



# CHAPTER 4



### 4.1. Introduction

Analysis and interpretation of data is an essential step that involves giving meaning to the data that has been acquired and drawing inferences based on those data. It is the stage where one tests the research hypotheses and the null hypotheses to come to a conclusion based on a careful examination of evidence. This chapter presents the research findings derived from the analysis of both quantitative and qualitative data. The analysis involved the use of several statistical techniques, as well as the analysis of the interview data. The chapter unveils the findings and interpretations of the data according to the objectives and the hypotheses designed to direct the research. The data generated from the research have been analyzed with inferential and descriptive statistics for quantitative findings and thematic analysis for qualitative findings. The findings were further illustrated using tables and graphical presentations for better understanding. The chapter has the following sections:

- Section 4.2 discusses the normality of the data.
- Section 4.3 presents the data analysis and interpretation of Objective 1.
  - ❖ Section 4.3.1 Analysis of Dimension 1: Attitude toward the use and creation of Open Educational Resources.
  - ❖ Section 4.3.2 Analysis of Dimension 2: Attitude towards Sharing of OERs.
  - ❖ Section 4.3.3 Analysis of Dimension 3: Attitude towards the use of OER for professional development
  - ❖ Section 4.3.4 Analysis of Dimension 4: Attitude towards open licenses and Creative Commons Licenses
  - ❖ Section 4.3.5 Analysis of Dimension 5: Attitude toward accessibility of Open Educational Resources
- Section 4.4 presents the data analysis and interpretation of Objective 2.
- Section 4.5 presents the data analysis and interpretation of Objective 3.
- Section 4.6 presents the data analysis and interpretation of Objective 4.
- Section 4.7 presents the data analysis and interpretation of Objective 5.
- Section 4.8 presents the data analysis and interpretation of Objective 6.

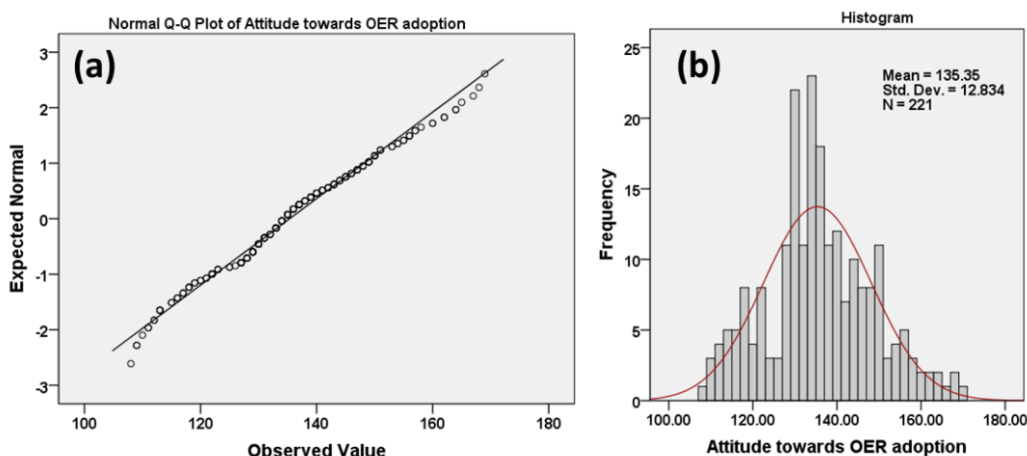
**4.2. Normality of the data**

Before moving on to any further analysis, the normality of the data distribution test has been carried out initially. This is done to determine which statistical tests would be the most appropriate for the dataset (Best and Kahn, 2003; Blanca, Arnau, Lopez-Montiel, Bono and Bendayan, 2013). The results of the normality test are presented in Table 4.2.1 below. To determine whether or not the data are normally distributed, kurtosis, and skewness, Z-values were computed and displayed in table 4.2.1. In addition, the Histogram, Normal Q-Q Plot, and box plot of the data are represented in Fig. 4.2.1 (a) and (b) respectively to illustrate the graphical distribution of the data.

**Table 4.2.1:** Showing Normal distribution of the data

Mean	SD	Median	Skewness	SEskewness	Zskewness	Kurtosis	SEkurtosis	Zkurtosis
135.35	12.83	134.00	0.202	0.164	1.23	-0.123	0.326	-0.38

Table 4.2.1 reveals the measures of Skewness, Kurtosis, and z-values of Skewness and Kurtosis. The Skewness value (0.202) indicates the positive and fairly skewed data, i.e. the right side skewness (Hopkins and Weeks, 1990; Hatem, Zeidan, Goossens and Moreira, 2022). The value of kurtosis (-0.123) is lower than zero which ensures that the distribution of data is somewhat platykurtic (Hopkins and Weeks, 1990; Brown, 2011). The z-values of Skewness and Kurtosis are 1.23 and -0.38 respectively which is between  $\pm 1.96$  at the level of 0.05 significance (Driscoll, Lecky, & Crosby, 2000; Hair, Black, Babin and Anderson, 2010; Pett, 2016). This shows that the distribution of the data is normal in our research study.



**Fig. 4.2.1:** (a) Showing the Normal Distribution through Q-Q Plot, (b) Showing the Normal Distribution through Histogram with NPC.

Again, as can be seen in Figure 4.2.1(a), the majority of the sample’s scores were aligned close to the regression line in the Q-Q plot, which provides more evidence that the sample follows a normal distribution. It is also possible to verify that the data were normally distributed by looking at the histogram (Fig 4.2.1 (b)), where the largest bars are clustered close to the mean value.

Thus, based on the results of the normality test, it is decided that the parametric test would be most appropriate (Vickers, 2005; Field, 2009; Orcan, 2020; Marshall and Samuels, 2017).

**4.3. Data analysis and interpretation of Objective 1**

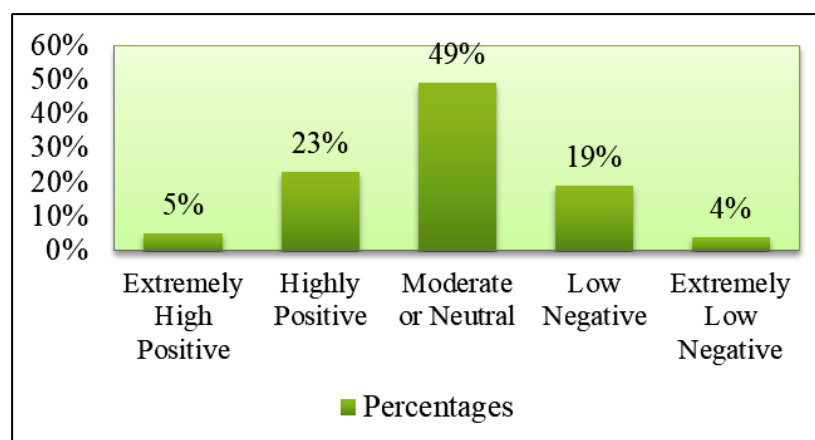
*To study the attitude towards the adoption of OER among the teachers of higher educational institutes of North East India*

**Quantitative analysis**

The responses of the teachers of higher educational institutes of North East India were analyzed to determine their levels of attitude toward the adoption of OER. The level of attitude of the teachers of higher educational institutes of North East India towards the adoption of OER is shown in Table 4.3.1

**Table 4.3.1** Showing the Level of attitude towards the adoption of OER

Range of z-Scores	F	%	Interpretation
+1.77 and above	11	5%	Extremely High Positive
+0.59 to +1.76	51	23%	Highly Positive
-0.58 to +0.58	109	49%	Moderate or Neutral
-0.59 to -1.76	42	19%	Low Negative
-1.77 and below	08	4%	Extremely Low Negative
TOTAL	221	100%	



**Fig. 4.3.1.** Graphical representation of percentages of sample participants belonging to different levels of attitude towards the adoption of OER.

**Interpretation:**

Based on Table 4.3.1 and Figure 4.3.1, it is evident that out of the total sample of 221 teachers of higher educational institutes in North-East India, the majority of the teachers, i.e., 49% (N=109) of them possess a moderate level of attitude towards the adoption of OER. Following this, it has been found that 23 % (N=51) of the teachers fall under the category of highly positive attitude towards the adoption of OER, while 19% (N=42) fall under the low negative attitude towards the adoption of OER. However, 5% of respondents (N=11) possess an extremely high positive attitude towards the adoption of OER and only 4% of respondents (N=08) have an extremely low negative attitude towards the adoption of OER.

The following section reports on the analysis of the dimensions of the statements that formed the “OER Teacher Attitude Scale”. While it has been discovered that teachers generally had a moderate attitude towards adopting OER, it is important and more insightful to further analyse dimension-wise item analysis of teachers’ attitudes towards the adoption of OER. Each statement's mean and standard deviation were determined for this analysis. Mean score interpretation is calculated using criteria developed by earlier studies (Wearley, 1996; Alston and Miller, 2001; Kotrlík and Redmann, 2009; Barakabitze, Kitindi, Sanga, Kibirige, and Makwinya, 2015; Veach, 2021) as:

**Table 4.3.1.1:** Level of Mean Score Interpretation

Range of mean Score	Descriptive Equivalent	Interpretation
4.50 - 5.00	Strongly Agree	Extremely High Positive Attitude
3.50 - 4.49	Agree	Highly Positive
2.50 - 3.49	Neutral	Moderate attitude
1.50- 2.49	Disagree	Low Negative
1.00 - 1.49	Strongly Disagree	Extremely Low Negative Attitude

## 4.3.1 Dimension 1: Attitude toward the use and creation of OER

Table 4.3.1.2: Dimension 1: Attitude toward the use and creation of OER

Statements	SA	A	N	D	SD	Weighted Mean	S.D.	Interpretation
I believe the creation of OER will help me in the process of promotion.	19%	56%	14%	7%	5%	3.76	3.37	Highly Positive
I believe by creating OER, will raise my reputation.	14%	48%	22%	14%	3%	3.55	3.17	Highly Positive
I am hesitant about using others' materials.	2%	9%	15%	62%	12%	3.73	3.31	Highly Positive
I may not be happy or satisfied with the way others modify my contents and would prefer others to use as it is.	4%	10%	23%	43%	20%	3.66	3.28	Highly Positive
I prefer to use only such resources that were recommended to me by others.	7%	24%	21%	38%	11%	2.79	2.50	Moderate
The use of OER can improve class interactivity and enhancement.	26%	49%	15%	8%	2%	3.88	3.48	Highly Positive
OER can promote inclusiveness and equity in learning.	32%	48%	14%	5%	1%	4.05	3.61	Highly Positive
I believe the use of OER textbooks is more beneficial than traditional textbooks.	12%	28%	27%	27%	6%	3.12	2.81	Moderate
I do not want others to make money from my original works.	18%	35%	21%	20%	6%	2.62	2.36	Moderate
<b>OVERALL TOTAL</b>	15%	34%	19%	25%	7%	3.46	3.10	Moderate

**Interpretation:**

The level of respondents' attitudes towards the adoption of OER is presented in Table 4.3.1.2 in terms of the first dimension, which is labelled as "Attitude towards the use and creation of OER". The result showed that the overall weighted mean of 3.46 and a standard deviation of 3.10 can be interpreted as teachers having a moderate level of attitude towards the use and creation of OER. The above-mentioned table demonstrates that 56% of the teachers agreed with the possibility that the creation of OER can assist them in the process of promotion ( $M=3.76$ ,  $S.D. = 3.37$ ) and 48% of them agreed that OER can raise their reputation ( $M=3.55$ ,  $S.D. = 3.17$ ). It has been found that 62% of teachers were not hesitant about using the materials created by others ( $M=3.73$ ,  $S.D. = 3.31$ ) and 43% disagreed that they may not be dissatisfied with the way that others adapt their content and would prefer that others use their materials as it is ( $M=3.66$ ,  $S.D. = 3.28$ ). Only 38 % of the teachers disagreed with the statement 'I prefer to use only such resources that were recommended to me by others with ( $M=2.79$ ,  $S.D. = 2.50$ ). However, about 49% and 48% of the teachers agreed and believed that the use of OER can improve class interactivity and enhancement ( $M=3.88$ ,  $S.D. = 3.48$ ) and promote inclusivity and equity in learning ( $M= 4.05$ ,  $S.D. = 3.61$ ). Next, only 28% of the teachers agreed that the use of OER textbooks can be more beneficial than traditional textbooks ( $M=3.12$ ,  $S.D. = 2.81$ ). Although the statement 'I do not want others to make money from my original works', 35% of the teachers agreed to it ( $M= 2.62$ ,  $S.D. = 2.36$ ).

**4.3.2 Dimension 2: Attitude towards Sharing of OERs****Table 4.3.1.3:** Dimension 2: Attitude towards Sharing of OERs

Statements	SA	A	N	D	SD	Weighted Mean	S.D.	Interpretation
I believe that educational resources should be a public good open and free to all.	47%	41%	8%	3%	1%	4.31	3.86	Highly Positive
Sharing resources with colleagues is important in teaching and research.	49%	47%	4%	0%	0%	4.43	3.95	Highly Positive
I believe sharing resources leads to learning new knowledge, new	54%	40%	5%	0%	0%	4.48	4.00	Highly Positive

ideas and the production of new resources.								
Sharing of resources brings achievement and success in outcomes.	36%	50%	12%	2%	0%	4.20	3.73	Highly Positive
Sharing resources makes me feel more confident.	34%	45%	17%	3%	1%	4.09	3.65	Highly Positive
Sharing resources improve my expertise in that field.	33%	46%	17%	5%	0%	4.07	3.63	Highly Positive
<b>OVERALL TOTAL</b>	<b>42%</b>	<b>45%</b>	<b>11%</b>	<b>2%</b>	<b>0%</b>	<b>4.26</b>	<b>3.80</b>	<b>Highly Positive</b>

### Interpretation:

Table 4.3.1.3 presents the attitude of teachers in terms of the second dimension, which is “Attitude towards Sharing of OERs”. The overall weighted mean of the dimension is 4.26 and the standard deviation is 3.80 which indicates that teachers have a highly positive attitude towards the sharing of OERs. It is depicted in the table that 47% of the teachers strongly believe that educational resources are a public good that should be open and free for all (M=4.31, S.D. = 3.86). 49% of teachers showed a highly positive attitude towards sharing of resources with colleagues as an important task in teaching and research (M = 4.34, S.D. = 3.95); 54% strongly agreed that sharing resources leads them to learn new knowledge, acquire new ideas and produce new resources (M= 4.48, S.D.= 4.00); 50% of them agreed sharing of resources brings achievement and success in outcomes (M= 4.20, S.D. = 3.73); 45% agreed that sharing of resources makes teachers feel more confident (M= 4.09, S.D. = 3.65) and 45% confirms that sharing OER improve their expertise in the field (M=4.07, S.D. = 3.63).

### 4.3.3 Dimension 3: Attitude towards the use of OER for professional development

**Table 4.3.1.4:** Dimension 3: Attitude towards the use of OER for professional development

Statements	SA	A	N	D	SD	Weighted Mean	S.D.	Interpretation
OER can give me global recognition.	22%	37%	33%	7%	1%	3.71	3.30	Highly Positive
I believe OER can	31%	52%	13%	3%	0%	4.11	3.66	Highly



help me in connecting with other colleagues around the world.								Positive
OER is a good way of disseminating my work to the research community and beyond.	27%	64%	8%	1%	0%	4.18	3.69	Highly Positive
OER saves my time and effort in resource development.	14%	58%	21%	5%	1%	3.80	3.35	Highly Positive
OER encourages me to reflect on my teaching practices.	20%	57%	17%	5%	1%	3.92	3.47	Highly Positive
OER provides me an opportunity to improve my work by receiving feedback from others.	23%	57%	14%	5%	0%	3.98	3.53	Highly Positive
OER will increase my citation rates.	24%	49%	24%	2%	0%	3.95	3.50	Highly Positive
OER will improve my pedagogical practice.	20%	61%	16%	2%	0%	3.98	3.51	Highly Positive
OER will increase my efficiency in content production.	22%	63%	12%	3%	0%	4.03	3.56	Highly Positive
OVERALL TOTAL	23%	56%	18%	4%	1%	3.96	3.51	Highly Positive

### Interpretation:

Regarding the third dimension, table 4.3.1.4 elucidates teachers 'Attitude towards the use of OER for professional development'. The overall weighted mean of this dimension is determined to be 3.96, and the standard deviation is 3.51, which results in teachers having a highly positive attitude towards the use of OER for professional development. The analysis showed that about 37% of teachers agreed to the fact that OER can give them global recognition in their field ( $M= 3.71$ ,  $S.D. = 3.30$ ); 52% agreed OER can help in establishing connections with other faculty around the world ( $M= 4.11$ ,  $S.D. = 3.66$ ) and 64% agreed OER is a good way of disseminating their work to the research community and beyond ( $M= 4.18$ ,  $S.D. = 3.69$ ). The data depicted that 58% of teachers believe that OER can save their time and effort in resource development ( $M= 3.80$ ,  $S.D. = 3.35$ ); both 57% of teachers agree that OER encourages

## CHAPTER 4 | ANALYSIS AND INTERPRETATION OF DATA

them to reflect on teaching practices ( $M = 3.92$ ,  $S.D. = 3.47$ ) and provides them with an opportunity to improve work by receiving feedback from others ( $M = 3.98$ ,  $S.D. = 3.53$ ) and 49% of them agreed that OER enables in increasing citation rates ( $M = 3.95$ ,  $S.D. = 3.50$ ). It is found that the majority of the teachers (61% and 63%) believe that OER will improve pedagogical practice ( $M = 3.98$ ,  $S.D. = 3.51$ ) and boost their efficiency in content production ( $M = 4.03$ ,  $S.D. = 3.56$ ).

### 4.3.4 Dimension 4: Attitude towards open licenses and Creative Commons Licenses

**Table 4.3.1.5:** Dimension 4: Attitude towards open licenses and Creative Commons Licenses

Statements	SA	A	N	D	SD	Weighted Mean	S.D.	Interpretation
I believe open licenses require knowledge of technical skills.	15%	54%	21%	9%	1%	3.74	3.31	Highly Positive
I believe open licenses enable me to customize the contents as per my needs.	13%	50%	31%	5%	1%	3.68	3.24	Highly Positive
I prefer the use of Creative Commons licenses in addition to my copyright license.	15%	51%	27%	6%	1%	3.72	3.29	Highly Positive
I think academicians should publish their works under Creative Commons licenses as teaching is a give-and-take process.	24%	49%	20%	6%	1%	3.88	3.46	Highly Positive
Creative Commons Licenses help in creating an online community of sharing and reusing.	24%	54%	19%	2%	1%	3.99	3.54	Highly Positive
Compared to traditional copyright, Creative Commons Licenses have made it easier to grant permission to all automatically rather than granting permission to each person individually.	19%	54%	22%	5%	1%	3.84	3.40	Highly Positive
I think Creative	9%	20%	36%	29%	6%	3.04	2.69	Moderat

Commons licenses remove my credibility and acknowledgement.								e
I think Creative Commons licenses will increase the rate of Plagiarism.	9%	18%	34%	29%	10%	3.14	2.81	Moderate
OVERALL TOTAL	16%	44%	26%	11%	3%	3.63	3.22	Highly Positive

### Interpretation:

In line with the fourth dimension, the results in the above-mentioned table 4.3.1.5 demonstrate teachers' attitudes towards open licenses and Creative Commons Licenses. The overall weighted mean is 3.63, and the standard deviation is 3.22, indicating a highly positive attitude of teachers towards open licenses and Creative Commons Licenses. The data demonstrate that 54% of teachers agreed that open licenses require knowledge of technical skills ( $M= 3.74$ ,  $S.D. =3.31$ ). 50% of them believe that open licenses enable them to customize the contents as per their needs ( $M= 3.68$ ,  $S.D. = 3.24$ ). However, it has been reflected that almost half of the teachers (51%) prefer the use of Creative Commons licenses in addition to copyright licenses ( $M= 3.72$ ,  $S.D.= 3.29$ ) and 49% of them considered that teachers should publish their works under Creative Commons licenses ( $M= 3.84$ ,  $S.D. = 3.41$ ). The majority of the teachers (54%) believe Creative Commons licenses help in creating an online community of sharing and reusing ( $M= 3.99$ ,  $S.D. = 3.54$ ). In comparison to traditional copyright licenses, 54% of teachers have a firm opinion that Creative Commons Licenses make it easier to grant permission without asking all ( $M=3.84$ ,  $S.D. = 3.40$ ). However, 36% and 34% of teachers showed a neutral attitude to whether Creative Commons licenses remove their credibility and acknowledgement ( $M=3.04$ ,  $S.D. = 2.69$ ) and increase the rate of Plagiarism ( $M=3.14$ ,  $S.D. = 2.81$ ).

