**	**1014**

Table 5.67: Descriptive Statistics Performed on the Counts of the OER Videos Comments from 2007-2022.

	Positive	**Negative**	**Neutral**
Mean	173.69	10.13	63.38
Standard Error	93.22	4.84	45.98
Median	26.00	4.00	5.50
Mode	3.00	0.00	0.00
Standard Deviation	372.89	19.36	183.90
Sample Variance	139043.30	374.92	33820.78
Kurtosis	12.67	9.85	15.33
Skewness	3.44	3.04	3.88
Minimum	0	0	0
Maximum	1508	76	747
Sum	2779	162	1014

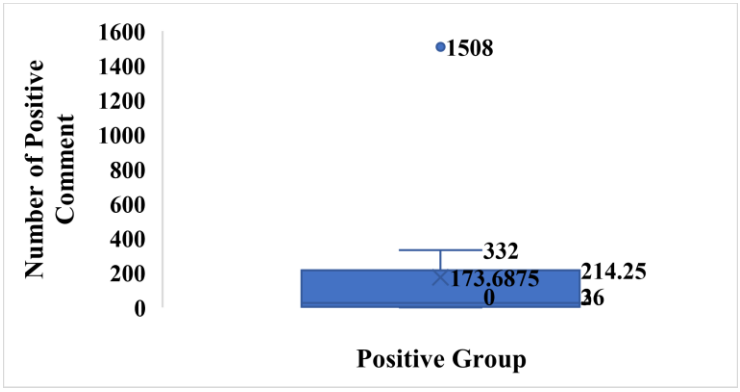

Figure 5.12: Box-whisker plot for the counts of positive comments

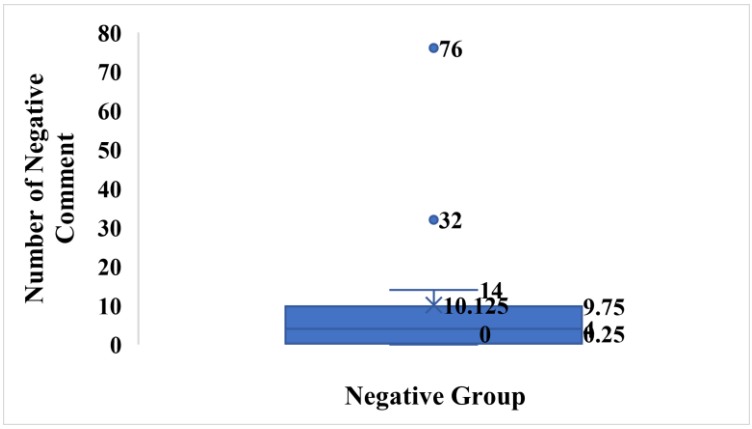

Figure 5.13: Box-whisker plot for the counts of negative comments

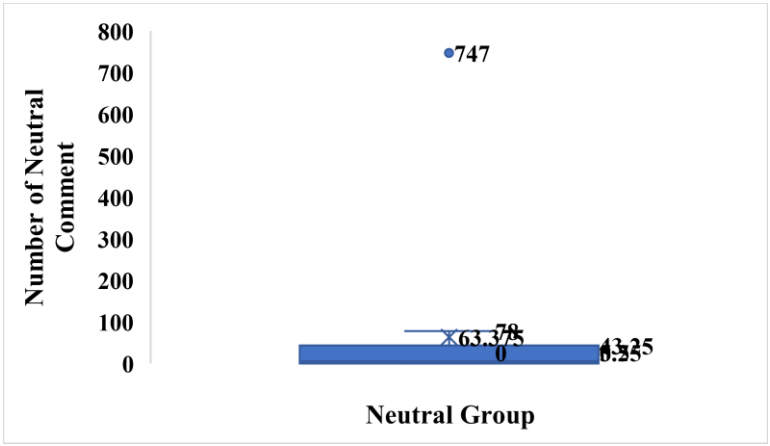

Figure 5.14: Box-whisker plot for the counts of neutral comments

The year-wise distribution of the count of different sentiments of the comments on the OER videos has been depicted from 2007 to 2022 (Table 5.66). It was observed that the number of positive comments was much higher than the negative and neutral comments. The mean count of positive comments was found to be 173.69 while 10.13 and 63.38 of negative and neutral comments, respectively. The median count of positive comments was found to be much higher than negative and neutral comments. The kurtosis and skewness in all three groups also implied that the observations were not normally distributed and large variations were present (Table 5.67). It was observed that the year 2020 had a large impact on the positive comments (count of 1508) (Figure 5.12). Similarly, the year 2020 has also had an impact on the negative (count of 76) and neutral comment (count of 747) groups (Figure 5.13, Figure 5.14).

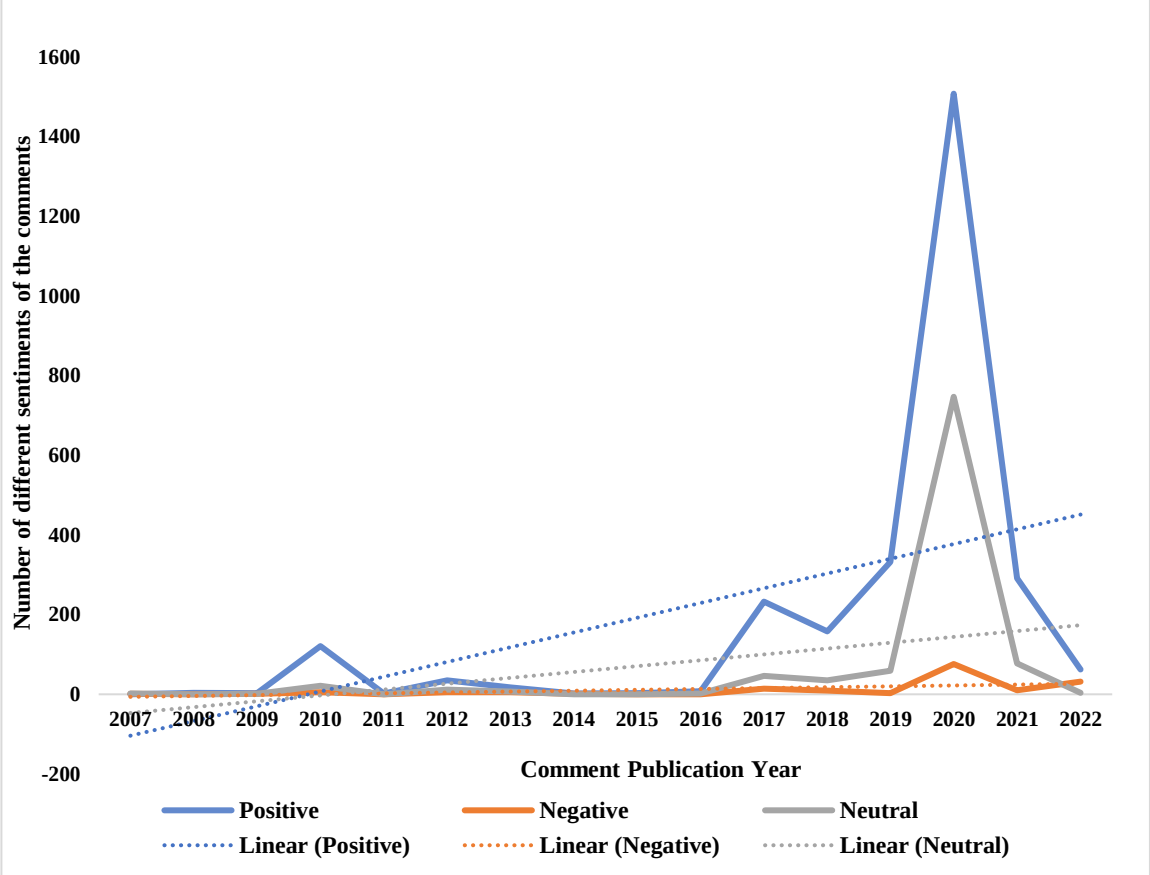

Figure 5.15: Year-wise Sentiment analysis of comments

It was further observed from the line graph with a linear trend line that the OER videos with positive comments were increasing from 2010 onwards significantly. Similarly, the neutral comments were observed to increase from 2013. However, there is a marginal increment of negative comments on the videos from 2017 (Figure 5.15).

5.14 Intention of the Viewers' Comments

Intention refers to the objective or purpose that drives an individual's actions or plans. To analyze the intent behind the comments, each comment was classified into one of the five most probable categories: "query," "feedback," "news," "marketing," and "spam". The intention of the comments made by video viewers is presented in Table 5.68 and Figure 5.16. Out of the 3955 comments analyzed, the category with the highest number of comments is feedback (1538), followed by spam (1457), news (566), marketing (210), and query (184).

Table 5.68: Intention of the viewers' comments

Intention	No. of Comments	%
Query	184	4.61
Feedback	1538	38.50
News	566	14.17
Marketing	210	5.26
Spam	1457	36.47
Total	**3955**	

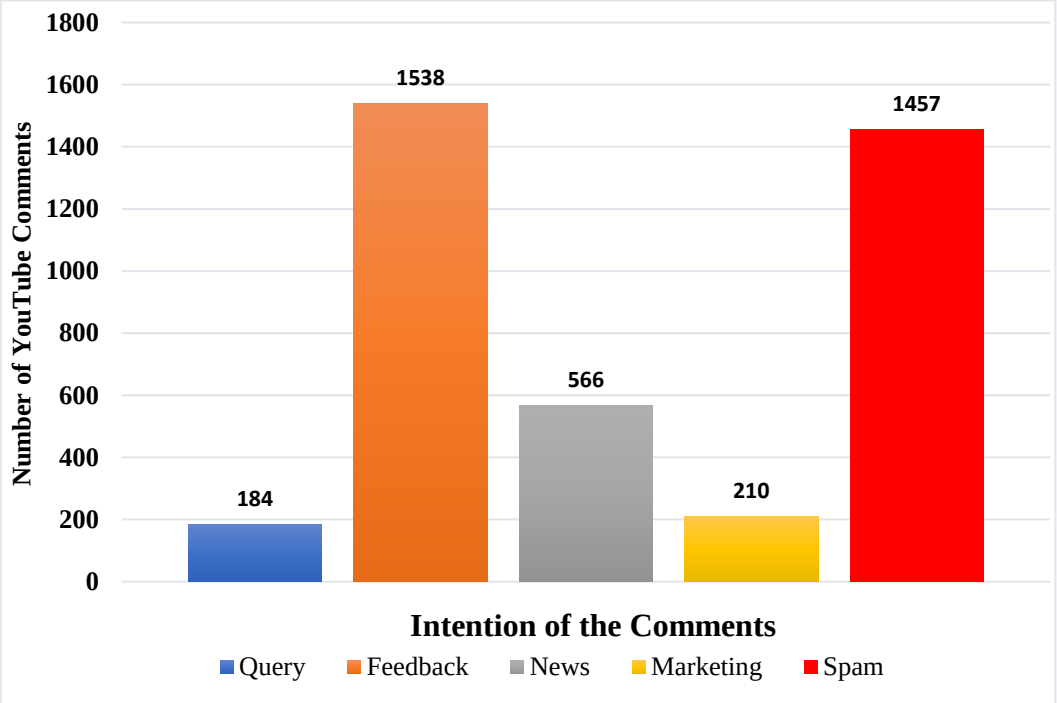

Figure 5.16: Intention of viewers' comments

5.14.1 Year-wise Analysis of Intention of Viewers' Comments

Given below is the demonstration of the year-wise emotion analyses of viewers' comments for the period 2007 to 2022 (Table 5.69). From Figure 5.17, it can be observed that the year 2020 received the highest number of comments regarding Query (121), Feedback (781), News (364), Marketing (101), and Spam (964) intentions.

