Realizing the Potential of Open Digital Resources in Secondary Education in Bangladesh: Challenges and Opportunities

Sadin Mostafa Musad[1], Shahrear Sadat[2], Arham Aariz Ahsan[3], Sazin Mostafa Muntakim[4]

Abstract

Open Digital Resources can improve secondary education by providing students with easier, more affordable, and multimodal access to learning materials that can help them personalize their education and increase their interest in lifelong learning. The use of digital resources varies depending on location, program type, and curriculum. This study examines the perspectives of parents, teachers, and secondary school students on the use of digital resources to enhance learning experiences. The study also looks at how teachers' and students' access to digital resources varies depending on the curricula and learning strategies used by the schools. The study aims to investigate secondary education programs in Bangladesh's awareness of and demand for open digital resources. In the study, both qualitative and quantitative methods are employed. A semi-structured questionnaire is used for interviews and surveys with students, instructors, and other pertinent stakeholders. According to the study, there are several reasons why Open Digital Resources are not being adopted, such as low awareness, social stigma, technological incapacity, and a lack of adaptability. The study also suggests that in order to guarantee improved access to open digital resources, institutions and the government should invest in developing user-friendly open resource repositories.

Keywords: Open Digital Resources, Personalized Learning, Lifelong Learning, Bangladesh.

1.0. Introduction

Technology and digital alternatives have increasingly integrated into nearly every sector of society, driven by the rapid rise in internet access and mobile phone penetration. Education in Bangladesh is no exception and has been significantly transformed by digital expansion. As of December 2024, approximately 52.4% of households have access to the internet, compared to 2023, when only 38.1% of households had access to the internet (BBS, 2025; 2023). Primarily, during COVID-19, it was found that 70% of students used smartphones and 5% students had multiple devices to participate in online classes (*BANBEIS*, 2021). This widespread digital access has created a conducive environment for integrating digital resources into education. Despite this progress, traditional methods of education delivery—particularly at the secondary level—continue to face significant limitations such as a lack of teachers, institutions, and resources. In recent years, digital alternatives to tackle these limitations have been implemented. It was reported that around 92% of students have watched TV lessons through Sangsad Television to a varying extent (*BANBEIS*, 2021).

However, this rise of digital alternatives brings forth issues such as responsible access, digital literacy, and compliance with copyright and intellectual property laws. While the use of technology to access students' education has increased, there remains a lack of clarity and awareness around ethical use of digital resources. Therefore, this study aims to explore these gaps by examining how secondary level students, teachers, and parents in Bangladesh perceive and use digital resources. A particular focus is placed on assessing the level of awareness and understanding of Open Digital Resources (ODRs), which represent a promising, legally accessible, and cost-effective alternative to traditional educational content.

Online Digital Resources (ODRs) used for education purposes are often called Open Educational Resources (OERs). They are educational materials made available through digital platforms ensuring free accessibility. These include recorded lessons, e-books, courses, curricula, assignments, educational software and such all fall under the umbrella of OERs if available with free access. Since OERs are designed to be freely used, adapted and redistributed, they can serve as an efficient supplement to traditional teaching and have potential to reduce learning inequalities across schools in the country.

[1] Grade 12 Student, Glenrich International School, Uttara, Bangladesh; Corresponding Author; Email: mrmostofa365@gmail.com

[2] Grade 12 Student, Glenrich International School, Uttara, Bangladesh; Email: yoursadav1908@gmail.com

[3] Grade 12 Student, Glenrich International School, Uttara, Bangladesh; Email: arhamaariz2007@gmail.com

[4] Grade 11 Student, Aga Khan Academy, Dhaka, Bangladesh; Email: sazinmostafamuntakim@gmail.com

In a country where educational resources are often unevenly distributed and traditional classrooms strained by overcrowding, under-resourced teachers, and curriculum rigidity, open digital resources serve as a promising supplement. According to *BANBEIS* (2022) there are approximately 8,889,674 students in secondary education compared to 247,013 teachers. Similarly, it was reported that there are 4,388,005 students in college education compared to 116,225 teachers. This suggests resource scarcity in secondary schools. Additionally, 25% of teachers reported having inadequate ICT training (*BANBEIS*, 2022) and most teachers who conduct classes using ICT claimed to not have enough technical expertise to handle ICT supported teaching and learning systems (*BANBEIS*, 2022). This suggests that even with the drastic digital expansion, many users are unfamiliar with how to find, evaluate or effectively use educational content. This highlights our critical issue, that just having access to the internet may not translate to an efficient usage of it.