### 4.3.5 Dimension 5: Attitude toward accessibility of Open Educational Resources

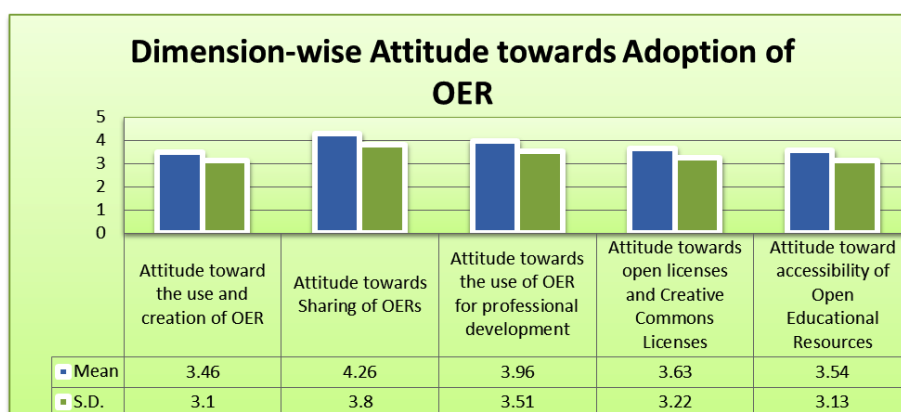
**Table 4.3.1.6:** Dimension 5: Attitude toward accessibility of Open Educational Resources

Statements	SA	A	N	D	SD	Weighted Mean	S.D.	Interpretation
Searching for OER is a time-consuming	8%	33%	24%	32%	3%	2.88	2.55	Moderate

activity								
OER can be accessed from anywhere.	19%	57%	17%	8%	0%	3.85	3.41	Highly Positive
The use of OER does not fit my course.	2%	6%	12%	69%	11%	3.81	3.37	Highly Positive
OER are easy to download.	14%	57%	21%	8%	1%	3.74	3.31	Highly Positive
OER can be easily revised and remixed.	10%	42%	32%	14%	3%	3.41	3.01	Moderate
<b>OVERALL TOTAL</b>	<b>10%</b>	<b>39%</b>	<b>21%</b>	<b>26%</b>	<b>4%</b>	<b>3.54</b>	<b>3.13</b>	<b>Highly Positive</b>

**Interpretation:**

The result of the fifth dimension ‘Attitude toward accessibility of Open Educational Resources’ is presented in Table 4.3.1.6. The analysis illustrated that the overall weighted mean is computed to be 3.54 and the standard deviation is 3.13 which determines that teachers have a highly positive attitude towards the accessibility of Open Educational Resources. 33% of the teachers agreed that searching for relevant OER is a time-consuming activity for them while 32% of them disagreed with the statement (M=2.88, S.D. = 2.55). The majority of them (57%) accepted that OER can be accessed from anywhere (M= 3.85, S.D. = 3.41) and can be easily downloaded (M= 3.74, S.D. = 3.31). Furthermore, 69% of the teachers disagreed that the use of OER may not fit their course curriculum (M=3.81, S.D= 3.37) and 42% of them agreed to the opinion that OER can be easily revised and remixed (M= 3.41, S.D. = 3.01).



**Fig. 4.3.2:** Summary of the overall Means and Standard Deviation of the dimensions of attitude towards the adoption of OER.

Qualitative analysis

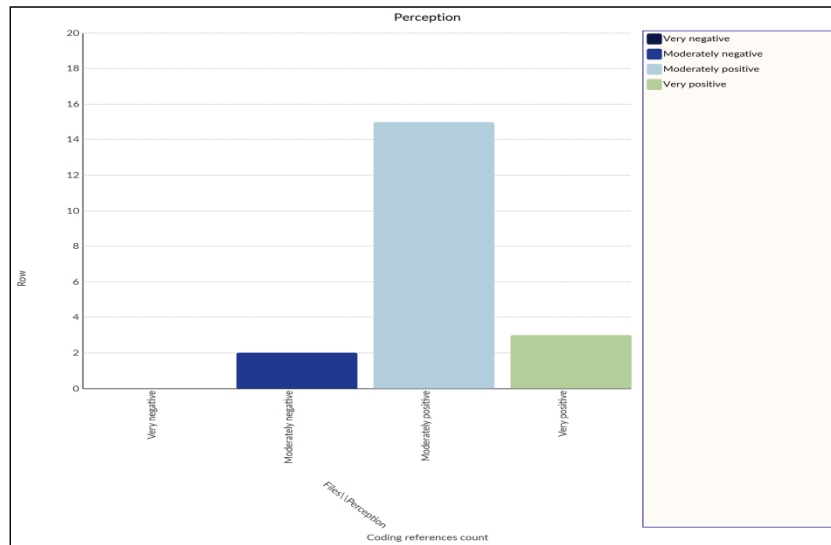
How do OER users and OER creators perceive the adoption of OERs in the higher education sector?

In this section, the perspectives of OER users and OER creators concerning the adoption of OER in the field of higher education have been discussed. The interviews have been analyzed with the help of NVivo software. The analysis focused on the theme of perception, and several sub-codes that have been generated from the transcribed data. In all, five categories (sub-codes) have been identified from the key concepts that emerged during the interview data analysis. As can be seen in Figure 4.3.3, these codes helped to present a clear picture of how interviewees (the OER users and OER creators) perceive the adoption of OER.

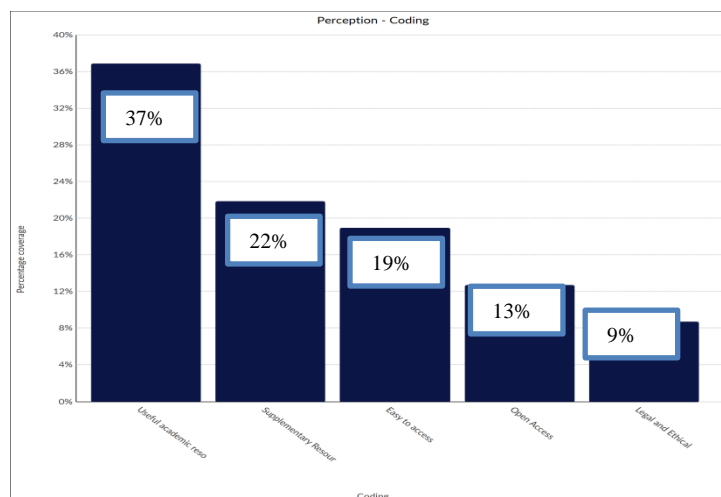
Name	Files	References	Created on	Created by	Modified on	Modified by
Useful academic resources	1	12	4/17/2023 8:22 PM	SAIKIA	4/17/2023 8:30 PM	SAIKIA
Supplementary Resources	1	7	4/17/2023 8:20 PM	SAIKIA	4/17/2023 8:30 PM	SAIKIA
Open Access	1	4	4/17/2023 8:18 PM	SAIKIA	4/17/2023 8:29 PM	SAIKIA
Legal and Ethical	1	3	4/17/2023 8:24 PM	SAIKIA	4/17/2023 8:24 PM	SAIKIA
Easy to access	1	7	4/17/2023 8:21 PM	SAIKIA	4/17/2023 8:29 PM	SAIKIA

Fig. 4.3.3: Subcodes of the main theme “perception” (perception of OER users and creators).

Five distinct categories of perception toward the adoption of OER emerged during the interview analysis. These are (a) useful academic resources (b) supplementary resources (c) open access (d) legal and ethical and (e) easy to access. The outputs of the NVivo software indicate that the maximum number of interviewees viewed the adoption of OER as moderately positive. The results of the auto-coded sentiment analysis showed how OER users and creators perceived the adoption of OERs in the higher education sector. This is apparent in Figure 4.3.4 below.



**Fig. 4.3.4:** NVivo Auto-coding sentiment analysis of Coding Reference Graph of Teachers’ (OER users and OER creators) responses towards OER adoption.



**Fig. 4.3.5:** Percentage Coverage of the sub-codes emerged from the main theme “Perception”.

The perceptions of OER users and creators about the adoption of OER are summarized in percentage form in Fig. 4.3.5. The findings of the interviews revealed that a total of 37% of those interviewed believed that OER is a valuable academic resource. The following is a list of some of the comments that support this argument:

*“Open educational resources have the potential to be an excellent resource hub” (P8).*

*“In this age of technology, it is not very simple for everyone to gain access to hard print materials, and in the midst of this COVID pandemic, it is obvious that open educational resources are helpful in the teaching and learning process of the institution” (P9).*

*“Open educational resources are an excellent educational movement. The practice should be encouraged and recognized in the realm of higher education. A culture that encourages the sharing of resources should definitely be present” (P11).*

*“Open educational resources offer good resources to educators at a zero cost. They are able to supply the instructor with lessons that make use of multimedia resources and I find it easy to access” (P18).*

*“Teachers have access to a valuable asset in the form of open educational resources. They offer a connection to a network of other professionals who have produced informative information in my area of concern” (P22).*

Next, 22 % of interviewed teachers considered OER to be supplemental materials, as seen by their comments:

*“I have benefited tremendously from Open educational resources, and I have utilized it by downloading materials and storing them in my repositories, reusing it, and adding it to the stock of study material that I bring to my classroom” (P2).*

*“I rely on open educational resources quite a bit in addition to books.....” (P5).*

*“If used as supplemental materials, I believe that open educational resources could be something that would make it easier for students to interact in the classroom. Because they are distributed under Creative Commons Licenses, these may be easily and are openly available. Furthermore, no authorization from anyone is required in order to modify them in any way” (P29).*

Easy to access OER discovered as another emerging sub-code. 19% of the participants stated they envisioned OER adoption as a way to gain access to resources that were adaptable, flexible and easy to use. This has been addressed in a variety of cases:

*“Open educational resources can be easily accessed through various online channels, making it convenient for both students and teachers to use” (P6).*

*“The idea of open educational resources can be accessed at any time and place. It is not necessary to physically go to a location in order to obtain access to the resources” (P10).*

*“To me, an open educational resource connotes freedom and autonomy. While using open educational resources, you may learn whenever and wherever you choose, it's simple and engaging, and it can increase the overall quality of the educational materials that you use” (P23).*

Less than one-fifth of respondents (13%) viewed OER as open access which is openly available in online format. As some of the faculty members commented that-

*“Open educational resources are any resources that can be found on a website and that have been made available on the internet for open access” (P1).*

*“There is a scope to revise/remix open educational resources that make learning according to the needs of the target audience. The creative commons license of open educational resources enables flexibility in educational settings” (P19).*

*“Open educational resources are resources prepared learners. Anyone who wishes to access the materials can utilize them for teaching which is free and open access, as they are protected by Creative Commons License” (P26).*

Further, just 9% of interviewed teachers advocated OER adoption because they believe it is legally and ethically acceptable. This is supported by comments like:

*“It is a unique opportunity that legally and ethically allows us to adapt other's resources” (P13).*

*“You don't have to feel ashamed or ask permission for reusing it, as they are meant to be reused or modify to gain insight into learning” (P14).*

*“When it comes to asking permission to use content protected by intellectual property rights, I find the process rather awkward. In this regard, creative commons and open educational resources have been of great assistance to me in that they enable me to freely, openly, and lawfully adapt the work of others” (P15).*

**4.4. Data analysis and interpretation of Objective 2**

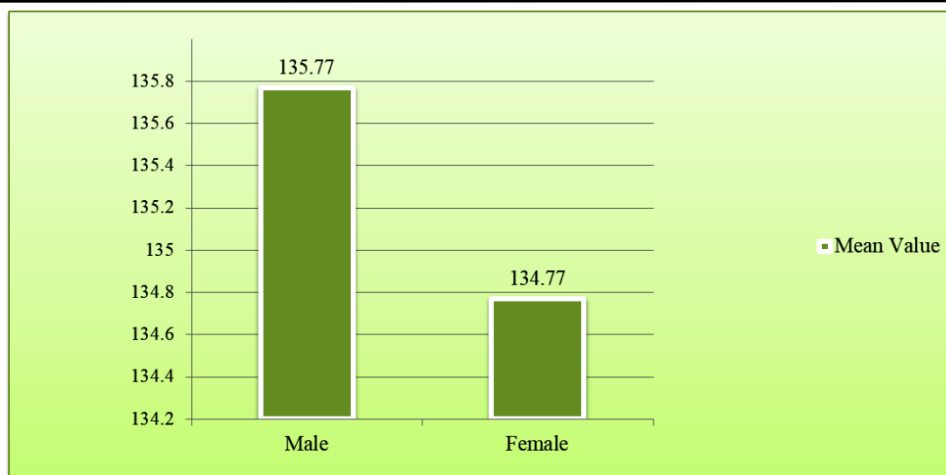
*To find out the significant difference between the attitude of teachers towards the adoption of OER with regard to gender, years of teaching experiences and academic rank.*

**NULL HYPOTHESIS (H<sub>0</sub>1):** There is no significant difference between the attitude of teachers towards the adoption of OER with regard to gender.

**Table 4.4.1:** Shows the descriptive statistics of teachers' attitude towards the adoption of OER based on gender

Gender	N	Mean	Std. Deviation	Std. Error Mean
Male	128	135.77	13.723	1.213
Female	93	134.77	11.546	1.197





**Fig. 4.4.1:** Mean Scores of teachers' attitude towards the adoption of OER based on gender.

**Table 4.4.2:** Showing the Levene's test for equality of variances and Independent t-test for equality of means of teachers' attitude towards the adoption of OER based on gender

Equal variances assumed	Levene's Test for Equality of Variances				t-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error difference
	3.41	0.066	0.571	219	0.569	0.999	1.751

### Interpretations:

Table 4.4.1 presents the descriptive statistics for the sample based on gender. It shows the Mean and S.D. value of male and female teachers in the level of attitude towards the adoption of OER. The mean value of male teachers (N=128) is 135.77 with S.D. of 13.72. The mean value of female teachers (N=93) is 134.77 with an S.D. of 11.54. Similarly, the standard error mean for male teachers is 1.213, whereas the standard error mean for female teachers is 1.197.

To determine if there is a statistically significant difference between the mean value of the male and female teachers attitude towards the adoption of OER, an independent sample t-test has been performed. The result is presented in Table 4.4.2. Levene's test is shown to check for equality of variances. This helps to evaluate whether the differences between the two groups are the same, i.e. whether there are any variations between the attitude of male and female teachers about the adoption of OER. If the *p*-

value is higher than 0.05, this indicates that the variance of both test groups is equal. And, if the  $p$ -value is lower than 0.05, this indicates that the variances of the two test groups are unequal (Field, 2000; Martin & Bridgmon, 2012; Verma and Abdel-Salam, 2019). The above table showed that the F value for the Levene's test is 3.411, and the  $p$ -value is 0.06, which is greater than the accepted significance level of 0.05 (i.e.  $p > 0.05$ ), hence it can be inferred that male and female teachers have the same variances, indicating that assumption of homogeneity of variances has been verified. For equal variances, the t value is 0.571 with a df of 219. The  $p$ -value for this is 0.569, which is significantly greater than the standard level of significance of 0.05. While the difference is not statistically significant, Figure 4.4.1 shows that the mean score of male teachers (135.77) is somewhat higher than the mean score of female teachers (134.77). Male-female teachers mean difference is 0.99, which is negligible. Because of this, the null hypothesis, which states that there is no statistically significant difference between the attitude of teachers towards the adoption of OER based on gender is accepted.

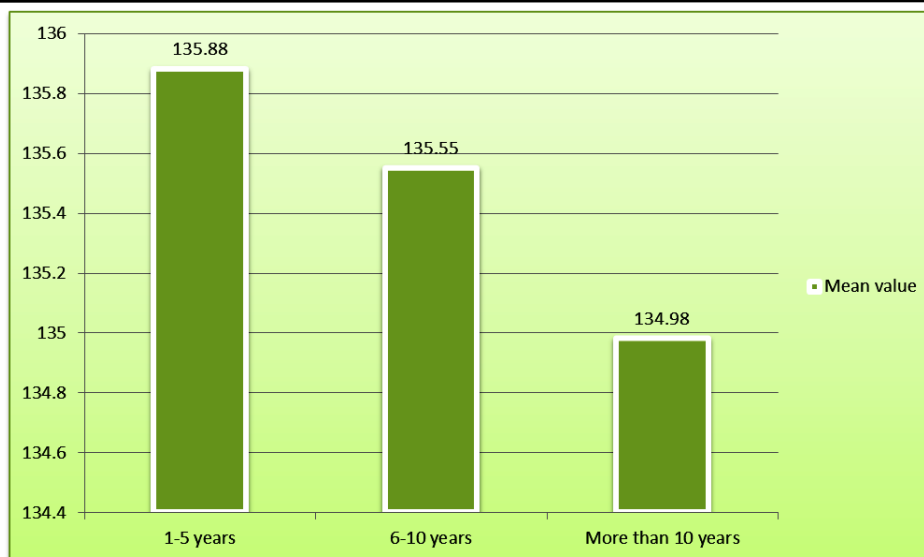
**NULL HYPOTHESIS (H<sub>0</sub>2):** There is no significant difference between the attitude of teachers towards the adoption of OER with regard to years of teaching experiences.

**Table 4.4.3:** Shows the Test of Homogeneity of Variances of teachers' attitude towards the adoption of OER based on years of teaching experiences

Levene Statistic	df1	df2	Sig.
0.422	2	218	0.656

**Table 4.4.4:** Shows the descriptive statistics of teachers' attitude towards the adoption of OER based on years of teaching experiences

Teaching Experiences	N	Mean	Std. Deviation	Std. Error
1-5 year	43	135.88	11.348	1.731
6-10 year	77	135.55	12.932	1.474
More than 10 year	101	134.98	13.449	1.338
Total	221	135.35	12.834	0.863



**Fig. 4.4.2:** Means score of teachers' attitude towards the adoption of OER based on years of teaching experience.

**Table 4.4.5:** One-way ANOVA comparison of the level of attitude of teachers towards adoption of OER based on years of teaching experiences

Parameters	Source of Variations	Sum of Squares	df	Mean Square	F	Sig.
Years of teaching experiences	Between Groups	29.001	2	14.500	0.087	0.916
	Within Groups	36205.470	218	166.080		
	Total	36234.471	220			

### Interpretations

Table 4.4.3 displays the test of homogeneity of variances. Levene's test determines the  $p$ -value is 0.656 with df 2 and 218. The test results demonstrate that the homogeneity of variance is not statistically significant at the 0.05 level ( $p > .05$ ). Therefore, the result is driven by the assumption that there are equal variances among the three different groups of teachers on the level of attitude towards the adoption of OER based on teaching experiences.