Table 5.69: Year-wise Analysis of Intention of Viewers' Comments

Year	Query	Feedback	News	Marketing	Spam
2007	1	0	0	0	2
2008	0	1	2	0	1
2009	0	5	0	0	0
2010	2	65	13	14	53
2011	0	0	0	1	1
2012	6	21	7	12	6
2013	9	13	3	1	3

2014	0	2	1	0	0
2015	0	1	0	1	1
2016	2	4	1	1	2
2017	9	148	37	28	71
2018	5	125	10	13	49
2019	9	199	44	25	117
2020	121	781	364	101	964
2021	13	136	67	8	155
2022	7	37	17	5	32
Total	**184**	**1538**	**566**	**210**	**1457**

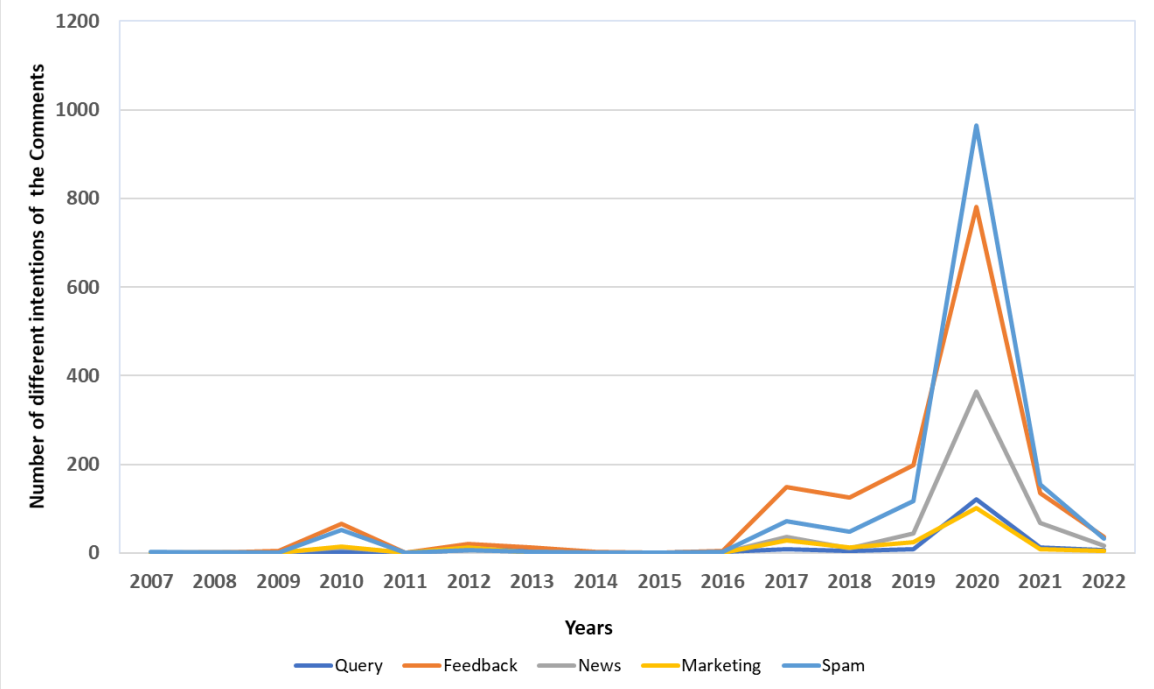

Figure 5.17: Year-wise analysis of Intention of viewers' comments

5.15 Subjectivity of the viewers' comments

The subjectivity of a sentence refers to the degree to which it expresses personal opinions, feelings, or biases, while objectivity refers to the presentation of factual information without personal bias or emotions. Out of 3955 viewers' comments on OER

videos on YouTube spanning from 2007 to 2022, 3057 were identified as subjective, indicating that they contained personal opinions, emotions, or biases (Table 5.70). On the other hand, 898 comments were classified as objective, meaning that they presented factual information without personal bias or emotions. This distribution suggests that a significant portion of the viewers' comments expressed subjective viewpoints, while a smaller portion remained objective in nature.

Table 5.70: Subjectivity of the viewers' comments

Subjectivity	No. of Comments	%
Subjective	3057	76.52
Objective	898	22.48
Total	**3955**	

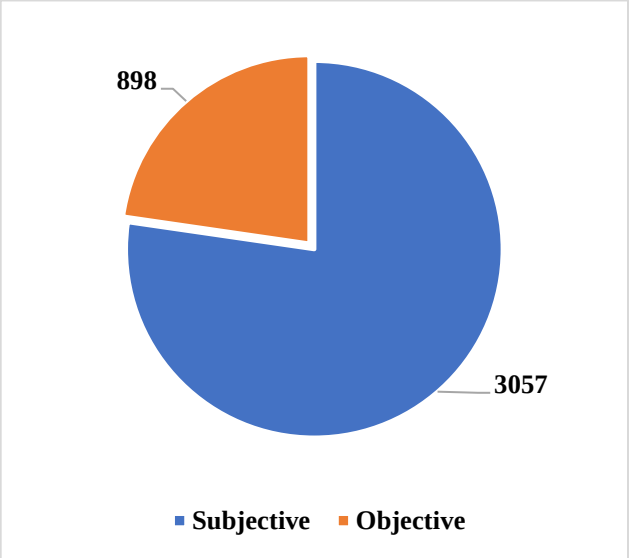

Figure 5.18: Subjectivity of the viewers' comments

5.15.1 Year-wise Analysis of Subjectivity of the Viewers' Comments

Here, the analysis of the subjectivity of the comments on OER during the period 2007 to 2022 has been done (Table 5.71). From Figure 5.19 it is to be noted that the year 2020 has the highest number of subjective (1803) and objective (528) comments.

Table 5.71: Year-wise analysis of Subjectivity of the viewers' comments

Year	Subjective	Objective
2007	2	1
2008	4	0
2009	4	1
2010	123	24
2011	1	1
2012	31	21
2013	17	12
2014	3	0
2015	3	0
2016	7	3
2017	231	62
2018	182	20
2019	298	96
2020	1803	528
2021	264	115
2022	84	14
Total	**3057**	**898**

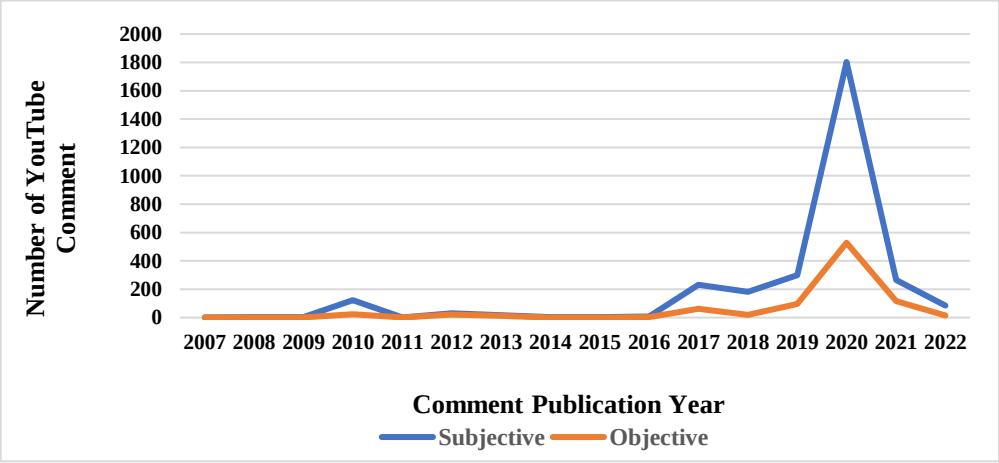

Figure 5.19: Year-wise analysis of Subjectivity of the viewers' comments

5.16 Emotion Analysis of the Viewers' Comments

Emotions can be assessed based on sentiments such as happiness, excitement, sadness, anger, and fear. Table 5.72 and Figure 5.20 present the distribution of comments across these emotional categories for OER videos. Upon studying the comments, it was observed that the most commonly expressed emotion by viewers was "Happiness," with 2751 responses. This was followed by "Excitement" with 673 comments. A total of 145 comments expressed the emotion of "Sadness" in relation to the OER videos.

Table 5.72: Emotion of the viewers' comments

Emotion	No. of Comments	%
Happy	2751	69.56
Excited	673	17.02
Sad	145	3.67
Fear	159	4.02
Angry	157	3.97
Bored	70	1.77
Total	**3955**	

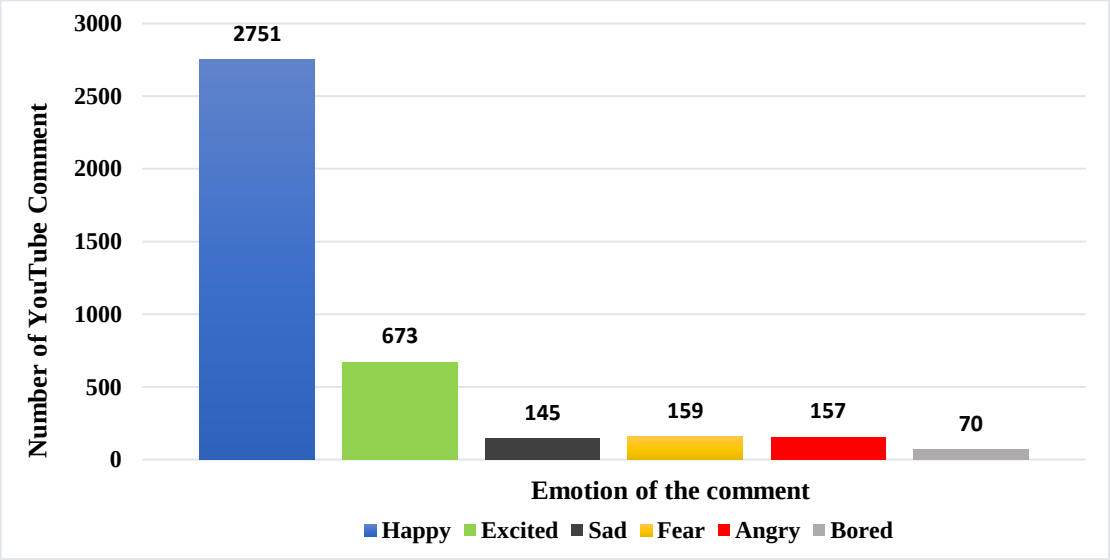

Figure 5.20: Emotions of viewers' comments

5.16.1 Year-wise Emotion analysis of the viewers' comments

The following table demonstrates the year-wise emotion analyses of viewer's comments for the period 2007 to 2022 (Table 5.73). From Figure 5.21, it can be seen that the emotion of happiness was recorded in the highest number of comments in the year 2020. Likewise, the emotions of excitement, sadness, anger, and boredom were also seen in the highest number in the year 2020.

Table 5.73: Year-wise Emotion analysis of the viewers' comments

Year	Happy	Excited	Sad	Fear	Angry	Bored
2007	1	1	0	1	0	0
2008	3	0	0	0	0	1
2009	4	0	1	0	0	0
2010	77	54	0	6	5	5
2011	0	1	0	1	0	0
2012	30	11	0	0	8	3

2013	12	5	3	4	5	0
2014	3	0	0	0	0	0
2015	3	0	0	0	0	0
2016	7	0	0	2	1	0
2017	167	74	10	14	19	9
2018	136	29	10	12	14	1
2019	238	97	4	19	21	15
2020	1731	326	96	85	67	26
2021	283	53	13	15	10	5
2022	56	22	8	0	7	5
Total	**2751**	**673**	**145**	**159**	**157**	**70**

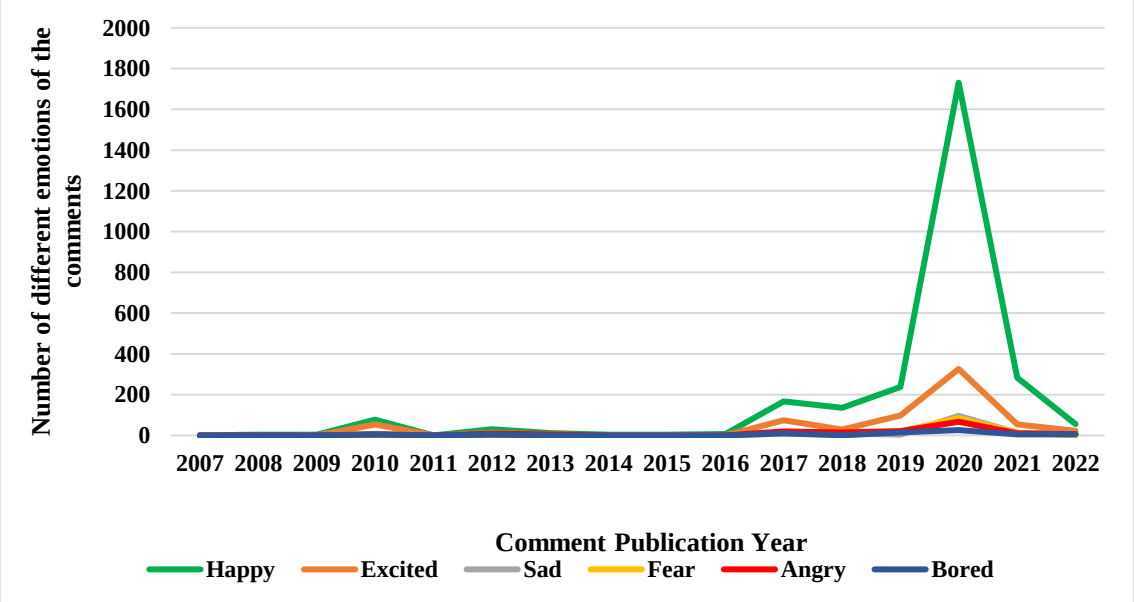

Figure 5.21: Year-wise emotion analysis of the viewers' comments

5.17 Top terms

Top terms refer to the words that occur most frequently in a given text corpus. Word cloud visualization is often utilized to complement the presentation of these top terms. The font size in the word cloud represents the prominence and frequency of a specific term or subject. Figure 5.22 showcases the complete collection of data in the form of a word cloud, generated using the Word Art website (https://wordart.com/). This visualization displays the frequency of terms found in the comments of OER videos on YouTube, as indicated in Table 5.74. Among these terms, the most frequently mentioned one is "Thank," which appeared 991 times in the comments. Following that is "Video," with a frequency of 967, and "OER" and "Watching," both appearing with a frequency of 884 and 857, respectively.

Table 5.74: Top Ten Terms with their Frequency

Rank No.	Term	Word Frequency
1	Thank	991
2	Video	967
3	OER	884
4	Watching	857
5	Good	791
6	Informative	647
7	Nice	575
8	Interesting	556
9	Useful	411
10	Webinar	350

Figure 5.22: Word Cloud of comments on OER

5.18 Hypothesis Testing

Two hypotheses were formulated for the study based on the presumptions developed by reviewing articles and other literature from the field. The results of the hypotheses testing through statistical methods are discussed below

Hypothesis 1

H_1 Majority of the videos are available with positive sentiments rather than negative.

