

National Repository of Open Educational Resources —a digital repository of learning resources: SWOC analysis

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Abstract

After mass use of the internet open access has reached a new dimension in the forms of open access journals and open access digital repositories. So, a digital repository is a place where one can store, search and find digital content anytime anywhere in and around the globe. This paper aims to critically evaluate the open educational resources, e-books and courses available in the National Repository of Open Educational Resources (NROER). In this paper, the researcher retrieved 19,496 OERs including 440 e-books, and 14 e-courses from NROER while browsing the website concerned. The paper also tries to analyze the generic features of OERs including e-books and courses available in NROER. After surveying NROER, the content has been analyzed in respect of type, sources, subject, education level, target group, language, etc. After analysis OERs and e-books of multidisciplinary subjects, languages, and Secondary level e-documents have been observed. It is also observed that NCERT is the main source of OERs in NROER. To conclude, it may be opined that NROER will play a vital role in the development of the Digital Library.

Keywords: Repository, Open Access, National Repository of Open Educational Resources (NROER), e-books, Open Educational resources (OERs), Open education.

Introduction

The open access publishing movement started its journey in 2003 to provide access to resources to all without any cost. Later open access publishing has been divided into two types-Green Method i.e. self-archiving in repositories and Gold Method i.e. submission of open access papers in online journals. Here, the repository is a virtual place where something is stored for future access. In this regard, the National Repository of Open Educational Resources (NROER) is a digital platform for sharing open educational resources related to school and teacher education, developed by the Department of School Education and Literacy, Ministry of Human Resource Development, Government of India in 2013 in New Delhi and run by the Central Institute

of Educational Technology, National Council of Educational Research and Training, Homi Bhabha Centre for Science Education, Mumbai manage this NROER on the Meta Studio platform having registered users of 20,957 at the time of data collection.

As per data available on the repository, total of 19,496 OERs including 440 e-books in many subjects, languages and formats are available in NROER for the purpose of Primary, Secondary, and Senior Secondary education under Creative Commons CC BY-SA 3.0 License. So, Open educational resources popularly known as OERs can be accessed freely under an open license and used for teaching and research purposes. OERs include e-books, text, audio-visual materials and any other documents used for teaching-learning

and research purpose. Here, CC license means creative commons license in which the author gives rights to anyone to use, share, attribute and remix his/her OERs with different types. It is also noteworthy that 14 online and blended e-courses are available in NROER. In NROER, these open educational resources have no technical and price burden except a few copyrights and licensing restrictions for users. The users not only use these resources, but also they can reuse them with proper attribution.

Literature Review

The following related studies have been found after consultation with both foreign and Indian literature:

Upneja in his paper discussed Indian OER initiatives and their usage by information professionals. In it, he showed that among information professionals, the National Digital Library of India (NDLI) has gained the highest popularity as per the highest usage frequency (17.59 per cent) followed by Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM) (15.60 per cent) and then followed by ePathshala (14.04 per cent) (Upneja, 2020). Chakrabarti in his paper related to institutional repositories studied 75 websites of institutional repositories through content analysis with respect to their generic features and revealed that many multidisciplinary subject-oriented repositories are available. It is also observed by him that a huge number of open educational resources have been found in these repositories (Chakrabarti, 2017). Thakran and Sharma in 2016 investigated the role of OERs in Indian higher education amidst lacking trained faculty and geographical variation regarding accessing education. Both the authors gave a brief overview of initiatives of OER in India to overcome the barriers of educational challenges faced in higher education (Thakran &

Sharma, 2016). Dutta in 2016 threw light on the possibilities and challenges in connection with OER in Indian higher education. In this respect, the author enumerated some initiatives of the Government of India like NROER, SHAKSHAT, NKN, EKLAVYA, NMEICT, NPTEL, OSCAR, E-grid, etc. (Dutta, 2016). Khan, in his paper, discussed about NROER and its various activities in the field of School Education. He tries to investigate the OERs of NROER with special emphasis on Physics in pre-primary and secondary levels of education (Khan, 2015). Das in 2014, in his paper, defined the term OER and international policy related to OER. He then emphasized Indian initiatives of the OER through the support of National Mission on Education through ICT (NME-ICT) (Das, 2014).

