Asian Journal of Information Science and Technology
ISSN: 2231-6108 (P), Vol.13 No.1, 2023, pp.1-7

DOI: https://doi.org/10.51983/ajist-2023.13.1.3384

Usability of Open Educational Resources Platforms among Students of Al Kabir Polytechnic, Jamshedpur, India: A Case Study

Kolawole Francis Ogunbodede[1] and Mohammad Atique[2]
[1]The University Library, University of Africa, Toru-Orua, Bayelsa State, Nigeria
[2]Librarian, Al Kabir Polytechnic, Jamshedpur, Jharkhand, India
E-mail: kolawoleogunbodede@yahoo.com, atiquelibrarian@gmail.com
(Received 16 November 2022; Revised 28 November 2022; Accepted 21 December 2023; Available online 13 March 2023)

***Abstract* - The usability of open educational resources (OER) among students from Al Kabir Polytechnic in India was examined in the study. The study was guided by one hypothesis and four research questions. A descriptive survey was used in the investigation. 1000 students from Al Kabir Polytechnic made up the study population, and a simple random selection procedure was utilized to choose the sample size of 300 students. The study's sample size was determined using the Taro Yamane formula. A questionnaire was used to obtain the data. The results demonstrate that students used OER with a high level of awareness. Students reported that OER was very usable and that the biggest obstacle to actual OER adoption was a lack of digital proficiency. Lastly, the study demonstrates a strong correlation between student awareness and the use of OER. The statement implies that students' knowledge of OER positively influenced their usage. The researchers proposed that the institution's library and school administration should offer training on digital literacy to students and that lecturers and librarians should keep promoting its use to students to sustain OER use.**
Keywords: **Usability, Open Educational Resources, Students, Al Kabir Polytechnic, India**

I. INTRODUCTION

Students now have new opportunities to overpower the constraints placed by printed materials thanks to the integration of Internet technology into the educational system. Everyone now has access to education thanks to the Internet, which also makes it possible for information to be used, shared, and reused. As educational institutions worldwide place more prominence on openness and high-quality instruction, open educational resources (OER) are assuming a prominent role. In 2002, UNESCO hosted the first inclusive OER meeting, the name "OER" was introduced. The symposium placed a strong emphasis on OER's role in expanding educational access, mainly in developing countries (Plotkin, 2010). Then numerous institutions and organizations began making their course materials available to everyone (Vladoiu & Constantinescu, 2011).

Although OER is defined in a variety of ways, all definitions agree that the key component of OER is that the resources are easily accessible to users via the Internet for free. The researchers defined OER as publicly accessible, freely usable, and extensible online educational materials. OER is a term coined by Bissell (2009) to describe electronic resources that teachers, researchers, and self-learners can use and reuse. Online content in the public domain or that is otherwise freely accessible is referred to as OER (Atkins *et al.,* 2007). Textbooks, lecture videos, tests, assignments, software, project reports, journal articles, etc., and any other tools, resources, or strategies for expediting education access are all considered to be part of OER (William & Flora Hewlett Foundation, 2008).

By making top-notch learning resources freely available, the idea behind OER is to narrow the achievement gap in education. Using OER can enhance the standard of higher education and provide it to more people at a reduced price (Kumar & Raja, 2019). OER has grown to be an important tool for expanding access and improving both the teaching and learning processes since its inception (Zaid & Alabi, 2020). OER fosters student involvement and directly enhances their educational experience (Itasanmi, 2020). OER has made it possible for underprivileged students to access the archives of multiple educational institutions both locally and globally, which is a dream come true for students. OER can promote lifelong learning and personalized learning globally while removing demographic, economic, and geographic obstacles to education and increasing the range of available educational options.

Over the years, several OER projects have been initiated in India as a potential reaction to pressing educational issues. A lack of excellent teachers, inadequate infrastructure, inadequate libraries, and a lack of high-quality educational materials were some of the challenges (Kumar, 2009). The National Knowledge Commission (NKC) was set up in 2005 to address these problems and promote quality education. The NKC report states that increasing access to and raising the standard of education is essential for our success in the knowledge economy and recommends creating and disseminating OER via broadband Internet connectivity. For Indian universities, producing, modifying, and utilizing OER was the aim. As a result, the National Repository of Open Educational Resources (NROER), as well as other OER programs, were established (James & Bossu, 2014). These projects significantly aided the development, adoption, and growth of OER in India.