Table 5.75: Descriptive statistics performed on the number of Positive and Negative comments on OER Videos from 2007 to 2022.

	Positive	**Negative**
Mean	173.69	10.13
Standard Error	93.22	4.84
Median	26.00	4.00
Mode	3.00	0.00

Standard Deviation	372.89	19.36
Variance	139043.30	374.92
Minimum	0	0
Maximum	1508	76
Total	2779	162

It was observed that the number of comments with positive intentions and negative comments greatly varies. However, the number of videos with positive comments was approximately 17-fold greater than the number of videos with negative videos. Furthermore, the median count of the number of videos in 16 years with positive comments was 6 folds greater than the number of videos with negative comments. The particular findings suggested that over the last 16 years, the majority of OER videos on YouTube are available with positive comments rather than negative comments.

Hypothesis 2

H_1 Majority of the learners prefer to show their opinion about the videos through likes only.

Table 5.76: Total number of views, likes, and comments on OER Videos

No. of Video	No. of View	No. of Like	No. of Comments
1,030	38,84,589	51,642	4,667

In order to examine the learners' preferences to show their opinions about the videos, the investigator considered all 1030 videos for analysis. As reflected in Table 5.73, there are a total of 38,84,589 views witnessed in all videos. Observing the responses to those videos, the investigator witnessed a total of 51,642 likes and 4,667 comments.

The mean count of likes and comments over the years in the OER videos was found to be 53.35 and 5.28, respectively. It was found that the average number of likes

was approximately 10 folds higher than the average number of comments providing a clear indication that the learners prefer to put their opinion through likes. Furthermore, the Chi-square test of association (Performed in R v 4.0.5) between like counts and comment counts over the years also suggested that these variables were significantly associated (X-squared = 42693, P-Value < 2.2e-16).

5.19 Conclusion

This chapter primarily addresses the study's data analysis components. A detailed analysis of the data collected from various sources was displayed and analyzed in accordance with the study's objectives. The data analysis and interpretation have revealed some remarkable findings that will be extremely useful to future researchers and policymakers.

CHAPTER -6
FINDINGS, CONCLUSIONS AND SUGGESTIONS

6.1 Introduction

This final chapter of the study presents the culmination of the research by discussing the findings, drawing conclusions, and providing valuable suggestions. This study analyzed the utilization of Open Educational Resources (OER) videos on the YouTube platform and conducted a sentient analysis to know their impact on education. This chapter aims to provide a comprehensive overview of the key findings, offer insightful conclusions based on the research outcomes, and present suggestions for future research. The research has focused on exploring the landscape of OER videos on YouTube and their significance in facilitating open and accessible education. By employing sentient analysis techniques, we have delved into the vast collection of OER videos available on YouTube, investigating their content, quality, and educational value. Through this analysis, we have gained valuable insights into the potential of OER videos on YouTube to enhance learning experiences, engage learners, and foster collaboration and knowledge sharing. In this final chapter, we present a synthesis of the findings derived from our research. These findings are based on a meticulous analysis of the sentient data collected through automated sentiment analysis tools and manual evaluation. By examining the sentiments expressed in the OER videos, we have gained a deeper understanding of their effectiveness, learner engagement, and overall impact on educational outcomes.

Furthermore, we draw meaningful conclusions from the findings, identifying patterns, trends, and relationships observed in the sentient analysis of OER videos on YouTube. These conclusions shed light on the potential benefits and limitations of utilizing OER videos for educational purposes, highlighting their role in promoting open and inclusive education. The research also explores the implications of these conclusions for educators, learners, policymakers, and educational institutions, aiming to inform decision-making and pedagogical practices.

In addition to the conclusions, the study provides valuable suggestions for future research and practical implementation. These suggestions will serve as a roadmap for further exploration and improvement in leveraging OER videos on YouTube. The study highlights areas that require further investigation, such as the impact of specific video characteristics on learner engagement and the development of guidelines for creating effective OER videos. Furthermore, the study offers recommendations for educators and policymakers on integrating OER videos into instructional practices, ensuring their alignment with educational objectives and pedagogical approaches. As we present the findings, conclusions, and suggestions in this chapter, we aim to contribute to the broader understanding of OER videos on YouTube and their potential to transform education. By examining the impact and implications of our sentient analysis, we hope to inspire further research and practical applications in utilizing OER videos to enhance teaching and learning experiences.

6.2 General Findings

a) A total of 1030 videos related to open educational resources were identified on YouTube. The growth pattern of OER video uploads on YouTube from 2007 to 2022 was analyzed, revealing fluctuations in the number of uploads over time. In 2020, there were 258 OER videos uploaded, followed by 216 in 2021 and 161 in 2022.

b) These findings shed light on the availability and trends of OER videos on YouTube during the analyzed period. The data demonstrates a variation in the number of uploads, with 2020 having the highest number of OER videos, followed by a slight decrease in 2021 and a further decrease in 2022.

c) The findings suggest an increased demand for OER videos during the pandemic outbreak, as reflected in the higher number of uploads in 2020. This aligns with the existing literature covered in the earlier chapter. However, as the lockdown period ended, the number of video uploads started to decrease. These insights contribute to a deeper understanding of the utilization and popularity of OER

videos on YouTube, highlighting their relevance and impact in the educational landscape.

d) The highest annual growth rate (AGR) of OER videos on YouTube was observed in the year 2020 and the compound annual growth rate (CAGR) for the OER videos was found to be 4.03.

e) The analysis of OER YouTube video durations from 2007 to 2022 indicates that viewers have a preference for shorter content. A considerable number of videos, 471 in total, have a duration ranging from 0 to 10 minutes. Additionally, 109 videos have a duration between 10 and 20 minutes. This suggests that individuals accessing OER on YouTube tend to favor concise and focused video materials, emphasizing the importance of providing content that is easily digestible for effective knowledge transfer.

f) A closer examination of the retrieved videos reveals that HD videos prevail over SD videos in the OER context. Out of the total videos analyzed, there are 900 videos available in HD, while only 130 videos are posted in SD. This suggests that content creators and users on OER platforms prioritize higher-resolution videos, which provide a more visually appealing and immersive learning experience.

g) The majority of OER video creators on YouTube prefer to use the Standard YouTube License (SYL) instead of the Creative Commons license (CCL). Out of the total number of analyzed OER videos, 713 videos are made available for viewing under the SYL, while only 317 videos are accessible under the CCL.

h) The preference for the SYL over the CCL may be attributed to factors such as ease of use and familiarity, as the SYL is the default option when uploading videos to YouTube. Additionally, content creators may choose the SYL to retain greater control over their educational materials and ensure compliance with YouTube's terms of service, which may offer more protection against unauthorized use and redistribution of their content.

i) The analysis of YouTube views for OER videos from 2007 to 2022 reveals significant variations in popularity among different videos. The "Get to Know

OER Project" video emerges as the most viewed OER video, accumulating an impressive total of 10,64,325 views. Following closely, the "[Webinar] Developing Learning Management System (LMS) and Open Educational Resources (OERS) 22 May" video secures the second-highest number of views, with a total of 2,68,946 views. These findings demonstrate the varying levels of engagement and interest among viewers regarding specific OER videos on YouTube.

j) The analysis reveals that specific OER videos on YouTube have received significant engagement and positive reception from viewers. The video titled "Teaching with DepEd Commons and Open Educational Resources with Mr. Mark Anthony Sy" stands out as the most-liked OER video, accumulating an impressive total of 3,830 likes. Close behind, the "Open Educational Resources (OER) - Advanced OER Programme" and "OER Proficiency Programme (Part 3)" videos secure the second and third positions, with 3,125 and 2,644 likes, respectively. These findings demonstrate the strong engagement of viewers and the favorable response towards these particular OER videos on YouTube, emphasizing their popularity and impact within the online educational community.

k) The video titled "Teaching with DepEd Commons and Open Educational Resources with Mr. Mark Anthony Sy" emerges as the OER film with the highest number of comments, totaling 665 comments. This indicates a significant level of engagement and discussion among viewers. Following closely, the videos "Webinar Sessions on Open Educational Resources for all ALS Teachers Part 2" and "[OER Proficiency Programme (Part 2) (11/5/2020)]" secured the second and third positions in terms of comments, with 246 and 189 comments, respectively. These findings highlight the active participation and interest of viewers in these specific OER videos, as evidenced by the number of comments received.

l) Out of 4667 comments from 1030 videos on OER for the period 2007-2022; 3955 comments were in English language and 712 comments were in other languages.

6.3. Objective wise Findings of the study

6.3.1 Objective 1: Analyze the sentiments of the comments expressed as positive, negative, or neutral of the YouTube videos on OER

a) Sentiment analysis of 3955 English-language comments collected from 1030 OER videos revealed that the majority of viewers expressed positive sentiments towards the content. Out of these comments, 2779 were categorized as positive, indicating satisfaction and contentment with the OER videos on YouTube. This suggests a strong level of viewer appreciation and enjoyment.

b) Additionally, the sentiment analysis also identified 1014 neutral comments and 162 negative comments. The presence of neutral comments suggests a balanced or impartial response from viewers, while the relatively low number of negative comments indicates that dissatisfaction or negative feedback was less prevalent among the viewers.

c) Overall, these findings highlight the positive reception of the OER videos, reinforcing the notion that the majority of viewers are content and pleased with the content presented on YouTube.

6.3.2 Objective 2: Identify the intention of a comment which are being expressed by the commenter

a. The analysis of 3955 comments provided insights into the intentions expressed by video viewers. Among these comments, feedback emerged as the most prevalent intention, with 1538 instances. This suggests that a significant number of viewers shared their opinions and reactions to the OER videos.

b. Additionally, the analysis revealed 1457 comments categorized as spam, indicating the presence of unwanted or irrelevant content. Furthermore, 566 comments reflected news-related intentions, while 210 comments were associated with marketing-related intentions. Queries were found in 184 comments, showcasing viewers seeking information or clarification.

c. These findings highlight the diverse range of intentions expressed by video viewers, with feedback being the dominant category.

6.3.3 Objective 3: Find out the subjectivity of the comments

a. Subjectivity and objectivity were analyzed in 3955 viewers' comments on OER videos spanning from 2007 to 2022 on YouTube. Among these comments, 3057 were classified as subjective, reflecting personal opinions, emotions, or biases. Conversely, 898 comments were categorized as objective, presenting factual information without personal bias or emotions. This distribution indicates that a considerable portion of the comments expressed subjective viewpoints, while a smaller proportion remained objective in nature.

b. The analysis of viewers' comments on OER videos revealed a distinction between subjectivity and objectivity. Among the 3955 comments, a significant majority of 3057 comments were subjective, expressing personal opinions, emotions, or biases. In contrast, 898 comments were deemed objective, providing factual information devoid of personal bias or emotions.

c. This finding suggests that the viewers' comments predominantly reflected subjective perspectives, highlighting the individual viewpoints and emotions associated with the OER videos on YouTube.

d. In the year-wise distribution of comments, the year 2020 was recorded to be the highest where 1803 subjective and 528 objective comments were received.

6.3.4 Objective 4: Determine the emotion which has been expressed by the user

a. The analysis of comments on OER videos revealed valuable insights into the emotions expressed by viewers. The most prevalent emotion among the viewers was "Happiness," as indicated by 2751 responses. This suggests that the OER videos had a positive impact on the viewers, eliciting feelings of joy and satisfaction.

b. Additionally, "Excitement" was a commonly expressed emotion among viewers, with 673 comments reflecting this sentiment. The OER videos were able to evoke a sense of enthusiasm and anticipation among the viewers, further highlighting their engaging and captivating nature. On the other hand, a smaller number of

comments, totaling 145, conveyed the emotion of "Sadness" in relation to the OER videos, indicating that there were instances where viewers experienced a sense of melancholy or disappointment.

c. These findings demonstrate the range of emotions elicited by the OER videos, with happiness and excitement being the most prominent ones, contributing to a positive viewer experience overall.

6.3.5 Objective 5: Find out the frequently used words in comments.

a. Top terms, representing the most frequently used words in the comments of OER videos on YouTube, provide valuable insights into the audience's preferences and interests. Among these terms, the most frequently mentioned one is "Thank," appearing 991 times in the comments. This indicates that viewers expressed gratitude or appreciation for the content or experiences associated with the OER videos.

b. Another frequently mentioned term is "Video," with a frequency of 967. This suggests that the viewers often referred to the videos themselves or the visual content being discussed. Additionally, the terms "OER", "Watching" and “Good” were also frequently used, appearing with frequencies of 884, 857, and 791 respectively.

c. These findings highlight the recurring topics and subjects that captured the attention and engagement of the audience in the comments of OER videos on YouTube.

6.4 Conclusion

This study was aimed at exploring different aspects of OER videos that are uploaded on YouTube in order to provide insights on the availability of these videos, trends, preferences of viewers, engagement levels, sentiments, and emotions of the comments. The study findings contribute to a deeper understanding of the OER videos and their impact on academics. The analysis of the study provides detailed insights into

the OER landscape and the user sentiment regarding the content uploaded on OER, its availability patterns over the years, and information regarding user behavior.