To determine if there is a statistically significant difference in the level of teachers' attitude towards the adoption of OER on the basis of years of teaching experience, the researcher calculated the data by a one-way ANOVA test. The findings of the ANOVA for descriptive statistics across groups of teachers' years of teaching

experience are outlined in Table 4.4.4. It has been observed that the mean value of teachers with 1-5 years of teaching experience is 135.88 with a standard deviation of 11.35, that the mean value for teachers with 6-10 years of teaching experience is 135.55 with a standard deviation of 12.93, and that the mean value for teachers with more than 10 years of teaching experience is 134.98 with a standard deviation of 13.83.

Following this, Table 4.4.5 summarizes the result of the one-way ANOVA. It is evident that the F value of 0.916 is lower than the critical value at a significance level of 0.05 (DF 2, 215 = 3.04). As the test statistic is significantly smaller than the critical value, thus, the null hypothesis is accepted which concludes that there is no statistically significant difference between the attitude of teachers towards the adoption of OER in relation to their years of teaching experience.

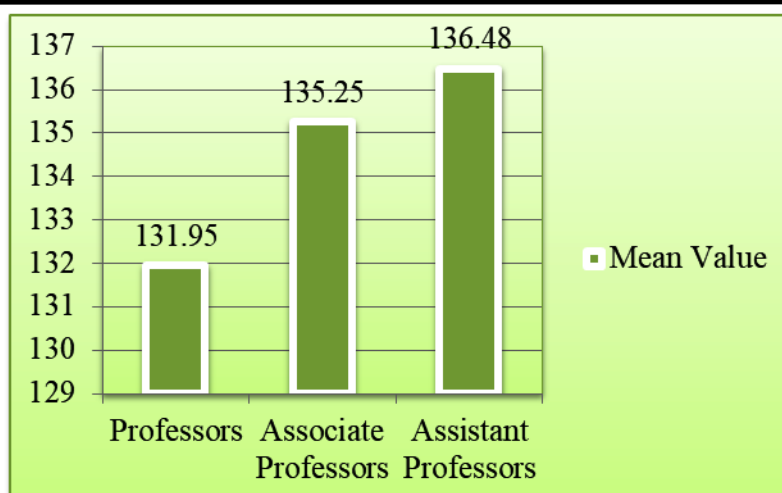
**NULL HYPOTHESIS (H<sub>0</sub>3):** There is no significant difference between the attitudes of teachers towards the adoption of OER with regard to academic rank.

**Table 4.4.6:** Shows the Test of Homogeneity of Variances of teachers' attitude towards the adoption of OER based on academic rank

Levene Statistic	df1	df2	Sig.
1.814	2	218	0.165

**Table 4.4.7:** Shows the descriptive statistics of teachers' attitude towards the adoption of OER based on academic rank

Academic Rank	N	Mean	Std. Deviation	Std. Error
Professors	43	131.95	13.522	2.062
Associate Professors	44	135.25	10.477	1.580
Assistant Professors	134	136.48	13.198	1.140
Total	221	135.35	12.834	0.863



**Fig. 4.4.3:** Mean Scores of teachers' attitude towards the adoption of OER based on academic rank.

**Table 4.4.8:** One-way ANOVA comparison of the level of attitude of teachers towards the adoption of OER based on academic rank

Parameters	Source of Variations	Sum of Squares	df	Mean Square	F	Sig.
Academic Rank of teachers	Between Groups	666.881	2	333.440	2.044	0.132
	Within Groups	35567.590	218	163.154		
	Total	36234.471	220			

### Interpretations

The results of the test of homogeneity of variances are presented in Table 4.4.6. According to the results of Levene's test, the  $p$ -value with df 2 and 218 is 0.165. The findings of the test indicate that the homogeneity of variance is not statistically significant at the 0.05 level. This shows that there are equal variances among the three main groups of teachers on the level of attitude towards the adoption of OER based on their academic rank.

In Table 4.4.7, the results of the ANOVA for descriptive statistics of teachers' attitudes towards OER adoption depending on their academic rank have been summarized. It has been found that the mean value of the Professors is 131.95 with a standard deviation of 13.52, that the mean value of the Associate Professors is 135.25 with a standard deviation of 10.47, and that the mean value of the Assistant Professors is 136.48 with a standard deviation of 13.19.

Table 4.4.8 reflects the findings of the one-way ANOVA. It is evident that the computed F value of 2.044 is lower than the critical value at a significance level of 0.05 (DF 2, 218 = 3.04). Similarly, as the test statistic is significantly lower than the critical value, thus, the null hypothesis is accepted which concludes that there is no statistically significant difference between the attitude of teachers towards the adoption of OER based on the academic rank of teachers.

**4.5. Data analysis and interpretation of Objective 3**

*To investigate the adoption of OER (in terms of 5R’s framework- retain, reuse, revise, remix and redistribute) by the teachers in higher educational institutes of North East India.*

**Quantitative analysis**

As per the responses of teachers, the tables given below show the results of the adoption of OER (in terms of 5R’s framework- retain, reuse, revise, remix and redistribute) by the teachers in higher educational institutes of North East India.

**Table 4.5.1:** Percentages of teachers who have retained OER

Item	Yes	No
Have you ever retained or downloaded online content created by others?	91%	9%

**Interpretation:**

The percentages of teachers who have retained or downloaded online content produced by others are displayed in Table 4.5.1. It shows that the majority of teachers (91%) have downloaded OER, with only 9% of them claiming to have never downloaded any OER.

**Table 4.5.2:** Percentages of teachers who have reused OER

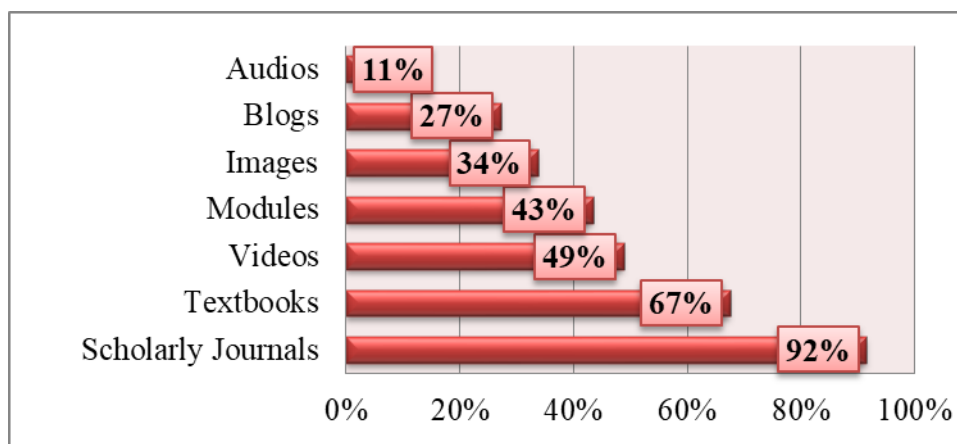
Item	Yes	No
Have you ever reused (use content created by others but without any modifications) OERs in your courses?	75%	25%

**Interpretation:**

The outline of Table 4.5.2 displays the percentages of teachers who have reused OER in their course materials. It is found that 75% of the teachers have reused, which means they have incorporated content that is developed by others into their lessons without

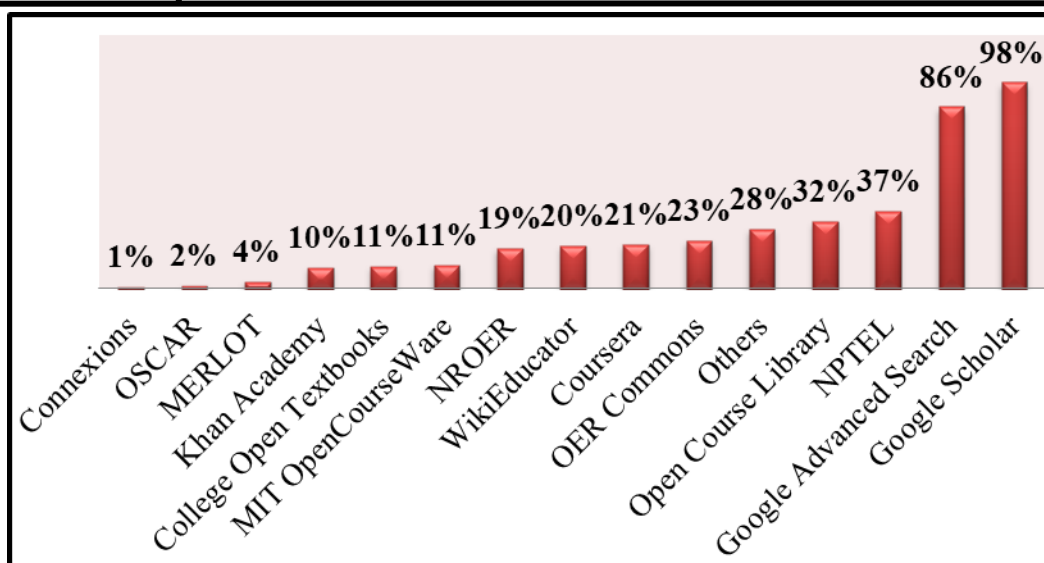
making any modifications. Whereas, 25% of them have expressed their disagreement with the proposition.

With regard to reuse, the following questions have been posed to those respondents who admitted that they have reused content created by others in its totality without making any alterations: (a) What kind of OER content have you used in your course? (b) Where did you find the OERs that you used in your classroom?



**Fig 4.5.1:** Types of OER content reused in the course.

**Interpretation:** Among the total sample that has reused OER, Fig 4.5.1 illustrates the percentages of different types of OER content that have been reused in their course materials. It has been observed that 11% of the users have reused audio; 27% of them reused content from blogs; 34% of them have reused images, 43% reused modules, and 49% of the teachers reused videos. However, the majority of the teachers, 67% and 92% reported that they have repurposed textbooks and content from scholarly publications in their classrooms teaching.



**Fig 4.5.2:** Sources from where OERs have been assessed.

**Interpretation:** After that, the teachers were further inquired about the sources from where they have assessed OER content. It can be demonstrated from Fig 4.5.2 that the majority of the teachers, around 98% assessed OER from Google Scholar, followed by 86% of the teachers who assessed from Google Advanced Search. 37% of respondents said they assessed OER from NPTEL, while 32% assessed OER from Open Course Library. 28% of respondents assessed OER from other sources, such as Project Gutenberg, z-Library, SWAYAM, E-Gyankosh, Youtube, Shodhganga, Inflibnet, NCTEOER, NCERT, and Commonwealth of Learning (COL); 23% of the teachers assessed OER content from OER Commons; 21% from Coursera; 20% WikiEducator; 19% NROER; 11% MIT Open CourseWare and College Open Textbooks; and 10% from Khan Academy; 4% from MERLOT; only 2% and 1% of the teachers assessed OER from OSCAR and Connexions.

**Table 4.5.3:** Percentages of how frequently teachers use OER in their teaching

Item	Always	Sometimes	Never
How often do you use OERs in your teaching?	10%	86%	5%

**Interpretation:** Table 4.5.3 reveals how frequently the teachers accessed OER in their teaching. It has been found that 10% of the teachers always accessed OER in their teaching, while the majority of the teachers (86%) accessed OER sometimes and only 5% of the teachers reported that they never used OER in their teaching.



**Table 4.5.4:** Percentages of how frequently teachers use OER for professional improvement

Item	Always	Sometimes	Never
How often do you use OERs in your teaching?	13%	71%	16%

**Interpretation:** Table 4.5.4 shows how frequently the teachers used OER for professional improvement. The result indicated that 13% of the teachers always used OER for professional improvement, while a vast majority of the teachers (71%) accessed OER sometimes, and only 16% of the teachers claimed that they never used OER for professional improvement.

**Table 4.5.5:** Percentages of teachers who have revised OER

Item	Yes	No
Have you ever revised the original content as per your own needs?	67%	33%
Have you ever translated or changed OER content? (E.g. translating a lesson written in a regional language or turning it into an English Audio-video material).	13%	87%

**Interpretation:** The percentages of teachers who have altered or revised OER content are displayed in Table 4.5.5. According to the findings, 67% of the teachers have modified the original content to better suit their requirements, while 33% of the teachers reported that they have not made any changes to the material. Again, it has been observed that only 13% of them agreed that they have translated OER content. While 87% of the teachers have never translated or changed OER content.

**Table 4.5.6:** Percentages of teachers who have remixed OER

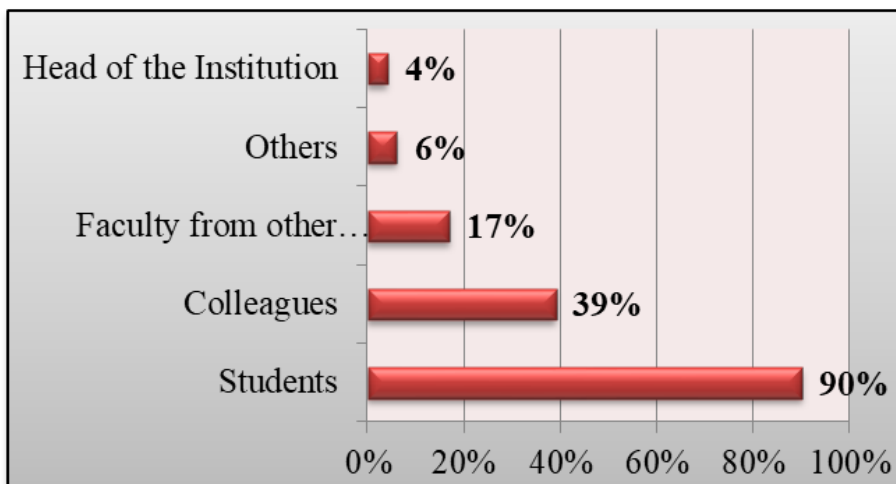
Item	Yes	No
Have you ever created new/remixed content by combining the original or revised content with other similar content?	39%	61%

**Interpretation:** Table 4.5.6 presents the percentage of teachers who have remixed OER material. According to the findings, 39% of the teachers have remixed or created new content by combining the original or revised content with other similar content whereas the majority of the teachers, 61% reported that they have not remixed or created any content by combining with other similar content.

**Table 4.5.7:** Percentages of teachers who have redistributed OER

Item	Yes	No
Have you ever redistributed any OERs?	65%	35%

**Interpretation:** Table 4.5.7 depicts the percentages of teachers who have shared or redistributed OERs. The data demonstrate that 65% of the teachers have shared OER resources with other people, whereas 35% of them have not shared OER with anyone.



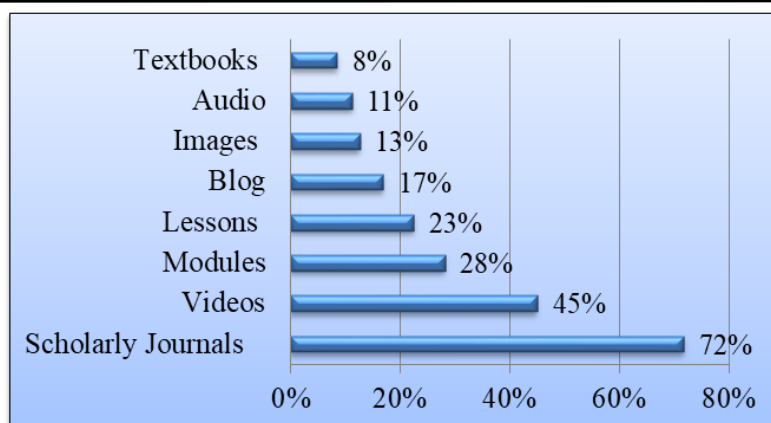
**Fig 4.5.3:** Percentages with whom OER are being shared.

**Interpretation:** Following that, the respondents were questioned about the individuals with whom they have shared OER. Figure 4.5.3 shows that the majority of teachers redistributed OER with students (90%), followed by 39% of them with colleagues; 17% of the teachers share OER with faculty from other universities; 6% of the teachers shared with others (like NCTE, NROER, NCERT, Journals for publications, NPTEL, e-PG Pathshala, SWAYAM); and 4% of them shared the OER materials with the Head of the institution.

**Table 4.5.8:** Percentages of teachers who have created OER

Item	Yes	No
Have you ever created content as OER?	32%	68%

**Interpretation:** According to the data presented in Table 4.5.8, approximately 32% of the teachers have created OER, whereas the majority of teachers, 68% of them, have not produced any content in the form of OER.



**Fig 4.5.4:** Percentages of types of OER created by teachers.

**Interpretation:** The teachers who self-identified as OER creators were further asked regarding the types of OER they created. The above figure, 4.5.4, shows that 72% of the teachers have published their OER in the form of articles in scholarly journals; 45% of them have created videos; 28% of them have created modules; 23% lessons; 17% blog content; 13% images and 11% audio; and 8% of them have created textbooks as OER.

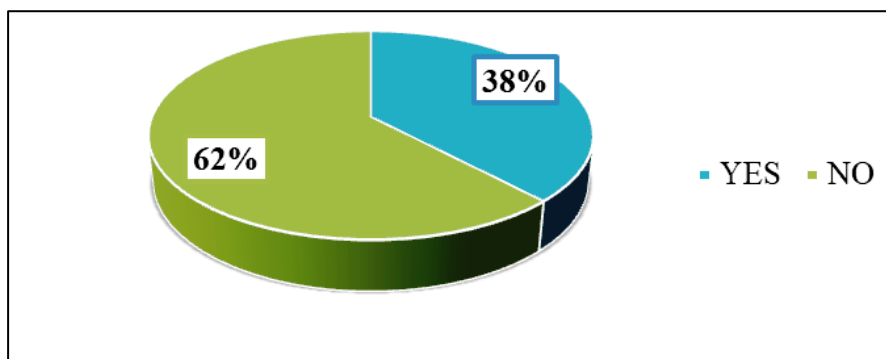
**Table 4.5.9:** Percentages of types of CC licenses under which teachers have created OER

Types of CC license	Frequency	Percentages
CC BY (reuse, remix, modify, distribute and use the content commercially with proper citation)	27	38%
CC BY-SA (reuse, remix, modify, distribute, use the content even commercially but have to publish the work under the same license conditions)	20	28%
CC BY-ND (distribute, used the content even commercially with a proper citation but cannot be modified by others)	17	24%
CC BY-NC-SA (reuse, alter, distribute the work with proper citation and publish the new work under the same license condition, but cannot be used commercially)	31	44%
CC BY-NC (distribute, remix and alter the original work by acknowledging the author but not for commercial purposes)	4	6%
CC BY-NC-ND (download and distribute the content with others, acknowledge the author, not for commercial purposes and without any alterations).	10	14%

**Interpretation:** Furthermore, the OER creators were questioned regarding the Creative Commons license under which they have published their OER. According to

Table 4.5.9, the majority of teachers (44%) have published their OER under CC BY-NC-SA (reuse, alter, distribute the work with proper citation and publish the new work under the same license condition, but cannot be used commercially) followed by 38% of teachers under CC BY (reuse, remix, modify, distribute and use the content commercially with proper citation). Besides that, 28% of them have published under CC BY-SA (reuse, remix, modify, distribute, use the content even commercially but have to publish the work under the same license conditions); 24% of them CC BY-ND (distribute, used the content even commercially with a proper citation but cannot be modified by others); and 14% under CC BY-NC-ND (download and distribute the content with others, acknowledge the author, not for commercial purposes and without any alterations). Lastly, just 6% of teachers have released their OER materials under the CC BY-NC (distribute, remix and alter the original work by acknowledging the author but not for commercial purposes).