The available research on OER drives and utilization in higher education in India reveals that OER is currently developing and not yet entirely exploited, notwithstanding its rising fame, advantages, and capacity to support educational expansion (Padhi, 2018). The inadequate utilization of OER may be caused by the fact that many students access to OER platforms is limited.

"Usability" is the ease with which a system can be successfully used by users without any difficulties (Nielsen, 1993). OER usability assesses how quickly and effectively users can complete tasks and interact with OER websites, how well they do their work there, and even how emotionally attached they become to the site. OER usability improves the browsing experiences of individuals with and without disabilities. To increase OER usability, the website must follow the five usability criteria outlined by the Nielsen model. OER platforms' usability is crucial to their uptake and success. Both expert and unskilled users must be able to navigate the OER website's user interface without difficulty and find what they need on time.

OER usability covers every facet, including navigation and user interface. One major factor influencing students' success in learning is how usable an online platform is (Raspopovic *et al.,* 2014). Most OER platforms lack concerted and interactive tools (Gillani & Eynon, 2014). User motivation is influenced by usability, which also determines the success rate. It affects satisfaction, which affects usage intention. The usability assessment of OER platforms is crucial and significant in this setting because of the COVID-19 epidemic's rapid expansion of online learning, which has led to the acceptance of more OER (Schaffhauser, 2020).

The usability of OER materials must be increased to reduce unneeded mental anxiety and maximize their latent instructional value. Consequently, despite the significant investment in OER, only a few studies have been done to examine the usability of OER platforms by students. In this study, the Nielsen (1993) usability model is used to fill research gaps and investigate Indian students' perceptions of the usability of OER platforms. In light of this, the study investigated the usability of OER platforms among students at the Al Kabir Polytechnic in Jamshedpur, India.

II. STATEMENT OF THE PROBLEM

The core goal of OER is to make learning more affordable for everyone who wishes to pursue higher education by providing free access to excellent educational materials for learning and research. Agyekum & Ossom (2015) noted that students still have difficulty addressing and meeting their research expectations by using online learning and research platforms. This can be caused by the platforms' poor usability. Nielsen (2000) asserts that if a website's resources are hard to find, visitors won't use them. Because of this, one of the key factors in evaluating whether or not a system will be embraced by users is how accessible OER platforms are. The ease of use of OER platforms is essential for promoting their utilization. The current study, which tries to fill this gap, was motivated by the researchers' observation that there aren't many empirical studies on the usability of OER in India. Based on this, the researchers looked at how well OER was used by students at Al Kabir Polytechnic in Jamshedpur, India. The work also seeks to proffer answers to these research questions.

1. What is the student's level of awareness and use of OER?
2. What is the degree of usability of OER?
3. What are the challenges in the use of OER?

III. HYPOTHESIS OF THE STUDY

There is no discernible correlation between students at Al Kabir Polytechnic in Jamshedpur, India, being aware of open educational resources and using them.

IV. LITERATURE REVIEW

Three main principles served as the framework for this literature review: students' awareness and use of OER; the usability of OER platforms; and the difficulties associated with OER use.

A survey on OER use and awareness among Indian academics and students was conducted by D'Souza in 2021. The majority of respondents to the study were found to be familiar with and regularly utilize OER. In a similar study, the use of OER by college students at India's Alagappa University was examined by Nagaiah & Thanuskodi (2021). 121 of the 245 students received the online survey and responded. The statistics showed that the majority of learners are responsive to OER and utilize them for learning purposes.

The use of OER by Chinese college students at Zhejiang University was the focus of a study by Hu *et al.,* (2015). The results of a two-part survey that included 1239 students show that most university students have utilized OER. Wiche & Ogunbodede (2021) investigated the knowledge and usage of OER by students at the Ignatius Ajuru University of Education. The results show that students are highly aware of OER and frequently use it. The University of Kelaniya's students' use of OER was investigated by Hettige *et al.* (2022). The results prove that most students utilize OER and that the ease of access to knowledge at any time was the main driving force behind OER's accessibility.