The study found an increased demand for OER videos during the Covid-19 pandemic outbreak and the higher number of uploads in the year 2020 substantiates this. The finding also aligns with the literature covered for this study which explains the higher demand for OER during crisis period. As the lockdown period got over, the number of uploads also decreased which suggests the shift in the preference and engagement of viewers. One interesting finding from the analysis was the viewers' preference for shorter content with video duration ranging from 0 to 10 minutes emphasizing the need for OER content to be concise and focused. Hence it underlines how the content creators should follow optimal length for their videos in order to cater to the viewer preference. Another finding was the prevalence of HD videos that indicate viewers prefer higher resolution videos suggesting that the content creators should focus on visually appealing content for an immersive learner experience. Regarding the licensing, it was found that most of the creators preferred the Standard YouTube License (SYL) and this may indicate that this choice may be because of factors such as ease of use, familiarity, etc., and also the protection SYL offers the creators against unauthorized use and redistribution of their contents. Viewer engagement patterns found in the analysis showed significant variations among different OER content as different videos had different amounts of views, likes, and comments and hence the positive engagement and feedback indicate the popularity of OER in the online academic community.

The sentiment analysis of the comments revealed the higher levels of positive sentiments of viewers towards OER videos thereby reflecting the contentment and satisfaction of the user. The presence of negative comments was relatively lesser hence it underscores that OER videos uploaded on YouTube get a significant amount of user appreciation. Similarly, the analysis of intention revealed that most number comments were giving out feedback and hence a significant number of viewers shared opinions. The study also explored the subjectivity of the comments and the findings indicate that

the majority expressed the subjective perspective that encompasses opinions, bias, and emotions. Only a smaller percent remained objective in the comments that provided factual information only. The predominance of the subjectivity of the comments has been identified as highlighting the perception and emotional response of the individuals. By means of emotion analysis, the most prevalent emotion was found to be 'happiness' thereby indicating the satisfaction of the user with the content.

In summary, the findings of the study contribute to the valuable insights surrounding open educational resources and their videos uploaded to YouTube exploring the availability, trend, preference, engagement, sentiment, emotions, etc. emphasizing the popularity and utilization of OER in the educational landscape and its impacts. The findings of the study highlight the importance of user engagement and how important it is to consider their preferences and needs by means of which the content can be created in accordance with that. The sentiment, intention, and emotion of the user comments can be studied to understand the reach and involvement of OER and the insights of this study can be used by creators and academics for the enhancement and proliferation of effective, engaging, and inclusive online learning.

6.5 Limitations of the study

Several limitations should be addressed despite the findings and insights this study put forward.

1. The study focused only on English language comments and excluded other language comments for feasibility.
2. The study was limited to YouTube and no other social media platforms with OER were explored.
3. The study covered a limited period only and could have potentially missed the recent developments.
4. The study quantified publicly available data and its sentiment and this may introduce biases.

6.6 Suggestions

Based on the findings of the study, the researcher put forward some suggestions for academicians and academic institutions. It can be effectively implemented in order to create a much more dynamic environment for OER with an increased set of users and enhanced user engagements.

1. Educational institutions should take the initiative to start YouTube channels and other potential social media platforms to make educational content openly available for its students so that an engaging digital community is built through which a wider reach and increased engagement of users can be achieved.
2. To cater to the learners in accordance with their diversity, the institutions should make the OER content available in regional/multi-languages as well. Translating OER content in such a way can help in achieving the inclusiveness of students and learners from various linguistic backgrounds.
3. Educational institutions should make a collaborative learning environment available to their academic community by means of interactive discussions, forums, and feedback surveys in order to understand the specific needs of the users and get feedback on OER.
4. Educational Institutions can make use of data analytics to identify specific user needs and thereby cater to and recommend OER tailored to the user-specific needs.
5. OER content should be made available in multiple formats as different learners might have different kinds of preferences. The institutions can incorporate various learning styles by incorporating diverse types of learning materials for enhanced user engagement.
6. In order to create a more interactive and collaborative learning environment, educational institutions should facilitate user-generated OER content as well which can in turn benefit peer-to-peer learning.

7. Educational institutions can make use of sentiment analysis techniques and tools in order to identify the response of the students and their learners and can be further used for the revisal/modification/development of the OER contents.
8. Library and information professionals can make use of the potential of sentiment analysis to understand and study the engagement patterns of the users, their needs, complaints, and suggestions for the betterment of library services. For this, the successful integration of social media is necessary and hence the sentient analysis can be a great tool in aiding the further growth of libraries in this rapidly growing digital world.

6.7 Scope for Future Research

1. The potential of AI in OER is a trending area. Gamification elements, Virtual reality (VR) and Augmented reality (AR), Algorithms, etc. can be studied in this context by means of which a more immersive learning experience can be explored.
2. Comparative studies can be conducted among students who extensively use OER and those who use traditional learning materials; in order to identify and examine academic performance and knowledge retention.
3. The present pedagogical approaches and methods can be put to examination in the context of OER to gain insights into its effectiveness among its audience. Such a study could explore the potential approaches that can be adopted through which the pedagogical instructional designs can be changed/modified.
4. Cultural/contextual settings can be put to study in the context of OER exploring the learner demographics, existing disparities, digital gaps, social factors, diverse learning needs, etc. to achieve an enhanced inclusive learning environment. This could benefit learners from various cultural backgrounds and promote equitable access to learning.
5. The changing audience in terms of the dynamics of their generation can be an interesting area of study as the characteristics, user patterns, and changing preferences on information use and access can be subjected to a comparative study

as the new generation such as Gen-Z, Gen-Alpha, etc. are identified to show traits vaguely different from the previous generations.

6. For future study, a researcher can choose any other significant area for the sentiment analysis of YouTube video comments and interesting studies can be conducted that are relevant and innovative.
7. With time, sentiment analysis is going to be a growing area of research as it becomes more complex in determining the sentiments and emotions of people. Therefore, a forward-looking framework that can overcome the anomalies in the existing sentiment analysis research can be given significant importance and an analysis system that is more accurate and efficient can be developed.

Abedin, T., Ahmed, S., Al Mamun, M., Ahmed, S. W., Newaz, S., Rumana, N., & Turin, T. C. (2015). YouTube as a source of useful information on diabetes foot care. *Diabetes Research and Clinical Practice*, 110(1), e1–e4. https://doi.org/10.1016/j.diabres.2015.08.003

Adhikari, J., Sharma, P., Arjyal, L., & Uprety, D. (2016). YouTube as a source of information on cervical cancer. *North American Journal of Medical Sciences*, 8(4), 183-186

Alkhasawneh, S. (2020). Perception of academic staff toward barriers, incentives, and benefits of the open educational resources (OER) Network (SHMS) at Saudi universities. *Italian Journal of Sociology of Education*, *12*(1).

Alobaid, A. (2020). Smart multimedia learning of ICT: role and impact on language learners' writing fluency— YouTube online English learning resources as an example. *Smart Learning Environments*, 7(1). https://doi.org/10.1186/s40561-020-00134-7

Anand, T., Singh, V., Bali, B., Sahoo, B. M., Shivhare, B. D., & Gupta, A. D. (2020, June). Survey paper: sentiment analysis for major government decisions. In *2020 International Conference on Intelligent Engineering and Management (ICIEM)* (pp. 104-109). IEEE.

Asghar, M. Z., Ahmad, S., Marwat, A. & Kundi, F. M. (2015). Sentiment Analysis on YouTube: A Brief Survey. Retrieved on the 10th of February, 2020 from https://www.researchgate.net/publication/284724207_Sentiment_Analysis_on_YouTube_A_Brief_Survey

Ashraf, N. & Jamal, S. (2019). Perception of Teacher Educators towards Usage of Open Educational Resources. *In* Rai, P., Singh, A. & Bakhshi, S. I. (*Eds.*), *Bridging Educational Divides MOOCs and OERs* (pp. 140-148). Delhi: National Law University Delhi.

Asmiarti, D., & Winangun, G. (2018). The Role of YouTube Media as a Means to Optimize Early Childhood Cognitive Development. In *MATEC Web of Conferences* (Vol. 205, p. 00002). EDP Sciences.

Azak, M., Şahin, K., Korkmaz, N., & Yıldız, S. (2022). YouTube as a source of information about COVID-19 for children: Content quality, reliability, and audience participation analysis. *Journal of Pediatric Nursing*, 62, e32–e38. https://doi.org/10.1016/j.pedn.2021.06.024

Baas, M., van der Rijst, R., Huizinga, T., van den Berg, E., & Admiraal, W. (2022). Would you use them? A qualitative study on teachers' assessments of open educational resources in higher education. *The Internet and Higher Education*, 54, 100857.

Bachalapur, M. M., & Hugar, J. G. (2021). *The role of libraries and librarians in open educational resources in ...* Librarian's Awareness on Open Educational Resources in India. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=5467&context=libphilprac

Barretto, M. C. & Morajkar, S. (2017). Sentiment Analysis Tools and Techniques: A Comprehensive Survey. *International Journal for Research in Applied Science & Engineering Technology,* 5(XI), pp.3030-3035.

Basani, Y., Sibuea, H. V., Sianipar, S. I. P. & Samosir, J. P. (2019). Application of Sentiment Analysis on Product Review E-Commerce. *Journal of Physics: Conference Series,* pp.1-8.

Basch, C. H., Basch, C. E., Hillyer, G. C., & Reeves, R. (2015). YouTube Videos Related to Skin Cancer: A Missed Opportunity for Cancer Prevention and Control. *JMIR Cancer*, 1(1). https://doi.org/10.2196/cancer.4204

Bhuiyan, H., Ara, J., Bardhan, R., Islam, R. (2017). Retrieving YouTube Video by Sentiment Analysis on User Comment. *2017 IEEE International Conference on Signal and Image Processing Applications* (pp. 474-478). Malaysia. Retrieved on the 6th of February, 2020 from https://www.researchgate.net/publication/321408074_Retrieving_YouTube_video_by_sentiment_analysis_on_user_comment

Birjali, M., Kasri, M., & Beni-Hssane, A. (2021). A comprehensive survey on sentiment analysis: Approaches, challenges and trends. *Knowledge-Based Systems*, *226*, 107134. https://doi.org/10.1016/j.knosys.2021.107134

Breslyn, W., & Green, A. E. (2022). Learning science with YouTube videos and the impacts of Covid-19. *Disciplinary and Interdisciplinary Science Education Research*, 4(1). https://doi.org/10.1186/s43031-022-00051-4

Brown, A. B. (2019). YouTube and Open Education: Exploring the Potential. Oxford University Press.

Cambria, E., Das, D., Bandyopadhyay, S., & Feraco, A. (Eds.). (2017). A practical guide to sentiment analysis.

Cheung, S. K. (2017). Distance-learning students' perception on the usefulness of open educational resources. In *International Conference on Blended Learning* (pp. 389-399). Springer, Cham.

Cheung, S.K.S. (2018). Perceived usefulness of open educational resources between full-time and distance-learning students. In *International Conference on Blended Learning* (pp. 357-367). Springer, Cham.

Choudhury, S. & Breslin, J. G. (2010). User Sentiment Detection: A YouTube Use Case. *21st National Conference on Artificial Intelligence and Cognitive Science.* Galway, Ireland. Retrieved on the 6th of February, 2020 from https://www.researchgate.net/publication/316898473_User_Sentiment_Detection_A_YouTube_Use_Case

Chtouki, Y., Harroud, H., Khalidi, M., & Bennani, S. (2012). The impact of YouTube videos on the student's learning. In *2012 international conference on information technology based higher education and training (ITHET)* (pp. 1-4). IEEE.

Cunha, A. A. L., Costa, M. C. & Pacheco, M. A. C. (2019). Sentiment Analysis of YouTube Video Comments Using Deep Neural Networks. *In* Rutkowski, L., Scherer, R., Korytkowski, M., Pedrycz, W., Tadeusiewicz, R. & Zurada, J. (*Eds*.) *Artificial Intelligence and Soft Computing* (pp. 561-570). ICAISC 2019. Springer, Cham. Retrieved on the 5th of February, 2020 from https://link.springer.com/chapter/10.1007/978-3-030-20912-4_51

Curran, V., Simmons, K., Matthews, L., Fleet, L., Gustafson, D. L., Fairbridge, N. A., & Xu, X. (2020). YouTube as an Educational Resource in Medical Education: a Scoping Review. *Medical Science Educator*, 30(4), 1775–1782. https://doi.org/10.1007/s40670-020-01016-w

Datt, G., & Singh, G. (2021). Acceptance and Barriers of Open Educational Resources in the Context to Indian Higher Education. *Canadian Journal of Learning and Technology*, 47(3). https://doi.org/10.21432/cjlt28028

Datt, G., & Singh, G. (2021). Acceptance and Barriers of Open Educational Resources in the Context to Indian Higher Education. *Canadian Journal of Learning and Technology*, 47(3). https://doi.org/10.21432/cjlt28028

Deo, G. S., Mishra, A., Jalaluddin, Z. M., & Mahamuni, C. V. (2020). Predictive analysis of resource usage data in academic libraries using the vader sentiment

algorithm. In *2020 12th International Conference on Computational Intelligence and Communication Networks (CICN)* (pp. 221-228). IEEE.

Deori, M., Kumar, V., & Verma, M. K. (2021). Analysis of YouTube video contents on Koha and DSpace, and sentiment analysis of viewers' comments. *Library Hi Tech.* https://doi.org/10.1108/lht-12-2020-0323

Deori, M., Verma, M. K., & Kumar, V. (2021). Sentiment Analysis of Users' Comments on Indian Hindi News Channels Using Mozdeh: An Evaluation Based on YouTube Videos. *Journal of Creative Communications*, 09732586211049232.

