Challenges and Opportunities of Open Educational Resources at University of Rajshahi, Bangladesh

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Abstract

This paper examines the insight of Open Educational Resources (OER) initiatives, benefits, and challenges based on a survey designed to gauge the students' perceptions of adopting OER. The survey was conducted in January 2024 among 116 students from 12 Faculties at University of Rajshahi, Bangladesh (the second largest public university in Bangladesh). An overwhelming majority of respondents (99.14%) strongly agree that OER includes research, teaching, and learning resources accessible to everyone. Most respondents (97.41%) agree that UGC Digital Library (UDL) plays a significant role in facilitating access to a wide range of digital academic materials, helping higher education institutions to integrate and disseminate OER ($\bar{x}$ = 1.97, σ = 0.16). OER is also considered as a popular and efficient method for collaborative learning (99.14%; $\bar{x}$ = 1.01; σ = 0.09). However, there are numerous obstacles to developing OER in Bangladeshi educational institutions. To promote OER in higher education, frequent capacity-building programs should be conducted within educational institutions to establish sustainable OER-based services (50%; $\bar{x}$ = 1.51; σ = 0.52). Everyone has the right to access accurate information. Therefore, OER transforms the approach to education by promoting a more humanistic view of knowledge.

Keywords: Open Educational Resources (OER), OER Awareness, OER Adoption Challenges, Teaching and Learning Enhancement, Bangladesh.

Introduction

The Open Educational Resources (OER) movement is now twenty-two years old. The term "Open Educational Resources" was first coined and adopted at a UNESCO meeting in Paris in July 2002, which involved representatives from developing nations (Bliss & Smith, 2017). It emerged to offer free educational resources worldwide (UNESCO, 2002). The term OER is frequently used interchangeably with Open CourseWare (OCW), though OCW typically refers to a more structured subset of OER. Unlike online learning or e-learning, OER specifically refers to educational resources that can be produced in several modes, such as computer-based multimedia, audio, video, and text on paper. Many current open resources, while available digitally, can also be printed (Butcher, 2015). Its initial application in pedagogy was as a learning object (McKerlich *et al*., 2013). These learning objects could be reused, modified, shared, and freely utilized by learners for educational purposes (Downes, 2011).

OER are *open resources* for teaching, learning, and research that are either in the public domain or made accessible under an intellectual property license that allows others to use and modify them without being restricted (Hewlett Foundation, n.d.; Smith & Casserly, 2006). Open Educational Resources (OER) can provide equitable access, reduce costs, and enhance educational quality. OER fosters sharing and collaboration, enabling teachers to create contextually relevant materials (Commonwealth of Learning [COL], 2017). OER encompasses three distinct areas: learning content (full course, learning objects, etc.), tools (content development tools, CMS, etc.), and implementation resources (intellectual property licenses) (Hylen, 2006; OECD, 2007). These three areas have become central to numerous higher education initiatives, including efforts by organizations to publicly share their instructional resources (such as class summaries, text lists, and syllabi) and assignments that promote the development, distribution, and dissemination of open content via the creation of user communities, standards, and software (Yuan *et al*., 2008). There is a growing belief that OER can address many educational challenges and improve learning outcomes. The education institute are promoting the education and technological environment for the performance of the students (Jin et al., 2024). With this, medical institutes are also enhance the performance of students with the implementation of emerging technologies (Zakria et al., 2024). However, many OERs are not tailored to specific student learning needs or grade levels, and simply having an open license does not make a resource inherently educational. Though OER can improve access and potentially enhance learning by changing teaching and learning models,

their adoption in educational institutions remains slow due to obstacles such as a dearth of inducements for instructors, difficulties in securing consistent funding, limited awareness of copyrights and licensing, concerns about material quality and relevance, and incompatibility with institutional cultures and agendas (Friesen, 2009; Hylen, 2006; Mishra, 2017).