Objective of the study

The main objectives of the study are stated below:

- To identify the existing OERs and to analyze the generic features of OERs including e-books available in NROER in terms of type, sources, subject, education level, target group and language.
- To present SWOC analysis of NROER

Methodology

The data relating to NROER in terms of type, sources, subject, education level, target group, language have been collected from the website concerned and the relevant information as per the objectives mentioned above has been extracted, summarized, tabulated, and analyzed using MS Excel. For analysis of data, content analysis of the website of NROER and case study method have been acquired. For the quantitative analysis of the data the percentage is worked out. Qualitative analysis was

done after browsing the repository concerned and also after consulting the review of related studies. The period of data collection was from 16.06.2021 to 20.06.2021.

Analysis and Interpretation of Results

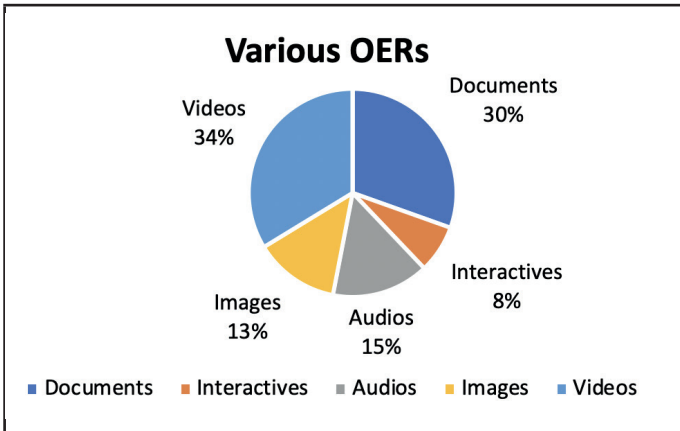
According to the objective stated above, the following tables and figures have been prepared below for minute analysis. These figures and tables are stated below-

Table-1: Type of OERs available in NROER

Type	Number of OERs	Percentage
Documents	5934	30
Interactives	1453	08
Audios	2956	15
Images	2582	13
Videos	6571	34
All Files/Total	19496	100

(Source: NROER, 2021)

Figure-1: Type of OERs available in NROER



(Source: NROER, 2021)

Table 1 and figure 1 present 19,496 homogeneous collections of open educational resources in NROER. The total collection includes 5,934 documents, 1,453 interactives, 2,956

audios, 2,582 images and 6,571 videos. The above table clearly shows that 33.71 per cent videos are available in the repository immediately followed by 30.44 per cent of documents.

Table-2: Sources of OER in NROER

Sources of OERs	Number of OERs
CIET,NCERT	6771
NCERT	12701
Explosive	181
VIDYA'S ONLINE	20
Arvind Gupta	1726
Vigyan Prasar	383
CCRT	449
UNICEF	282

(Source: NROER, 2021)

Table 2 states that NCERT is the highest contributor of OERs followed by CIET, NCERT. There are other partners like Azim Premji University, Gandhi Smriti Darshan Samiti, Society for All Round Development, Vidya Online, etc. who/which contributed OERs to NROER. Some noteworthy contributions have been observed viz. 181 images of Explosive, 1,726 videos of Arvind Gupta-author of Science Books for Children, 383

videos of Vigyan Prasar-autonomous organization under Department of Science and Technology, 443 images of CCRT out of 449 images, 223 audio files of UNICEF out of 282, etc. The total number of resources presented in the above table exceeds the total number of OERs (19,496 OERs) because some OERs may be the sources of more than one institution e.g. NCERT and CIET.