However, research has revealed that students have poor levels of OER usage and knowledge. Ismail *et al.,* investigated OER consciousness among students at the Tanzania's State University of Zanzibar in 2019. There were 713 undergraduate participants in the study, and 352 were randomly selected. The data showed that students were underusing OER and had a considerable knowledge gap. A study of OER usage by students at the University of Lagos in Nigeria was conducted in 2016 by Onaifo. The findings demonstrate how little the participants knew about OER and

OER repositories. Christoforidou & Georgiadou did a study in 2021 on OER use and awareness among Greek lecturers and students in higher education in the field of graphic arts. Even though educators are aware of OER, the results indicate that awareness is poor, particularly among undergraduate students. Even though these studies showed that students' awareness of OER varies, the researchers concluded that students are becoming increasingly familiar with the concept of OER. As a result, educators, university management, and librarians must constantly raise awareness of OER and promote its use among students.

The usefulness of the research management web platform at a Moroccan institution was investigated by Khaoula *et al.,* in (2019). The Nielsen Attributes of Usability (NAU) questionnaire was utilized in the study to measure usability. The platform has a high level of usability, which influences how quickly users accept it. To evaluate the usefulness of OER in Indonesia, Isbandiputra *et al.,* (2016) used a range of techniques. The findings demonstrate that I-OER conforms to both the five usability criteria and the eight golden guidelines of interface design.

Oppong *et al.,* (2022), in contrast, examined how Kumasi Technical University students in Ghana used research help platforms and how much they knew about them. The questionnaire was used to gather information from 126 randomly selected participants. According to the research, the majority of students were not aware of and did not make use of the university library's online research assistance tools. Additionally, it was discovered that undergraduate students had trouble navigating the research platforms. Students benefit from better online browsing thanks to OER's usability. These Nielsen (1993) usability model requirements should be met by the website to improve OER online usability.

The use of OER, however, has significant difficulties, especially in developing countries. For instance, Padh (2018) found that problems with the use of OER include a lack of funding and a lack of knowledge to utilize and incorporate OER in Indian higher education. According to Itasanmi (2020), obstacles to the use of OER by students in south-western Nigeria included a dearth of direction on the availability and usage of OER and inadequate ICT infrastructure, among other things. In a similar study, it was also determined that the obstacles to the use of OER in Nigeria included a lack of digital skills, an inadequate power supply, poor Internet connection, a lack of sensitization by the library, a lack of access to computers and laptops, and a lack of help from lecturers on the use of OER (Wiche & Ogunbodede, 2021; Ogunbodede *et al.,* 2021).

V. USABILITY MODEL

This study examines the usability of OER among Al Kabir Polytechnic students in Jamshedpur, India, using the Nielsen (1993) usability paradigm. The five criteria for usability, according to Nielsen, are learnability (the system is easy to use and simple to learn), efficiency, memorability, mistakes, and satisfaction. Nielsen's model is superior to Shackel and Richardson's because it specifies the site of usage and states the structure of quality features more methodically (Kurosu, 2015).

The Nielsen model's five usability criteria are depicted on a map in the test procedure utilized in this study (Fig. 1).