In this context, Open digital resources serve as freely accessible, openly licensed digital materials which could bridge the resource gaps and support more flexible learning pathways for students. In a study about secondary education, 96% of students from schools reported believing that they are benefitted by using ICT devices in institutions and 78% believe that it's important to do so (*BANBEIS*, 2022). Another study showed that about 88% of teachers informed that the use of ICT devices at the classrooms has helped enhance students' concentration and thereby improved the teaching and learning quality (*BANBEIS*, 2022). Thus, presenting a welcome attitude towards further use of digital integration in education. Additionally, it was reported that around 61.2% were aware of OERs in a study conducted in University of Rajshahi (Islam et al., 2024), and 99.1% agreed that OERs are effective for collaborative learning. Furthermore, another study in feasibility of OERs in tertiary education suggested that less than half (43.31%) of students claimed to understand what an OER is, compared to 61.02% of teachers who understood OER (Akter & Mahbub, 2020). From the same study, 42.6% identified the cost effectiveness, open access, and shareability as benefits of using open digital resources for education. Overall, this suggests a lack of proper utilization of OERs yet and highlights the perceived benefits that could be obtained.

The study focuses on the relationship between the access to technology and internet, awareness and use of ODRs, perceptions and attitude towards ODRs with the adoption of open digital resources in secondary education in Bangladesh. The study also identifies the gaps that negatively affect open digital resource adoption and recommends strategies to mitigate them.

1.1. Objectives

- To investigate the awareness and understanding of Open Digital Resources (ODRs) among secondary school students and teachers in Bangladesh.
- To study the accessibility and usage patterns of digital technologies and the internet across urban and rural settings in secondary education.
- To assess the frequency and effectiveness of ODR usage for education among students from different curricula (NCTB and English Medium).
- To explore stakeholder attitudes and perceptions—including those of students and teachers—regarding the usefulness, engagement potential, and relevance of digital learning resources compared to traditional methods.
- To propose pragmatic strategies for enhancing the adoption, accessibility, and effectiveness of Open Digital Resources in secondary education in Bangladesh.

1.2. Methodology

In this study, both qualitative and quantitative methods are used. While the qualitative component uses open-ended responses to examine stakeholder perceptions, the quantitative component uses surveys to show patterns and trends. This method was selected in order to offer a thorough grasp of both statistical patterns and personal viewpoints regarding the use and awareness of Open Digital Resources (ODRs). The study makes use of primary data that was gathered directly from teachers and students via interviews and online surveys.

A non-probability convenience sampling method was utilized to target secondary-level students and teachers. While the sample size is limited, it aligns with Roscoe's (1975) rule of thumb that sample sizes between 30 and 500 are adequate for behavioral research. Given the exploratory nature of the study, the sample size of 38 participants is considered acceptable for preliminary statistical analysis. A semi-structured questionnaire was designed to collect data. It included both closed-ended items (Likert-scale, frequency counts) for statistical analysis and open-ended items for qualitative insights. Though no extensive qualitative interviews were conducted, open-ended questions in

the survey allowed participants to express their views freely, helping to understand the different perspectives and suggestions of the participants regarding ODRs.

Quantitative data were analyzed using descriptive statistics (mean, standard deviation, frequencies), cross-tabulation, and non-parametric tests such as Mann-Whitney, and Wilcoxon signed-rank tests. Spearman's correlation was also used to explore relationships among items. Data analysis was performed using JASP and Google Sheets.

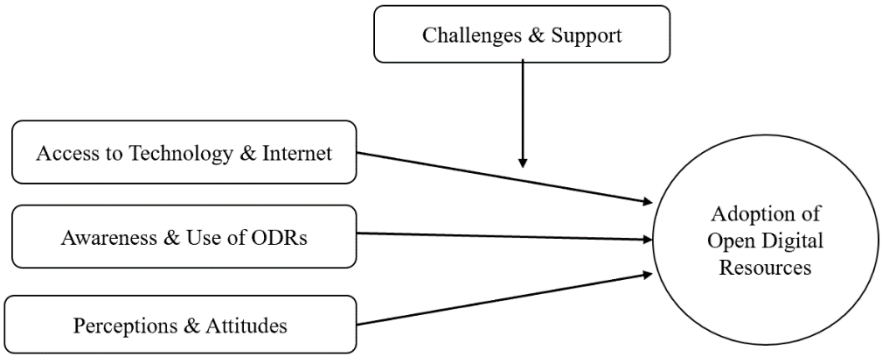
1.3. Literature review

The proportion of households with internet access has risen significantly from 2023 alone, jumping from 38.1% in 2023 (BBS, 2023) to 52.4% in December 2024. The proportion of secondary schools with access to internet has also been rapidly growing throughout the last decade, nearly doubling from 26.49% in 2015 to 56.09% in 2023 (a2i, n.d.). All these suggest a growing trend in internet access in Bangladesh, which has been shown by Joshkun et al. (2024), to have enough evidence to suggest that it positively affects basic digital literacy. Bashorun et al. (2024) argue that digital skills are crucial to get the most out of digital materials as well as to effectively navigate through such resources. This can also be seen in a positive effect on Online Learning Motivation for teacher trainees at Bangladesh Open University's Faculty of Education as found by Ahmed et al. (2024). As such, it follows that access to the internet is imperative to improving the adoption of Open Digital Resources in students.