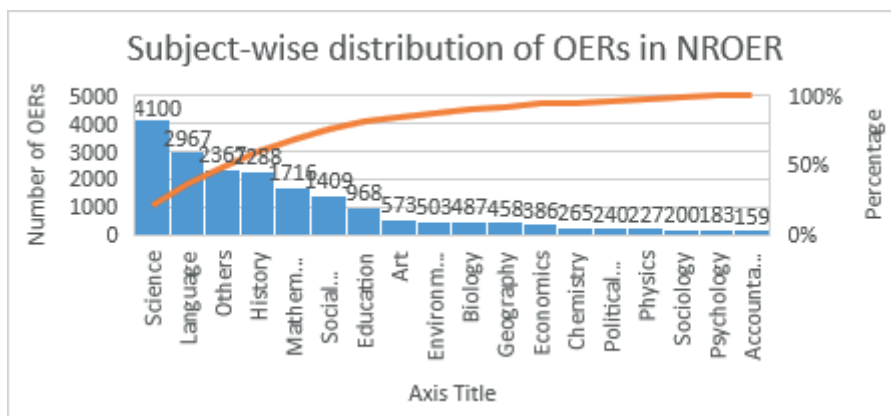
Table-3: Subject-wise distribution of OERs in NROER

Subject	Number of OERs	Percentage
Accountancy	159	00.82
Art	573	02.94
Biology	487	02.50
Chemistry	265	01.36
Economics	386	01.98
Education	968	04.97
Environmental Studies	503	02.58
Geography	458	02.35
History	2288	11.74
Language	2967	15.22
Mathematics	1716	08.80
Physics	227	01.16
Political Science	240	01.22
Psychology	183	00.94
Science	4100	21.03

Social Science	1409	07.23
Sociology	200	01.03
Others	2367	12.14
Total	19496	100

(Source: NROER, 2021)

Figure-2: Number of OERs available in NROER



(Source: NROER, 2021)

Table-3 and clustered bar chart (figure-2) show that most of the OERs belong to Science (4,100 OERs i.e. 21.03 per cent) compared to Language (2,967 OERs i.e. 15.22 per cent) and Social Science (1,409 OERs i.e. 07.23 per cent). There are other notable subjects like Mathematics (1,716 OERs i.e. 08.80 per cent) and

History (2,288 OERs i.e. 11.74 per cent) which can be specially mentioned. In NROER, 1,823 audio files out of 2,967 in language, 2,100 video files out of 4,100 in Science and 457 videos out of 968 OERs in education have been also observed.

Table-4: Education Level-wise distribution of OERs in NROER

Level of Education	Number of OERs
Primary Level	7479
Upper Primary Level	5943
Secondary	9034
Senior Secondary	5907
Not Mentioned	1091

(Source: NROER, 2021)

In NROER, Secondary level OERs are available in large numbers (9,034 OERs) followed by Primary Level (7,479 OERs) and then followed by Upper Primary Level (5,943 OERs). The notable attribute

of the study is that total of 1,091 OERs do not belong to any specific level of education. The total number of open educational resources presented in the above table exceeds the total number

of OERs (19,496 OERs) because some OERs belong to more than one level of education. Here, the Secondary level denotes Class IX and Class X, Upper

Primary Level denotes Class VI to Class VIII and Primary Level denotes Class I to Class V.

Table-5: Target Groups-wise distribution of OERs in NROER

Target Groups	Number of OERs
Teachers	17428
Students	18068
Teacher Educators	4245

(Source: NROER, 2021)

Table 5 states that most of the OERs available in NROER for students (18,068 OERs) are followed by Teachers (17,428 OERs) and then followed by Teacher educators (4,245 OERs). The total number of resources presented in the above table exceeds the total number of

OERs (19,496 OERs) because the target users of some OERs are both teachers and students. Here, the Teacher Educator indicates those teachers who give training to pre-service teachers and help them to teach effectively.