In addition, it has been inquired as to whether or not the OER creators were engaged in collaboration with any other organizations or educational institutions for the creation of OER. The majority of OER creators, 62% responded that they have not collaborated with any other agencies or people from other educational institutions to create OERs, as illustrated in Fig 4.5.5. However, it has been found that only 38% of OER creators are involved in active collaboration with other agencies or educational institutions for the creation of OER.



**Fig 4.5.5:** Percentages of OER creators who are collaborating with other agencies or educational institutions for the creation of OER.

**Table 4.5.10:** Percentages of types of CC license preferred by teachers

Item	Frequency	Percentages
CC BY (reuse, remix, modify, distribute and use the content commercially with proper citation)	76	34%
CC BY-SA (reuse, remix, modify, distribute, use the content even commercially but have to publish the work under the same license conditions)	86	39%
CC BY-ND (distribute, used the content even commercially with a proper citation but cannot be modified by others)	32	14%
CC BY-NC-SA (reuse, alter, distribute the work with proper citation and publish the new work under the same license condition, but cannot be used commercially)	98	44%
CC BY-NC (distribute, remix and alter the original work by acknowledging the author but not for commercial purposes)	93	42%
CC BY-NC-ND (download and distribute the content with others, acknowledge the author, not for commercial purposes and without any alterations).	108	49%

**Interpretation:** Last but not least, the researcher inquired as to which Creative Commons licenses the teachers preferred. According to the data presented in Table 4.5.8, the vast majority of teachers, 49% favoured **CC BY-NC-ND** (download and distribute the content with others, acknowledge the author, not for commercial purposes and without any alterations) followed by the preference of 44% of these teachers for **CC BY-NC-SA** (reuse, alter, distribute the work with proper citation and publish the new work under the same license condition, but cannot be used commercially). 42% of teachers preferred **CC BY-NC** (distribute, remix and alter the original work by acknowledging the author but not for commercial purposes) and about 39% of teachers preferred **CC BY-SA** (reuse, remix, modify, distribute, use the content even commercially but have to publish the work under the same license conditions). Again, 34% of them preferred **CC BY** (reuse, remix, modify, distribute and use the content commercially with proper citation); however, only 14% of the overall teachers preferred **CC BY-ND** (distribute, used the content even commercially with a proper citation but cannot be modified by others).

#### **Qualitative analysis:**

From the interview analysis, the researcher identified some of the reasons behind the use or creation of OER.

**OER Users**

- (a) **For teaching-learning purposes:** The participants interviewed replied that the primary reason for using OER is for teaching and learning purposes. Some of the interviewees' comments were:

*“I favour the use of OER most. Because of it, I have access to a wide variety of resources, such as PowerPoint presentations; after verifying the content, I either distribute it to the students or apply it myself in the classroom. The primary reasons I used OER were for research and teaching-learning purposes” (P3).*

*“The sole reason behind my choice to make use of open educational resources was, unsurprisingly, academic. I want to make sure that the materials I give to my students are of the highest possible standard and accuracy” (P17).*

*“I use open educational resources for teaching in the class as it offers a wealth of information” (P26).*

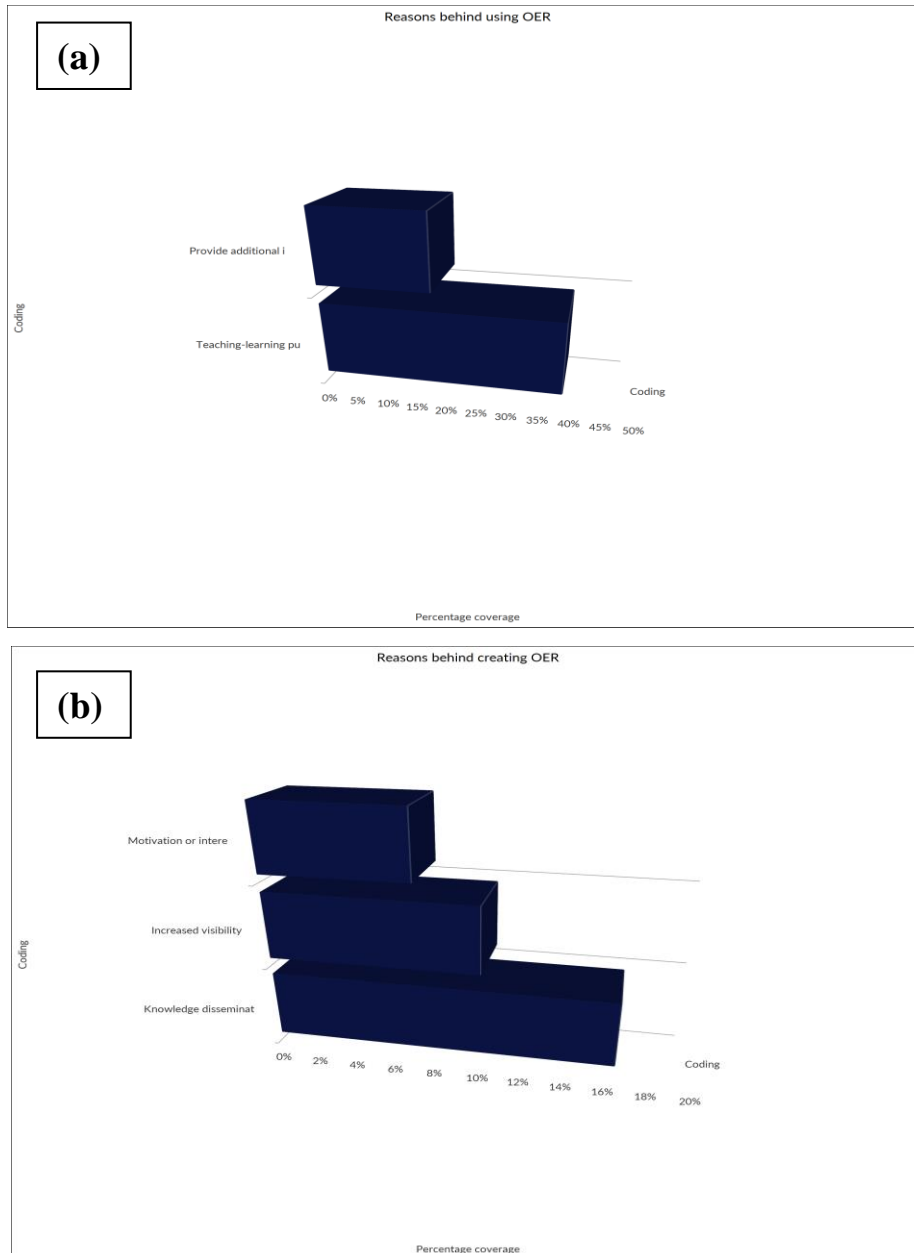
- (b) **To provide additional information:** Another reason for using OER is that additional information might be given to the pupils. Teachers highlighted that OER is an excellent source of knowledge that can add to the knowledge that has already been accumulated. This has been remarked on by the interviewees as:

*“Most of the time, when I use open educational resources; I am looking for additional enrichment knowledge so that I may get the most out of using such resources” (P6).*

*“When I need to search for further material on a topic that I teach, I primarily utilize open educational resources” (P12).*

*“I used it in the classroom as a way to augment the learning experience by providing some additional material” (P14).*

*“Using open educational resources makes the learning process more effective. When there are a large number of supplementary instances and texts, it is much simpler for the professors to deliver explanations” (P15).*



**Fig 4.5.6:** (a) NVivo coding of the reasons behind the use of OER, (b) NVivo coding of the reasons behind the creation of OER.

### OER Creators

- (a) **Knowledge dissemination:** Most of the OER creators considered creating OER because they wanted to share their expertise, knowledge, or information with other people working in the academic field, be it students, colleagues, or other people connected to the sector. Teachers believed that a wall of copyright should not be put between students and the knowledge or educational materials that they might access for free. In the words of one of the interviewees-

*“My information should be accessible to anybody and everyone, which is why I decided to publish it as OER. Why should I choose to prevent the general public, such as students and colleagues, from making use of it when someone else might find that it's helpful? It ought to be available to each and everybody” (P1).*

Another OER creator commented *“IGNOU, NIOS, NCERT, and NCTE are some of the other institutions that I am associated with, and as a result, I have created OER. The fact that it is a relatively recent advancement, the breadth of our knowledge is increasing, and it is therefore absolutely vital that we impart such resources to as many people as possible. In this age of technology, it has become one of the most effective platforms for communicating information to other people. I have created videos as well as pdfs for the teacher education programme for both the B.Ed. and the M.Ed. degrees” (P11).*

Another faculty asserted that *“.....The idea of openness appeals to me because I think that information ought to be shared as widely as possible, unrestricted by any kind of obligation or restriction” (P20).*

**(b) Increased visibility:** The OER creators answered that another reason for them to create OER is to increase their visibility or exposure in the academic community for the work that they have done. This has been mentioned by one of the professors that –

*“Increasing your visibility among academics or on a global platform by producing content and information, which in turn increases your recognition due to this fact it was produced by me” (P9).*

Likewise, the following are some additional comments made by faculty members:

*“I am preparing for my students.....In addition, I wanted to make some sort of contribution to the field of open education” (P5).*

*“I decided to develop open educational content because I want to convey my expertise, to the field of education and to the young minds. As a teacher, I must pass on what I have learned to my students and to other people” (P22).*

**(c) Motivation or interest to create:** If individuals or faculty members have a compelling interest in creating OER, they will do so. The interviews seem to point to the fact that the acts of OER creators are driven by their motivation or interest to produce OER. The following are some of the sentiments that have been voiced concerning this theme:



“I have a lot of experience with using ICT, in addition to my passion for it” (P11).

“Because I am interested in making open educational resources, I have made some of my own like published articles in journals which are under CC; videos, blogs” (P20).

**4.6. Data analysis and interpretation of Objective 4**

*To assess the current state of the enabling conditions (i.e., access, permission, awareness, capacity, availability, and volition) that facilitate teachers’ adoption of OER in the higher educational institutes of North East India.*

The next section reports on the analysis of the current state of the enabling factors or conditions that facilitate teachers’ adoption of OER in the higher educational institutes of North East India. The researcher employed percentage analysis for factors 1 and 2, while mean scores have been used to assess the current situation of factors 3, 4, 5, and 6. The interpretation of the mean scores has been guided by the established criteria outlined in previous studies conducted by Pimentel (2019) and Alotaibi, Almasari, Alkadam, Alanazi, and Gahtani (2017).

**Table 4.6.1:** Interpretation of Mean Score for factors 3,4,5 and 6

Range of Mean Score	Interpretation
1.00-1.66	Low awareness/capacity/availability/volition
1.67-2.33	Moderate awareness/capacity/availability/volition
2.34-3.00	High awareness/capacity/availability/volition

**Factor 1:** Access (Items related to Physical Infrastructure: Hardware and Software facilities)

**Table 4.6.2:** Percentages of respondents’ access to Physical Infrastructure

Items	Yes	No
Access to internet connection at home	98%	2%
Access to internet connection at department/institution	99%	1%
ICT resource centre in department/institution	79%	21%
Access to software tools like learning management tools to deliver content	67%	33%
Have a personal webpage/blog to share content	21%	79%

Table 4.6.2 presents the percentage analysis of the respondents' access to various physical infrastructure facilities. In terms of the overall sample, it has been found that 98% of the teachers do have access to a home internet connection. Only 2% of them

have responded that they do not have access to an internet connection at their homes. Also, 99% of the teachers reported having access to an internet connection at their department or institution, whereas only 1% of the teachers said they did not have an internet connection at their department/institution. The majority of the teachers (79% and 67%) stated that an ICT resource centre is available in their department/institution and they have access to software tools such as learning management tools to deliver content. Lastly, most of the teachers (79%) answered that they do not have a personal webpage or blog to share content; however, just 21% of the teachers have a blog page to share content.

**Factor 2:** Permission (items related to Institutional Property policies)

**Table 4.6.3:** Percentages of responses related to permission

Items	Yes	No
Institution have a defined IPR and copyright policy	71%	26%
Institution have copyright over the content developed by me	29%	74%

The percentages of the teachers' responses to the questions concerning permission are displayed in Table 4.6.3. 71% of the teachers surveyed stated that their institutions have a well-defined IPR and copyright policy, whereas 26% of the teachers surveyed responded that they do not. However, the majority of the teachers (74%) said that the institution does not hold the copyright over the content developed by them, although 29% of them answered that the institution does.

**Factor 3:** Awareness (Items related to the Concept of OER, its nature, Open License and CC license)

**Table 4.6.4:** Percentages, Mean and SD of respondents' awareness towards OER and its related concepts

Items	Agree	Neutral	Disagree	Mean	S.D
OERs are the free and open materials that are available on the Web.	68%	29%	2%	2.66	2.17
OERs are similar to the public domain.	36%	55%	9%	2.27	1.80
OERs are the digitally available resources published under creative commons licenses.	62%	33%	5%	2.57	2.09
Creative Commons licenses are “free, easy-to-use copyright licenses”	44%	45%	10%	2.34	1.89
The Creative Commons licenses transform all rights reserved to some rights reserved.	34%	49%	17%	2.17	1.74

Creative commons licenses still protect the moral rights of the copyright holders.	42%	44%	14%	2.27	1.84
I know how to apply creative commons license for my work.	21%	48%	31%	1.90	1.49
<b>OVERALL</b>	44%	43%	13%	2.31	1.86

Based on the data presented in Table 4.6.4, it has been inferred that the majority of participants (44%, with  $M=2.31$  and  $SD=1.86$ ) have a moderate level of awareness of OER, the nature of OER, open licenses, and CC licensing. The vast majority of teachers (68%) have a strong understanding that OERs refer to the free and open resources that are available on the internet/web. Almost 55% of the teachers are aware that OERs are similar or reside under the public domain. 62% of the teachers are aware that OERs are the digitally available resources that have been published under creative commons licenses, and that 45% of them are aware that Creative Commons licenses are "free, easy-to-use copyright licenses." While 49% and 44% of the participants have a moderate level of awareness regarding the fact that Creative Commons licenses transform all rights reserved into some rights reserved and protect the moral rights of copyright holders. However, it is revealed that only a smaller percentage of the respondents (21%) agreed that they were aware of applying Creative Commons license for their work.

**Factor 4:** Capacity (items related to ICT Competencies)

**Table 4.6.5:** Percentages, Mean and SD of respondents' ICT competencies

Items	Highly Competent	Moderately competent	Less Competent	Mean	SD
Ability to understand basic computer understanding and concepts.	58%	40%	2%	2.56	2.07
Ability to create web pages.	13%	48%	40%	1.73	1.31
Ability to install and configure application software.	29%	56%	16%	2.13	1.68
Ability to create, upload and edit multimedia.	21%	57%	23%	1.98	1.54
Ability to navigate different search engines.	42%	49%	9%	2.33	1.87
Ability to find required educational resources on the internet.	62%	35%	3%	2.59	2.10
Ability to share and upload resources (OER) on the web.	7%	55%	38%	1.69	1.24
<b>Overall</b>	33%	48%	19%	2.14	1.69

## CHAPTER 4 | ANALYSIS AND INTERPRETATION OF DATA

It can be deduced from Table 4.6.5 that the majority of the participants (48%, with  $M=2.14$  and  $SD=1.69$ ) have moderate levels of ICT competencies. In terms of their ability to understand basic computer concepts, more than half of the teachers (58%) exhibited a high level of competence. The percentage analysis revealed that the majority of the teachers have a moderate level of competency in the following areas: creating web pages (48%,  $M=1.73$ ,  $S.D=1.31$ ); ability to install and configure application software (56%,  $M=2.13$ ,  $S.D=1.68$ ); ability to create, upload and edit multimedia (57%,  $M=1.98$ ,  $S.D=1.54$ ); ability to navigate different search engines (49%,  $M=2.33$ ,  $S.D=1.87$ ). In addition, it has been discovered that the majority of teachers, approximately 62%, have a high degree of competency in locating the necessary educational resources on the internet. On the other hand, only a small percentage of teachers, specifically 7%, have a high degree of competency to share and upload OER on the web.

**Factor 5:** Availability- (Items related to Relevance/Quality of the OER content)

**Table 4.6.6:** Percentages, Mean and SD of respondents' availability (Relevance/Quality of the OER content)

Items	Agree	Neutral	Disagree	Mean	SD
Satisfied with the quality of free and open educational resources created by others	32%	64%	5%	2.27	1.78
Content relevant to your teaching context	30%	65%	5%	2.24	1.76
The quality of OER is inferior to the proprietary resources	11%	63%	26%	1.85	1.39
OER content presented at a reading level appropriate for higher education students	30%	61%	9%	2.21	1.74
OER provide useful and authentic sources of information	37%	57%	6%	2.30	1.83
The instructions or exercises given in the content clear and comprehensive	33%	62%	5%	2.29	1.80
The language of the OER content free of grammatical, spelling and typological errors	22%	62%	16%	2.06	1.60
Ensure the quality of OER before its use	65%	34%	0%	2.65	2.14
Ensure the authenticity of the OER before use	63%	36%	1%	2.62	2.12
<b>OVERALL</b>	36%	56%	8%	2.28	1.80

Table 4.6.6 represents that the majority (56%, with  $M=2.28$  and  $S.D=1.80$ ) of the teachers have a moderate level of availability in terms of relevance or quality of the

OER content. The majority of respondents, 64%, have a neutral opinion on whether or not they are satisfied with the quality of the free and open educational resources that were developed by others. Out of the total, 65% and 63% have neutral views about the OER content relevant to their teaching context and that the quality of OER is inferior to the proprietary resources. However, 61% of the respondents see that OER content is presented at a reading level appropriate for higher education students; and 57% of respondents believe that OER provides useful and authentic sources of information. 62% of the teachers showed neutral opinion on the statement that the instructions or exercises provided in the OER content are clear and comprehensive and that the language of the OER content is free of grammatical, spelling and typological errors. In addition, 65% and 63% of the teachers agreed that they used to ensure the quality and authenticity of the OER before use.

**Factor 6: Volition (Items related to Personal Motivation)**

**Table 4.6.7:** Percentages, Mean and SD of respondents’ Volition (Personal Motivation)

Items	Agree	Neutral	Disagree	Mean	SD
Giving credit to the professional profile will encourage me for OER adoption	64%	29%	7%	2.57	2.10
I feel confident adopting OER	52%	39%	9%	2.43	1.97
I am eager to learn more about OER	69%	31%	0%	2.69	2.18
I am motivated towards creating OER with colleagues	57%	33%	10%	2.47	2.02
I am motivated towards using OER in teaching	52%	38%	10%	2.43	1.97
<b>OVERALL</b>	59%	34%	7%	2.51	2.05

According to the data presented in Table 4.6.7, the majority of teachers (59%, with M=2.51 and SD =2.05) have a high level of volition that relates to their personal motivation to adopt OER. 64% of the teachers agreed that receiving professional credit will encourage them to OER adoption. Most of the teachers (52%) agreed that they were confident to adopt OER and 69% of them were eager to learn more about OER. More than half of the participants (57% and 52%) were motivated to create and use OER.

#### 4.7. Data analysis and interpretation of Objective 5

*To ascertain the relationship between the factors that influence OER adoption and the attitude of the teachers towards OER adoption.*

NULL HYPOTHESIS (**H<sub>0</sub>4**): There exists no relationship between access to the infrastructural facility and the attitude of the teachers towards the adoption of OER.