Deshmukh, U. B. (2018). Open educational resources and the role of Librarians. *International Journal of Science and Research*, 9(2).

Devika, M. D., Sunitha, C., & Ganesh, A. (2016). Sentiment analysis: a comparative study on different approaches. *Procedia Computer Science*, *87*, 44-49.

Feldman, R. (2013). Techniques and applications for sentiment analysis. *Communications of the ACM*, *56*(4), 82-89.

Godbole, N., Srinivasaiah, M. & Skiena, S. (2007). Large-Scale Sentiment Analysis for News and Blogs. *ICWSM 2007- International Conference on Weblogs and Social Media*, (pp.219-222). Retrieved on the 8th of February, 2020 from https://www.researchgate.net/publication/215470709_Large_Scale_Sentiment_Analysis_for_News_and_Blogs

Halevi, G. & Schimming, L. (2018). An Initiative to Track Sentiments in Altmetrics. *Journal of Altmetrics,* 1(1), pp.1-7.

Hassona, Y., Taimeh, D., Marahleh, A., & Scully, C. (2016). YouTube as a source of information on mouth (oral) cancer. *Oral Diseases*, 22(3), 202–208. https://doi.org/10.1111/odi.12434

Hettige, S., Dasanayaka, E., & Ediriweera, D. S. (2022). Student usage of open educational resources and social media at a Sri Lanka Medical School. *BMC Medical Education*, 22(1). https://doi.org/10.1186/s12909-022-03106-2

Hewitt, J., & Forte, A. (2006). Crossing boundaries: Identity management and student/faculty relationships on the Facebook. In Proceedings of the 2006 20th Anniversary Conference on Computer Supported Cooperative Work (pp. 463-472). Association for Computing Machinery. https://doi.org/10.1145/1180875.1180942

Hewlett Foundation. (2018). Open Educational Resources. Retrieved from https://hewlett.org/strategy/open-educational-resources/

Huang, R., Liu, D., Tlili, A., Knyazeva, S., Chang, T. W., Zhang, X., ... & Holotescu, C. (2020). Guidance on open educational practices during school closures: Utilizing OER under COVID-19 pandemic in line with UNESCO OER recommendation. *Beijing: Smart Learning Institute of Beijing Normal University*.

Hussein, D. M. E. D. M. (2018). A survey on sentiment analysis challenges. *Journal of King Saud University-Engineering Sciences*, *30*(4), 330-338.

Iarmolenko, I. (2017). Effectiveness and Transparency of Sentiment Analysis Tools for Academic Purposes. *13th International Conference on ICT in Education, Research and Industrial Applications,* (pp.273-280). Kyiv, Ukraine. Retrieved on 5th February, 2020 from https://www.ceur-ws.org>Vol-1844

Illia, F., Eugenia, M. P., & Rutba, S. A. (2021). Sentiment analysis on pedulilindungi application using textblob and vader library. In *Proceedings of The International Conference on Data Science and Official Statistics* (Vol. 2021, No. 1, pp. 278-288).

Jaffar, A. A. (2012). YouTube: An emerging tool in anatomy education. *Anatomical Sciences Education*, 5(3), 158–164. https://doi.org/10.1002/ase.1268

Johnson, K. (2022). YouTube for Open Educational Resources: A Comprehensive Guide. OER World. Retrieved from https://www.oerworld.com/youtube-oer-guide

Kabugo, D. (2020). Utilizing open education resources to enhance students' learning outcomes during the COVID-19 Schools Lockdown: A case of Kolibri by selected government schools in Uganda. *Journal of Learning for Development*, *7*(3), 447–458. https://doi.org/10.56059/jl4d.v7i3.465

Karadia, A. (2021). Content Analysis of Top View YouTube Videos on Open Educational Resources. *Library Philosophy and Practice (e-journal),* 5474, 1-14.

Keramatfar, A., & Amirkhani, H. (2019). Bibliometrics of sentiment analysis literature. *Journal of Information Science*, *45*(1), 3-15.

Kimmons, R. (2016). Open educational resources: Learning and teaching in the digital age. WISE Words, 5(1), 17-22. https://repository.wcsu.edu/jcps/vol5/iss1/3/

Kousha, K., Thelwall, M., & Abdoli, M. (2012). The role of online videos in research communication: A content analysis of YouTube videos cited in academic publications. *Journal of the American Society for Information Science and Technology*, 63(9), 1710–1727. https://doi.org/10.1002/asi.22717

Kumar, A., Buragohain, D. & Deka, M. (2019). Open Educational Resources (OER) Issues and Recommendations. *In* Rai, P., Singh, A. & Bakhshi, S. I. (*Eds.*), *Bridging Educational Divides MOOCs and OERs* (pp. 90-98). Delhi: National Law University Delhi.

Kumar, K. S., Mahendraprabu, M., Kalaiyarasan, G., Ramnath, R., Kumar, N. S., & Mani, M. (2021). Social Media as an Open Educational Practice Tools and Challenges. *Library Philosophy and Practice,* 1-24.

Kumar, V. (2023). Exploring the Use of Sentiment Analysis in Library User Studies: Approaches and Challenges. In A. Tripathi, M. K. Verma, & A. K. S. Yadav (Eds.), *Changing Landscape of LIS Education and Research* (Prof. H.N. Prasad Festschrift Volume) (pp. 446-457). Shree Publishers and Distributors.

Lamba, M. & Madhusudhan, M. (2018). Application of sentiment analysis in libraries to provide temporal information service: a case study on various facets of productivity. *Social Network Analysis and Mining*, 8(1). Retrieved on the 5th of February, 2020 from https://www.researchgate.net/publication/328265550_Application_of_Sentiment_Analysis_in_Libraries_to_Provide_Temporal_Information_Service_A_Case_Study_on_Various_Facets_of_Productivity

Lawrence, L. P. (2014). Reliability of Sentiment Mining Tools: A comparison of Semantria and Social Mention. *3rd IBA Bachelor Thesis Conference-2014* (pp.1-13). Enschede, Netherlands. Retrieved on the 5th of February, 2020 from https://www.semanticscholar.org/paper/Reliability-of-Sentiment-Mining-Tools%3A-A-comparison-Lawrence/4ed0b086959d44610c776482d2f70821b39a203b

Lawrence, L. P. (2014). Reliability of Sentiment Mining Tools: A comparison of Semantria and Social Mention. *3rd IBA Bachelor Thesis Conference-2014* (pp.1-13). Enschede, Netherlands. Retrieved on 5th February, 2020 from https://www.semanticscholar.org/paper/Reliability-of-Sentiment-Mining-Tools%3A-A-comparison-Lawrence/4ed0b086959d44610c776482d2f70821b39a203b

Lee, H., & Chang, M. C. (2022). YouTube as a source of information regarding the effect of vitamin C on coronavirus disease. *Complementary Therapies in Medicine*, 67, 102827. https://doi.org/10.1016/j.ctim.2022.102827

Lee, H., Choi, A., Jang, Y., & Lee, J. I. (2018). YouTube as a learning tool for four shoulder tests. *Primary Health Care Research & Development*, 20(e70), 1-7. https://doi.org/10.1017/s1463423618000804

Li, K. C., & Wong, B. T. M. (2021). A review of the use of open educational resources: the benefits, challeng es and good practices in higher education. *International Journal of Innovation and Learning*, 30(3), 279. https://doi.org/10.1504/ijil.2021.118189

Liu, B. (2012). Sentiment analysis and opinion mining. *Synthesis lectures on human language technologies*, 5(1), 1-167.

Lo, C. K., Tlili, A., & Huang, X. (2022). The Use of Open Educational Resources during the COVID-19 Pandemic: A Qualitative Study of Primary School Mathematics Teachers in Hong Kong. *Education Sciences*, *12*(11), 744. https://doi.org/10.3390/educsci12110744

Luo, T., Hostetler, K., Freeman, C., & Stefaniak, J. (2020). The power of open: benefits, barriers, and strategies for integration of open educational resources. *Open Learning: The Journal of Open, Distance and e-Learning*, *35*(2), 140–158. https://doi.org/10.1080/02680513.2019.1677222

Majid, S., Khine, W. K. K., Oo, M. Z. C., & Lwin, Z. M. (2012). An analysis of YouTube videos for teaching information literacy skills. In *Advanced Information Technology in Education* (pp. 143-151). Springer, Berlin, Heidelberg.

Malhotra, N., & Goyal, T. (2021). Sentiment Analysis Using Twitter Information Flow About The New Education Policy Introduced in India. IN 2020. *International Journal of Management*, 11(12). https://doi.org/10.34218/ijm.11.12.2020.228

Marín, V. I., Zawacki-Richter, O., Aydin, C. H., Bedenlier, S., Bond, M., Bozkurt, A., Conrad, D., Jung, I., Kondakci, Y., Prinsloo, P., Roberts, J., Veletsianos, G.,

Xiao, J., & Zhang, J. (2022). Faculty perceptions, awareness and use of open educational resources for teaching and learning in higher education: a cross-comparative analysis. *Research and Practice in Technology Enhanced Learning*, *17*(1). https://doi.org/10.1186/s41039-022-00185-z

Medhat, W., Hassan, A., & Korashy, H. (2014). Sentiment analysis algorithms and applications: A survey. *Ain Shams engineering journal*, *5*(4), 1093-1113.

Mejova, Y. (2009). Sentiment analysis: An overview. *University of Iowa, Computer Science Department*.

Midha, M., & Kumar, J. (2022). Users' Awareness and Usage of Open Educational Resources in Central Universities of North India. *DESIDOC Journal of Library & Information Technology*, 42(1).

Misuraca, M., Forciniti, A., Scepi, G., & Spano, M. (2020). Sentiment Analysis for Education with R: packages, methods and practical applications. *arXiv preprint arXiv:2005.12840*.

Moghavvemi, S., Sulaiman, A., Jaafar, N. I., & Kasem, N. (2018). Social media as a complementary learning tool for teaching and learning: The case of youtube. *The International Journal of Management Education*, 16(1), 37–42. https://doi.org/10.1016/j.ijme.2017.12.001

Mozdeh Big Data Text Analysis. (n.d.). Mozdeh Big Data Text Analysis. http://mozdeh.wlv.ac.uk/

Mukhopadhyay, S., Kruger, E., & Tennant, M. (2014). YouTube: A New Way of Supplementing Traditional Methods in Dental Education. *Journal of Dental Education*, 78(11), 1568–1571. https://doi.org/10.1002/j.0022-0337.2014.78.11.tb05833.x

Mwinyimbegu, C. M. (2018). The role of libraries and librarians in open educational resources in Tanzania: the case of selected public university libraries. *Library Philosophy and Practice*, 0_1-15.

National OER Center. (2018). Integrating YouTube into Open Educational Resources: Best Practices and Challenges. UNESCO. Retrieved from https://unesco.org/report/youtube-oer-integration

Novielli, N., Girardi, D. & Lanubile, F. (2018). A Benchmark Study on Sentiment Analysis for Software Engineering Research. *15th International Conference on Mining Software Repositories (MSR 2018)* (pp.1-12). Gothenburg, Sweden. Retrieved on 6th February, 2020 from https://www.semanticscholar.org/paper/A-Benchmark-Study-

Oblinger, D., & Hawkins, B. L. (2006). The myth about e-learning: Is technology transforming education? EDUCAUSE Review, 41(2), 14-16. Retrieved from https://er.educause.edu/-/media/files/article-downloads/erm0621.pdf

OpenAI Platform. (n.d.). OpenAI Platform. https://platform.openai.com

Pahwa, B., Taruna, S., & Kasliwal, N. (2018). Sentiment analysis-strategy for text pre-processing. *Int. J. Comput. Appl*, *180*(34), 15-18.

Pande, J. (2018). Opportunities and challenges in the adoption of open educational resources for course development: a case study of Uttarakhand Open University. *International Journal of Information Technology*, *10*(3), 339–347. https://doi.org/10.1007/s41870-018-0126-z

Papachristopoulos, L., Ampatzoglou, P., Seferli, I., Zafeiropoulou, A., & Petasis, G. (2019). Introducing sentiment analysis for the evaluation of library's services effectiveness. *Qualitative and Quantitative Methods in Libraries*, *8*(1), 99-110.

Parabhoi, L. & Saha, P. (2018). Sentiment Analysis of YouTube Comments on Koha Open Source Software Videos. *International Journal of Library and Information Studies, 8*(4), pp. 96-102. Retrieved on the 10th of February, 2020 from https://www.researchgate.net/publication/330619821_Sentiment_Analysis_of_YouTube_Comments_on_Koha_Open_Source_Software_Videos

Parabhoi, L. (2019). Twitter sentiment analysis: a case study of ten university libraries. *12th International CALIBER-2019* (pp.179-191). Bhubaneswar, Odisha: INFLIBNET. Retrieved on 10th February, 2020 from https://www.researchgate.net/publication/337812660

ParallelDots APIs - Google Workspace Marketplace. (n.d.). ParallelDots APIs - Google Workspace Marketplace. https://workspace.google.com/u/0/marketplace/app/paralleldots_apis/729052469457

Patra, S. K. (2019). How Indian libraries tweet? Word frequency and sentiment analysis of library tweets. *Annals of Library and Information Studies (ALIS)*, *66*(4).

Pokharel, B. P. (2020). Twitter sentiment analysis during covid-19 outbreak in nepal. *Available at SSRN 3624719*.