Table-6: Language-wise distribution of OERs in NROER

Language	Number of OERs	Percentage
Assamese	52	00.27
English	13102	67.20
Gujarati	03	00.02
Hindi	4011	20.57
Manipuri	30	00.15
Marathi	400	02.05
Others	1898	09.74
Total	19496	100

(Source: NROER, 2021)

Table 6 indicates the availability of language-wise OERs in NROER. OERs in the English language are available in large numbers (13,102 OERs i.e. 67.20 per cent) followed by Hindi (4011 OERs i.e.20.57 per cent). The OERs in other languages like Manipuri, Gujarati, Marathi, Assamese, etc. are also available in NROER. The main attribute of the study here is that 52 videos are available in Assamese and 400 videos are available in Marathi. In

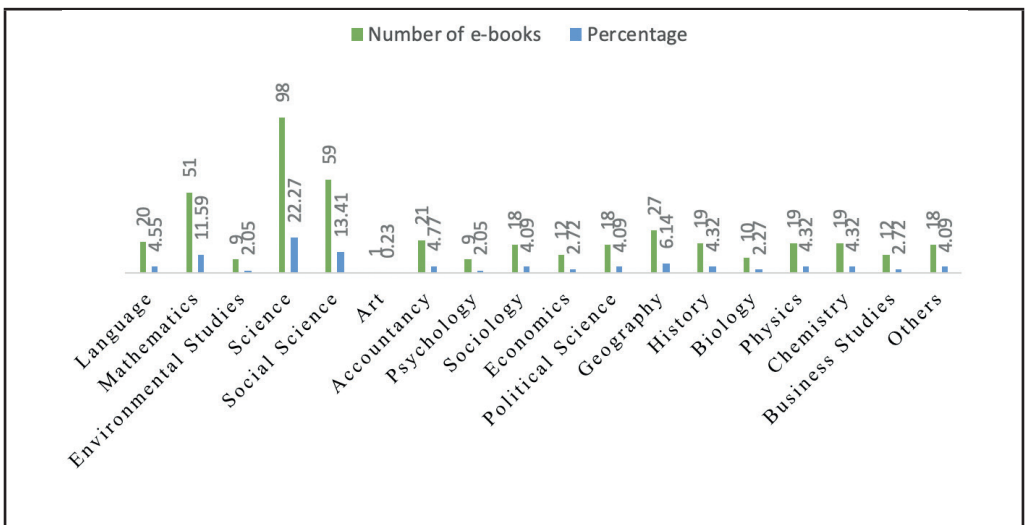
this respect, it may be remembered that the almost same result has been observed by Chakrabarti and Maharana in 2019 in their paper related to Library and Information science. They observed that 95 Open Access Repositories in Open DOAR are available in English. So, English is the main source of OERs not in education discipline, but also in other subjects (Chakrabarti & Maharana, 2019).

Table-7: Distribution of e-books according to Subject in NROER

Subject	Number of e-books	Percentage	Rank
Language	20	04.55	xx
Mathematics	51	11.59	3
Environmental Studies	09	02.05	xx
Science	98	22.27	1
Social Science	59	13.41	2
Art	01	00.23	xx
Accountancy	21	04.77	5
Psychology	09	02.05	xx
Sociology	18	04.09	xx
Economics	12	02.72	xx
Political Science	18	04.09	xx
Geography	27	06.14	4
History	19	04.32	xx
Biology	10	02.27	xx
Physics	19	04.32	xx
Chemistry	19	04.32	xx
Business Studies	12	02.72	xx
Others	18	04.09	xx
Total	440	100	xx

(Source: NROER, 2021)

Figure-3: Number of e-books available in NROER



(Source: NROER, 2021)

Table 7 and clustered column bar (figure-3) represent the subject-wise distribution of e-books i.e. 'Device independent digital books' i.e. a book available in such a format to read it on an electronic device and shows 440 e-books in NROER which can be read by scanning QR codes. QR- coded e-books can be downloaded through QR Code

Readers available in a large number. It also shows that most of the e-books belong to Science (98 e-books i.e. 22.27 per cent) compared to Social Science (59 e-books i.e. 13.41 per cent). There are other notable subjects like Mathematics (51 e-books i.e. 11.59 per cent) and Language (20 e-books i.e. 04.55 per cent) which is noteworthy.