The Awareness and Use of Open Digital Resources is important in influencing Open Digital Resource adoption in secondary education. Amin et al. (2020) have found that more students use ICT for personal rather than educational purposes, though they do see the benefit in using ICT for academics. At the University of Rajshahi, Islam et al. (2024) have found evidence for excellent awareness of Open Digital Resources among students, as evidenced by the 99.14% of students who agreed that OER encompasses teaching, learning, and research resources that are available to everyone (Islam et al., 2024). Similarly, Atikuzzaman & Saha (2021) found that 80.2% of students are aware of copyright infringement. Despite that, 60.2% have admitted to committing it, leading to a lack of sensitivity towards copyright issues. This can hinder ODR adoption on a large scale, as most students may commit copyright infringement rather than look for Open Digital Resources. Moreover, a study by Salam and Azad (2017) has highlighted that most teachers may not have been given the ICT training required to promote use of Open Digital Resources, furthering the setbacks faced by Open Digital Resources in the country.

The Perceptions and Attitudes of teachers and students regarding Open Digital Resources may vary. For example, students may lean positively towards using digital resources as evidenced by Amin et al. (2020), and Islam et al. (2024) at Rajshahi University. This is also evident in secondary education as evidenced by Rahman (2024). Akter (2024) also finds secondary students in rural areas are interested in digital learning. Similarly, teacher trainees at the Faculty of Education in Bangladesh Open University seem to have prominent online learning motivation (Ahmed et al., 2024). However, attitudes regarding the adoption of online learning seem to be mixed. One study by Ahmed et al. (2024) found that teacher trainees at Bangladesh Open University's Faculty of Education showed a positive attitude towards the effective use of technology in education, although their views on the use of ICT were mixed. The perceptions and attitudes of teachers towards digital resources directly affects the adoption of open digital resources, due to both being of the same nature. Thus, improving the perceptions and attitudes of teachers and students may increase the adoption of open digital resources.

Conceptual Framework



2.0. Findings and Analysis

2.1. Demographic background of the respondent students

Table 1. Descriptive statistics on Age

	Mean	Std. Deviation	Mode
Age	16.921	1.617	18.000

Source: Own Survey. Age is in years.

Table 1 shows that the respondents have a mean age of 16.921 and a standard deviation of 1.617, indicating that they are mostly concentrated around the 16-18 age group. The mode age of 18 indicates that most respondents are 18 years of age as well.

Table 2. Cross tabulation of Curriculum and Grade by Gender

	Category	Gender		
		Male	Female	Total
Grade Level	A Level/HSC/DP	42.11%	21.05%	63.16%
	O Level/SSC/MYP	13.16%	23.68%	36.84%
	Total	55.27%	44.73%	100.00%
Curriculum	English Medium	42.11%	39.47%	81.58%
	NCTB	13.16%	5.26%	18.42%
	Total	55.27%	44.73%	100.00%

Source: Own Survey.

Table 2 shows that the respondents are about equally divided in terms of gender. There is a higher representation of male respondents in A Level/HSC/DP levels, while there is a higher representation of female respondents in the O Level/SSC/MYP levels. In terms of curriculum, there is a roughly equal representation of both genders for English Medium students, but there is a higher representation of male students for the NCTB syllabus.

2.2. Access to Technologies and Internet

2.2.1. Reliability of internet connection

Table 3. Reliability of internet connection

Mean	Std. Deviation	Median
4.105	0.863	4.000

Source: Own Survey; Note: Responses were mentioned on a 5 point Likert Scale from 1 (Never) to 5 (Always)

All students have access to the internet. Table 3 shows that the respondents also have a high level of internet reliability concentrated around Sometimes (3) to Always (5). The mean of 4.15, the median of 4.000, and the low standard deviation further solidifies this.