##### Quantitative analysis:

**Table 4.7.1:** Point Biserial Correlation Coefficient of access to the infrastructural facility and attitude of the teachers towards the adoption of OER

	ACCESS TO INFRASTRUCTURAL FACILITY	1	2	3	4	5	6
1	Access to internet connection at home	1					
2	Access to internet connection at department/institution	-0.013	1				
3	ICT resource centre in department/institution	-0.07	.186**	1			
4	Access to software tools like learning management tools to deliver content	-0.094	.137*	.309**	1		
5	Have a personal webpage/blog to share content	-0.012	0.05	0.076	.196**	1	
6	Attitude towards adoption of OER	<b>0.009</b> (0.894)	<b>0.096</b> (0.155)	<b>0.038</b> (0.578)	<b>-0.031</b> (0.651)	<b>0.012</b> (0.854)	1

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

As shown in above Table 4.7.1, there is a weak or negligible correlation between access to internet connection at home ( $r_{pb}=0.009$ ,  $p=0.894$ ); access to internet connection at department/institution ( $r_{pb}=0.096$ ,  $p=0.155$ ); ICT resource centre in department/institution ( $r_{pb}=0.038$ ,  $p=0.578$ ); access to software tools like learning management tools to deliver content ( $r_{pb}=-0.031$ ,  $p=0.651$ ) and having a personal webpage/blog to share content ( $r_{pb}=0.012$ ,  $p=0.854$ ) with teachers' attitude towards OER adoption. The  $p$ -value is greater than the level of significance of 0.05, which meant that the correlations between any of these variables did not meet the criteria for being significant. Hence, it proved the null hypothesis and found no evidence to support the idea that there is a connection between having access to various infrastructure facilities and the attitude of teachers toward the adoption of OER.

##### Qualitative analysis:

However, the researcher received mixed responses from the participants when asked about their opinions on whether or not access to infrastructural facilities influences the adoption of OER. Teachers described in detail how ICT infrastructure is a catalyst for OER use but not an ardent promoter of OER uptake in the university. The quantitative result indicating access is not an influencing factor that influences attitudes towards OER adoption has also been represented by many of the interviewees. For example, one faculty who is currently using OER said:

*“It does hinge on access to the infrastructural facility, but if lecturers are connected with these facilities, we still have the choice of either using or creating OER. Thus, I will opine that having access to the internet, a desktop computer, a laptop, or any other software is necessary for the use of any technology, but it is not an essential factor that can affect my choice to use OER” (P9).*

In agreement with the viewpoint presented above, a faculty who has created OER stated that *“Adoption of OER requires, without a doubt, high-quality ICT facilities and equipment. And all of these facilities are available to us at any time; therefore, access can be a barrier in rural areas, but in my situation, as I have the availability, I do not believe that it directly influences the use of OER” (P13).*

The following are some additional remarks in support of the quantitative results: *“I believe infrastructure is a prerequisite that is necessary for the adoption of OER into the classroom, but it is not adequate on its own. To make use of or develop OER, one obviously needs access to the necessary infrastructure” (P16).*

However, in the opinion of one of the OER creators *“Access, in my view, is not a factor that influences or facilitates the adoption of OER in higher education. Indeed, a desktop computer, internet access, and other applications are required, but having these things does not compel a person to use or generate OER. For instance, even if universities possess the necessary hardware and software for adopting OER, if they do not possess the necessary technical skills or awareness that are necessary to use those hardware and software, the adoption of OER may not be successful. Hence, I will state unequivocally that accessibility cannot play a role in the process of increasing the adoption of OER in higher education” (P22).*

*“The primary infrastructural facility in central universities is the physical equipment, such as computers, servers, and network infrastructures that must be available in order to implement OER. Hence, access is important, but this consideration on its own is not enough to convince educators to use or create OER. You can see that our university is very technologically sufficient; nonetheless, you may be wondering whether or not this has assisted the adoption of OER. Not at all, because there is an absence of consciousness. Many of us are still unfamiliar with the OER concept” (P28).*

However, on the other hand, some of the interviewees expressed concerns about the broadband connection for OER adoption. These issues are voiced more commonly by those who reside in hilly areas, as it is stated that these people have a more challenging time accessing a reliable internet connection. The faculty quoted *“In my opinion the convenience with which we access the internet is sufficient. Because of the remoteness of our location (hilly areas), we frequently experience issues with internet connectivity, such as sluggish speeds or intermittent blackouts. One of the most important requirements for making use of these educational resources is a web connection” (P2).* Someone else pointed out, *“When there is access to hardware and software facilities, I believe that it will lead to an increase in the utilization of OER. In my opinion, those two parameters (hardware and software) are the primary key to facilitating the adoption of OER” (P6).*

**NULL HYPOTHESIS (H<sub>0</sub>5):** There exists no relationship between permission and the attitude of the teachers towards the adoption of OER.

**Quantitative analysis:**

**Table 4.7.2:** Point Biserial Correlation Coefficient of permission and attitude of the teachers towards the adoption of OER

	<b>Permission</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>1</b>	Institution have a defined IPR and copyright policy	1		
<b>2</b>	Institution have copyright over the content developed by you	.194	1	
<b>3</b>	Attitude towards adoption of OER	0.055 (0.416)	.029 (0.673)	1



Table 4.7.2 demonstrates that there is a weak or negligible correlation between an institution having a defined IPR and copyright policy ( $r_{pb}=0.055$ ,  $p=0.416$ ) and an institution having copyright over the content developed by you ( $r_{pb}=0.029$ ,  $p=0.673$ ) with teachers' attitude towards OER adoption. The p-value is greater than the level of significance of 0.05, which meant that the correlations between any of these variables did not meet the criteria for being significant. Consequently, the result accepted the null hypothesis that there is no relationship between permission and the attitude of the teachers toward OER adoption.

### **Qualitative analysis:**

The researcher interviewed teachers about the extent to which permission in the form of guidelines or an OER policy would influence their decision to adopt OER or their attitude towards OER. The OER users and creators all offered the same response, that a policy could persuade individuals to think more seriously about using them. Some of these statements stipulated that the permission might be responsible for less awareness of the actual use of OER and the creation of OER by the teachers, while not influencing their attitude towards the adoption of OER (who already know it). So, in a general sense, it is arguable that permissions do not influence the adoption of OER; rather, they are to blame for less knowledge.

The faculty members reasoned that:

*“Indeed, the creation of a guideline for the use of OER in educational institutions has my full support. From what I can recall, the draft of the NEP 2019 did, in fact, include about OER as a support service for students who are engaged in a distance learning programme. In addition, to encourage and educate educators to produce digital content that is licensed under creative commons. The provision of the educational content of a high standard and free from intellectual property restrictions was also emphasized in the proposal. So, I am assuming that having such a policy in place would have increased our level of knowledge or would have encouraged us to adopt OER” (P5).*

*“Acceptability is the most important consideration for us to make while adopting such resources. The inclusion of OER into higher education can be made more seamless with acceptance from the UGC or from our universities in the form of guidelines such as intellectual property rights and copyright regulations” (P10).*

An OER creator further stated that guidelines should be established with regard to promoting OER, just as the UGC has mandated that higher education institutions must offer students the opportunity to earn credit for up to 40% of their coursework from MOOCs. This has been stated as *“The authority has started a great deal of policies, such as installing smart classrooms in every department and mandating that MOOCs be included in the curricula of every department. At the master's level, the curriculum for every department is required to allocate at least 20% of the available credit to MOOCs. If you produce any kind of content for MOOCs or any other kind of online platform, then it will be counted against your career advancement or marks in any recruitment procedure. This policy has already been established by the UGC. It is one of the driving forces for the creation of such materials. Hence, to answer your question, yes, I do think that a policy or guidelines relating to OER should be formulated to facilitate the adoption of OER in each and every university” (P1).*

One of the interviewees who have developed OER expressed their belief that *“I have created OER despite the fact that there is no OER policy in India or in the rules of the university, as I am interested in developing more OER in the future. Hence, it is true that having a policy or guideline in place would have assisted in accelerating the adoption of OER in India; however, I am unable to determine whether or not such a policy or guideline would have any positive or negative influence on the mindset of teachers” (P22).*

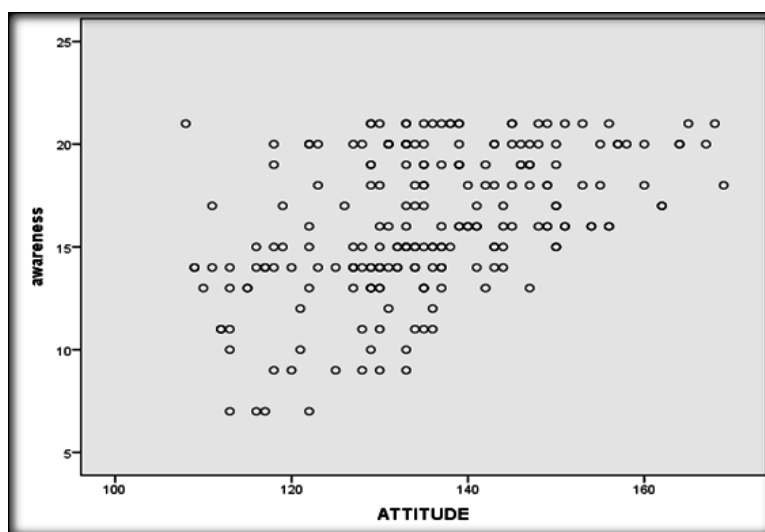
**NULL HYPOTHESIS (H<sub>06</sub>):** There exists no relationship between awareness and the attitude of the teachers towards the adoption of OER.

**Quantitative analysis:**

**Table 4.7.3:** Pearson Correlation of awareness and attitude of the teachers towards the adoption of OER

		Awareness	Attitude
Attitude	Pearson Correlation	1	.469**
	Sig. (2-tailed)		.000
	N	221	221
Awareness	Pearson Correlation	.469**	1
	Sig. (2-tailed)	.000	
	N	221	221

As shown in Table 4.7.3, the value of the Pearson correlation coefficient ( $r$ ) is estimated to be 0.469 with a  $p$ -value of  $0.00 < 0.05$  level of significance. This means that teachers' awareness and attitudes towards OER adoption are correlated, therefore rejecting the null hypothesis. The data demonstrates that there exists a moderately significant positive relationship between the variable awareness and attitude of the teachers towards OER adoption. The result has been presented through a scatterplot (see Fig. 4.7.1).



**Fig. 4.7.1:** Scatterplot showing the correlation between awareness and attitude of the teachers towards the adoption of OER.

**Qualitative analysis:**

From the interview data, it has been found that teachers are aware of the significance of the knowledge about OER to make use of it and develop it. They believed that awareness is one of the crucial factors that ensure the successful adoption of OER. People need to be aware of the technologies to be able to use them. It is essential to have an appropriate understanding of any innovation or technology to ensure its successful adoption and technology. This has also been demonstrated by the statement made by an OER creator, *“Indeed, awareness is a very significant factor. If I am an author and I do not know anything about CCL, how am I supposed to publish my work, how am I supposed to reuse the work of others, and how am I supposed to share my work with other people on online platforms?”* (P1).

**Another one mentioned that** *“An individual’s attitude on the ease of using the technology depends on their familiarity with the technology. In my perspective, awareness and attitude towards ICT or OER are intrinsically intertwined concepts that cannot be separated. The user must have an understanding of the system in order to have a feeling or build a viewpoint on adopting it. After then, he or she will make an effort to use or create it after they have a comprehensive understanding of how to use or develop OER and the significance of OER in education” (P5).*

Further, an OER creator stated *“The importance of being familiar with the idea cannot be overstated. To answer your question, yes, awareness does play a role in the rate of OER adoption in higher educational institutions. It seems that many faculties have the naive idea that if they create OER, they will lose the moral rights or copyright they have over the content they produce. This is either a result of misinformation or a misperception” (P18).*

An OER user outlined that *“Definitely, having awareness is very crucial. I am familiar with CCL, but I am not familiar with the details of it. I have a rough idea. I just link it with some copyright and ethical issues means that we are not allowed to modify materials that were made by someone else, so it is something that is related to ethics. It is necessary for teachers to have awareness. Knowledge of the various platforms or training on how to get started. In general, we believe that we need a camera and a room that is soundproof in order to create a video lecture; besides that, in addition to those things, there's also certain software that will enhance us to develop the quality of the videos, and we need to learn more about it” (P10).*

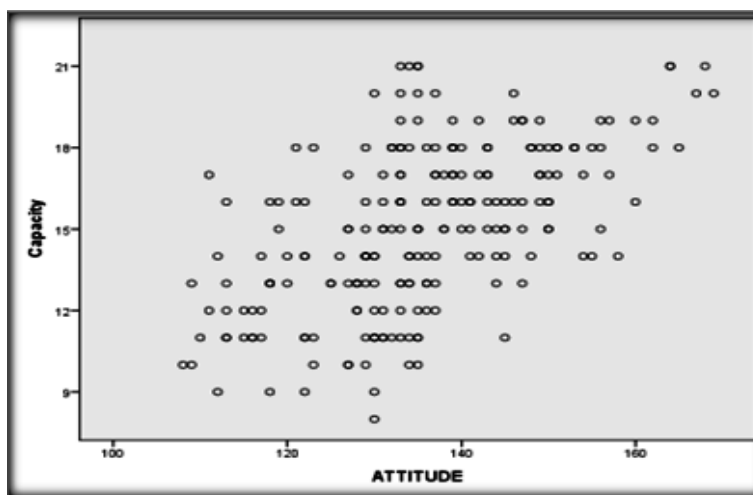
**NULL HYPOTHESIS (H<sub>0</sub>7):** There exists no relationship between the capacity and the attitude of the teachers towards the adoption of OER.

**Quantitative analysis:**

**Table 4.7.4:** Pearson Correlation of capacity and attitude of the teachers towards the adoption of OER

		<b>Attitude</b>	<b>Capacity</b>
<b>Attitude</b>	Pearson Correlation	1	.565**
	Sig. (2-tailed)		.000
	N	221	221
<b>Capacity</b>	Pearson Correlation	.565**	1
	Sig. (2-tailed)	.000	
	N	221	221

It can be determined from Table 4.7.4 that the value of the Pearson correlation coefficient (*r*) is 0.565, with a *p*-value of 0.00<0.05 level of significance. As a consequence of this, the hypothesis that there exists no relationship between the capacity and attitude of the teachers towards OER adoption is rejected. The data indicated that there is a moderately significant positive correlation between teachers' capacity and their attitudes toward adopting OER. the result has been presented through a scatterplot diagram (see Fig. 4.7.2).



**Fig. 4.7.2:** Scatterplot showing the correlation between capacity and attitude of the teachers towards the adoption of OER.

**Qualitative analysis:**

During the interview, the participants were asked whether or not their capacity for using ICT would influence their decision to adopt OER or their attitude towards OER. It has been found that teachers tend to have a greater sense of confidence in their

adoption of technology when they are certain that they possess all of the necessary skills and capabilities to use it. During the course of the interview, one of the OER creators stated, *“I would consider myself to be tech-savvy and confident enough with technology. This was a significant reason for me to create OER and have a positive attitude towards developing such resources for my students as I have the confidence to try it. The fact that I would be competent to answer any questions or handle any problems that I encountered on my own. Therefore, I will state that teachers' ICT competence is an important component that must impact their attitude towards adopting OER” (P5).*

They described the fact that having more knowledge and abilities may entail less effort when utilizing a variety of technologies, which would make them better adopters. According to the observations of one of the users of the OER, *“Certainly, of course, someone who is more knowledgeable about technology will be more competent in utilizing it, and perhaps he will always have some interest in it” (P10).*

Another user said, *“If you already have some expertise, then using OER is not a problem for you. Hence, I will confirm that having proficient digital competencies is of the foremost importance for the adoption of such educational innovation” (P15).*

In addition, the analysis of the interviews has shown that for teachers to make meaningful use of ICT in their educational process, they need to have some understanding of the pedagogical role that ICT serves. One of the participants put this idea into words as *“For teachers to successfully implement OER, they need training in fundamental pedagogical knowledge, as well as how to generate high-quality content; knowledge of operational matters and the psychological aspects of learners; and principles of curriculum development” (P22).*

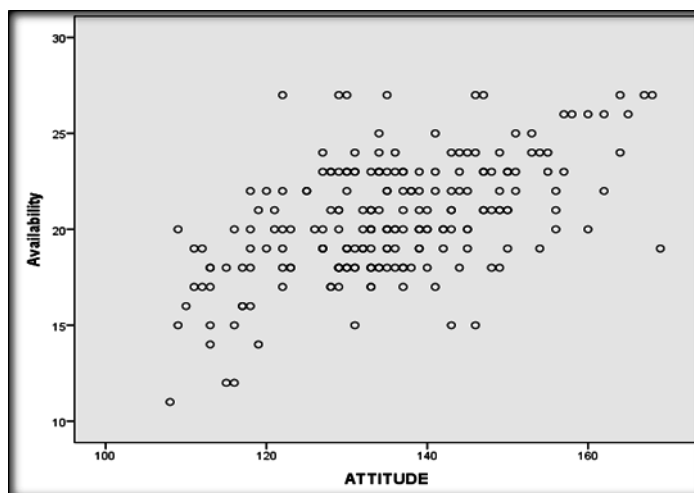
NULL HYPOTHESIS ( $H_0$ ): There exists no relationship between the availability and the attitude of the teachers towards the adoption of OER.

**Quantitative analysis:**

**Table 4.7.5:** Pearson Correlation of availability and the attitude of teachers towards the adoption of OER

		Attitude	Availability
<b>Attitude</b>	Pearson Correlation	1	.540**
	Sig. (2-tailed)		.000
	N	221	221
<b>Availability</b>	Pearson Correlation	.540**	1
	Sig. (2-tailed)	.000	
	N	221	221

Table 4.7.5 illustrates the value of the Pearson correlation coefficient ( $r$ ) which is found to be 0.540 with a  $p$ -value of  $0.00 < 0.05$  level of significance. As a result, the hypothesis that there exists no relationship between the availability and attitude of the teachers towards OER adoption has been rejected. Thus, the result indicates a moderately significant positive correlation between teachers' availability of OER content and their attitudes toward adopting OER. The result has been demonstrated through the use of a scatterplot (see Fig. 4.7.3).



**Fig. 4.7.3:** Scatterplot showing the correlation between availability and attitude of the teachers towards the adoption of OER.

**Qualitative analysis:**

When participants were asked to comment on their concerns and if they perceive quality as a factor in OER adoption, the majority of participants stated that quality is

the single most important factor in adopting OER. The use of OER is highly reliant on the quality and availability of relevant resources. The level of acceptability that these resources are used is reflected in their overall quality.