The prevalent availability of OER brings several challenges that must be addressed to fully realize their educational potential. One of key issues is the discovery problem, as finding OER can be difficult, necessitating extensive technical work on metadata and standards to make these resources more accessible (Wiley *et al*., 2014). Sustainability is another major challenge, as OER must be produced and shared consistently, with factors such as user engagement, provider type, and operation size influencing their long-term viability (Atkins *et al*., 2007; Rolfe, 2012; Yuan *et al*., 2008). Intellectual property and copyright concerns also hinder OER development, with authors needing permissions for third-party content, and practical, compatibility, and awareness issues posing additional obstacles (Rolfe, 2012). Furthermore, the digital divide and interoperability issues are significant, particularly in developing countries like Bangladesh where limited and unstable internet connectivity, along with inadequate interoperability standards, restrict the sharing and practice of instructive resources across platforms and institutions (Smith & Casserly, 2006). Addressing these challenges is essential to harness the full educational potential of OER. Universities are also facing the challenges towards the implementation of new technologies (Ahmad et al., 2019). The academic community's positive perception of OER leads to more productive, engaged learning experiences, cost-saving aspects, and reduced financial burdens for students and educational institutions. Hence, this research aims to determine what students recognize about OER initiatives. The survey included learners from diverse subject fields to give an all-encompassing view concerning university-wide consciousness of OER in education. The study findings may be helpful in the formulation of educational policies.

Research Objectives and Questions

This research aims to analyze the challenges and opportunities of Open Educational Resources (OER) at University of Rajshahi, Bangladesh, evaluating awareness, resources, initiatives, benefits, and obstacles, and providing recommendations to enhance OER's effectiveness in the Bangladeshi higher education system. In line with these research objectives, the subsequent queries were formulated:

- What is the level of awareness among research students at University of Rajshahi regarding the term Open Educational Resources (OER)?
- How do they perceive its importance in their academic activities?
- What types of OER resources and initiatives are currently available and promoted in universities, and
- What are the perceived benefits and challenges related to their practice?

Literature Review

The concept of Open Educational Resources (OER) has been recognized globally for over two decades, yet its implementation in Bangladesh remains nascent. The Bangladesh Open University (BOU), the Commonwealth of Learning (CoL), the government's few projects, and several private universities have taken pivotal steps to promote and familiarize OER within the country. Despite these efforts, there is a noticeable scarcity of literature detailing the development, functionality, and activities of OER in Bangladesh. This literature review will explore the existing significant initiatives related to OER in Bangladesh, highlighting their potential impact on future educational advancements.

For the sustainability of the educational institutes the implications of new technologies are imperative (Azam & Ahmad, 2023). In this context, the education system in Bangladesh is structured into three levels: primary, secondary, and higher education. There are three types of universities: public, private, and international. The country hosts 55 public universities, 114 private universities, and 3 international universities, with a total of 2,522 colleges under the National University (University Grants Commission of Bangladesh, n.d.; Wikipedia, n.d.) Most universities in Bangladesh struggle to provide high-quality education and perform poorly in international rankings. The socio-economic conditions of Bangladesh make it difficult for students to afford educational resources. Limited access to resources negatively impacts students' grades and study choices, and the current access methods risk copyright infringement. Since most online materials are in English, developing Bangla (mother tongue of Bangladeshi people) educational content can benefit both local and global Bengali communities. Tariq (2010) quoted that in recent years, however, several universities and research institutes in the country have started accessing electronic contents mostly through the Bangladesh INASP-PERii Consortium (BIPC). The Consortium allows access to donor-sponsored resources through PERii and a few other non-PERii services like AGORA, HINARI and OARE.

The Bangladesh Open University (BOU), with support from the Commonwealth Educational Media Centre for Asia, has developed BOU-OER, an open platform for accessing educational resources licensed for reuse, revision, remixing, retention, and redistribution (5Rs). BOU offers both in-person and online learning using self-study tools, lecture notes, audio/video lectures, assignments, and course materials. BOU also offers Open Educational Resources (OER), allowing students to access learning materials anytime, use technology to enhance understanding and obtain admission forms and other information online (Billah, 2013). In 2014, Bangladesh Open University (BOU) implemented an OER policy, making some of its educational materials available under Creative Commons licenses through its eBooks Portal (Rahman & Panigrahi, 2017).