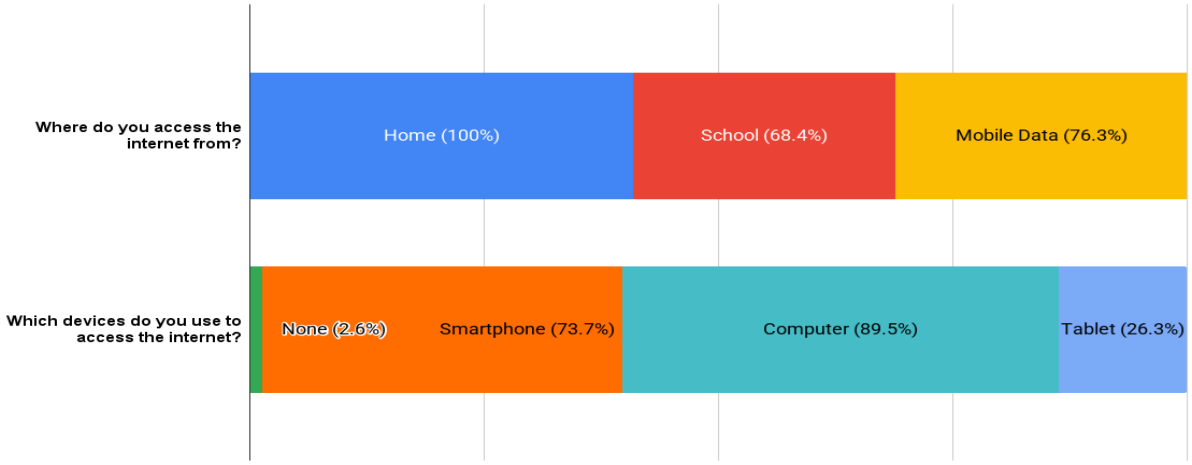


Figure 2.2.1(a). Access to internet; Source: Own Survey

Figure 2.2.1(a) shows that all respondents have internet available at home, while a vast majority of them also have internet availability at school and with mobile data. A majority of the respondents also use smartphones and computers to access the internet, while about a quarter use tablets and very few use none.

2.3. Awareness and Use of ODRs

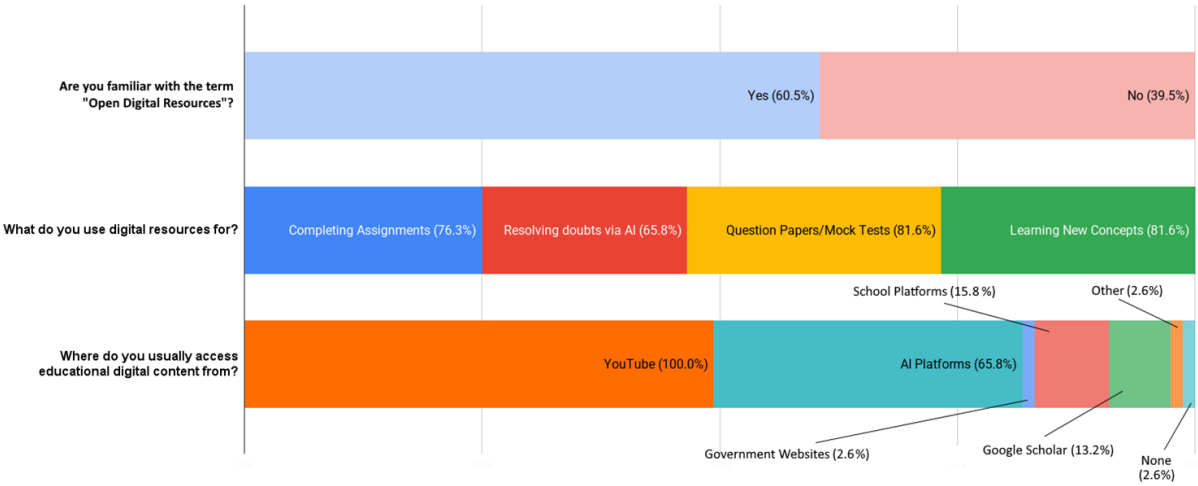


Figure 2.3.1(a). Use of ODRs; Source: Own Survey; Note. For the second and third questions, the percentage shown is the percentage of total students.

Figure 2.3.1(a)'s first question shows that most respondents are familiar with the term "Open Digital Resources". However, a large number of respondents, 39.474%, are not familiar with the term, indicating a gap in awareness about Open Digital Resources from the students. The second question shows that a vast majority of respondents use digital resources for completing assignments, questions papers/mock tests, and learning new concepts. A large portion of respondents also use AI to dispel their doubts at 65.8%. The third question shows that all respondents use YouTube to access educational digital content. Similar to above, a majority of respondents at 65.8% use AI Platforms. A smaller minority use school platforms and Google Scholar, and few use other platforms. Only 2.6% use no platforms to access digital content.

Table 4. How often students use Open Digital Resources

Mean	Std. Deviation	Median
3.500	1.109	4.000

Source: Own Survey; Note: Responses were mentioned on a 5 point Likert Scale from 1 (Never) to 5 (Frequently),

and mean and median were calculated as approximate central tendencies.

Table 4 shows that most respondents use Open Digital Resources often with 4 being the median. The results are concentrated around Sometimes (3) to Frequently (5), indicating that most respondents are using Open Digital Resources on a frequent basis. However, there is a large portion of respondents that use it rarely (1) at 18.421%, while a few never use it (2.632%).

Table 5. Descriptive statistics on familiarity with Copyright Law and Creative Common License

	Mean	Std. Deviation	Median
I am familiar with Copyright laws	3.395	1.285	3.500
I am familiar with Creative Common Licenses	2.079	1.323	1.000

Source: Own Survey; Note. N = 38. Responses were coded numerically from 1 (Strongly Disagree) to 5 (Strongly Agree), and means and medians were computed as approximate central tendencies.

Table 5 shows that most respondents seem to be somewhat familiar with copyright law, with a mean of 3.395 and a median of 3.500. However, the number of students familiar with Creative Commons is less with a low median of 1.000, indicating that although they are familiar with copyright law, they aren't necessarily familiar with open licenses.