Some of the perspectives obtained from the participants, which represent that quality is an essential factor that can influence their attitude are as follows:

*“The quality of the OER that is available is inconsistent, with some of them falling well short of expectations. Nonetheless, some of them are fairly relevant with the times. From both equations, I will say that it is 50/50. Because of this, there are moments when I question whether or not we should make use of it.” (P3).*

*“The authenticity and reliable of the information should be the emphasis. My primary concern is with regard to the quality. If I am sharing something first I need to verify the information. There must be no passing down of inaccurate information from one generation to the next” (P5).*

*“The concern is with the quality; the sources should have the highest possible quality and be reliable. In my opinion, this is the single aspect that can either encourage or discourage teachers from making use of OER. And, certainly, this will have an impact on our attitudes; how we look into OER in terms of the quality and accessibility of the resources” (P14).*

*“Attitude toward adopting OER and the quality of OER seem to have a close relationship. If quality and good OER are not readily available for teachers, they will not consider using them as an alternative. They are not going to spend the time or make the effort to search for or look for such materials” (P30).*

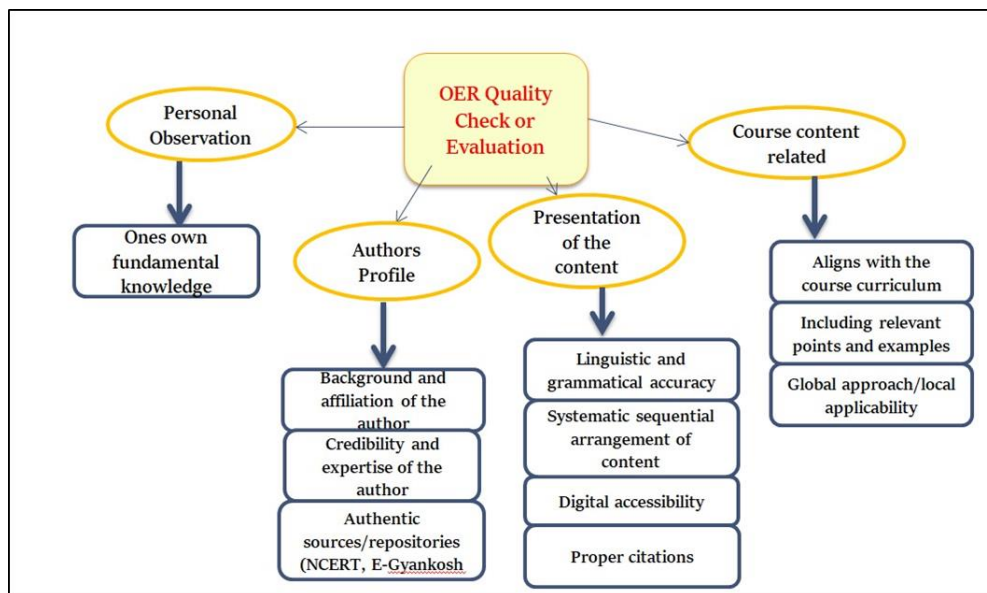
Even, concerns have been raised by teachers over the possibility of the contents being plagiarized as remarked by an interviewee *“In some cases, in the future, there is an equal chance of it getting morphed. By the word "morphed," I mean that somebody might take your work in an unethical manner and pass on this information as his own without giving recognition, which is a copyrighted issue” (P27).*

Furthermore, when asked how they determine the quality of the OER material, they brought up numerous key aspects, which are illustrated in the following Fig 4.7.4

- (a) Personal Observation:** Teachers’ personal knowledge of the subject matter is one of the criteria that have been identified from the interview transcripts as



criteria to judge the quality of OER content. This has been echoed by participants as:



**Fig 4.7.4** Interviewees’ description of criteria for OER quality check.

*“Before attempting to evaluate the quality of OER, it is imperative that I have, at the very least, a basic understanding of the concept” (P17).*

*“I am well-versed and proficient in the topic I look for, my mastery over the topic sometimes helps me to find the right information online. I keep myself up-to-date in my field. As a professor, I need to stay advanced by reading the latest publications and books and participate in various research programmes so that I can accurately assess the relevant sources” (P23).*

*“My prior knowledge of the subject matter assists me in determining the authenticity and quality of the information. If I am knowledgeable about the topic at hand, I will be able to determine whether the material that is provided is accurate or not; only after doing so will I share or use the OER. If the instructor has a limited knowledge base, then they will not be able to accurately evaluate the content of the lesson” (P30).*

This finding suggests that teachers need to have a comprehensive knowledge of the subject matter to build logical conceptual understanding, draw connections between concepts, and rectify any errors within the content. Such prior conceptual knowledge lays the groundwork for assessing the quality of the OER content.

**(b) Authors' Profile:** The profile of the author is another criteria that has come into emphasis. Before reading or using OER, many of those interviewed indicated that they always examine the educational background and affiliation of the author. They used to research the author's credentials. Therefore, based on the data obtained from the interviews, it is not just the relevance of the content that determines its quality, but also the trustworthiness and credibility of the source of the content. Some of the faculty, however, paid more attention to factors beyond the author's credentials, such as the publication site. This thought has been pointed out by some of the interviewees:

*“Verifying the originality of the author's thought is something I usually do before using any content from online sources. Who created the content?; what is that person's area of expertise?; where it has been published?; etc. These questions need to be addressed for evaluation of the content” (P3).*

*“The contents must be verified with respectable sources and knowledgeable individuals in the field concerned. Additionally, I favour using content that has been published in Sage, Taylor & Francis” (P10).*

*“The level of quality is quite crucial. It depends. I have to do a lot of browsing and then lend to some content that is more authentic; yet, we are required to crosscheck it. The credibility of the author is the primary factor to consider. Since I consider the content provided by IGNOU and E-Gyankosh to have a high level of credibility, I often refer to it as I am familiar with the editorial board” (P14).*

*“The quality is determined by the contributors who make the contributions. If the contributor has a strong command over the content, which includes information that is both high quality and pertinent, then the content will, of course, find a suitable platform. In that manner, quality may be ensured to be reliable. Also, the background of the author, including their affiliations is another criteria for me. Swayam, NPTEL, and Shodhganga are a few examples of authentic platforms that I relied on” (P32).*

**(c) Course related-content:**

When selecting an OER, one of the most significant elements for a teacher to take into consideration is how well it aligns with the content of the class. The OER ought to be aligned with the content, target audience, and professional standards of the educators that they belong to. The educational material needs to prioritize the learner, fostering active engagement within the classroom setting.

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Related and contextual examples with illustrations should be provided so that the content can be applied to real-world scenarios. This ensures that the learning experience for students is serving its intended goals. This has been stated by the participants in the following ways:

*“The content must be suitable for the target audience in terms of both age and context, with concrete examples to which students may relate” (P10).*

*“I use to determine whether or not the content is appropriate, whether or not it is appropriate for a particular group of students, and whether or not it includes proper citations and examples, explanations that make logical sense, and terminology that is simple to understand” (P28).*

During the interview, an OER creator expressed the viewpoint that *“Before utilizing, producing, or sharing OER, I would always ask myself questions such as ‘Does it indicate its audience and purpose clearly?’; ‘Can students relate themselves to the examples cited in the material?’; Does it have any connection to the cultural and social context in which they exist?’; Is it properly tailored to meet the diverse learning needs of today’s students?’. Considering this, I shaped my content following these norms” (P1).*

Moreover, teachers emphasized the need for pupils to learn content that provides authentic facts and practical experiences from the real world to prepare them for an increasingly competitive world. As illustrated by a faculty that *“According to me, the quality of a resource at this time is determined by the demands of the current generation. If the data accomplishes what it was intended to do, then I believe that the work has good quality. When one considers the current state of affairs, one sees a generation that is highly competitive and yearns for a great deal of accurate knowledge in order to enter the workforce or secure a seat in the university. Therefore, the material should include all the relevant details, with an emphasis on cultivating a critical mindset in young people so that can compete successfully for a living” (P8).*

The content should also address global and local issues to help students gain a broader knowledge of the subject matter. This has been expressed as:

*“How it has incorporated global and local issues in the text. For example, if I am developing content for political science, that same content should be applicable somewhere else in the world; if I am using some content developed by German*

*professors, it should be useful in the context of India; or the provision to modify the content so that it fits your context should be applicable” (P19).*

**(d) Presentation of the content:** Based on the findings of the interview, the teachers unanimously agreed that a well-organized presentation of the material is essential for an OER to be considered high-quality and effective. It is important to see how the content is presented to its target audience. The content of a high-quality OER should be well-written and organized logically. There must not be any typos or other grammatical or linguistic errors. The material should be presented in a universally acceptable way, with clear and appropriate typefaces, visual features, and a layout that is easily navigable for all learners. However, some teachers consider the presence of a complete source of citations and references within the text to be a hallmark of high-quality content. They thought that authors should correctly cite all sources thereby mitigating the possibility of committing plagiarism.

Some of the comments stated by the interviewees were:

*“Quality is evaluated by the standards of the content, like the writing style, presentation, use of words, etc. It should match with my professional level” (P2).*

*“It needs to be very clear, very specific, and the language needs to be relevant. The content should be well-articulated” (P16).*

*“The level of linguistic and grammatical accuracy throughout the items should be emphasized” (P25).*

*“It is important that the content be properly cited, that references be clear to avoid plagiarism, that the content be easily readable, and that the voice be clear if the material is being presented in an audio format” (P32).*

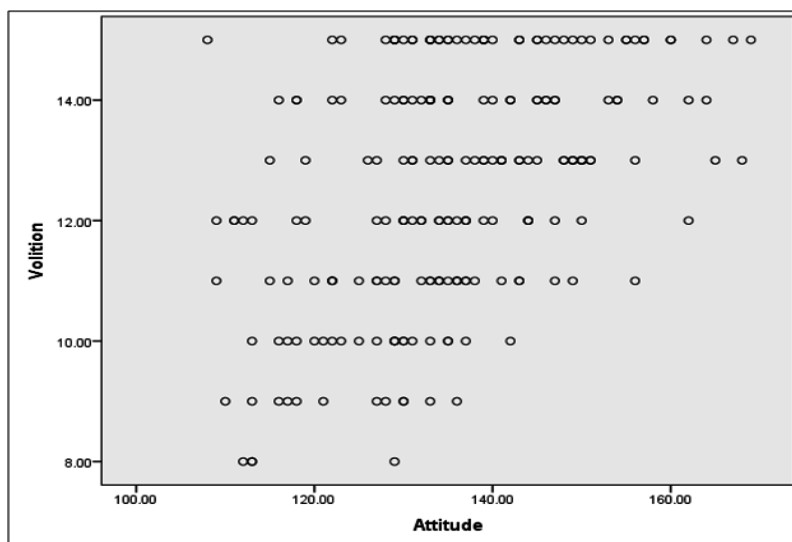
**NULL HYPOTHESIS (H<sub>0</sub>9):** There exists no relationship between the volition and the attitude of the teachers towards the adoption of OER.

**Quantitative analysis:**

**Table 4.7.6:** Pearson Correlation of volition and attitude of the teachers towards the adoption of OER

		<b>Attitude</b>	<b>Volition</b>
<b>Attitude</b>	Pearson Correlation	1	.453
	Sig. (2-tailed)		.000
	N	221	221
<b>Volition</b>	Pearson Correlation	.453	1
	Sig. (2-tailed)	.000	
	N	221	221

As displayed in above Table 4.7.6, the value of the Pearson correlation coefficient (*r*) is reported to be 0.453 which means a positive moderate correlation. The *p*-value (0.000) is smaller than the level of significance of 0.05, which meant that the correlation between volition and attitude toward OER adoption is significant. Hence, this study rejects the null hypothesis and concludes that there is a statistically moderate correlation between teachers volition to use or create OER and the attitude of teachers towards the adoption of OER. The result has been demonstrated through the use of a scatterplot (see Fig. 4.7.5).



**Fig. 4.7.5:** Scatterplot showing the correlation between the volition and attitude of the teachers towards the adoption of OER.

**Qualitative analysis:**

The participants in the interview all affirmed that their level of motivation is a driving factor that affects their attitude toward the adoption of OER. This has been realized that teachers' outlook on making use of or producing OER will not improve until and unless there is an intrinsic drive among them. Some of the statements that confirm the motivation of teachers influence their attitude are outlined below:

*“As authors and teachers, we are required to give it some thought and to be self-motivated about the adoption of OER. The consciousness of the teachers is sufficient and essential. It is sufficient to deliver trustworthy papers to others if one possesses self-awareness, self-motivation, and authentic self” (P1).*

*“On an institutional scale, there have been a number of conferences, seminars, and workshops, as well as the Swayam Platform that has encouraged us about OER and made us aware of OER. But, the personal urge of knowing and the personal urge of seeking out knowledge and developing OER is the most important catalyst for its development” (P5).*

*“Obviously, a lot of educators lacked prior expertise in the field of OER creation as OER is a relatively recent development in the field of education. As a result, the need for motivation among us is apparent. It had an impact on the adoption of OER” (P10).*

*“In order to develop such materials, teachers need intrinsic motivation. My level of interest is what pushed me to create OER, which I have done. The relationship between motivation and attitude is reciprocal. We are unable to cultivate a positive attitude if we are not motivated.” (P21).*

**4.8. Data analysis and interpretation of Objective 6**

*To explore the effectiveness and challenges in the adoption of OER in the higher educational institutes of North East India from the perspective of OER users and OER creators.*

**Qualitative analysis:**

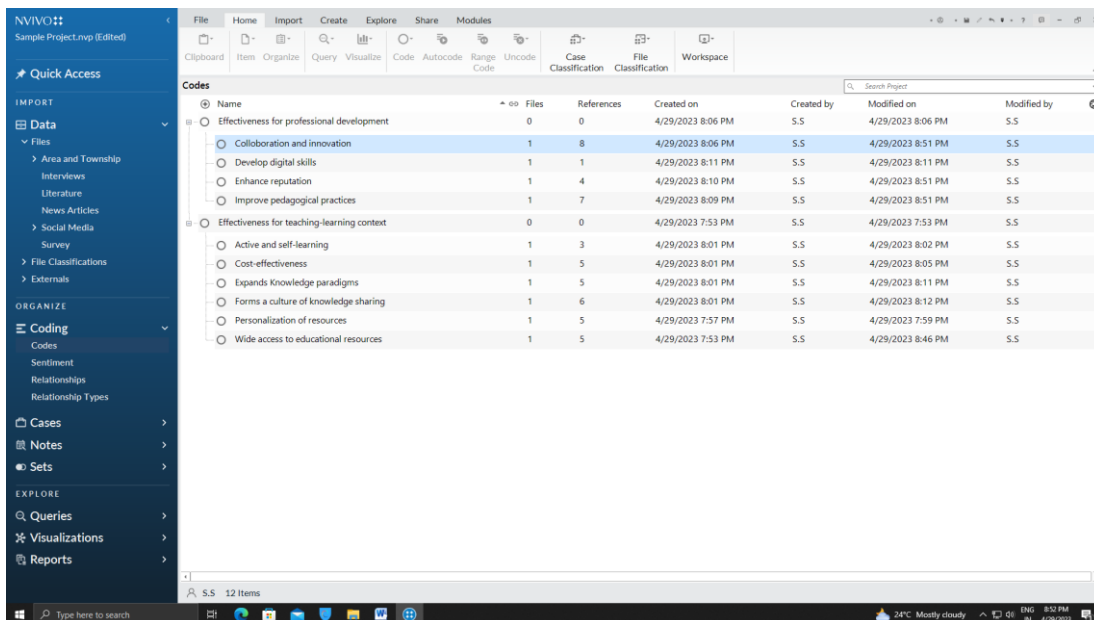
The researcher seeks to explore the effectiveness of OER adoption in the context of higher education. The effectiveness of OER has been addressed by all interviewees with respect to the teaching-learning process and professional development. The analysis of interview data has been carried out with the help of NVivo software. The

## CHAPTER 4 | ANALYSIS AND INTERPRETATION OF DATA

sub-themes or codes of this analysis generated from the transcribed data have been presented in Fig 4.8.1 and 4.8.2 (through tree map).

### *Effectiveness of OER in the teaching-learning processes at higher education institutions*

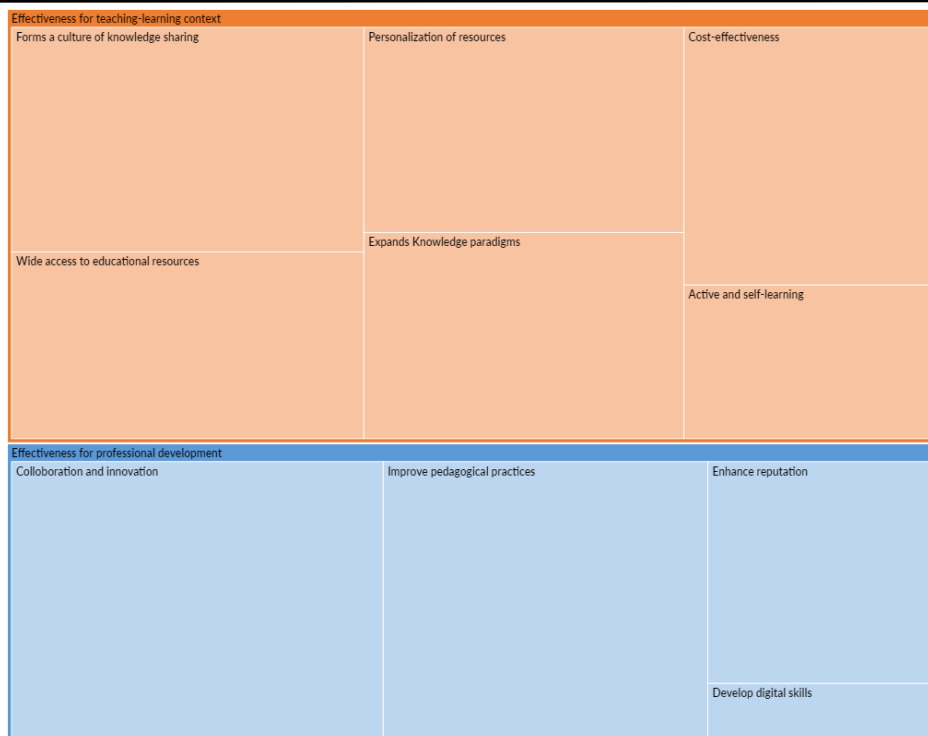
The teachers hold the belief that OER possesses the potential to enhance the educational experience for both teachers and students. OER offers a diverse range of information sources that expand one's knowledge paradigm. This involves the process of searching for information, questioning its validity, analyzing its content, summarizing its key points, and sharing it with others. The transcribed data yielded the formation of the subsequent sub-themes.



The screenshot displays the NVIVO software interface with a list of codes. The main theme is 'Effectiveness for teaching-learning context and professional development'. The subcodes are listed in a table with columns for Name, Files, References, Created on, Created by, and Modified on.

Name	Files	References	Created on	Created by	Modified on
Effectiveness for professional development	0	0	4/29/2023 8:06 PM	S.S	4/29/2023 8:06 PM
○ Collaboration and innovation	1	8	4/29/2023 8:06 PM	S.S	4/29/2023 8:51 PM
○ Develop digital skills	1	1	4/29/2023 8:11 PM	S.S	4/29/2023 8:11 PM
○ Enhance reputation	1	4	4/29/2023 8:10 PM	S.S	4/29/2023 8:51 PM
○ Improve pedagogical practices	1	7	4/29/2023 8:09 PM	S.S	4/29/2023 8:51 PM
Effectiveness for teaching-learning context	0	0	4/29/2023 7:53 PM	S.S	4/29/2023 7:53 PM
○ Active and self-learning	1	3	4/29/2023 8:01 PM	S.S	4/29/2023 8:02 PM
○ Cost-effectiveness	1	5	4/29/2023 8:01 PM	S.S	4/29/2023 8:05 PM
○ Expands Knowledge paradigms	1	5	4/29/2023 8:01 PM	S.S	4/29/2023 8:11 PM
○ Forms a culture of knowledge sharing	1	6	4/29/2023 8:01 PM	S.S	4/29/2023 8:12 PM
○ Personalization of resources	1	5	4/29/2023 7:57 PM	S.S	4/29/2023 7:59 PM
○ Wide access to educational resources	1	5	4/29/2023 7:53 PM	S.S	4/29/2023 8:46 PM

**Fig 4.8.1:** Subcodes of the main theme “Effectiveness for teaching-learning context and professional development”.



**Fig 4.8.2:** Representing the sub-themes that emerged in the interview transcript through a tree-map chart.

### **OER offers stakeholders extensive access to educational resources**

The study's participants elaborated upon the potential of OER to provide educational stakeholders with a diverse range of resources that can facilitate teaching and learning across various levels. These assets have the potential to augment current educational conditions, broaden the reach of educational opportunities, and facilitate research endeavours. OER facilitated the dissemination of these educational materials to students, who are able to access them at no cost. According to the data, teachers view OER as a platform that offers a plethora of information sources, which are easily accessible and available at any time and place. Teachers have the ability to utilize an OER repository to locate lesson plans, presentations, and activities that are in accordance with their academic programme. The following are a few of the statements made by the interviewees.