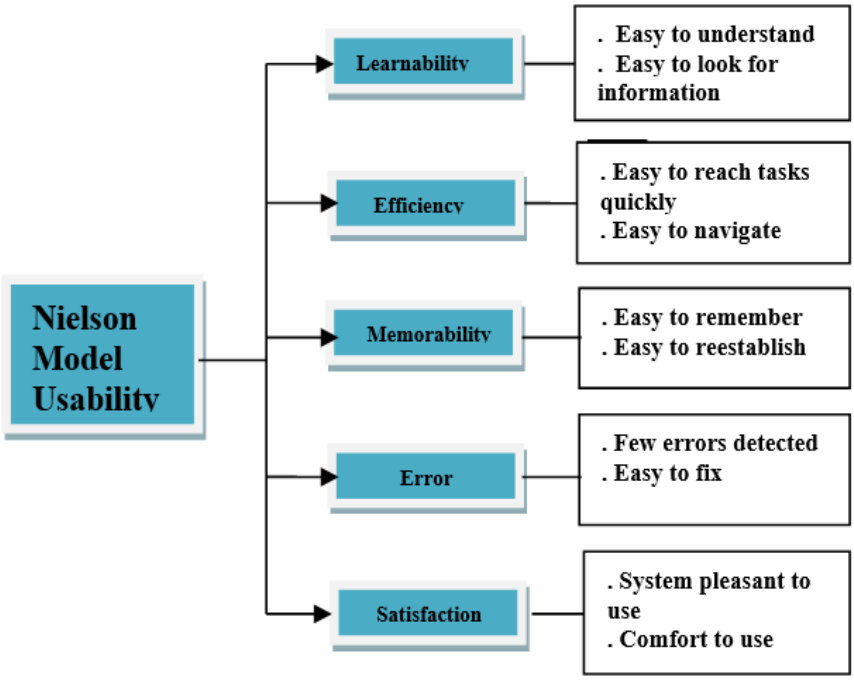

Fig. 1 Map of the five usability attributes of the Nielsen model

VI. METHODOLOGY

Using a descriptive survey approach, the study's population consisted of 1000 students, and a straightforward random sample process was used to select 300 pupils. The Taro Yamane sample size method was used to establish the study's sample size. A questionnaire served as the data collection tool. The instrument's reliability was assessed using Cronbach's alpha, and the result was 0.98. According to the coefficient found, the questionnaire was considered reliable. A 4-point Likert-style scoring scale was used to weigh the responses to each of the items. The options available to the respondents were Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. A criterion score of 2.5 was chosen on the scale.

Following is how the criterion score was determined: (4+3+2+1)/4 = 2.5. Items with an average score higher than the required score of 2.5 for research questions 1 and 2 were deemed to have high levels of awareness and usage, whereas items with a mean score below 2.5 were deemed to have low levels of awareness and utilization. Similar to research question 2, items were categorized as having a "high degree of usability" for research question 3 and a "poor extent of usability" for research question 3 if their mean scores were below the criterion score of 2.5. Items with a mean score over the criterion score of 2.5 were finally allowed, while those with a mean score below 2.5 were not. The results are displayed in the table below.

VII. RESULTS OF THE STUDY

The following tables, together with explanations, show the study's results.

TABLE I GENDER OF THE RESPONDENTS

Gender	Frequency	Percentage (%)
Male	233	78
Female	67	22
Total	300	100

The result in Table I implies that the majority of the students that participated in the study were male.

Research Question 1: What is your level of awareness of OER?

TABLE II STUDENT'S LEVEL OF AWARENESS

Sl. No.	Awareness of OER	SA	A	D	SD	Mean
1	I am aware of OER	162	122	15	01	3.5
2	I am aware that OER provides quality free materials for learning and research	157	124	16	03	3.5
3	I am aware that OER are in online/electronic format	172	116	11	01	3.5
4	I am aware that OER is readily available for teaching, learning, and research	150	134	15	01	3.4
5	I am aware that anyone can legally and freely copy, adapt and re-share OER	132	142	20	06	3.3
	Grand Mean					3.4

Table II shows the student's level of awareness of OER. All the items in Table II have mean values that are above the criterion mean of (2.5), more so, the grand mean (3.4) is greater than the criterion mean (2.5), which shows that the students have a high level of awareness of OER.

TABLE III STUDENTS' LEVEL OF OER USAGE

Sl. No.	Usage of OER	SA	A	D	SD	Mean
1	I make use of OER to supplement my learning	169	108	15	08	3.5
2	I use OER to get access to quality materials	152	128	12	08	3.4
3	I use OER to increase my research productivity	151	122	20	07	3.4
4	I use OER as an alternative to expensive commercial print textbooks	166	119	10	05	3.4
5	I use OER to prepare for my tests and examinations	142	119	22	17	3.3
6	I use OER to learn from other learned scholars	105	84	77	34	2.9
	Grand Mean					3.3

Research Question 2: What is your level of OER usage?

The grand mean (3.3) is higher than the criterion mean (2.5) in Table III, which further demonstrates the students' extensive use of OER. All of the items in Table III have mean values that are higher than the criterion mean of (2.5).

Research Question 3: What is the extent of usability of OER?

TABLE IV STUDENTS' EXTENT OF USABILITY OF OER

Sl. No.	Usability of OER	SA	A	D	SD	Mean
1	I can easily access and use OER materials	156	117	20	07	3.4
2	OER materials are clear and understandable	149	123	17	11	3.4
3	I can easily use and integrate OER into my courses	119	156	20	05	3.3
4	It is very easy to find relevant OER materials in my course of study	125	158	10	07	3.3
5	OER is easy to learn	143	123	17	17	3.3
6	I feel comfortable and satisfied using OER	132	142	20	06	3.3
7	OER is easy to use and remember	136	116	28	20	3.2
8	Interaction with OER is clear	84	146	55	15	2.9
	Grand Mean					3.3

Table IV components all have mean values that are higher than the criterion mean of (2.5), and the grand mean (3.3) is higher than the criterion mean of (2.5), demonstrating that students are highly adept at using OER.