Table 6. Wilcoxon signed rank test for legal familiarity

Variable 1	Variable 2	Test statistic	p	Z
Copyright Law Familiarity	CC Licenses Familiarity	357.500	<0.001	4.048

Source: Own Survey; Note. A Shapiro–Wilk test showed that the difference scores were not normally distributed (W = 0.931, p = 0.022), so a Wilcoxon signed-rank test was used to compare educational and entertainment screen time.

Table 6 denotes a statistically significant difference in the familiarity scores between the two variables, suggesting that participants have higher familiarity with copyright law compared to Creative Commons licenses.

Table 7. Descriptive statistics on average screen time per day on education and entertainment

	Category	Percent	Median
What is your approximate average screen time per day?	0-3 Hours	15.789	3.000 (5-7 Hours)
	3-5 Hours	15.789	
	5-7 Hours	28.947	
	7-10 Hours	21.053	
	10+ Hours	7.895	
	Prefer not to Answer	10.526	
What is the approximate average time you spend for education using digital resources per day?	0-2 Hours	47.368	1.500 (Between 0-2 Hours and 2-4 Hours)
	2-4 Hours	28.947	
	4-5 Hours	13.158	
	5-7 Hours	0	
	7+ Hours	5.263	
	Prefer not to Answer	5.263	
What is the approximate average time you spend on entertainment digitally per day?	0-2 Hours	26.316	2.000 (2-4 Hours)
	2-4 Hours	26.316	
	4-5 Hours	21.053	

5-7 Hours	7.895
7+ Hours	7.895
Prefer not to Answer	10.526

Source: Own Survey; Note. Responses were coded numerically from 1 (0-2 hours) to 5(7+ hours) for entertainment and education screen time and 1 (0-3 hours) to 5 (10+ hours) for total screen time, and medians were computed as approximate central tendencies. 'Prefer not to answer' responses were excluded from calculations.

Table 7 shows that the median screen time for the respondents was 5-7 hours, indicating a good amount of digital proficiency. The median amount of time spent for entertainment and education were between 0-2 and 2-4 hours, and 2-4 hours respectively. This signals that respondents may use more time digitally on entertainment than they do education.

Table 8. Wilcoxon signed rank test for Education and Entertainment screen time

Variable 1	Variable 2	Test statistic	p	Z
Education screen time	Entertainment Screen time	73.000	0.026	-2.200

Source: Own Survey; Note. A Shapiro–Wilk test showed that the difference scores were not normally distributed (W = 0.926, p = 0.023), so a Wilcoxon signed-rank test was used to compare educational and entertainment screen time.

Table 8 denotes a statistically significant difference between the two variables, suggesting that respondents digitally spend more time on entertainment than they do on education.

Table 9. Descriptive statistics on How often Students use digital resources for learning purposes

	Mean	Std. Deviation	Median
How often students use digital resources for learning purposes	4.842	0.547	5.000

Source: Own Survey; Note. Responses were coded from 1 (Never) to 5 (Daily), and mean and median were computed as approximate central tendencies.

Table 9 shows that respondents use digital resources for learning purposes very often, with median frequency being daily (5) and mean frequency being 4.842, which is close to daily (5). The standard deviation, 0.547, is also low, which indicates that there is not much variation in this statistic either.

2.4. Perceptions

Table 10. Descriptive Statistics of Perceptions and Awareness towards digital resources of Teachers and Parents

Statement	Mean	Std. Deviation	Mode
I feel that my guardians are supportive of studying with digital resources	3.974	0.885	4.000
I feel that my teachers are supportive of studying with digital resources	4.105	0.689	4.000

Note. *N* = 38. Responses were measured on a 5 point Likert scale (1= Strongly Discourages it, 5 = Strongly Supports it)

Table 10 shows that the respondents feel that their teachers and guardians are supportive of their digital education. The low standard deviation indicates that there is not much variation in this opinion.

Table 11. Wilcoxon signed rank test for supportiveness of teachers and guardians

Variable 1	Variable 2	Test statistic	p	Z
Teachers	Guardians	131.000	0.578	0.539

Note. *N = 38*. A Shapiro–Wilk test showed that the difference scores were not normally distributed (W = 0.881, p < 0.001), so a Wilcoxon signed-rank test was used to compare supportiveness of teachers and guardians.

Table 11 denotes that the difference in opinion about teachers and guardians is not statistically significant and suggests that both groups are similarly supportive of using educational digital resources.

Table 12. Descriptive Statistics of Perceptions and Awareness towards digital resources of students

Statement	Mean	Std. Deviation	Mode
Digital resources make lessons more interesting.	4.053	0.804	4.000
I prefer digital content over printed textbooks.	3.000	1.040	3.000
I would use digital resources more if they were part of my school curriculum.	4.263	0.795	5.000
I find it easy to judge whether online content is reliable.	3.447	1.179	4.000
Using ODRs helps me learn at my own pace.	4.263	0.685	4.000

Source: Own Survey; Note. Responses were measured on a 5 point Likert scale (1= Strongly Disagree, 5 = Strongly Agree).