Additionally, Bangladeshi learners benefit from Commonwealth of Learning's (COL) free online courses and resources (COL, 2023). With assistance from the Commonwealth of Learning (COL) and in partnership with a2i (Aspire to Innovate), Bangladesh Open University (BOU) organized a national consultation on March 19, 2017, at the Prime Minister's Office to draft a national OER Policy for Bangladesh to ensure Education for All (EFA). This draft national OER policy recommends releasing all publicly funded educational resources under an open license, increasing teachers' and students' awareness and capability to use OER, and creating OER repositories for better access to open resources (COL, 2017).

CEMCA (The Commonwealth Educational Media Centre for Asia), the regional centre of COL, conducted a 5-day virtual workshop at City University, Bangladesh, in December 2021, focusing on Open Educational Resources (OER) to ensure free access to course materials and support faculty in creating customized materials. The decisions made during the workshop included discussing how Open Access evolved into Open Educational Resources (OER), identifying OER that had Creative Commons licenses, instructing participants on how to locate and use OER for educational purposes, and producing OER using the remix and revise technique (Rahman, 2021).

An analysis of feedback from students in private universities reveals that the current state of OER in Bangladesh is unsatisfactory. The educators believe that the country is not yet ready to adopt OER (Akter & Mahbub, 2020). Therefore, the present study aims to examine the fundamental challenges contributing to the negative attitudes and resistance toward Open Educational Resources (OER) among students in public universities in Bangladesh. This investigation will focus on understanding students' perceptions of the benefits of OER and will

seek to provide recommendations for improving the preparedness and capability of educational institutions to effectively implement OER.

Research Method

The study uses a descriptive research methodology, collecting quantitative data through a standardized questionnaire to enable statistical analysis and provide insightfully answers to the research questions. The population consists of research students at University of Rajshahi, selected using a purposive sampling method to ensure a balance of male and female students. A total of 200 questionnaires were distributed across 40 departments within 12 faculties at University of Rajshahi, resulting in 116 completed responses, yielding a 58% response rate. The questionnaire was designed with the study's objectives in mind, incorporating elements from existing literature. It comprised five sections: demographic information, concept of OER, OER initiatives in Bangladesh, advantages and challenges of OER, and OER recommendation. A five-point Likert scale, with options from "Strongly agree" to "Strongly disagree," was utilized to measure students' attitudes towards open educational resources. The data were coded and imported into MS Excel and IBM SPSS statistics, Version 25 for statistical analysis, where methods such as mean, standard deviation, and percentage were applied. The data were examined by Chi-squared and Kruskal-Wallis tests, with significance established at $p<0.05$. The study adhered to ethical standards to ensure respondent anonymity and confidentiality, with informed consent obtained from all participants. The collected information was used exclusively for research purposes.

Results and Discussions

Demographic information of the respondents

Table 1 depicts that out of a total of 116 respondents, 52 are female, representing 44.8% of the sample, while 64 are male, accounting for 55.2%. The largest respondents are from the 2nd year, with 42 individuals making up 36.2% of the total. This is followed by 1st-year students, who comprise 33.6% with 39 respondents. In the 3rd year, there are 22 respondents, accounting for 19%. Master's students' number 8, representing 6.90%, and there are 5 respondents from the 4th year, making up 4.3% of the total. Compare to the age group with the highest frequency of respondents is under 18, representing 50.9% of the total. The next largest group falls within the 19-21 age range, comprising 40.5% of respondents. The smallest group, aged over 22, accounts for only 8.6% of the respondents. In the present survey, most respondents came from the Faculty of Arts, making up 27.6% of the total. This is followed by

the Faculty of Social Sciences with 22.4%, the Faculty of Sciences, and the Faculty of Biological Sciences with 11.2%.