Research Question 4: What are the challenges in the use of OER?

TABLE V CHALLENGES IN THE USE OF OER

Sl. No.	Challenges in the Use of OER	SA	A	D	SD	Mean
1	Lack of digital literacy skills	78	156	50	16	2.9
2	Lack of awareness of Intellectual Property Right Issues	17	35	182	66	2.0
3	Lack of library/lecturers sensitization on the use of OER	19	22	182	77	1.9
4	Lack of awareness of the availability of OER	20	19	152	109	1.8
5	Lack of resources/technology to access the Internet	13	11	195	81	1.8
6	Poor Internet connectivity	13	15	192	80	1.8
7	Lack of relevant OER materials in my course of study	11	10	158	121	1.7
8	Inconsistent power supply	08	11	189	92	1.7
	Grand Mean					1.9

Except for item 1, which has a mean value that is higher than the criterion mean of (2.5), items 2 through 8 have mean values that are lower than the criterion mean of (2.5), and the grand mean (1.9) is even lower (2.5). This demonstrates that problem 1, or a lack of digital literacy, is the only issue impeding the efficient use of OER in this study.

TABLE VI CORRELATION BETWEEN STUDENTS AT AL KABIR POLYTECHNIC

Variable	Mean	Standard Deviation	N	R	p-value	Remark
Awareness	17	3.2	300	0.983	0.000	Significant
Use	19	4.6				

$\alpha = 0.05$

Tabel VI shows that there is no discernible correlation between students at Al Kabir Polytechnic in Jamshedpur, India, being aware of OER and using them.

The table displays a p-value of 0.000 and a strong correlation coefficient of 0.983. The p-value is less than the alpha value of 0.05. Thus, the null hypothesis is disproved. As a result, there is a strong correlation between student awareness and the use of OER. The optimistic connection inferred that students' utilization of OER in the study was positively influenced by their knowledge of them.

VIII. DISCUSSION

The study looked at how well OER was utilized by students in Jamshedpur, India's Al Kabir Polytechnic. According to the findings of the study, students are aware of and used OER. The growing popularity of the idea among Indian students may be responsible for the high level of awareness. This might be due to the various OER initiatives launched in India as a potential reaction to pressing educational issues. The COVID-19 pandemic has made students dependent on OER and other digital resources. The increased adoption of

OER may be attributable to the ease with which a huge number of excellent OER that are freely accessible online can be accessed. This result is in line with that of Nagaiah & Thanuskodi (2021), who found that most students were aware of and used OER. The research also discovered that students' use of OER was quite good. This can be attributed, among other things, to the fact that OER resources are simple to use; understandable, and clear; that they can be swiftly absorbed; and that students can find pertinent OER materials in their subject areas. The usability of the OER is demonstrated by the user's acceptance and use of it. According to Isbandiputra *et al.,* (2016), who discovered that the Indonesia OER web platform had a high level of usability, this is in line with their findings. The study found that a lack of digital skills was the only obstacle to efficient OER adoption. Lastly, there is a significant correlation between student knowledge and the use of OER in Jamshedpur, India's Al Kabir Polytechnic. The strong correlation implied that the use of OER in the study is positively influenced by students' level of awareness. This research backs up Manzo & Kannan's (2020) findings that students' use of digital resources is closely related to their awareness of those resources.

IX. CONCLUSION AND RECOMMENDATIONS

The participants in this study showed a high level of OER knowledge and usage. The poll also revealed that students had a high degree of OER usability and that a lack of digital skills is the only thing standing in the way of actual OER implementation. According to the hypothesis test, there is a strong correlation between OER awareness and use. The strong correlation shows that the utilization of OER in the study is positively impacted by students' awareness of them. In other words, there is a definite connection between usage and awareness of OER. The researchers advised that students should receive training in digital literacy skills from the school administration and library management to use these resources efficiently. To maintain OER usage, lecturers and librarians should continue to encourage students to use them.