Table 12 argues that respondents generally agree that digital resources make lessons more interesting, but they are not sure whether they prefer digital content or printed textbooks more. Respondents also generally strongly agree that they would use digital resources more if they were part of their school curriculum, and are somewhat confident that they can judge whether online content is reliable. Moreover, respondents quite strongly agree that using Open Digital Resources helps them learn at their own pace.

Table 13. Spearman's Correlations

Q1: Digital resources make lessons more interesting.
Q2: I prefer digital content over printed textbooks.
Q3: I would use digital resources more if they were part of my school curriculum.
Q4: I find it easy to judge whether online content is reliable.
Q5: Using ODRs helps me learn at my own pace.
Q6: I feel that my guardians are supportive of studying with digital resources
Q7: I feel that my teachers are supportive of studying with digital resources

Variable		Q1	Q2	Q3	Q4	Q5	Q6	Q7
Q1	Spearman's rho	1.000						
	p-value	0.000						
Q2	Spearman's rho	0.232	1.000					
	p-value	0.161	0.000					
Q3	Spearman's rho	**0.369**	0.131	1.000				
	p-value	**0.022**	0.433	0.000				
Q4	Spearman's rho	**0.329**	-0.251	0.03	1.000			
	p-value	**0.044**	0.128	0.856	0.000			
Q5	Spearman's rho	**0.537**	0.188	**0.519**	0.036	1.000		
	p-value	**< .001**	0.258	**0.051**	0.828	0.000		
Q6	Spearman's rho	0.218	-0.077	0.204	0.075	-0.049	1.000	

	p-value	0.189	0.647	0.218	0.653	0.769	0.000	
Q7	Spearman's rho	0.205	-0.126	0.23	0.042	0.126	0.094	1.000
	p-value	0.217	0.451	0.166	0.804	0.450	0.573	0.000

Note. Correlation coefficients are Spearman's ρ. $N = 38$.

Table 13 argues that there might be a statistically significant moderately strong correlation between finding digital resources interesting and agreeing that ODRs help them learn at their own pace. Furthermore, it argues that there might be a statistically significant weak correlation between finding digital resources interesting and using it more if it were to be integrated into their curricula or finding the reliability of online content easy to judge. It also suggests a weak correlation between agreeing that ODRs help them learn at their own pace and using it more if it were part of their curriculum with approaching significance.

2.5. Overall Perceptions of the Students and Teachers

Although the current use of ODRs is limited, both the students and teachers got a positive attitude toward the use of ODRs as they believe integration of ODRs into curricula will enhance inclusivity and equity in the context of a developing country like Bangladesh. Their overall comments are as follows:

- [Student 1] Educational resources should be made publicly available for free – this will allow the deprived students (who are unable to take advantage of private coaching) to have clear concepts about their subjects.
- [Student 2] All we need is measures to allow more people to access these digital resources (such as training in computer skills, availability of resources, localization of content, etc) and better integration of digital resources and education methods into traditional education.
- [Student 3] Open digital resources and digital educational content in Bangladesh could be helpful alongside the use of physical textbooks.
- [Student 4] Physical learning content is irreplaceable; however, the use of digital resources could be highly beneficial when utilized effectively to bridge gaps and offer a comprehensive learning experience.
- [Student 5] I think ODRs are a great way of enhancing education and saving up money. Digital educational content is more accessible in the urban zones of the country than in the rural regions; access to devices or the internet may be limited in certain areas. Consequently, some are deprived from having access to digital education
- [Teacher 1] Increasing open digital resources can be one way of increasing the literacy rate in Bangladesh by making learning more inclusive for people of different classes if the provision of the internet is also maintained to support it.
- [Teacher 2] If digital learning resources could be made more localised, it could help students connect with and learn the content better.
- [Teacher 3] The government could make policies and allocate resources effectively, e.g., ensuring resources are distributed in remote areas without fees, making them more accessible.
- [Teacher 4] Self-learning and visual adaptation would definitely improve the outcomes.

3.0. Discussions

The study demonstrates that the students have a high degree of internet reliability, as evidenced by the low standard deviation, mean reliability level of 4.15, and median reliability level of 4.000. All students have internet available at home, while a vast majority of them also have internet availability at school and with mobile data. A majority of them also use smartphones and computers to access the internet, while about a quarter use tablets and very few use none.

Furthermore, the study shows that most respondents are aware of the term "Open Digital Resources". Students may not be fully aware of Open Digital Resources, though, as a sizable percentage of respondents (39.474%) do not know what the term means., a significant portion of respondents (39.474%) do not know what the term means, suggesting that students are not fully aware of Open Digital Resources. Students use digital resources to learn new concepts, complete assignments, and complete question papers and mock tests. A large portion of students (65.8%)

also use AI to dispel their doubts. Most students access instructional digital content through YouTube and AI platforms. A smaller minority use school platforms and Google Scholar, and other digital learning platforms as well.