*“OERs encompass a diverse array of educational materials, such as textbooks, lectures, and multimedia resources. The availability of a broad spectrum of learning resources guarantees that students can access a diverse array of educational materials that accommodate their unique learning requirements” (P1).*



*“OER are beneficial since they aid students. Currently, a significant portion of educational activities is conducted through online platforms or in hybrid mode. Additionally, MOOCs have emerged as a popular means for individuals to provide educational offerings. Considering the ever-increasing demand for online learning, OER offers students a valuable opportunity to obtain a vast quantity of materials through open pathways” (P6).*

*“Bringing OER into the classroom is an approach that I support. When we look at the course outline, we may find that we do not immediately receive sufficient or specialized resources; however, with the help of this media, we can gain access to a wide resource. I use it as supplemented materials in classroom teaching” (P10).*

*“I think OER will help in teaching and learning because it provides vast information via open access” (P19).*

*“OER can be used to support education initiatives and promote educational access and equity on a global scale” (P26).*

#### **OER allows for the personalization of resources**

A major perk of OER is its capacity to enable the customization of learning materials, thereby allowing learners to adapt their learning experience to suit their individualized needs and preferences. One of the participants said the utilization of OER as a personalized approach to instructional materials. He further elaborated that *“they (OER) can be modified in any way, lawfully. Since my students in a P.G. classroom come from a wide range of socioeconomic and cultural backgrounds, I must tailor my lessons to meet their specific needs, and OER is one such platform that supports me in this circumstance. It is an individualized approach to educational materials that is designed to meet the necessities of the students” (P24).*

The customization and adaptation of resources can potentially enhance student engagement and motivation by catering to their individual needs. During the interview, one of the participants pointed out that *“According to me, the use of OER will definitely enhance the culture of teaching-learning because OER are something that can be customized and adapted to meet the specific needs of learners, improving the quality of education and increasing student engagement” (P9).*

Another participant stated *“It is extremely helpful because the content is developed by experts from all over the world, and it is simple to modify and reproduce as long as the*

*appropriate citation is included. OER offers me with some new information that I was able to incorporate into my teaching” (P2).*

*“OER promotes individualized knowledge construction, allowing students and educators to organize and analyze knowledge at their own pace. OER provides students with the opportunity to construct their own knowledge and learning environment. For example, teachers can modify and remix Khan Academy's videos to create personalized learning experiences for their students” (P4).*

The teacher has an opportunity to adapt an OER lesson plan to include illustrations from their local community. As described by one of the faculty, *“The ability to remix or modify helps a lot. As a faculty of English I use OER materials to teach a language class, incorporating local idioms or cultural references” (P25).*

### **OER promotes active and self-learning**

The analysis of the interview disclosed that OER can serve as a potent instrument for fostering self-directed and active learning. The adoption of OER makes it possible to develop dynamic learning environments that cater to a variety of learning preferences and needs. OER facilitates self-directed learning by enabling students to independently explore topics and study materials according to their own preferred pace. Various forms of multimedia such as videos, podcasts, textbooks, and simulations can serve as effective tools for boosting the understanding of the subject matter. As evidence in support of this argument, participants affirmed that:

*“OER facilitates the blending of multimedia and various interactive elements into the educational experience, resulting in an engaging and interactive learning environment for students. Sometimes I use an OER video to present a new concept, followed by a class discussion to help students for a more comprehensive inquiry of the topic. This can encourage active participation and engagement in the learning process” (P32).*

An OER creator commented that *“If professors use them in the right way, OER possess an avenue to foster a more appealing and interactive educational environment for our pupils” (P22).*

Some OER comes in the form of interactive learning content, such as the courses offered on the SWAYAM platform or MIT OpenCourseWare. These courses allow for real-time task and assignment completion, quick feedback, and multimedia content, all of which are designed to cater to the various educational needs of learners. As remarked one OER user *“OER provide learners the autonomy to acquire knowledge at*

*their own pace and according to their unique needs. The MIT OpenCourseWare initiative offers free access to academic resources from MIT courses” (P30).*

### **OER expands knowledge paradigms**

OER exhibits the potential to expand individual knowledge paradigms through the provision of cost-free access to a diverse range of educational materials. Individuals can broaden their knowledge beyond the scope of a conventional classroom environment by assessing resources from various authors and institutions. Meanwhile, OERs are produced through a collective effort involving a group of educators and specialists, thereby enabling the integration of diverse viewpoints and knowledge into a single material. This can facilitate the acquisition of extensive knowledge of the topic among students and teachers. This has been brought up in the interview by several faculty members and they stated that-

*“By leveraging these resources, we can increase the scope and complexity of our understanding of the world around us by gaining new knowledge, abilities, and perspectives. As an example, if I or a student watches an OER lecture series on world history that gives diverse perspectives on historical events, we will obtain a broader view of the past as a result of using this resource” (P3).*

*“The use of OER unquestionably encourages a broader reach to content and information through the internet, hence expanding the sphere of knowledge acquisition” (P14).*

*“It is of the utmost significance now that such educational innovations should be embraced in higher education for the benefit of students, and I will urge that students be encouraged to make use of them. At the university level, students are not provided with knowledge in a spoon-fed manner. Educators do not impart every bit of knowledge within the walls of the classroom. We expect pupils to figure it out on their own. OER has presented a novel opportunity for students with a new way to learn beyond the scope of one class. They can acquire knowledge independently through various means such as reading articles, watching educational content on platforms such as YouTube, and enrolling in courses offered by platforms like Swayam and Coursera, all of which are available at no cost” (P20).*

*“There are times when we do not have a sufficient understanding of a particular concept; yet, through the use of OER, one has the opportunity to enhance their pre-existing knowledge” (P31).*

**OER forms a culture of knowledge-sharing**

Based on the narratives of the interviewees, OER has played a noteworthy role in fostering a culture of knowledge diffusion. OER have the potential to cultivate a culture of knowledge sharing among educators by enabling them to share their resources with others in the field. This process can facilitate the development of new resources and enhance the quality of pre-existing ones. The concept of knowledge-sharing culture relates to the sharing of knowledge and resources to improve learning and growth. Many participants noted that:

*“I have no doubt in my mind that the culture of knowledge will improve as a result of increased sharing and open access to materials such as OER” (P7).*

*“The most effective way for us to expand our knowledge is to share it with other people. The act of sharing is valuable to the field of education. It is the wisest course of action to master. And open licenses will make it possible to legally share materials with others”(P11)*

*“In my opinion, the concept of copyright and IPR, despite the fact that, to some extent, they declare that they would safeguard the knowledge, but it treats the knowledge as property. I basically think that knowledge should mainly be for the purpose of sharing. There is a saying that ‘when we share knowledge, the knowledge will not shrink rather it will to expand’. When I see from this angle, it is clear that OER will play an important part in knowledge dissemination” (P13).*

*“Indeed, authentic materials authored by the contributors need to be uploaded to the website so that new information can be generated and existing knowledge can be developed. If this does not occur, then the knowledge culture will not expand” (P15).*

*“I find OER very helpful in the exchange of cultural and intellectual information. We get access to the best materials, which we may reproduce, download, and distribute to our other students and friends. This illustrates the simplicity of using OER” (P16).*

**OER represents a cost-effective approach for both students and teachers**

Participants in the interview regard OER as an economically viable alternative to traditional textbooks and educational materials, thereby enhancing the accessibility and affordability of learning resources for teachers as well as students, especially those from low-income backgrounds. They remarked that

*“The use of OER is cost-effective because it will reduce the price of textbooks, which can be prohibitively expensive for people like us and especially for students” (P8).*

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Teachers mentioned that *“The cost of some publications is so exorbitant that we are unable to purchase them, thus for me OER is a cost-effective solution” (P12).*

Also, some teachers brought up the point that sometimes copyrighted books are sold for hundreds or thousands of dollars, making it nearly impossible for teachers and students to purchase them. On the other hand, there is no charge associated with accessing an OER textbook. This argument is supported by responses such as:

*“.....Yes actually, I do not need to purchase the entire book because I can simply download and print what I need. In the field of mass communication, for example, Sage and Routledge’s publications are fairly expensive; as a result, I occasionally access the complete study materials free of cost” (P10).*

*“Because there are some books that are out of our price range, we download OER and make use of them to enrich our knowledge” (P17).*

*“We cannot always afford to pay for proprietary resources, OER was created specifically for students and teachers” (P23).*

While, teachers also said that universities or they personally do not have subscriptions to certain journals, and in such cases, the use of open-access journals through the adoption of OER can prove to be a viable solution as noted by one faculty that *“Even though there is still a demand, many Universities in India do not currently subscribe to academic journals. OER are able to fill this void, whether they come in the form of MIT lectures, Coursera courses, or Swayam courses. It is beneficial to have access to those lectures and materials. It lowers both the cost and the expenditure required to gain access” (P5).*

### **Effectiveness of OER in the Professional Development of Teachers**

According to the interviewees, OER has the potential to serve as a beneficial means of professional development for teachers in higher education. Through the use and creation of OER, they have the opportunity to develop new strategies for teaching and learning, improve their instructional design skills, collaborate with colleagues to promote innovation, improve their digital literacy, reflect on their pedagogical practice, and advance their careers in the academic sector. The interviewees' comments have been analyzed in light of the themes that emerged throughout the transcripts:

**OER expands opportunities for collaboration and innovation**

The participants have the impression that OER provides an opportunity to promote collaboration and innovation in the higher education sector. Through the act of openly sharing educational resources, teachers can engage in collaborative efforts aimed at enhancing the quality of such materials. The participants commented that

*“There is no doubt that it facilitates the forming of connections. It is a novel approach to acquiring or imparting knowledge” (P1).*

*“Using OER allowed us to collaborate with colleagues worldwide in creating and sharing useful resources” (P2).*

Further, the conversation revealed that participants believed OER may help teachers to network and interact with one another, and this would allow them to exchange knowledge, work together on the creation of new resources, and build professional relationships. This is put forth as *“OER can provide educators with the opportunity to connect with other teachers and professionals in their field. This can lead to new ideas, new perspectives, and new collaborations” (P6).*

*“As a matter of course, through OER we are able to build connections with faculty and other professionals working in the same domain.....” (P9).*

The use of OER has resulted in the formation of an online professional community of colleagues who have similar interests and needs as remarked by one of the participants *“It will help me in building communities of practice among educators who share a common interest or focus. For example, faculty who are interested in teaching political science can connect with other faculty who are also interested in the area. In this manner, an excellent piece of work will emerge with multiple ideas” (P19).*

**OER improved teachers’ pedagogy practices**

Teachers hold a belief that OER could enhance pedagogical practices by enabling them to access a wide range of resources and customize them to cater to the unique needs of their students. OER has the potential to facilitate open pedagogy practices that emphasize fostering collaboration, creativity, and innovation in the realm of teaching and learning. The establishment of a collaborative and supportive teaching environment can facilitate mutual learning among teachers, leading to the improvement of their pedagogical practices. This has been mentioned by some of the OER creators as:

*“Creating OER requires teachers to think creatively and develop innovative approaches to teaching and learning. This can help them develop new pedagogical strategies that can be applied in their teaching”*(P13).

*“I believe that the creation of OER can present educators with an opportunity to engage in self-reflection as well as professional growth. Teachers can reflect upon their pedagogical practices and develop materials in accordance with their teaching goals and values.”*(P18).

*“The creation of OER often calls for collaboration with other educators, which can improve a teacher's ability to work effectively in a group and communicate effectively. This collaboration can also lead to the exchange of ideas and best practices, both of which are beneficial to the pedagogical approach of a teacher because they can provide new information and improve existing practices”* (P21).

However, some of the supported comments from OER users are:

*“As we see another teacher explaining the same topic, in a different way, we pick up a few pointers that we can use in our practices, thus the answer is yes, and it does help me better my teaching practices. In addition to giving lectures and material, we will also exchange information through video links and short courses, which is something that is a part of the current technological generation. This will bring about a shift in my teaching practices as well”* (P27).

*“OER use, adaptation, modification and remix as well as sharing ones’ information and knowledge will improve teachers’ pedagogical practices if incorporated effectively in the classroom”* (P28).

### **Enhanced teachers’ reputation**

OER may boost the reputation of a teacher, as they are considered to be more innovative and accessible. OER can be accessed and used by students, other professors and universities worldwide, thereby promoting global recognition of the work. One of the participants made a statement that... *“As I have stated, I have created OER intending to increase my professional profile and add to my C.V. This platform provides educators with a worldwide opportunity to openly share their content and information, thereby increasing the visibility and readers of their published works”* (P21).

However, one of the OER creators mentioned that even though creating OER will enhance one's reputation or he/she will gain acknowledgement for the work, but such pursuits do not necessarily contribute to career advancement or promotion. This has been explicitly stated *“As an OER creator, it may have added to my CV, but it hasn't exactly helped me get promoted” (P5).*

Also, one of the OER users remarked that *“OERs can help teachers build their professional network and reputation, by contributing to online communities and sharing their expertise with others” (P29).*

### **Enhance the Digital literacy of teachers**

OER have the potential to facilitate the development of teachers' digital literacy proficiencies, encompassing their ability to locate, assess, and utilize digital materials. Through the use and creation of OER, educators can enhance their abilities in generating, modifying, and disseminating digital content. OER can provide university teachers with exposure to a variety of digital tools and technologies. This level of exposure may aid teachers in becoming more acquainted and at ease with utilizing digital technologies within their instructional practices.

During the interview, a participant stated *“Overall, by engaging with OER, faculty members can gain valuable experience and skills in the use of digital technology in their respective classrooms. This can help us to become more digitally literate and better equipped to teach our pupils in a digital world that is constantly evolving” (P29).*

### **Challenges of OER Adoption from the perspective of OER Users and OER Creators**

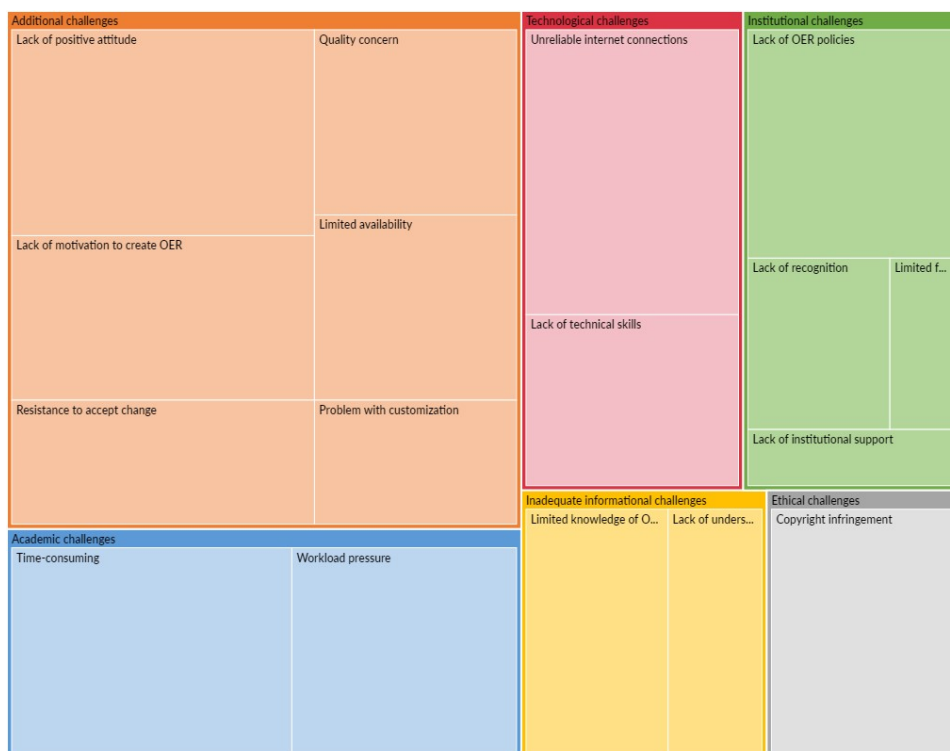
The present section of the study analysed the challenges that stand in the way of the widespread adoption of OER in higher education institutions from the points of view of both OER users and OER creators. The analysis of the interview has been carried out with the help of NVivo software. The sub-themes or codes of this analysis generated from the transcribed data have been presented in Fig 4.8.3, 4.8.4 and 4.8.5 (through tree map and sunburst).



# CHAPTER 4 | ANALYSIS AND INTERPRETATION OF DATA

Name	Files	References	Created on	Create	Modified on	Modify
Time-consuming	1	5	4/30/2023 9:45 AM	S.S	4/30/2023 9:48 AM	S.S
Workload pressure	1	4	4/30/2023 9:45 AM	S.S	4/30/2023 9:48 AM	S.S
Additional challenges	0	0	4/30/2023 9:54 AM	S.S	4/30/2023 9:54 AM	S.S
Lack of motivation to create OER	1	4	4/30/2023 9:54 AM	S.S	4/30/2023 9:56 AM	S.S
Lack of positive attitude	1	5	4/30/2023 9:54 AM	S.S	4/30/2023 9:55 AM	S.S
Limited availability	1	3	4/30/2023 9:54 AM	S.S	4/30/2023 9:57 AM	S.S
Problem with customization	1	2	4/30/2023 9:54 AM	S.S	4/30/2023 9:58 AM	S.S
Quality concern	1	3	4/30/2023 9:54 AM	S.S	4/30/2023 9:59 AM	S.S
Resistance to accept change	1	3	4/30/2023 9:54 AM	S.S	4/30/2023 9:57 AM	S.S
Ethical challenges	0	0	4/30/2023 9:49 AM	S.S	4/30/2023 9:49 AM	S.S
Copyright infringement	1	4	4/30/2023 9:49 AM	S.S	4/30/2023 9:51 AM	S.S
Inadequate informational challenges	0	0	4/30/2023 9:37 AM	S.S	4/30/2023 9:37 AM	S.S
Lack of understanding of open licenses and CC licers	1	2	4/30/2023 9:37 AM	S.S	4/30/2023 9:39 AM	S.S
Limited knowledge of OER	1	3	4/30/2023 9:37 AM	S.S	4/30/2023 9:39 AM	S.S
Institutional challenges	0	0	4/30/2023 9:41 AM	S.S	4/30/2023 9:41 AM	S.S
Lack of institutional support	1	1	4/30/2023 9:41 AM	S.S	4/30/2023 9:43 AM	S.S
Lack of OER policies	1	4	4/30/2023 9:41 AM	S.S	4/30/2023 9:43 AM	S.S
Lack of recognition	1	2	4/30/2023 9:41 AM	S.S	4/30/2023 9:43 AM	S.S
Limited funding	1	1	4/30/2023 9:41 AM	S.S	4/30/2023 9:42 AM	S.S
Technological challenges	0	0	4/30/2023 9:34 AM	S.S	4/30/2023 9:34 AM	S.S
Lack of technical skills	1	3	4/30/2023 9:34 AM	S.S	4/30/2023 9:34 AM	S.S
Unreliable internet connections	1	5	4/30/2023 9:34 AM	S.S	4/30/2023 9:35 AM	S.S