Table 1: *Demographic Information of the Respondents*

		Male N	Female n	Total n	%
Gender		64	52	116	100%
Academic Year	1st Year	19	20	39	33.6%
	2nd Year	27	15	42	36.2%
	3rd Year	14	8	22	19%
	4th Year	1	4	5	4.3%
	Master	3	5	8	6.9%
Total		64	52	116	100%
Age Group	≤18	41	18	59	50.9%
	19-21	19	28	47	40.5%
	≥22	4	6	10	8.6%
Total		64	52	116	100%
Faculties	Arts	17	15	32	27.6%
	Law	2	4	6	5.2%
	Sciences	9	4	13	11.2%
	Business Studies	5	0	5	4.3%
	Social Science	9	17	26	22.4%
	Agriculture	0	2	2	1.7%
	Engineering	7	3	10	8.6%
	Fine Arts	0	2	2	1.7%
	Biological Sciences	11	2	13	11.2%
	Geological Sciences	0	2	2	1.7%
	Fisheries	2	0	2	1.7%
	Veterinary & Animal Sciences	2	1	3	2.6%
Total		64	52	116	100%

Perceptions of OER (Open Educational Resources)

As shown in Table 2, 37.93% of the survey respondents were unaware of the concept of OER, while 62.07% were aware of it. The Chi-Square test of Independence is used to determine if there is a significant association between male and female variables in commenting the concept of OER. There is no linear association between male and female variables regarding the awareness of OER.

Table 2: *Perceptions of OER (Open Educational Resources)*

			Gender		
			Male N	Female n	Total n and %
Have you heard OER?	Yes	Count	40	32	72
		% of Total	34.5%	27.6%	62.1%
	No	Count	24	20	44
		% of Total	20.7%	17.2%	37.9%
Total		Count	64	52	116
		% of Total	55.2%	44.8%	100.0%
		Value	Df	Asymptotic Significance (2-sided)*	
Pearson Chi-Square		.011[a]	1	.915	

* Pearson Chi-Square (Male vs Female); a. 0 cells have an expected count less than 5

Resources for open education

Drawing from the information presented in Table 3, the OER resources in Bangladesh can be categorized into learning content, tools, and implementation resources. Here is an explanation of each category about the data:

A. Learning content of OER

An overwhelming majority (97.41%) consider full course modules to be very important ($\bar{x} = 1.03$, $\sigma = 0.23$). Nearly all respondents (99.14%) view courseware as very important, with a mean score of 1.99 and a low standard deviation ($\sigma = 0.09$), indicating strong consensus. Half of the respondents (50.86%) rate content modules as very important. Most of the respondents (43.97%) find learning objects very important ($\bar{x} = 1.68$, $\sigma = 0.73$). A significant majority (63.79%) see collections as very important, and 27.59% find them important ($\bar{x} = 1.47$, $\sigma = 0.70$). Almost half (46.55%) consider journals very important, with another 49.14% rating them as important ($\bar{x} = 1.58$, $\sigma = 0.58$).

B. Tools of OER

A vast majority (97.41%) regard software supporting learning content as very important ($\bar{x} = 1.03$, $\sigma = 0.23$). All respondents (100%) find these systems important, indicated by a mean score of 2.00 with zero standard deviation, showing unanimous agreement. Most respondents (45.69%) view content development tools as very important, with 43.10% considering them important ($\bar{x} = 1.66$, $\sigma = 0.70$). Many respondents (45.69%) rate online learning communities as very important, while 42.24% find them important ($\bar{x} = 1.69$, $\sigma = 0.75$).

The Kruskal-Wallis H test was employed to assess the significant differences in the distribution of (a) the Learning Content of OER, and (b) Tools of OER among different age groups (≤18, 19-21, and ≥22). For most categories, the null hypothesis cannot be rejected, indicating no statistically significant differences in the distribution of the majority of OER resources across the age groups. However, a significant difference was observed in "Content development tools" (p = .039), suggesting that the distribution of this tool varies among the age groups. Thus, age group affects the perception of content development tools among the OER resources, but not other aspects such as learning content or implementation resources.