Pounds, A., & Bostock, J. (2019). Open educational resources (OER) in higher education courses in aquaculture and fisheries: opportunities, barriers, and future perspectives. *Aquaculture International*, 27(3), 695–710. https://doi.org/10.1007/s10499-019-00355-9

Rodés, V., Gewerc-Barujel, A., & Llamas-Nistal, M. (2019). University Teachers and Open Educational Resources: Case Studies from Latin America. The International Review of Research in Open and Distributed Learning, 20(1). https://doi.org/10.19173/irrodl.v20i1.3853

Rogalski, K (2023). The 17 Best AI Sentiment Analysis Tools. *Brand24 Blog*. https://brand24.com/blog/best-sentiment-analysis-tools/

Rolfe, V. (2012). Open educational resources: Staff attitudes and awareness. Research in Learning Technology, 20(0). https://doi.org/10.3402/rlt.v20i0.14495

Sarmah, H. (2019). 7 Sentiment analysis tools to understand what customers are feeling about your brand. Retrieved on the 5th of February, 2020 from https://analyticsindiamag.com/7-sentiment-analysis-tools-to-understand-what-customers-are-feeling-about-your-brand/

Serdaroglu, E. (2020). Exploring the use of YouTube by Symphonic Orchestras as an educational platform during the pandemic of covid-19. *European Journal of Social Science Education and Research*, *7*(3), 59. https://doi.org/10.26417/770wga72a

Shams, S., Haq, M. A. U., & Waqar, Y. (2020). Open educational resources (OER) usage trends among university students of Pakistan. *Education and Information Technologies*, 25(6), 5637–5654. https://doi.org/10.1007/s10639-020-10195-3

Shukla, A. (2021). COVID-19 pandemic: An analysis of popular YouTube videos as an alternative health information platform. *Health Informatics Journal*, 27(2), 146045822199487. https://doi.org/10.1177/1460458221994878

Shukla, P. (2020). Open Educational Resources: Initiatives in India. *Library Philosophy and Practice (e-journal)*. 3876. https://digitalcommons.unl.edu/libphilprac/3876

Smith, J. D. (2020). Leveraging YouTube as an Open Educational Resource. *Journal of Open Education*, 8(2), 123-145.

Tanesab, F. I., Sembiring, I. & Purnomo, H. D. (2017). Sentiment Analysis Model Based on YouTube Comment Using Support Vector Machine. *International*

Journal of Computer Science and Software Engineering (IJCSSE), 6(8), pp.180-185.

Tanesab, F. I., Sembiring, I. & Purnomo, H. D. (2017). Sentiment Analysis Model Based on YouTube Comment Using Support Vector Machine. *International Journal of Computer Science and Software Engineering (IJCSSE)*, 6(8), pp.180-185.

The William and Flora Hewlett Foundation (2015). *Open Educational Resources: Advancing Widespread Adoption to Improve Instruction and Learning.* Retrieved on the 10th of February, 2020 from https://hewlett.org/strategy/open-educational-resources/

The William and Flora Hewlett Foundation. (2002). The Cape Town Open Education Declaration. Retrieved from http://www.capetowndeclaration.org/read-the-declaration

Thelwall, M. (2017). Social media analytics for YouTube comments: potential and limitations. *International Journal of Social Research Methodology*, *21*(3), 303–316. https://doi.org/10.1080/13645579.2017.1381821

Thompson, S. D., & Muir, A. (2019). A case study investigation of academic library support for open educational resources in Scottish universities. *Journal of Librarianship and Information Science*, *52*(3), 685–693. https://doi.org/10.1177/0961000619871604

Tlili, A., Huang, R., Chang, T. W., Nascimbeni, F., & Burgos, D. (2019). Open Educational Resources and Practices in China: A Systematic Literature Review. *Sustainability*, *11*(18), 4867. https://doi.org/10.3390/su11184867

UNESCO (2002). Forum on the Impact of Open Courseware for Higher Education in Developing Countries: Final report. Retrieved on the 10th of February, 2020 from https://unesdoc.org/ark:/48223/pf0000128515

UNESCO. (2012). Paris OER Declaration. Retrieved from https://en.unesco.org/sites/default/files/paris-oer-declaration_2012_en.pdf

UNESCO. (n.d.). *Open educational resources*. Open Educational Resources. https://www.unesco.org/en/open-educational-resources#:~:text=Open%20Educational%20Resources%20(OER)%20are,adaptation%20and%20redistribution%20by%20others.

Upneja, S. K. (2020). Contribution of Library Professionals and Libraries in Open Educational Resources in Indian Scenario. *DESIDOC Journal of Library & Information Technology*, *40*(02), 445–451. https://doi.org/10.14429/djlit.40.02.15339

Veletsianos, G., & Kimmons, R. (2013). Scholars and faculty members' lived experiences in online social networks. *The Internet and Higher Education*, 16, 43-50. https://doi.org/10.1016/j.iheduc.2012.04.004

Vins, M., Aldecoa, M., & Hines, H. N. (2022). Sharing wildlife conservation through 4 billion views on YouTube. *Global Ecology and Conservation*, 33, e01970. https://doi.org/10.1016/j.gecco.2021.e01970

Wankhade, M., Rao, A. C. S., & Kulkarni, C. (2022). A survey on sentiment analysis methods, applications, and challenges. *Artificial Intelligence Review*, *55*(7), 5731–5780. https://doi.org/10.1007/s10462-022-10144-1

Webometric Analyst: altmetrics, web citation analyis, alternative indicators, link analysis, social web. (n.d.). Webometric Analyst: Altmetrics, Web Citation Analyis, Alternative Indicators, Link Analysis, Social Web. http://lexiurl.wlv.ac.uk/

West, R., & Victor, L. (2011). Open educational resources and social media in global education. *Journal of Global Literacies, Technologies, and Emerging Pedagogies*, 1(3), 244-261. https://doi.org/10.5151/9788521206301-028

Whitelaw, C., Garg, N., & Argamon, S. (2005). Using appraisal groups for sentiment analysis. In *Proceedings of the 14th ACM international conference on Information and knowledge management* (pp. 625-631).

Wikipedia (2020). *YouTube*. Retrieved on the 10th of February, 2020 from https://en.m.wikipedia.org/wiki/YouTube

Wiley, D. (2009). *Open Educational Resources (OER).* Retrieved on the 10th of February, 2020 from https://opencontent.org/definition/

Wiley, D., & Green, C. (2012). Why openness in education? In J. M. Spector, D. Ifenthaler, P. Isaias, & S. Sampson (Eds.), Proceedings of the IADIS International Conference on e-Learning (pp. 49-55). Retrieved from https://opencontent.org/docs/why_openness_in_education.pdf

Word Cloud Generator. (n.d.). Word Cloud Generator - WordArt.com. https://wordart.com/

Yaacob, Z., & Md Saad, N. H. (2020). Acceptance of YouTube as a learning platform during the COVID-19 pandemic: The moderating effect of subscription status. *TEM Journal*, 1732–1739. https://doi.org/10.18421/tem94-54

Yousif, A., Niu, Z., Tarus, J. K., & Ahmad, A. (2019). A survey on sentiment analysis of scientific citations. *Artificial Intelligence Review*, *52*, 1805-1838.

Zahidi, Y., El Younoussi, Y., & Al-Amrani, Y. (2021). Different valuable tools for Arabic sentiment analysis: a comparative evaluation. *International Journal of Electrical & Computer Engineering (2088-8708)*, *11*(1).

Zahoor, S., & Rohilla, R. (2020). Twitter sentiment analysis using lexical or rule based approach: a case study. In *2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO)* (pp. 537-542). IEEE.

Zhang, L., Wang, S., & Liu, B. (2018). Deep learning for sentiment analysis: A survey. *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery*, *8*(4), e1253.

Zhang, X., Tlili, A., Huang, R., Chang, T., Burgos, D., Yang, J., & Zhang, J. (2020). A case study of applying open educational practices in higher education during COVID-19: Impacts on learning motivation and perceptions. *Sustainability*, *12*(21), 9129. https://doi.org/10.3390/su12219129

Zhang, X., Tlili, A., Nascimbeni, F., Burgos, D., Huang, R., Chang, T. W., Jemni, M., & Khribi, M. K. (2020). Accessibility within open educational resources and practices for disabled learners: a systematic literature review. *Smart Learning Environments*, *7*(1). https://doi.org/10.1186/s40561-019-0113-2

BIODATA OF THE CANDIDATE

Name:	Manashjyoti Deka
Date of Birth:	01.03.1995
Father Name:	Gopeswar Deka
Mother Name:	Rina Tahbildar Deka
Present Address:	Dept. of Library & Information Science, Mizoram University

List of Publications

Journal Articles

1. Lalduhzuali, Amit Kumar, Dibanjyoti Buragohain and **Manashjyoti Deka. "Assessing and fostering media literacy education among undergraduate students: the competence in information retrieval and usability."** *Journal of Print and Media Technology Research.* Vol. 11 No. 3 (2022). pp. 205-217. ISSN: 2223-8905. Peer-Reviewed Journal, **Scopus** and **WoS Indexed**.

2. Amit Kumar and **Manashjyoti Deka**. **"A Quick Perusal to Open Educational Resources (OERs) Presence for the Past One Decade through Bibliometric Lens with Special Reference to SpringerLink."** *Qualitative and Quantitative Methods in Libraries.* Vol. 11 No. 02 (2022). pp. 259-290. ISSN 2241-1925. Peer-Reviewed Journal, **WoS Indexed**

3. Dibanjyoti Buragohain, **Manashjyoti Deka** and Amit Kumar**. "Documentation and Preservation of Endangered Manuscripts through Digital Archiving in North-Eastern States of India."** *Library Philosophy and Practice (e-journal).* 6662 (2022). pp. 1-23. ISSN: 1522-0222, Peer-Reviewed Journal, **Scopus Indexed.**

4. **Manashjyoti Deka**; Janu Komut and Amit Kumar**. "Mapping the Publication Trends of the Journal of Big Data through Bibliometric Perspectives."** *Qualitative and Quantitative Methods in Libraries.* Vol. 10 No. 04 (2021). pp. 565-584. ISSN: 2241-1925. Peer-Reviewed Journal, **WoS Indexed.**

5. Amit Kumar**,** Lalduhzuali, **Manashjyoti Deka** & Dibanjyoti Buragohain. **"Media Literacy and its Significance for the Past One Decade: A Study of Literature Published by SpringerLink Database through Bibliometric Lens."** *Library Philosophy and Practice (e-journal)*, 5981, (Aug., 2021): pp. 1-24. ISSN: 1522-0222. Peer-Reviewed Journal. **Scopus Indexed.**

6. Amit Kumar**,** Diganta Baishya and **Manashjyoti Deka**, **"Open Educational Resources (OER) Issues and Problems Experienced by Social Scientists of Select Higher Educational Institutions in India"** *Library Philosophy and Practice (e-journal),* 5625, (May 2021): pp. 1-20. ISSN: 1522-0222. Peer Reviewed Journal. **Scopus Indexed.**

Book Chapters

1. **Manashjyoti Deka. "A Quantitative Study of YouTube Videos on National Education Policy 2020 through Sentiment Analysis**" In National Education Policy 2020: A Forward-Looking Vision for LIS Education and Services. Pravakar Rath, Amit Kumar and Manendra Kumar Singh (eds.). 2023. pp. 145-157. Today & Tomorrow's Printers and Publishers, New Delhi. ISBN: 9789391734329

2. **Manashjyoti Deka**, Yadukrishnan T.A. and Amit Kumar. "**A Quick Overview of Open Educational Resources Videos available on YouTube through Sentimental Analysis"** in CALIBER 2022, Joorel and others (eds.) Publisher: INFLIBNET. Pg. 185-196. ISBN: 978-93-81232-10-1 Available at https://ir.inflibnet.ac.in/bitstream/1944/2373/1/16.pdf

3. **Manashjyoti Deka** and Amit Kumar**. "Green Marketing for the Past One Decade: A Bibliometric Study of Literature Published by SpringerLink"** In Green Marketing and Sustainable Development. Amit Kumar Singh and Priyanka Mahanta (eds.). 2022. pp. 113-130. Mittal Publications, New Delhi (India). ISBN: 978-93-90692-97-2.

4. Dibanjyoti Buragohain and **Manashjyoti Deka**. "**An Overview of Open Data And Role Of Lis Professionals In Open Data Ecosystem**" In Web Based Services In Library And Information Science. Ksh Krishna Devi, Sur Chandra Singha and Manoj Kumar Verma (eds.). 2021. pp. 18-23. Shree Publishers & Distributors, New Delhi. ISBN: 978-93-90674-36-7.

5. Amit Kumar, Dibanjyoti Buragohain and **Manashjyoti Deka.** "**Open Educational Resources (OER) Issues and Recommendations"** In Bridging Educational Divides: OER and MOOCs. Priya Rai, Akash Singh and Samar Iqbal Bakshi (eds.). 2019. pp. 90-98. National Law University Delhi. ISBN: 978-92-84272-25-8.

Papers Presentation

1. Presented a paper entitled **"ICT-based library security tools and technologies: A special reference to the Central Library, Mizoram University"** in the National Seminar organized by Central Library, Mizoram University, during 11th-12th May, 2023.

2. Presented a paper entitled **"Sentiment Analysis of OER (Open Educational Resources) Videos available on YouTube"** in the **IASLIC 29th National Seminar** organized by Central Library, North-Eastern Hill University, Shillong in collaboration with IASLIC, Kolkata during 15th-17th March, 2023.