The respondents' average screen time of five to seven hours suggests a high level of digital engagement. Two to four hours are spent on entertainment, and zero to two hours are spent on education. This suggests that respondents use digital platforms more for entertainment than for learning. This could raise the possibility of using quiz contests, digital gamification, and other entertaining platforms to teach.

The study shows that most of the students use ODR frequently. However, some of them use it rarely and few students never use it. The findings show that the students are somewhat familiar with copyright law, with a mean of 3.395 and a median of 3.500. However, they are not familiar with Creative Commons licenses.

The study reveals that the students feel that their teachers and guardians are supportive of their digital education. However, they are not sure whether they prefer digital content or printed textbooks more. Respondents strongly agree that they would use digital resources more if they were part of their school curriculum. Moreover, respondents strongly agree that using Open Digital Resources helps them learn at their own pace.

The study shows the statistically significant moderately strong correlation between interest in digital resources and learning at their own pace. It also suggests a moderately strong correlation between agreeing that ODRs help them learn at their own pace and using it more if it were part of their curriculum. This may suggest that they would prefer a curriculum with the integration of ODRs as it may help them learn better as they can learn at their own pace.

3.1. Conclusion and Recommendations

Improving access to high-quality resources requires the use of open digital resources. ODRs offer cost-effective, flexible, and scalable learning opportunities that can bridge the urban-rural divide, support differentiated learning, and enrich the national curriculum. However, a lack of localized and contextualized content, language barriers, digital skill gaps between teachers and students, and infrastructure limitations continue to impede the full realization of this potential. According to the study, teachers and students who participated had adequate digital literacy, good access to digital resources, and a positive mindset towards digital resources; however, they hardly ever used open digital resources in their instruction. The teachers and policymakers' inflexible attitude toward traditional print-based resources and their ignorance of open resources are the causes. A shift in the mindset among stakeholders — teachers, policymakers, and learners—is essential to foster an open culture that values sharing, collaboration, and innovation. Based on the findings of the study, the following steps may be taken to improve the use of ODRs in the teaching-learning process at the secondary schools in Bangladesh.

- **Awareness Program:** There should be awareness training for teachers and students about open licenses and the benefit of using open digital resources rather than closed digital resources.
- **ODR Policy:** There should be OER and Open Access policies at the institutional and national level, such as openly licensed government books, government educational platforms, and repositories for all curricula. Furthermore, there should be a government policy regarding promotion of digital devices to disadvantaged students in order to minimize the digital divide and ensure that all students countrywide can take advantage of open digital resources.
- **Integration of Open Pedagogy:** There should be a strong integration of Open Pedagogy into the curricula of educational institutions where open digital resources will be used for the cost-effective access to Open Digital Resources.
- **Digital Literacy:** Digital literacy training should be baked into the curriculum to ensure the effective minimum basic digital literacy required to take advantage of such resources.
- **Recognition of Open Educational Practices (OEP):** There should be a reward system recognizing the efforts of institutions for adhering to OEP.
- **Co-Creation of ODR:** All resources created by students and teachers in secondary education should be released under open licenses digitally in an open licensed archive. Students should be encouraged to be part of said process to develop a positive mindset about openly licensed digital resources.
- **Private-Public Partnership:** As a Corporate Social Responsibility (CSR), the private enterprises should be attracted to the potential creation of open digital educational resources which will contextualize the educational resources for use in secondary schools.
- **Encourage Research and Innovation on ODR:** Research on ODR and Innovation especially in the context of secondary education should be promoted, especially by the government which should spare funds specifically for this endeavor.

Limitations

The study could not be sufficiently done due to the time constraints given that most potential respondents were preoccupied with exam preparation. Consequently, the responses were low in number although we distributed the questionnaire among 380 students. As such, the small size of the data may not allow us to effectively generalize findings. Furthermore, the sampling was not random as a non-probability convenience sampling method was used. A limited number of responses was found from the rural areas.

References

1. Ahmed, M. M., Sultana, M., Rokonuzzaman, M., & Hossain, M. K. (2024). The nexus between teacher trainees' digital literacy and online learning motivation. *Asian Association of Open Universities Journal.* Advance online publication. https://doi.org/10.1108/AAOUJ-01-2024-0004

2. Akter, H., & Mahbub, T. B. (2020). Open educational resources (OER) at the tertiary level education in Bangladesh: Feasibility and prospects. *IOSR Journal of Humanities and Social Science, 25*(11), 1–8. https://www.iosrjournals.org/iosr-jhss/papers/Vol.25-Issue11/Series-8/A2511080108.pdf

3. Akter, S. (2024). Digitalization of education in rural schools: A study of access, utilization, and impact toward digitalization in Bangladesh. *American International Journal of Multidisciplinary Scientific Research, 15*(1), 75–82. https://doi.org/10.46281/aijmsr.v15i1.2205

4. Amin, R., Sheikh, M. I., & Ali, M. H. (2020). ICT usage pattern and perception among students within Bangladesh. *Romanian Economic and Business Review, 15*(2), 35–48. https://doi.org/10.2139/ssrn.3583650