Table-8: Distribution of e-books according to the Level of education in NROER

Level of education	Number of e-books	Percentage
Primary Level	028	06.36
Upper Primary Level	018	04.09
Secondary	110	25.00
Senior Secondary	093	21.14
Not Mentioned	191	43.41
Total	440	100

(Source: NROER, 2021)

In NROER, Secondary level e-books are available in large numbers (110 e-books i.e. 25 per cent) followed by Senior Secondary Level (93 e-books i.e. 21.14 per cent) then followed by Primary Level (28 e-books i.e. 06.36 per cent). It

is also observed that 191 e-books have not been assigned to a particular level of Education. These e-books may be assigned to either a primary or upper primary level or the Secondary or Senior secondary level.

Table-9: Distribution of e-books according to Target Groups in NROER

Target Groups	Number of e-books
Teacher	423
Students	440
Teacher Educators	000

(Source: NROER, 2021)

Table-9 gives an overall picture of e-books according to Target Groups in NROER and finds that 423 e-books are best suited for Teachers and 440 e-books are best suited for Students. On

the other hand, no e-books have been found suited for Teacher Educators. Some e-books may be considered for both teachers and students.

Table-10: Distribution of e-books according to the Language in NROER

Language	Number of e-books	Percentage
English	183	41.59
Hindi	138	31.36
Others	119	27.05
Total	440	100

(Source: NROER, 2021)

Table 10 presents the distribution of e-books according to Language in NROER. e-books in the English language are available in large numbers (183 e-books i.e. 41.59 per cent) followed by Hindi (138 e-books i.e. 31.36 per cent). The 119 e-books in other languages like Assamese, Marathi, Gujarati, Manipuri, etc. have been found at the time of searching in NROER.

Table-11: Distribution of e-Courses according to the Subject in NROER

Subject	Number of e-Courses	Percentage
Mathematics	04	28.57
Science	5	35.71
English	2	14.29
Values	1	07.14
Research	2	14.29
Total	14	100

(Source: NROER, 2021)

Figure-4: Number of e-courses available in NROER

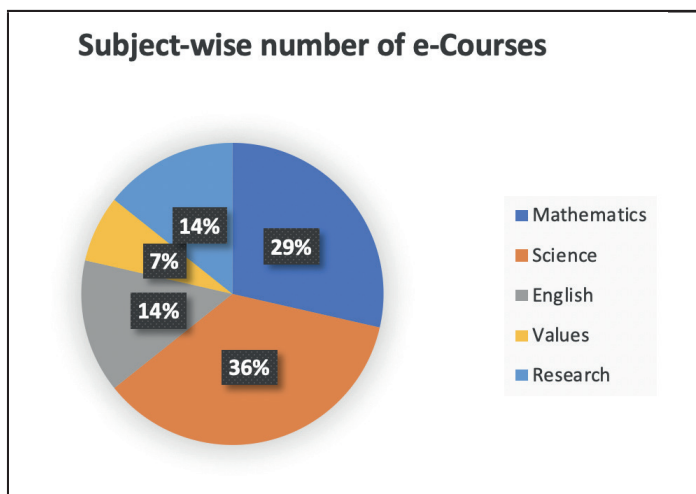


Table-11 and figure-4 show the distribution of e-Courses according to Subject in NROER. These e-courses are blended i.e. type of continuing education programme aimed to provide students with instructions through classroom and online delivery. From the above table, it is clear that 35.71 per cent of

e-courses belong to Science subject followed by 28.57 per cent of e-courses belong to Mathematics then followed by 14.29 per cent of e-courses belong to English. The main attribute of the study is that 13 e-courses belong to Grade 8 and Grade 9 except one Mathematics e-course for secondary level.