3. Presented a paper entitled **"A Quantitative Study of YouTube Videos on National Education Policy 2020 through Sentiment Analysis**" in the National Seminar organized by the Dept. of Library & Information Science, Mizoram University during 1st-3rd March, 2023.

4. Presented a paper entitled "**A Quick Overview of Open Educational Resources Videos available on YouTube through Sentiment Analysis**" in the **13th International CALIBER 2022** organized by the INFLIBNET Centre and Central Library, Banaras Hindu University during November 17-19, 2022.

5. Presented a paper "**Social Media and Privacy**" in the National Seminar organized by the Dept. of Library & Information Science, Mizoram University during 26th-28th February, 2020.

PARTICULARS OF THE CANDIDATE

NAME OF THE CANDIDATE	:	Manashjyoti Deka
DEGREE	:	Ph.D.
DEPARTMENT	:	Library and Information Science
TITLE OF THE THESIS	:	Sentiment Analysis of Open Educational Resources (OER) Videos on YouTube: A Study
DATE OF ADMISSION	:	23.07.2019
APPROVAL OF RESEARCH PROPOSAL		
1. DRC	:	13.03.2020
2. BOS	:	18.05.2020
3. SCHOOL BOARD	:	29.05.2020
MZU REGISTRATION NO.	:	1900187
Ph.D. REGISTRATION NO. & DATE	:	MZU/Ph.D./1431 of 23.07.2019
EXTENSION (IF ANY)	:	N/A

Head

Department of Library and Information Science

ABSTRACT

SENTIMENT ANALYSIS OF OPEN EDUCATIONAL RESOURCES (OER) VIDEOS ON YOUTUBE: A STUDY

AN ABSTRACT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

MANASHJYOTI DEKA

MZU REGISTRATION NO.: 1900187

Ph.D. REGISTRATION NO.: MZU/Ph.D./1431 of 23.07.2019

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE

SCHOOL OF ECONOMICS, MANAGEMENT AND INFORMATION SCIENCE

JUNE 2023

SENTIMENT ANALYSIS OF OPEN EDUCATIONAL RESOURCES (OER) VIDEOS ON YOUTUBE: A STUDY

BY

MANASHJYOTI DEKA

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE

NAME OF SUPERVISOR

DR. AMIT KUMAR

SUBMITTED

IN PARTIAL FULFILLMENT OF THE REQUIREMENT OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN LIBRARY AND INFORMATION SCIENCE OF MIZORAM UNIVERSITY, AIZAWL

1. Introduction

Library and information science as a discipline attain its dignity and position because of the diverse nature of evolving the subject. The evolution of the subject has led to the development of new concepts and ideas in the academic community. It leads many researchers and academicians to undertake research activities to create and innovate the mindset of the people. The advancement of ICT has paved a new way for scholarly communication among the academic community. It also leads to the emergence of many new areas and to undertake the research activity. The emergence of ICT has also changed the scenario of information processing, storage, dissemination, and communications, and it facilitates researchers, academicians, and LIS professionals to move towards multi-disciplinary research. The LIS professionals of the contemporary time have developed a new environment where ICT tools are the main driving forces to carry out any operations in the library, and they got acquainted with the latest tools and techniques to perform their tasks which was made possible due to the prominent research in the respective fields. The emergence of Open Educational Resources (OER) has also changed and revolutionized the way library functions and operates in terms of access and usage when it comes to academia. The way information has found its new channels in reaching people is a fascinating area to look into. The information society and its constant adoptions and adaptations to avail information have fundamentally led to the proliferation of OER and its worldwide reach.

Social media is one of the important components of the modern information society. People from every walk of life have adopted and accepted social media as one of the important mediums to receive and send information. Social media has various utilities, and people use these for various purposes. It is found from the study that commercial firms and online shopping sites are connected with social media for the promotion of products and services. Online shopping sites also retrieve information related to comments, opinions, or feedback from the consumer through social media.

YouTube is the most prominent social media which is widely used across the globe. This popular online video site possesses a huge collection of videos related to different areas. It consists of product descriptions, services, entertainment, news,

tutorial educational videos, etc. YouTube received a huge amount of comments from viewers. It is very important for the consumer to analyze the comments and opinions before purchasing any items. Many commercial firms and industries are undertaking sentiment analysis to understand the position of the services provided by the firms. The prime objective of sentiment analysis is to examine whether the text or sentence has positive or negative emotions. Sentiment analysis has attained a dignified position and gained rapid popularity in different study areas.

2. Sentiment Analysis

Sentiment Analysis is generally defined as the study of a person's opinion or sentiment towards something, be it a product, service, event, or political situation. It is the automated process of analyzing text data and sorting it into sentiments, positive, negative, or neutral. It is extremely helpful for social media monitoring since it gives us a broad picture of how the general population feels about particular issues. With the advancement of ICT and the popularity of web applications like social networks, blogs, forum discussions, and e-commerce sites, people sharing their opinions about products, services, or any topics has become common in today's world. Examples can be cited of Amazon collecting customer reviews about products or services, and social networks such as Twitter and Facebook allow users to publish their opinions on any topics, such as events, elections, products, or services. Both consumers and manufacturers can benefit from these viewpoints. The producers recognize the problems from the feedback from the customers, and they fix them to increase sales. From the customers' point of view, the opinion of the review documents about the products is useful to make decisions when purchasing the products in e-commerce sites where one can't physically view and verify the quality of the products. Based on the customer's reviews, we purchase the products. However, it is a very difficult task to classify the review documents according to positive or negative sentiment manually because a greater number of reviews are posted on many sites.

Moreover, people are interested to know about the sentiment of the entities at the level of the aspect. Hence, it is necessary to construct a sentiment analyzer that

classifies the review documents into positive or negative sentiment and also identifies the sentiment of the aspects of entities from the review documents automatically. In other words, Sentiment analysis is also known as opinion mining (Liu, 2012). In basic terms, it involves figuring out the emotional undertone of a string of words to comprehend the attitudes, opinions, and feelings conveyed in an online remark. The uses of sentiment analysis are numerous and effective. Organizations all over the world are using the capacity to extract insights from social data on a large scale.

3. Sentiment Analysis Tools

A Sentiment analysis tool is software that analyzes text conversations and evaluates the tone, intent, and emotion behind each message. Various tools, both open and commercial, are available for sentiment analysis purposes. Some of the popular tools are as follows:

i. AYLIEN
ii. Mozdeh
iii. Sentiment Analyzer
iv. ParallelDots API
v. RapidMiner
vi. Social Mention
vii. Semantria
viii. Clarabridge
ix. Brandwatch

4. Open Education Resources

All educational materials that are openly licensed for usage, access, reuse, modification, sharing, and resharing with others anywhere in the globe are referred to as "open educational resources." The phrase was first used in a gathering of nations from the developing world at the UNESCO Forum in 2002. In the forum, open educational resources were defined as “the open provision of educational resources, enabled by information and communication technologies, for consultation, use, and adaptation by a community of users for non-commercial purposes” (UNESCO,

2002). It is a trend that seeks to make education accessible to everyone at any time and anywhere in accordance with their requirements and convenience. The William and Flora Hewlett Foundation, the instrumental founder of this movement, defines OERs as "teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and repurposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials or techniques used to support access to knowledge" (The William and Flora Hewlett Foundation, 2015).

D. E. Atkins has also tried to define Open Educational Resources as "Teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or repurposing by others."

The activities involved in OER can be understood with 5R activities proposed by David Wiley as follows:

(i) Retain - the right to design, develop, and control the content copies, including their downloading, replication, storage, and management;
(ii) Reuse - The power to change how content is used in a variety of contexts, such as in a video lecture, study group, or in class;
(iii) Revise - The power to adapt, modify, or change the scope of the content to suit convenience, such as by translating it into its native tongue;
(iv) Redistribute - the power to share the original copies of the unique creation, revision, or blending of the other elements.
(v) Remix - the power to create a new diagram by merging the various materials, both the original and new elements. (For instance, send a friend a copy of the content)

Open Educational resources have become one of the thrust areas of research for academicians and a prime concern of the nations because of their potential.

5. YouTube

YouTube is a video-sharing platform where users can upload their videos as well as watch those that are posted by other users. People see the videos that creators complete and then share, like, and comment on them. The service was launched in 2005 as a standalone website before being purchased by Google in 2006. Today, YouTube is the largest user-driven video content provider in the world. It has become a major platform for disseminating multimedia information. YouTube videos are posted by people from all over the world, from all types of backgrounds. Therefore, there is a wide range of videos available on YouTube. Some examples include amateur films, homemade music videos, sports videos, and other fun events caught on video. Additionally, YouTube serves as a platform for users to share informative resources, like step-by-step tutorials, do-it-yourself guides, and educational content. Some users have been able to make money off of YouTube since Google offers revenue sharing for ad clicks made on video pages. Now people use YouTube as an online learning tool. Its immense importance lies in gaining familiarity among the modern generation of users who depend on YouTube for educational purposes. There are varieties of content available on YouTube related to educational purposes, which has compelled the academic community to be dependent on it to clear their doubts and confusion and also to understand any new area of study. YouTube has not only fulfilled academic scholarly communication but also acts as a tool to promote open educational resources that can be accessed by anyone across the globe.

6. Significance of the Study

Librarianship is the profession of having an interest in measuring the sentiments of users so that an extreme level of satisfaction can be achieved. Sentiment Analysis can be considered useful in social media monitoring as it allows the researchers to gain an insight that leads the wider public opinion behind certain topics. The application of social media is wide and powerful as it has the power to extract insights from the data through social media platforms where organization across the globe is being practiced. In recent decades, studies and research on

sentiment analysis have been conquering a significant place by using various social networking sites. Sentiment Analysis helps the researcher to analyze the opinions, suggestions, likes, dislikes, etc., of the public easily. Several studies were conducted by opting for Twitter, Facebook, and other websites, but it can be seen that so far, no studies have been conducted on YouTube with special emphasis on open educational resources, which is an emerging area in academics. The study will undertake several parameters to examine the sentiment of the users about open educational resources on YouTube. The study will also help the LIS professionals to evaluate the psychological aspects of the user by using social networking sites as a tool to measure. It will also help the LIS professionals to seek interest in this newly emerging area of research.

7. Scope of the Study

Sentiment analysis is considered one of the emerging branches of study to understand the sentiments of the people. People across the globe are using social media to communicate, share, disseminate, preserve, and retrieve information. It is seen from several studies that commercial firms and organizations are prominently adopting the culture of sentiment analysis to understand customers in a better way with the rapid application of social media platforms. The adoption of social media has led firms to promote their products and services in a new pattern. YouTube is one of the popular social media, which is a hub of different videos with different dimensions. It facilitates learning, research, and other academic activity. It also led to the emergence of open educational resources, which provided a new forum for the academic community. There are huge numbers of videos on open educational resources (OER) available on YouTube.

The present study focuses primarily on evaluating the sentiment analysis of open educational resources (OER) videos made available or uploaded on YouTube during 2007 - 2022. The study also tends to identify the intention of comments given by the users, to evaluate the comments, whether it is positive or negative in nature, and to understand the emotions, including emojis forwarded by the users. The study was conducted for a period of sixteen years, i.e., from 2007- 2022.

8. Statement of the Problem

Sentiment analysis is the systematic study to understand a person's opinions or sentiments towards anything, whether it may be a product, service, or even political situation, etc. It is an automated process where the evaluations of text mining are done, and then sorting is carried out wherein positive, negative, or neutral is marked. There is an ample amount of literature found on sentiment analysis by undertaking Twitter, YouTube, etc., mainly carried out by commercial firms. It is observed that so far, no studies on sentiment analysis have been conducted by considering Open educational resources on YouTube. The LIS community has felt the necessity to take up the imitative in investigating the sentiment analysis of people with regards to open educational resources on YouTube.

9. Objective of the Study

The following is the list of objectives that are laid down for the study:

i. To analyze the sentiments of the comments expressed as positive, negative, or neutral of the YouTube videos on OER;
ii. To identify the intention of a comment which are being expressed by the commenter;
iii. To find out the subjectivity of the comments;
iv. To determine the emotion which has been expressed by the user;
v. To find out the frequently used words in the comments

10. Research Methodology

For the systematic and scientific study of any concept, the methodology is an important and indispensable step. The research is exploratory and designed to analyze the sentiments of videos on open educational resources (OER) available on YouTube. The sentiment analysis includes different indicators to measure the research. The study covered the count of the total number of comments (English language only) on a video, no. of views and likes of the video, the resolution and license of the videos, top-viewed, top-liked, and top-commented videos on OER, and the sentiment of the comments, whether positive, negative, or neutral. Further,

the intentions, emotions, along subjectivity of the comments were also analyzed. For a detailed understanding, a word cloud constituting the most commented words on the videos was also constructed

11. Method of Data Collection and Analysis

The below listed are the various steps followed in the process of the collection of data and its analysis.

a. The videos were retrieved using search keywords “Open Educational Resources” and “OER” from Webometric Analyst 4.4 software.
b. After the retrieval videos were listed, they are gone through manual filtering.
c. All comments and video data from the specified videos were retrieved with the aid of the Webometric Analyst 4.4.
d. After listing in MS Excel, comments in languages other than English were carefully screened out.
e. Using the Parallel Dot API in Google Sheets, the sentiment, intention, and emotion of the comments were evaluated.
f. Using the OpenAI Text Classification Playground, the subjectivity of the comments was examined.
g. Mozdeh software was used to ascertain the words' frequency in the comments.