Table 3: *Resources for Open Education*

	5	4	3	2	1	$\bar{x}$	σ	Test Statistics [a,b] K-W H	df	Asymp. Sig.
A. Learning Content of OER										
1. Full course module	0.00	0.00	0.86	1.72	97.41	1.03	0.23	2.327	2	0.312
2. Courseware	0.00	0.00	0.00	99.14	0.86	1.99	0.09	0.966	2	0.617
3. Content modules	0.00	0.00	19.83	29.31	50.86	1.69	0.78	1.104	2	0.576
4. Learning objects	0.00	3.45	5.17	47.41	43.97	1.68	0.73	4.163	2	0.125
5. Collections	0.00	1.72	6.90	27.59	63.79	1.47	0.70	4.95	2	0.084
6. Journals	0.00	0.00	4.31	49.14	46.55	1.58	0.58	1.98	2	0.371
B. Tools of OER										
1. Software to support learning content	0.00	0.00	0.86	1.72	97.41	1.03	0.23	2.949	2	0.229
2. Content and learning management systems	0.00	0.00	0.00	100.00	0.00	2.00	0.00	0.000	2	1
3. Content development tools	0.00	0.86	10.34	43.10	45.69	1.66	0.70	6.499	2	0.039*
4. Online learning communities	0.00	2.59	9.48	42.24	45.69	1.69	0.75	0.917	2	0.632

N.B. 1= Very important, 2=Important, 3= Undecided, 4= Less important, 5=Not important at all; $\bar{x}$=Mean; σ=Standard Deviation; The cell values inside the Likert scale indicate percentage; a. Kruskal Wallis Test; b. Grouping Variable: Age group; *Significant at $p < 0.05$; Source for data items: Hylen, 2006.

Initiatives for promoting OER in Bangladesh

Table 4 depicts that vast majority (99.14%) strongly agree that BdREN is essential for providing digital resources and high-speed internet access, which makes it possible for educational institutions in Bangladesh to effectively employ open educational resources (OER) ($\bar{x}$ = 1.01, σ = 0.09). Most respondents (97.41%) concur that UDL plays a major role in facilitating access to a wide range of digital academic materials, which helps higher education institutions integrate and disseminate open educational resources (OER) ($\bar{x}$ = 1.97, σ = 0.16). To promote access to educational content, half of the respondents (50%) strongly agree that LiCoB fosters collaboration among libraries by encouraging resource sharing and the use of OER resources ($\bar{x}$ = 1.59, σ = 0.66). a2i emphasizes digital inclusion and literacy, encouraging the practice of OER to advance learning possibilities and facilitate lifelong learning, with a majority (53.45%) strongly agreeing ($\bar{x}$ = 1.54, σ = 0.64).

About *Shikkhok Batayon* (Teachers' window), a 2024 UN World Summit on Information Society Award-winning online teaching platform, nearly half of the respondents (47.41%) strongly agree that it provides a repository of OER to help instructors progress their methods and make resources more accessible ($\bar{x}$ = 1.57, σ = 0.59). Comparably, 48.28% strongly concur that the e-learning platform *Muktopaath* (Open education) offers a variety of classes and educational resources, encouraging the usage of OER to provide flexible and accessible learning possibilities for everyone ($\bar{x}$ = 1.58, σ = 0.63).

Table 4: *Initiatives for Promoting OER in Bangladesh*

Initiatives	5	4	3	2	1	$\bar{x}$	σ
Bangladesh Research and Education Network (BdREN)	0.00	0.00	0.00	0.86	99.14	1.01	0.09
UGC Digital Library (UDL)	0.00	0.00	0.00	97.41	2.59	1.97	0.16
Library Consortium of Bangladesh (LiCoB)	0.00	0.00	9.48	40.52	50.00	1.59	0.66
Aspire to Innovate (a2i)	0.00	0.00	7.76	38.79	53.45	1.54	0.64
Shikkhok Batayon (Teachers' window)	0.00	0.86	2.59	49.14	47.41	1.57	0.59
Muktopaath (Open education)	0.00	1.72	2.59	47.41	48.28	1.58	0.63

N.B. 1= Strongly Agree, 2=Agree, 3= Neither agree nor disagree, 4= Disagree, 5=Strongly disagree; $\bar{x}$=Mean; σ=Standard Deviation; The cell values inside the Likert scale indicate percentage.