Table-12: Distribution of e-Courses according to Unit specified

Unit	Number of e-Courses
1	08
2	03
3	01
4	02
Total	14

(Source: NROER, 2021)

Table 12 indicates the distribution of e-courses according to the Unit specified. From the above table, it is found that most of the e-courses have one unit i.e. 8 e-courses out of 14 e-courses and 3 e-courses have two units. It is also noted that 2 courses have four units and 1 course has three units. It is observed that 1-unit e-course is mostly because 13 e-courses belong to Grade 8 and Grade 9.

SWOC analysis of the findings

SWOC (S-Strength, W-Weakness, O-Opportunity and C-Challenge) analysis of NROER may be enumerated based on the findings from the above tables and figures to find out the real picture.

Strength

- i. In NROER, OERs including e-books are of several types like Video, Image, Audio, etc.
- ii. These OERs may be used as teaching and learning aids.
- iii. OERs of Science stream have been

found in large number in respect to Social science and Language.

- iv. All OERs including e-books are available here under the CC-BY-SA license i.e. anyone can edit and remix the e-books, even for commercial purposes without changing the original license and with full credit to the creator.
- v. The books of NCERT are in the format of Flipbook i.e. e-book looks like a real book having a page-turning facility and flipping sound.
- vi. Vigyan Prasar, Gujarat Institute of Educational Technology (GIET), SIE, SCERT, SIERT, CCERT, SIET and other stakeholders shared their resources in the NROER platform,
- vii. OERs on Themes and topics in different subjects like Economics, History, Biology, Political Science, Physics, Chemistry, Geography, Language and Mathematics which are mapped to the National Curriculum Framework, 2005 are available on a separate webpage for easy access of documents.

viii. Total of 14 online and blended e-courses are available in NROER where teachers and students can participate.

Weakness

- i. The textbooks of NCERT are openly licensed to download and also can be shared non-commercially without changing with proper attribution. It encourages creation and sharing of duplicate OERs.
- ii. Some of the OERs in NROER have not been accessed at the time of data collection.
- iii. The stakeholders are unaware of NROER, support from management, insufficient fund and lack of ICT infrastructure have been observed.
- iv. No search facility for multilingual OERs has been found.

Opportunity

- i. Anyone knowing the internet may use the OERs and access e-courses in NROER.
- ii. Academicians may contribute OERs according to the prescribed format of NROER.
- iii. OERs are available in Indian languages like Manipuri, Gujrati, Assamese, Marathi, etc. besides English and Hindi which are beneficial for students of all provinces of India.
- iv. This platform is very helpful for sharing OERs easily. These OERs help to build a National Digital Library.

Challenge

- A lack of skilled personnel and lack of preservation policies have

been observed while browsing the website concerned and collecting data.

- Lack of policy for checking plagiarism of OERs has been observed.
- Anyone may use these OERs for commercial purposes violating open licensing as these E-books are easily available to download.

The Way Forward

It is a matter of great joy that India is not far behind in hosting National Repository in the arena of School education. In this repository, a large number of open educational resources are available to students and academicians at any time anywhere. From the above-mentioned SWOC analysis, it may be pointed out that the organization concerned should have to minimize the weakness and threat and maximize the strength and opportunity to develop NROER and increase awareness regarding NROER. It is also observed from the related literature reviews that the academicians and students are not all fully aware of the use of e-books available in NROER. The awareness programs and workshops regarding use of e-books and their deposit by the academic community should be organized from time-to-time. The organizations concerned with NROER should approach various institutions to submit their intellectual output to NROER. Most of the institutions in India do not have sufficient infrastructure regarding the creation of e-books for school education. So, NROER in India should provide adequate infrastructure and other support for the creation and maintenance of e-books. For future sustainability, the content collection and functional development of NROER should be done to create a digital society.

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