REFERENCES

[1] Agyekum, B. O., & Ossom, S. (2015). Awareness and impact of electronic journal usage by faculty members and lectures in Kumasi Polytechnic Ghana. *Information and Knowledge Management, 5*(1), 9-12

[2] Atkins, D. E., Brown, J. S., & Hammond, A. L. (2007). A review of the open educational resources movement: achievements, challenges, and new opportunities. Retrieved from http://www.hewlett.org/uploads/files/ReviewoftheOERMovement.pdf

[3] Bissell, A. N. (2009). Permission granted: Open licensing for educational resources. Open Learning: *The Journal of Open, Distance and e- Learning,* 24(1), 97-106. Retrieved from https://doi.org/10.1080/02680510802627886

[4] Butcher, N. (2011). A basic guide to open educational resources. Retrieved from http://oasis.col.org/handle/11599/36.

[5] Butcher, N. (2015). A basic guide to open educational resources. Retrieved from http://oasis.col.org/handle/11599/36.

[6] Christoforidou, A., & Georgiadou, E. (2022). Awareness and use of OER by higher education students and educators. *Educ. Sci., 12*(16). DOI: https://doi.org/ 10.3390/educsci12010016

[7] Colvard, N. B., Watson, C. E., & Park, H. (2018). The impact of open educational resources on various student success metrics. *International Journal of Teaching and Learning in Higher Education, 30*(2), 262-276.

[8] Dillon, A. (1994). Designing usable electronic text: ergonomic aspects of human information usage. Taylor & Francis.

[9] Dsouza, F. (2021). Awareness and use of open educational resources: A study. *Library Philosophy and Practice (e-journal), 6570.* Retrieved from https://digitalcommons.unl.edu/libphilprac/6570.

[10] Gillani, N., & Eynon, R. (2014). Communication patterns in massively open online courses. *The Internet and Higher Education, 23,* 18-26.

[11] 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*(35). DOI: https://doi.org/10.1186/s12909-022-03106-2.

[12] Hu, E., Li, Y., Li, J. & Huang, W. (2015). Open educational resources usage and barriers : A study from Zhejiang University, China. *Springer, 63*(6), 957-974. DOI: https://doi.org/10.1007/s.

[13] Isbandiputra, I. N., Santoso, H. B., & Hasibuan, Z. A. (2016). Usability evaluation of Indonesia open educational resources using multi-methods Conference (Conference session). International Conference on Engineering Management and Industrial Technology (ICEMIT), Medan, Indonesia. Retrieved from https://www.researchgate.net/publication/314072960_Usability_Evaluation_of_Indonesia_Open_Educational_Resources_Using_Multi-Methods.

[14] Ismail, M., Yunus, A. & Ahmada, S. (2019). Awareness of open education resources in higher learning institutions: Perspectives from undergraduate students from the State University of Zanzibar, Tanzania. DOI: https://doi.org/10.1007/978-3-030-28764-1_25.

[15] Issa, A. I., Ibrahim, M. A., Issa, A. I., Ibrahim, M. A., Onojah, A. O., & Onojah, A. A. (2020). Undergraduates' attitude towards the utilization of open educational resources for learning. *International Journal of Technology in Education and Science (IJTES), 4*(3), 227-234.

[16] Itasanmi, S. (2020). OER awareness and usage among open and distance learning students in South-Western Nigeria. *International Journal of Indonesian Education and Teaching, 4*(2), 2548-8430. DOI: https://doi.org/10.24071/ijiet.2020.040216.

[17] James, R., & Bossu, C. (2014). Conversations from south of the equator: Challenges and opportunities. RUSC. *Universities and Knowledge Society Journal, 11*(3), 78-90. DOI: http://dx.doi.org/10.7238/rusc.v11i3.2220

[18] Khauola, B., Majida, L., Samira, K., Mohamed, L. K., & Abil, E. Y. (2019). Evaluating the usability of a Moroccan University Research management web platform. The 12th International Conference Interdisciplinary in Engineering. Retrieved from https://www.sciencedirect.com/

[19] Kumar, M. S. V. (2009) OER in India's national development. *Open Learning*: *The Journal of Open, Distance and e-Learning, 24*(1), 77-84. DOI: https://doi.org/10.1080/02680510802627860

[20] Kumar, P., & Raja, V. (2019). A study on awareness and attitude towards open educational resources in higher education students. Retrieved from https://www.researchgate.net/publication/335790901_A_Study_On_Awareness_And_Attitude_Towards_Open_Educational_Resources_In_HigherEducation_Students?msclkid=6825c5ada2b311ecbb9e632bc9c182ec

[21] Kurosu, M. (2015). Human-computer interaction: Design and evaluation, *Springer International Publishing, 9169.*

[22] Nagaiah, M., & Thanuskodi, S. (2021). Utilization of open educational resources among college students affiliated to Alagappa university in India. *Linguistics and Culture Review, 5*(S3), 1384-1399. DOI: https://doi.org/10.21744/lingcure.v5nS3.1822

[23] Nielsen, J. (1993). *Usability engineering.* Academic Press, Boston, MA.