Benefits of OER

Table 5 reveals that OER has become a popular and efficient method for collaborative learning (99.14%; $\bar{x}$= 1.01; σ=.09). It enables users to learn more thoroughly and easily from

various course materials and plays a crucial role in the digital education revolution (96.55%; $\bar{x}$= 1.97; σ=.18). The benefits of OER are extensive. It is shareable and customizable (49.14%; $\bar{x}$= 1.80; σ=.82), and being free and open, it fosters lifelong learning (46.55%; $\bar{x}$= 1.62; σ=.65). OER makes teaching and learning more accessible (45.69%; $\bar{x}$= 1.54; σ=.65) and is both time and cost-efficient, benefiting teachers and students alike (48.28%; $\bar{x}$= 1.73; σ=.73). By connecting the breach between non-formal, informal, and formal education (54.31%; $\bar{x}$= 1.49; σ=.57), OER encourages non-formal education (48.28%; $\bar{x}$= 1.59; σ=.65) and ensures equity for students due to its free nature (50.86%; $\bar{x}$= 1.57; σ=.64). Additionally, OER can support physical classes (56.90%; $\bar{x}$= 1.44; σ=.52).

The Kruskal-Wallis H test was utilized to evaluate the significant differences in the distribution of OER benefits among students from the Science, Business Studies, and Social Science faculties. For most categories, the null hypothesis cannot be rejected, indicating no statistically significant differences in the distribution of the majority of OER benefits across students from these faculties. However, significant differences were found in "Since it is time and money efficient, teachers and students can both benefit" (p = .048) and “Maximizing the utilization of taxpayer funds by inter-institutional exchange and reuse” (p = .012), suggesting that the distribution of these benefits varies among the faculty group. Thus, students from faculty groups influence the perception of these two benefits among the OER resources, but not other benefits.

Table 5: *Benefits of OER*

Benefits of OER	**5**	**4**	**3**	**2**	**1**	**$\bar{x}$**	**σ**	**Test Statistics [a,b]**		
								K-W H	**df**	**Asymp. Sig.**
It has become a popular, quick way for people to learn things together.	0.00	0.00	0.00	0.86	99.14	1.01	0.09	0.000	2	1.000
Users can learn more thoroughly and with more ease from certain course materials.	0.00	0.00	0.00	96.55	3.45	1.97	0.18	1.418	2	0.492
It can make learning and teaching easily accessible.	0.00	0.00	9.48	44.83	45.69	1.64	0.65	0.357	2	0.836
Since it is time and money-efficient,	0.00	2.59	8.62	48.28	40.52	1.73	0.73	6.065	2	0.048*

teachers and students can both benefit.										
It is shareable and customizable	1.72	1.72	9.48	49.14	37.93	1.80	0.82	0.099	2	0.952
It is a free and open resource	0.00	0.00	3.45	46.55	50.00	1.53	0.57	2.789	2	0.248
Due to its free nature, OER will guarantee student equity	0.00	0.00	7.76	41.38	50.86	1.57	0.64	2.411	2	0.300
Physical classes might be supported by OER	0.00	0.00	0.86	42.24	56.90	1.44	0.52	1.182	2	0.554
OER can be a key component of the digital education revolution	0.00	0.00	7.76	47.41	44.83	1.63	0.63	1.398	2	0.497
Fostering lifelong learning	0.00	0.86	6.90	45.69	46.55	1.62	0.65	3.128	2	0.209
Reducing the disparity between non-formal, informal, and formal education	0.00	0.00	3.45	42.24	54.31	1.49	0.57	0.229	2	0.892
Maximizing the utilization of taxpayer funds by inter-institutional exchange and reuse	1.72	0.00	3.45	45.69	49.14	1.59	0.72	8.848	2	0.012*
OER can encourage non-formal education	0.00	0.86	6.03	44.83	48.28	1.59	0.65	0.194	2	0.908

N.B. 1= Strongly Agree, 2=Agree, 3= Neither agree nor disagree, 4= Disagree, 5=Strongly disagree; $\bar{x}$=Mean; σ=Standard Deviation; The cell values inside the Likert scale indicate percentage; a. Kruskal Wallis Test; b. Grouping Variable: Faculty group (Science, Business Studies, and Social Science); *Significant at $p < 0.05$; Source for data items: Akter & Mahbub, 2020; Billah, 2013; Hodgkinson-Williams, 2010