5. Atikuzzaman, M., & Saha, M. (2021). Students' awareness and perceptions regarding copyright infringement: A study in a public university in Bangladesh. *International Journal of Information and Knowledge Studies, 1*(1), Article 3. https://doi.org/10.54857/ijiks.v1i1.3

6. a2i. (n.d.). *Indicator 4.a.1 – Proportion of schools offering basic services, by types of services.* a2i. Retrieved June 17, 2025, from https://admin.sdg.gov.bd/publicReports/indicator-wise/4/73/0/322

7. Bangladesh Bureau of Educational Information and Statistics. (2021). *Exploring teaching learning challenges at secondary level education in Bangladesh during COVID-19.* https://banbeis.portal.gov.bd/sites/default/files/files/banbeis.portal.gov.bd/page/bf60bc17_7f35_45aa_a082_8aedd460dd8a/EXPLORING%20TEACHING%20LEARNING%20CHALLENGES%20AT%20SECONDARY%20LEVEL%20EDUCATION%20IN%20BANGLADESH%20DURING%20COVID-19_compressed.pdf

8. Bangladesh Bureau of Educational Information and Statistics. (2022). *Bangladesh education statistics 2022.* https://banbeis.portal.gov.bd/sites/default/files/files/banbeis.portal.gov.bd/page/6d10c6e9_d26c_4b9b_9c7f_770f9c68df7c/Bangladesh%20Education%20Statistics%202022%20%281%29_compressed.pdf

9. Bangladesh Bureau of Educational Information and Statistics. (2022). *Study on status of higher secondary education in Bangladesh.* https://banbeis.portal.gov.bd/sites/default/files/files/banbeis.portal.gov.bd/page/6d10c6e9_d26c_4b9b_9c7f_770f9c68df7c/Study%20on%20Status%20of%20Higher%20Secondary.pdf

10. Bangladesh Bureau of Educational Information and Statistics. (2022). *Use of ICT devices and its impact on teaching learning at secondary education.* https://banbeis.portal.gov.bd/sites/default/files/files/banbeis.portal.gov.bd/page/6d10c6e9_d26c_4b9b_9c7f_770f9c68df7c/Use%20of%20ICT%20devices.pdf

11. Bangladesh Bureau of Statistics. (2023, July 9). *Quarterly report on ICT access and use survey 2023 (1st quarter: January–March 2023).* https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4_956b_45ca_872f_4cf9b2

f1a6e0/2023-07-09-09-26-e60a80d559ab625529faa94185d8f4e3.pdf

12. Bangladesh Bureau of Statistics. (2025, April 7). *Quarterly report on ICT access and use survey 2024–25 (2nd quarter: October–December 2024).* https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4_956b_45ca_872f_4cf9b2f1a6e0/2025-04-07-04-42-dba4e1b86ab0ba0020ffb9b3a5367fbe.pdf

13. Bashorun, M. T., Baruwa, L. O., Famuyiwa, S. T., & Falabi, M. O. (2024). Attitude and ICT skills as determinants of utilisation of open educational resources by undergraduates in faculty of education, University of Ilorin, Nigeria. *Communicate: Journal of Library and Information Science, 26*(2), 311–324. https://www.cjolis.org/index.php/cjolis/article/view/134

14. Islam, M. N., Islam, M. S., & Anka, N. T. (2024). Challenges and opportunities of open educational resources at University of Rajshahi, Bangladesh. *Journal of Information Management and Practices, 4*(2). https://journals.iub.edu.pk/index.php/jimp/article/view/3175

15. Joshkun, S., Kurmanov, N., Kabdullina, G., Bakirbekova, A., Sabyrzhan, A., Rakhimbekova, A., Satbayeva, A., & Utegenova, Z. (2024). School or home: Exploring the impact of digital infrastructure on digital literacy of school-age young people in a developing economy. *Journal of Infrastructure, Policy and Development, 8*(7), 4795. https://doi.org/10.24294/jipd.v8i7.4795

16. Rahman, R. (2024). Impact of technology integration on secondary level education in Bangladesh: A study in Dhaka City. *Journal of Scientific and Technological Research, 5*(1), 75–82. https://doi.org/10.59738/jstr.v5i1.23(75-82).fjsi5248

17. Roscoe, J. T. (1975). *Fundamental research statistics for the behavioral sciences* (2nd ed.). Holt, Rinehart and Winston.

18. Salam, M. A., & Azad, M. K. (2017). *Towards a national policy on open educational resources in Bangladesh*. Commonwealth of Learning. https://oasis.col.org/server/api/core/bitstreams/a44b5175-861c-49d4-bd77-cafaf42c472d/content

19. Shelly, A. A., & Kamal, M. A. (2021). Teachers' perceptions regarding technology-enabled learning during Covid-19 pandemic: A study on the BBA Program of Bangladesh Open University. *Commonwealth of Learning*. https://oasis.col.org/server/api/core/bitstreams/35213e18-3c6b-45d5-ac59-9c597a65b8d4/content