[24] Nielsen, J. (2000). *Designing web usability, 3.*

[25] NKC (2007). National Knowledge Commission: Report to the nation (2007). Government of India. Retrieved from http://www.knowledgecommission.gov.in/recommendations/oer.asp

[26] Nyamwembe, Tanui & Wamutitu (2018). Relationship between students' awareness and utilization of open educational resources for academic work in private universities in Kenya. *International Journal of Education and Research, 6*(9), 113-128.

[27] Odiel, E., Dieter, R. F., & Anaibis, A. M. (2021). The assessment of the usability of digital educational resources: An interdisciplinary analysis from two systematic reviews. *Education and Information Technologies*. DOI: https://doi.org/10.1007/s10639-021-10727-5.

[28] Ofoegbu, O. T., Asogwa, U. D., Ogbonna, C. S. (2021). Open educational resources and courseware development in dual-mode universities in Nigeria. *Education Tech Research Dev*. DOI: https://doi.org/10.1007/s11423-021-10014-7.

[29] Ogunbodede, K. F., Nwachokor, I. M. & Aminikpo, R. N. (2021). Awareness and use of open educational resources by academic staff of Federal College of Education Technical Asaba, Delta State, Nigeria. *Rivers State University Journal of Education* (RSUJOE), 24(1), 144-153. Retrieved from http://www.rsujoe.com/.

[30] Onaifo, D. (2016). Alternate academy : Investigating the use of open educational resources by students at the University of Lagos in Nigeria. Electronic Thesis and Dissertation Repository Western. Retrieved from https://ir.lib.uwo.ca/etd.

[31] Padhi, N. (2018). Acceptance and usability of OER in Indian higher education: An investigation using UTAUT model. *Open Praxis, 10*(1), 55-65.

[32] Plotkin, H. (2010). Free to learn: An open educational resources policy development guidebook for community college governance officials. Creative Commons, San Francisco. Retrieved from http://wiki.creativecommons.org/images/6/67/FreetoLearnGuide.pdf.

[33] Raspopovic, M., Jankulovic, A., Runic, J., & Lucic, V. (2014). Success factors for e-learning in a developing country: A case study of Serbia. *The International Review of Research in Open and Distributed Learning, 15*(3), 1-23.

[34] Raysh T. (2017). Use of open educational resources: Indian Scenario. *International Journal of Library & Information Science, 6*(5), 17-26. Retrieved from http://www.iaeme.com/IJLIS/issues.asp?JType= IJLIS&VType=6&IType=5.

[35] Schaffhauser, D. (2020). Free resources for schools during COVID-19 outbreak. Retrieved from https://thejournal.com/articles/2020/03/13/free-resources-ed-tech-companies-step-upduring-coronavirus-outbreak.aspx.

[36] Shackel, B. & Richardson, S. J. (1991). *Human factors for informatics usability.* Cambridge University Press.

[37] Torres, N. P. M. (2013). Embracing openness : The challenges of OER in Latin American education. *Open Praxis, 5*(1), 81-89.

[38] Vladoiu, M., & Constantinescu, Z. (2011). U-learning within a context-aware multiagent environment. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.186.196&rep=rep1&type=pdf

[39] Wiche, H. I., & Ogunbodede, K. F. (2021). Awareness and use of open educational resources by Library and Information Science Students of Ignatius Ajuru University of Education, Rivers State,Nigeria. *Library Philosophy and Practice* (e-journal). 5373. Retrieved from https://digitalcommons.unl.edu/libphilprac/5373

[40] William and Flora Hewlett Foundation. (2008). Open educational resources: Making high quality educational content and tools freely available on the web. Retrieved from http://www.hewlett.org/Programs/Education/OER/openEdResources.htm

[41] Yamane, Taro. (1973). Statistics: *An introductory analysis.* London: John Weather Hill, Inc.

[42] Zaid, Y. A. & Alabi, A. O. (2020). Sustaining open educational resources initiatives in Nigerian Universities. *Open Learning: The Journal of Open, Distance and e-Learning*, 1-18. DOI: https://doi.org/10.1080/02680513.2020.17137