**Fig. 4.8.3:** Subcodes of the main theme “challenges” emerged from the interview transcript.



**Fig. 4.8.4:** Representing the sub-themes that emerged in the interview transcript through a tree-map chart.

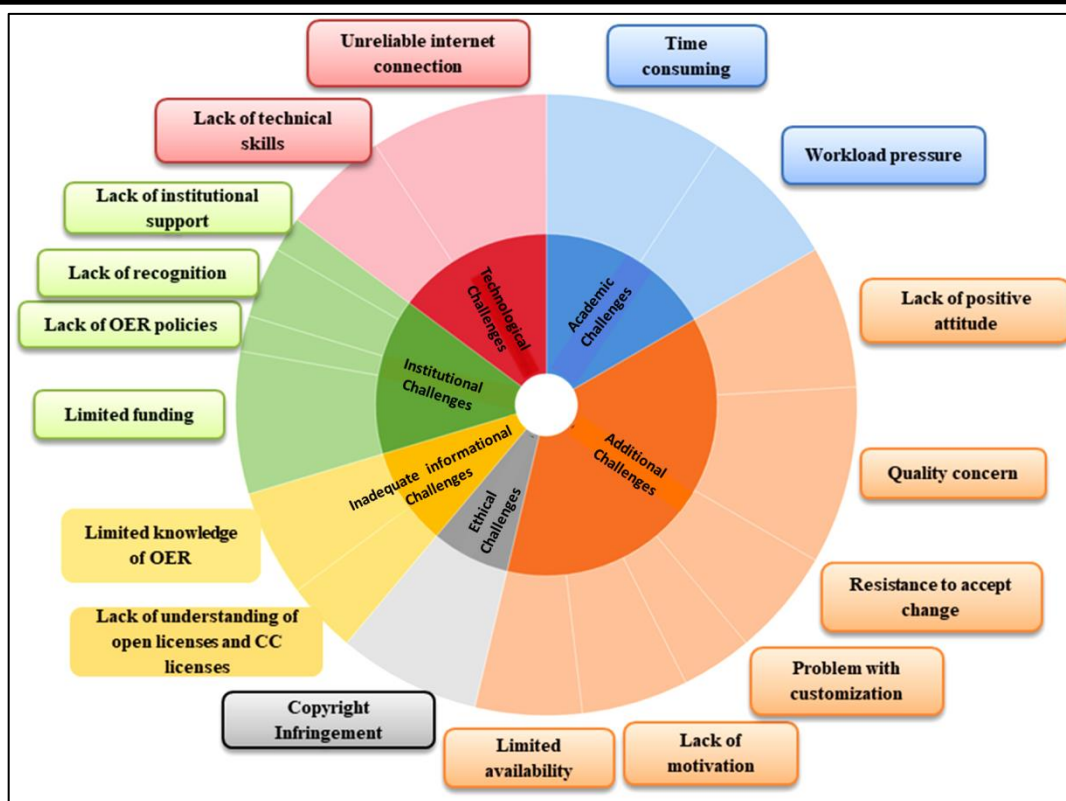
The challenges reported by the interview participants, which are categorized into sub-themes such as technological challenges, inadequate informational challenges, institutional challenges, academic challenges, ethical challenges, and miscellaneous challenges were discussed below:

**Technological Challenges:** OERs have the potential to revolutionize higher education; however, teachers have identified two primary technological challenges that impede their ability to either create or use OERs.

**(a) Technical skills**

According to the teachers who were interviewed, the development or use of OER frequently necessitates technical expertise, such as proficiency in software applications, file formats, and multimedia editing. Teachers may require training in the use of software applications such as Audacity for audio editing or GIMP for image manipulation to develop OER. This has been voiced by one of the OER creators, *“Professors at the university level must possess a strong understanding of digital technologies and possess the skills needed to use them efficiently in order to create, modify, and share OER. For example, a teacher who is not confident with the use of multimedia tools such as Audacity or GIMP or who does not have much knowledge of open-source software may have difficulty in creating OER that includes videos or animations. Because of the lack of these skills, the creation of OER will be hampered”* (P5).

Another participant shared the same thought *“Teachers may lack the requisite technical skills to develop or use OER. A lack of competence with web design, media editing software, or file formats is an obstacle”*(P2).



**Fig. 4.8.5:** Representing the sub-themes that emerged in the interview transcript.

Another participant thought that some senior professors lacked the necessary skills to make effective use of innovative technological advances. This has been aptly articulated by an interviewee in the following words: “*Again, there are some faculty who do not possess the competence or abilities to use technological gadgets effectively, particularly when it comes to the creation of e-contents. There are certain faculty who are unable to utilize technological tools, particularly some senior-most professors*”(P8).

#### **(b) Unreliable internet connection**

The teachers view unreliable internet connections as a key technology trouble that might act as a barrier to the use of OER. Teachers believed that being able to access and utilize OER requires a reliable and robust infrastructure, which includes consistent internet connections and compatible devices.

The following are some of the remarks made in connection to poor internet connections:

*“OER are available in large files, such as videos, photos, or other forms of interactive multimedia. It may be difficult for us and students to access and make use of OER due to poor internet connection that results in slow download speed” (P3).*

*“I think that the absence of internet access and the poor quality of internet access is one of the primary obstacles to the widespread adoption of such innovative ICT practices” (P10).*

*“Without a doubt, the most important barrier was the absence of an internet connection”(P11).*

However, some of the teachers have mentioned that even though their institution has a proper Wi-Fi connection or a strong internet network, they still experience significant internet outages or power failures on occasion because of bad weather as commented during the interview:

*“Despite the fact that we have a reliable Wi-Fi connection, Wi-Fi coverage is excellent in the department on the other hand, the weather here (hilly places) is always changing, which causes the power supply to automatically switch off. So, we are unable to access OER in such situations”(P14).*

*“There are times when there’s an issue with the network. Also, OER increases the digital divide because not everyone has constant, equal access to the internet. A major problem is that people living in hilly areas often lack access to the internet” (P17).*

**Inadequate informational challenges:** Inadequate information about OER can create significant challenges for teachers in adopting OER effectively.

**(a) Limited knowledge of OER**

It came to light that one of the major challenges to the adoption of OER is the teachers general lack of awareness regarding OER. Teachers believed that one who is not familiar with the idea of OER may have difficulty knowing how to locate and make effective use of these resources. They remarked that the concept of OER is still unfamiliar to many of their other colleagues. They stated that:

*“Although OER has the potential to be a helpful support system, very few of our faculty members are aware that it even exists” (P20).*

*“The main drawback to success in the use of OER is awareness. The primary users and creators of OER are educators. And if they were unaware of the advantages of*

*OER, or if they did not recognize the worth of making use of these materials in the classroom, then it is the worst failure” (P22).*

*“People might not make use of OER if they are unaware of what they are” (P23).*

**(b) Lack of understanding of open licenses and CC licenses**

A significant barrier to the adoption of OER is the insufficient knowledge of open licenses and CC licenses. The principal feature of OER is the open licensing that facilitates unrestricted utilization, adaptation, and redistribution. It has been revealed that teachers knew about OER and CC licenses, although with limited knowledge of the details of the CC license. They expressed their inability to create OER due to their lack of information regarding licenses and how to apply those licenses to one's work.

As highlighted by an OER user that *“There is a lack of understanding of CC license, I have heard about copyright laws and I am familiar with Creative Commons Licenses, but I have no in-depth knowledge about what is Creative Commons license, and how to use or apply it; yes I do know that a CCL logo is attached below the article, which means that this publication is under CCL and is an OER. Limited knowledge about CC license is a problem for me to create OER” (P26).*

However, according to an OER creator, *“Teachers who are not well-versed with open licenses may not understand how to use OER content legally and ethically. They may not know how to give proper attribution to OER authors or how to adapt OER resources for their own use without violating intellectual property laws. This lack of conceptual or practical knowledge is a challenge” (P22).*

**Institutional Challenges:**

When questioned about institutional challenges that have or might hamper the adoption of OER, nearly all of the participants, especially OER creators, claimed that they had encountered no such thing. They felt that eventually, it is up to them to decide whether or not to make use of OER. There has never been any resistance to using OER from within institutions. However, a few OER users have brought up the following institutional hurdles:

**(a) Lack of Institutional Support**

Some of the participants asserted that their institution has not yet emphasized the adoption of OER. According to the comments made by a few teachers, the fact that they have not received adequate support for the adoption of OER from their respective

institutions can make it challenging for them to integrate OER into their classroom practices. This has been expressed in words like *“Universities should provide institutional support in the form of incentives and rewards for the creation of OER, such as recognition, promotion, or financial incentives. This is missing, which means that teachers and people like us will never consider producing OER”* (P13).

Another statement followed as *“It is my opinion that OER are not formally recognized or supported by our universities at that level, and do not have any established policies that support the use or production of OER”* (P6).

#### **(b) Lack of recognition**

The participants expressed that lack of recognition may impede the effective adoption of OER. This statement came as *“Because the value of OER-based teaching and learning has not been acknowledged at university till now, it can be hard for academics to get recognition or progress based on their work using OER. Due to this lack of recognition, professors may be discouraged from utilizing or producing OER”* (P1).

Again, the creation of OER is often disregarded and unnoticed by others as remarked by an OER creator that *“However, the creation of OER often goes unrecognized and unrewarded, which might deter educators and institutions from investing time and money into creating and sharing OER”* (P9).

#### **(c) Limited Funding**

Another issue is that there is insufficient financing authorized to assist the adoption or promotion of OER. According to the opinions of interviewed teachers, the adoption of OER calls for significant financial investments in technology, infrastructure, and training. To create OER, a certain amount of financial resources is required, as expressed by an OER creator that *“If I or my department wishes to develop OER materials for a particular course, but we may not have the requisite funding to engage instructional designers, technical experts, or subject matter experts. Funding is important for its promotion”* (P9).

#### **(d) Lack of operational OER policies**

The lack of operational OER policy is another primary institutional challenge that can function as a barrier to the adoption of OER by teachers. Teachers may be hesitant to devote their time and resources to the creation of OER if there are no clear policies and guidelines for the creation and usage of OER. A participant remarked that *“as per my*

*knowledge there is currently no OER policy or guideline issued by the UGC or by our university so far, and this can create uncertainty and discourage adoption” (P12).*

Another participant thought that *“UGC has mandated university faculty to create and even include MOOCs in the curriculum, so faculty from the different department are creating and doing, but as such to OER, no such mandatory rules has been released” (P20).*

*“Without clear policies for licensing and sharing OER, faculty members may be unsure about the use of OER content” (P24).*

**Academic challenges:** Below are some of the academic challenges that impede the effective adoption of OER:

**(a) Time-consuming**

Participants have noted that it can be time-consuming to search for credible resources that are relevant to their courses. Depending on their work commitment and other responsibilities, teachers may have little time to research and assess OER that they can use in their classes. These thoughts has been communicated as:

*“I need to ensure that the OER I am going to use in my class teaching is accurate, up-to-date, and pedagogically sound. This calls for careful evaluation, which can be time-consuming” (P27).*

*“As the materials were created, adapted by others, I need to thoroughly review the information given, for this, I need lots of time, and due to lack of time, I don’t prefer to use OER sometimes” (P32).*

The process of localizing OER also takes a lot of time. The teachers we referred to said that they had to do a lot of browsing to discover relevant and particular materials that stood up to their standards.

*“Locating or looking for relevant, content-specific, need-specific OER and meeting the quality standards is a time-consuming act” (P32).*

Furthermore, the process of creating OER takes a significant amount of time as said by an OER creator, *“The development of OER takes time and effort. You need to examine the content as a whole, considering every aspect-its quality, relevance, accessibility, presentation, and so on. Contributing to OER demands quite a bit of time, effort, and dedication” (P13).*

**(b) Workload pressure**

The teachers considered the burden of their workload as another significant obstacle in OER adoption. They may face time constraints when attempting to locate, assess, and integrate OER into their curricula, especially if they are burdened with a lot of teaching work, and also active in research or other administrative activities. The creators of OER have noted it is very difficult to strike a balance between teaching classes, working on research projects, and simultaneously developing OER. A professor commented *“As a professor, I have to balance teaching, conducting research works and administrative responsibilities. I have very limited time to look for relevant OER or to create resources of this kind”* (P4).

Some further remarks that came up during the interview:

*“We need to revise our lesson plans to ensure that the materials we use are in line with the learning objectives and pedagogical strategies of the courses we teach. This can be time-consuming, which adds to that adds to workload pressure”* (P6).

*“Because of the amount of workload that I have to do in the classroom or department, I am unable to focus much on OER”* (P7).

*“It takes a lot of effort to search for and develop OER, and because I have so many other duties, I hardly ever have the opportunity to do so”* (P15).

**Ethical challenges:** The only major ethical challenge that has been brought to light is teachers being concerned about the possibility of violation of copyright laws.

**(a) Copyright infringement**

As a result of the open nature of OER and the ease with which it can be accessed, some users might tempt to copy or repurpose content without providing the appropriate attribution or citation, as voiced by some teachers during the interview. This can lead to academic dishonesty as well as infringement of the rights of intellectual property holders.

A participant has put forward this statement as *“As it is openly available, one should not temper the existing content or use plagiarized content”* (P32). Other participants said that

*“Indeed, this is a really significant ethical problem. The protection of one's intellectual property is an essential concern. Consider an example in which a student*



*who makes use of an OER textbook could copy content from it without properly citing the source. Such an act would be a violation of academic integrity” (P15).*

However, regarding ethical concerns, an OER creator holds the perception that *“There is a problem regarding copyright, such as the attribution that should be provided to safeguard our moral rights. Plagiarism, on the other hand, is not something that is specific to OER. It is a problem that is present in all types of education and one that can be solved via the provision of education and training on the proper ways of citation and attribution. On top of that, there are technological tools available that can help detect and prevent cases of plagiarism, which can help to alleviate concerns about the inappropriate use of OER” (P11).*

**Miscellaneous challenges:** Apart from the aforementioned challenges, there exist other challenges that teachers encountered during the creation and use of OER, which are described below.

**(a) Lack of positive attitude**

A negative mindset is one of the biggest barriers to adopting OER. Many of the participants stressed the need to maintain a positive outlook for the adoption of OER. This is observed from a participant’s viewpoint that *“Since OER are created by others, some teachers may be cautious about using them in their classrooms. This might lead to scepticism regarding the usefulness of OER and reluctance to incorporate them into classroom instruction and student learning” (P10).*

Besides this, the participants mentioned that there are times when teachers in higher education do not recognize the importance or need to utilize the content of others as articulated by some participants:

*“Many times, I have seen or heard that academics are not ready to accept ICT or use published resources created by others, especially these online contents. This mindset might be a roadblock in the process of OER adoption in higher education” (P1).*

*“Some faculty members may not perceive the need to use or create OER because they feel that students can learn equally the same from conventional textbooks. They may doubt OER’s authenticity or quality and prefer traditional books instead. They have a negative view of such internet-based resources” (P5).*

*“A negative attitude of the faculty members. OER are sometimes seen as having a low status than traditional publications. They believe publishing in a traditional academic journal is more valuable than creating and sharing OER” (P16).*

**(b) Lack of motivation to create OER**

The lack of desire and motivation among teachers to use OER and to create their own OER might serve as a serious obstacle to the widespread acceptance of such resources. Teachers emphasized that they almost always prefer to publish their papers in copyright journals, and are less motivated to create and publish their OER. Some remarks that represent this obstacle are put forward:

*“I am happy to use OER but I rarely make the effort to develop educational content and published it as OER. I will say I am not much motivated to do so at this point” (P17).*

*“There are some educators who are not mentally prepared to generate OER and who are unwilling to hand over their original creative works for others to openly use or alter. In terms of the adoption processes for OER, I will state that this will take some time” (P18).*

*“We generally devote all our efforts to publish in copyright journals rather than open access”(P19).*

In response to this, teachers also remarked that our academic society is not driven to adopt an open-access culture. They have been publishing their works in copyrighted journals, books, or other reputable publications for a very long time. Because OER is a relatively recent development, it will take some time to inspire teachers to start creating OER. This notion is conveyed in words like *“Lack of motivation is a barrier. For a very long time, we have been publishing our work in traditional academic publications or under copyright laws, which are often regarded as the principal indicators of scholarly productivity and prestige. This trend could cause academics and scholars to prioritize and be encouraged to publish more in copyrighted journals and less in such open access or OER” (P26).*

**(c) Concern about the quality of OER**

The quality of OER is a concern for many teachers considering its adoption. The teachers expressed concern about the accuracy of the materials as well as their overall quality. It may be complicated to ensure that OER is accurate and up to date because anyone can create and distribute these resources. Some of those interviewed believed

that some of the OER resources were of lower quality and did not provide sufficient detail. The following are some of the opinions expressed by the participants:

*“The inconsistency in the accuracy, validity, and relevance of the materials is a problem” (P19).*

*“There are some open access publications that are not always subject to thorough peer review, which is an essential component in ensuring that educational resources continue to meet the necessary criteria for high quality” (P20).*

*“The OER should adhere to rigorous academic standards. I am worried about the quality of such resources. Quality is the main issue. An open textbook should also meet the same standards as printed textbooks in terms of grammar and vocabulary” (P29).*

#### **(d) Limited availability of OER for certain topics**

Teachers have criticized the scarcity of quality OER materials for specific topics or specialized courses. According to them, it is a challenge to find appropriate materials for their classes since not all courses or topics had access to a variety of OER repositories or databases. This is outlined in the words of the interviewees as:

*“Everything is not available as OER. Some topics are not covered under the scope of OER” (P2).*

*“Not all topics can be found in the OERs repositories” (P19).*

*“There are not enough OER materials available for particular topics, which could pose a barrier in the way of OER adoption. If I wish to use OER materials for computational linguistics, I could find that there are limited numbers of resources for it” (P25).*

#### **(e) Problems with customizing the content**

The process of customizing OER may be challenging and hard. Teachers have mentioned that, despite the fact that OER grants us complete flexibility to reuse and remix the material, the process is not always as simple as it may appear to be. It takes a significant amount of time, effort, talent, and understanding to adapt or translate the material to fit into a particular context. Some of the participants shared their thoughts as,

*“The translation of the material into the many local languages is one of the greatest barriers. As an example, if I need to translate the material into the native language of the target audience, this may be difficult and time-consuming work that involves knowledge of both the original language and the language being translated into. Also,*

*the vocabulary that was utilized in the original OER might not have a similar meaning in the language of the target audience, which might further complicate the process of translation” (P21).*

However, a few of the teachers assumed that not all OERs are licensed for reusing or modifying the content, which might restrict the use of OER for them. As said by one interviewee that *“Some OER are licensed under Creative Commons Attribution-Noncommercial-No Derivatives (CC-BY-NC-ND) which indicates that they cannot be changed in any way and may only be used for non-commercial reasons. But the material may be suitable for certain people; this might limit teachers' ability to customize the material to use it in their classroom to meet their specific teaching needs” (P31).*

**(f) Resistance to accept change**

Teachers perceive that sometimes resistance to accept change is the biggest challenge to adopting technology. They asserted that some teachers might be resistant to changing their teaching methods, especially if they have been teaching the same way for a long time. Some faculty members may be resistant to adopting OER, either because of scepticism about the quality of OER materials or because of concerns about the impact on their workload.

The teachers hold the view that the most difficult obstacle to overcome when attempting to use new technologies is teachers' reluctance to embrace change. They said that some teachers might be resistant to changing their teaching approaches, particularly if they have been teaching in the same manner for a long period of time. There may be a few teachers who are hesitant to adopt OER due to scepticism over the quality of the OER resources or concerns about how it will affect their workload. This issue has been shared by two of the participants as:

*“Some faculty members may be unwilling to try something new or may feel intimidated by the technology involved in finding and using OER” (P22).*

*“As I have said acceptability is the most important consideration for us to make while adopting such innovation. The use of such materials might be hampered if educators show reluctance to use them” (P30).*