The data was collected in different time intervals with respect to the convenience of the study, and the final set of data was collected on the 15th of January, 2023.

12. Hypotheses

The hypotheses for the present study are as follows:

H_1 - Majority of the videos are available with positive sentiments rather than negative; and

H_2 - Majority of the learners prefer to show their opinion about the videos through likes and dislikes only.

13. Chapterization

The following chapters make up the current research area:

Chapter 1: Introduction

This chapter deals with the introductory part of the entire research. Various essential sections, such as significance, scope, objectives, hypotheses, research methods, etc., that frame the pillars of the study have been discussed in detail, which guide the progression of this study.

Chapter 2: Review of Literature

This chapter gives a comprehensive analysis of the related literature collected from various sources. Sixty relevant studies have been identified and reviewed in this chapter to form foundational ideas to carry out the research and to substantiate the existing gap in the literature.

Chapter 3: Sentiment Analysis and Social Media Platforms: An Overview

This chapter discusses the core themes of the study, sentiment analysis, and social media in detail, emphasizing the concept and significance of sentiment analysis. The chapter also looks into various software and applications of sentiment analysis in libraries.

Chapter 4: Open Educational Resources (OER), Social Media and its Impact on Librarianship

In this chapter, the concept and importance of Open Educational Resources (OER) are explored. The proliferation of social media as a tool of OER, and different OER sources, particularly emphasizing the significance of YouTube as an effective open educational resource, has been discussed. Further, its implication and impact on librarianship have also been highlighted.

Chapter 5: Data Analysis, Interpretation, and Findings

The chapter deals with the representation, analysis, and interpretation of the collected data. The findings have been elaborately and carefully examined and analyzed for further discussion and generalizations.

Chapter 6: Conclusions and Suggestions

In this chapter, the conclusions derived from the findings of the study have been discussed along with various constructive suggestions and scope for the advancement of further research developments in the proposed area. The major limitations of the study have also been mentioned in this chapter.

14. Research Objectives

This section primarily presents the discussion based on the following objectives:

a. To analyze the sentiments of the comments expressed as positive, negative, or neutral of the YouTube videos on OER.

Sentiment analysis of 3955 English-language comments collected from 1030 OER videos revealed that the majority of viewers expressed positive sentiments towards the content. Out of these comments, 2779 were categorized as positive, indicating satisfaction and contentment with the OER videos on YouTube. This suggests a strong level of viewer appreciation and enjoyment. Additionally, the sentiment analysis also identified 1014 neutral comments and 162 negative comments. The presence of neutral comments suggests a balanced or impartial response from viewers, while the relatively low number of negative comments indicates that dissatisfaction or negative feedback was less prevalent among the viewers. Overall, these findings highlight the positive reception of the OER videos, reinforcing the notion that the majority of viewers are content and pleased with the content presented on YouTube.

b. To identify the intention of a comment which are being expressed by the commenter.

The analysis of 3955 comments provided insights into the intentions expressed by video viewers. Among these comments, feedback emerged as the most prevalent intention, with 1538 instances. This suggests that a significant number of viewers shared their opinions and reactions to the OER videos. Additionally, the analysis revealed 1457 comments categorized as spam, indicating the presence of unwanted or irrelevant content. Furthermore, 566 comments reflected news-related intentions, while 210 comments were associated with marketing-related intentions. Queries

were found in 184 comments, showcasing viewers seeking information or clarification. These findings highlight the diverse range of intentions expressed by video viewers, with feedback being the dominant category.

c. To find out the subjectivity of the comments

Subjectivity and objectivity were analyzed in 3955 viewers' comments on OER videos spanning from 2007 to 2022 on YouTube. Among these comments, 3057 were classified as subjective, reflecting personal opinions, emotions, or biases. Conversely, 898 comments were categorized as objective, presenting factual information without personal bias or emotions. This distribution indicates that a considerable portion of the comments expressed subjective viewpoints, while a smaller proportion remained objective in nature. This finding suggests that the viewers' comments predominantly reflected subjective perspectives, highlighting the individual viewpoints and emotions associated with the OER videos on YouTube.

d. To determine the emotion which has been expressed by the user

The analysis of comments on OER videos revealed valuable insights into the emotions expressed by viewers. The most prevalent emotion among the viewers was "Happiness," as indicated by 2751 responses. This suggests that the OER videos had a positive impact on the viewers, eliciting feelings of joy and satisfaction. Additionally, "Excitement" was a commonly expressed emotion among viewers, with 673 comments reflecting this sentiment. The OER videos were able to evoke a sense of enthusiasm and anticipation among the viewers, further highlighting their engaging and captivating nature. On the other hand, a smaller number of comments, totaling 145, conveyed the emotion of "Sadness" in relation to the OER videos, indicating that there were instances where viewers experienced a sense of melancholy or disappointment. These findings demonstrate the range of emotions elicited by the OER videos, with happiness and excitement being the most prominent ones, contributing to a positive viewer experience overall.

e. To find out the frequently used words in comments.

Top terms, representing the most frequently used words in the comments of OER videos on YouTube, provide valuable insights into the audience's preferences and interests. Among these terms, the most frequently mentioned one is "Thank," appearing 991 times in the comments. This indicates that viewers expressed gratitude or appreciation for the content or experiences associated with the OER videos. Another frequently mentioned term is "Video," with a frequency of 967. This suggests that the viewers often referred to the videos themselves or the visual content being discussed. Additionally, the terms "OER", "Watching" and “Good” were also frequently used, appearing with frequencies of 884, 857, and 791 respectively. These findings highlight the recurring topics and subjects that captured the attention and engagement of the audience in the comments of OER videos on YouTube.

15 . Research Hypotheses

Hypothesis 1: Majority of the videos are available with positive sentiments rather than negative.

From the study, it was observed that the number of comments with positive intentions and negative comments greatly varies. However, the number of videos with positive comments was approximately 17-fold greater than the number of videos with negative videos. Furthermore, the median count of the number of videos in 16 years with positive comments was 6 folds greater than the number of videos with negative comments. The particular findings suggested that over the last 16 years, the majority of OER videos on YouTube are available with positive comments rather than negative comments.

Hypothesis 2: Majority of the learners prefer to show their opinion about the videos through likes only.

To examine the learners’ preferences to show their opinions about the videos, the investigator considered all 1030 videos for analysis. As reflected in Table 5.73, there are a total of 38,84,589 views witnessed in all videos. Observing

the responses to those videos, the investigator witnessed a total of 51,642 likes and 4,667 comments.

The mean count of likes and comments over the years in the OER videos was found to be 53.35 and 5.28, respectively. It was found that the average number of likes was approximately 10 folds higher than the average number of comments providing a clear indication that the learners prefer to put their opinion through likes. Furthermore, the Chi-square test of association (Performed in R v 4.0.5) between like counts and comment counts over the years also suggested that these variables were significantly associated (X-squared = 42693, P-Value < 2.2e-16).

16. Conclusion

This study was aimed at exploring different aspects of OER videos that are uploaded on YouTube in order to provide insights on the availability of these videos, trends, preferences of viewers, engagement levels, sentiments, and emotions of the comments. The study findings contribute to a deeper understanding of the OER videos and their impact on academics. The analysis of the study provides detailed insights into the OER landscape and the user sentiment regarding the content uploaded on OER, its availability patterns over the years, and information regarding user behavior.

The study found an increased demand for OER videos during the Covid-19 pandemic outbreak and the higher number of uploads in the year 2020 substantiates this. The finding also aligns with the literature covered for this study which explains the higher demand for OER during crisis period. As the lockdown period got over, the number of uploads also decreased which suggests the shift in the preference and engagement of viewers. One interesting finding from the analysis was the viewers' preference for shorter content with video duration ranging from 0 to 10 minutes emphasizing the need for OER content to be concise and focused. Hence it underlines how content creators should follow optimal length for their videos to cater the viewer preferences. Another finding was the prevalence of HD videos that indicate viewers prefer higher resolution videos suggesting that the content creators should focus on visually appealing content for an immersive learner experience.

Regarding the licensing, it was found that most of the creators preferred the Standard YouTube License (SYL) and this may indicate that this choice may be because of factors such as ease of use, familiarity, etc., and also the protection SYL offers the creators against unauthorized use and redistribution of their contents. Viewer engagement patterns found in the analysis showed significant variations among different OER content as different videos had different amounts of views, likes, and comments and hence the positive engagement and feedback indicate the popularity of OER in the online academic community.

The sentiment analysis of the comments revealed the higher levels of positive sentiments of viewers towards OER videos thereby reflecting the contentment and satisfaction of the user. The presence of negative comments was relatively lesser hence it underscores that OER videos uploaded on YouTube get a significant amount of user appreciation. Similarly, the analysis of intention revealed that most number comments were giving out feedback and hence a significant number of viewers shared opinions. The study also explored the subjectivity of the comments and the findings indicate that the majority expressed the subjective perspective that encompasses opinions, bias, and emotions. Only a smaller percent remained objective in the comments that provided factual information only. The predominance of the subjectivity of the comments has been identified as highlighting the perception and emotional response of the individuals. By means of emotion analysis, the most prevalent emotion was found to be 'happiness' thereby indicating the satisfaction of the user with the content.

In summary, the findings of the study contribute to the valuable insights surrounding open educational resources and their videos uploaded to YouTube exploring the availability, trend, preference, engagement, sentiment, emotions, etc. emphasizing the popularity and utilization of OER in the educational landscape and its impacts. The findings of the study highlight the importance of user engagement and how important it is to consider their preferences and needs by means of which the content can be created in accordance with that. The sentiment, intention, and emotion of the user comments can be studied to understand the reach and involvement of OER and the insights of this study can be used by creators and

academics for the enhancement and proliferation of effective, engaging, and inclusive online learning.

17. Limitations of the study

Several limitations should be addressed despite the findings and insights this study put forward.

1. The study focused only on English language comments and excluded other language comments for feasibility.
2. The study was limited to YouTube and no other social media platforms with OER were explored.
3. The study covered a limited period only and could have potentially missed the recent developments.
4. The study quantified publicly available data and its sentiment and this may introduce biases.

18. Suggestions

Based on the findings of the study, the researcher put forward some suggestions for academicians and academic institutions. It can be effectively implemented in order to create a much more dynamic environment for OER with an increased set of users and enhanced user engagements.

1. Educational institutions should take the initiative to start YouTube channels and other potential social media platforms to make educational content openly available for its students so that an engaging digital community is built by means of which a wider reach and increased engagement of users can be achieved.
2. To cater to the learners in accordance with their diversity, the institutions should make the OER content available in regional/multi-languages as well. Translating OER content in such a way can help in achieving the inclusiveness of students and learners from various linguistic backgrounds.
3. Educational institutions should make a collaborative learning environment available to their academic community using interactive discussions, forums,

and feedback surveys to understand the specific needs of the users and get feedback on OER.

4. Educational Institutions can make use of data analytics to identify specific user needs and thereby cater to and recommend OER tailored the user-specific needs.
5. OER content should be made available in multiple formats as different learners might have different kinds of preferences. The institutions can incorporate various learning styles by incorporating diverse types of learning materials for enhanced user engagement.
6. In order to create a more interactive and collaborative learning environment, educational institutions should facilitate user-generated OER content as well which can in turn benefit peer-to-peer learning.
7. Educational institutions can make use of sentiment analysis techniques and tools to identify the response of the students and their learners and can be further used for the revisal/modification/development of the OER contents.
8. Library and information professionals can make use of the potential of sentiment analysis to understand and study the engagement patterns of the users, their needs, complaints, and suggestions for the betterment of library services. For this, the successful integration of social media is necessary and hence the sentient analysis can be a great tool in aiding the further growth of libraries in this rapidly growing digital world.

19. Scope for Future Research

1. The potential of AI in OER is a trending area. Gamification elements, Virtual reality (VR) and Augmented reality (AR), Algorithms, etc. can be studied in this context employing which a more immersive learning experience can be explored.
2. Comparative studies can be conducted among students who extensively use OER and those who use traditional learning materials; in order to identify and examine academic performance and knowledge retention.

3. The present pedagogical approaches and methods can be put to examination in the context of OER to gain insights into its effectiveness among its audience. Such a study could explore the potential approaches that can be adopted through which the pedagogical instructional designs can be changed/modified.
4. Cultural/contextual settings can be put to study in the context of OER exploring the learner demographics, existing disparities, digital gaps, social factors, diverse learning needs, etc. to achieve an enhanced inclusive learning environment. This could benefit learners from various cultural backgrounds and promote equitable access to learning.
5. The changing audience in terms of the dynamics of their generation can be an interesting area of study as the characteristics, user patterns, and changing preferences on information use and access can be subjected to a comparative study as the new generation such as Gen-Z, Gen-Alpha, etc. are identified to show traits vaguely different from the previous generations.
6. For future study, a researcher can choose any other significant area for the sentiment analysis of YouTube video comments and interesting studies can be conducted that are relevant and innovative.
7. With time, sentiment analysis is going to be a growing area of research as it becomes more complex in determining the sentiments and emotions of people. Therefore, a forward-looking framework that can overcome the anomalies in the existing sentiment analysis research can be given significant importance and an analysis system that is more accurate and efficient can be developed.