Challenges of OER

There are numerous obstacles to developing OER in educational institutions in Bangladesh (Table 6). The country's socio-economic conditions make OER utilization challenging (51.72%; $\bar{x}$= 1.50; σ=.54). High costs of home internet access (98.28%; $\bar{x}$= 1.02; σ=.13) and the inability of many students to afford computers and related technologies (45.69%; $\bar{x}$= 1.72; σ=.82) further complicate the situation. Most OERs are produced in English (46.55%; $\bar{x}$= 1.56; σ=.55), and students are not accustomed to using OER as a supplement to physical classes (56.03%; $\bar{x}$= 1.47; σ=.55). Limited awareness of internet usage among

students, parents, instructors, and children (99.14%; x̄= 2.01; σ=.09) also presents a significant challenge. Poor infrastructure and inadequate internet bandwidth (54.31%; x̄= 1.59; σ=.71) impede OER implementation, and the concept remains largely unfamiliar within educational institutions (53.45%; x̄= 1.59; σ=.70). Contributing factors include a lack of institutional interest (50.86%; x̄= 1.54; σ=.53) and encouragement (54.31%; x̄= 1.57; σ=.79), insufficient maintenance services, and a shortage of trained personnel (53.45%; x̄= 1.50; σ=.57). Additionally, copyright issues and unfamiliarity with creative commons licenses (48.28%; x̄= 1.60; σ=.66), as well as concerns about the quality and accuracy of OER (54.31%; x̄= 1.47; σ=.52), further hinder the development of OER in Bangladesh.The Kruskal-Wallis H test was employed to assess the significant differences in the distribution of OER challenges among students from different academic years. For most categories, the null hypothesis cannot be rejected, except for "*Trustworthiness regarding quality and accuracy of OER*" (p = .038).

Table 6: *Challenges of OER*

Challenges of OER	5	4	3	2	1	x̄	σ	Test Statistics [a,b] K-W H	df	Asymp. Sig.
The expense of internet access at home is still high.	0.00	0.00	0.00	1.72	98.28	1.02	0.13	6.689	4	0.153
Parents, instructors, and kids all have little internet usage awareness	0.00	0.00	0.86	99.14	0.00	2.01	0.09	1.974	4	0.740
Inadequate facilities and incredibly poor internet bandwidth	0.00	0.00	12.93	32.76	54.31	1.59	0.71	1.874	4	0.759
Students find it difficult to afford computers and related technologies	0.00	5.17	7.76	41.38	45.69	1.72	0.82	3.022	4	0.554
Institutions don't give enough encouragement to use open educational resources	2.59	0.00	3.45	39.66	54.31	1.57	0.79	5.815	4	0.213
Unfamiliar to use OER	0.00	0.00	12.07	34.48	53.45	1.59	0.70	2.467	4	0.651

Inadequate maintenance services and a shortage of knowledgeable personnel	0.00	0.00	3.45	43.10	53.45	1.50	0.57	0.901	4	0.924
Disinterest in utilizing OER	0.00	0.00	1.72	50.86	47.41	1.54	0.53	0.352	4	0.986
Bangladesh's socioeconomic situation makes it unfavourable to use OER	0.00	0.00	1.72	46.55	51.72	1.50	0.54	3.940	4	0.414
Students don't habituate to using OER as a subsidiary of physical classes	0.00	0.00	2.59	41.38	56.03	1.47	0.55	4.528	4	0.339
The majority of OERs are created in English	0.00	0.00	2.59	50.86	46.55	1.56	0.55	4.021	4	0.403
Trustworthiness regarding the quality and accuracy of OER	0.00	0.00	0.86	44.83	54.31	1.47	0.52	10.168	4	0.038*
Copyright issues and unfamiliar creative commons license	0.86	0.00	4.31	48.28	46.55	1.60	0.66	7.904	4	0.095

N.B. 1= Strongly Agree, 2=Agree, 3= Neither agree nor disagree, 4= Disagree, 5=Strongly disagree; $\bar{x}$=Mean; σ=Standard Deviation; The cell values inside the Likert scale indicate percentage. a. Kruskal Wallis Test; b. Grouping Variable: Academic Year; *Significant at $p < 0.05$; Source for data items: Billah, 2013; COL, 2017; Sanjeeva & Powdwal, 2017.

Recommendations for using OER in Bangladesh

To promote OER in higher education in Bangladesh, several steps should be taken (Table 7):

- ***OER Literacy Campaigns***

  Implement campaigns to popularize OER usage among students, which has shown significant potential (49.14%; $\bar{x}$= 1.68; σ=.64).

- ***Seminars and Workshops***

  Authorities should organize seminars, workshops, and training sessions to raise awareness of OER literacy (95.69%; $\bar{x}$= 1.06; σ=.30).

- ***Capacity Building Programs***

Frequently conduct capacity-building programs within educational institutions to establish sustainable OER-based services (50%; $\bar{x}$= 1.51; σ=.52).

- ***OER Repositories***

  Universities should set up repositories for OER and integrate its content into academic curricula (55.17%; $\bar{x}$= 1.60; σ=.54).

- ***National OER Policy***

  The government should create a national OER policy (52.59%; $\bar{x}$= 1.47; σ=.50) to provide guidelines for making publicly funded educational materials available under an open license (46.55.17%; $\bar{x}$= 1.54; σ=.52).

- ***Infrastructure Support***

  Ensure fast, low-cost internet bandwidth for learners and take actions to promote OER access to students' doorsteps (96.55%; $\bar{x}$= 1.98; σ=.19).

These guidelines can help foster an environment favourable to the widespread implementation and utilization of OER in higher education in Bangladesh.

Table 7: *Recommendations for Using OER in Bangladesh*

Recommendations for using OER	5	4	3	2	1	$\bar{x}$	**σ**
Organize seminars, workshops, and training sessions to raise awareness of OER literacy.	0.00	0.00	1.72	2.59	95.69	1.06	0.30
Offer fast bandwidth at a low cost.	0.00	0.00	0.86	96.55	2.59	1.98	0.19
Institutions ought to take action to raise OER awareness among students and teachers.	0.00	0.00	9.48	49.14	41.38	1.68	0.64
The government should take the required actions to promote and act.	0.00	0.00	7.76	45.69	46.55	1.61	0.63
Publicly funded educational materials should all be made available under an open license.	0.00	0.00	0.86	52.59	46.55	1.54	0.52
The government ought to create a national OER policy.	0.00	0.00	0.00	47.41	52.59	1.47	0.50
Institutions ought to set up repositories for OER.	0.00	0.00	0.86	49.14	50.00	1.51	0.52
The OER capacity building program ought to be taken.	0.00	0.00	2.59	50.86	46.55	1.56	0.55
OER content development programs ought to be included in higher education curricula.	0.00	0.00	2.59	55.17	42.24	1.60	0.54

N.B. 1= Strongly Agree, 2=Agree, 3= Neither agree nor disagree, 4= Disagree, 5=Strongly disagree; $\bar{x}$=Mean; σ=Standard Deviation; The cell values inside the Likert scale indicate percentage; Source for data items: Akter & Mahbub, 2020; Billah, 2013; COL, 2017

Conclusion

The study focuses on OER, which are freely accessible and openly licensed learning resources that can be used, modified, and distributed by anyone. The study also highlights the prospective of OER to grow engagement and develop teaching and learning processes. The adoption of OER is significantly influenced by the awareness and perception of students and educators. When they are well-informed about OER's benefits and functionalities, they are more likely to use these resources effectively, reducing barriers such as scepticism about quality, uncertainty about usage, and unfamiliarity with open licenses. Increased awareness and positive perception of OER can lead to improved educational outcomes by providing adaptable and relevant learning materials, enhancing engagement, and easing financial burdens for students and institutions. By providing empirical data on student perceptions and awareness, particularly in a developing country like Bangladesh, the study contributes to the present literature and offers a benchmark for other institutions aiming to assess and enhance their own OER initiatives. However, challenges persist, such as economic barriers to internet access and technology adoption among students (Rafi et al., 2022). The predominance of English in OER creation poses linguistic challenges, while institutional unfamiliarity and inadequate infrastructure hinder widespread OER adoption. Addressing these challenges requires governmental support for affordable internet access, capacity building, and awareness campaigns among students, educators, and parents. Despite obstacles, OER promotes collaboration, accessibility, and creative teaching approaches, transforming educational paradigms towards inclusivity and shared knowledge. Universities of Bangladesh are encouraged to establish OER repositories and integrate OER into curricula, supported by a national policy ensuring open access to publicly funded educational materials.

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