CHAPTER 5

CHAPTER 5 RESULTS AND DISCUSSIONS

5.1. Introduction

The present chapter outlines the key findings of the study as per the research objectives. It also critically discusses these findings with reference to existing literature to assess their significance in relation to the research objectives. The chapter is divided into several sections, which are presented as follows:

- Section 5.2. Findings and discussion of objective 1.
- Section 5.3. Findings and discussion of objective 2.
- Section 5.4. Findings and discussion of objective 3.
- Section 5.5. Findings and discussion of objective 4.
- Section 5.6. Findings and discussion of objective 5.
- Section 5.7. Findings and discussion of objective 6.

5.2. Findings and discussion of objective 1

Objective 1: To study the attitude towards the adoption of OER among the teachers in the higher educational institutes of North East India.

Major findings:

i. The analysis of the data revealed that 49% (N=109) of the teachers have a moderate level of attitude towards the adoption of OER.

ii. Subsequent to this, 23% (N=51) of teachers have a highly positive attitude towards OER adoption, while 19% (N=42) have a low negative attitude. 5% of them (N=11) have an extremely high positive attitude and only 4% (N=08) have an extremely low negative attitude towards the adoption of OER.

iii. Furthermore, the analysis of qualitative data revealed that a majority of the interviewees held a moderately positive perspective toward the adoption of OER.

iv. The results of the interviews showed that a total of 37% of the teachers who were interviewed looked into OER as a ‘valuable academic resource’. 22% of them regarded OER as ‘supplementary materials’, 19% of the interviewees reported that they perceived the OER adoption as ‘easy to access’ resources that were adaptive, flexible, and easy to use. Again, 13% agreed that OER is a form of ‘open access’ material that is readily accessible in digital format via the

internet. Lastly, a mere 9% of the interviewed teachers advocated the OER adoption because they feel it is 'legally and ethically permissible'.

Discussion:

This research study intends to measure the attitude toward the adoption of OER among the teachers of higher educational institutes in North East India. According to the findings of the descriptive research, approximately half of the teachers (49%) have a moderate level of attitude towards the adoption of OER. Even from qualitative findings, it has been concluded that teachers have a moderately positive belief about the adoption of OER as they perceive the adoption of OER as valuable supplementary academic resources, which are easy to and openly access with legal and ethical considerations.

The same viewpoint has also been supported by the studies of Zaidi, Amir and Bhatia (2022), Deshmukh and Sahasrabudhe (2020), Magro and Tabaei (2019), Madiba (2018), Mukhopadhyay, Chander and Kumar (2018), Sambo, Utin and Udo (2016). However, the study also found out that about 5% and 23% of teachers have an extremely high positive and highly positive attitude towards the adoption of OER. While 19% and 4% of the respondents have low negative or extremely low negative attitudes toward the adoption of OER. These findings are also consistent with the studies of Alkhasawneh (2020), Karipi (2020), Nwesri (2019), Kiran (2017), Mishra and Singh (2017), Percy and Belle (2012) concluding that teachers have a positive attitude towards the adoption of OER. On the contrary, it is worth mentioning that only a few previous literature studies have discovered that teachers have a negative outlook toward the use and creation of OER (Buluma, 2013; Akter and Mahbub, 2020).

The research study deduced that the majority of the teachers were moderately impressed with the adoption of OER. The probable reasons for this might be the growing realization of the role that ICT and OER in particular, play in today's higher education. The use of OER is found to be particularly important in light of the issues posed by COVID-19 since it gives an alternative to hard print materials that may be difficult to access during the period of epidemic. This came to light through the analysis of qualitative data as well. Nowadays, to keep up with the upward trend of instructional support, teachers are placing an increasing need for supplemental educational materials beyond textbooks (Tang, Lin and Qian, 2021) that aid them in personalizing the content as per the needs of the students.

This has also been proven by the quantitative findings that teachers reported the creation of OER can assist one in advancing their career or increasing their professional reputation. Likewise, during the interview, one of the participants also stated that OER helps to connect them to a network of professionals who have produced materials in their particular field of interest. Joshith and Ashalatha (2019) asserted that OER facilitates collaboration and networking with other faculty or subject matter experts to produce high-quality resources, which in turn leads to the professional growth of educators. In the study of Kiran (2017) teachers have a strong belief towards the idea that OER has the potential to be an efficient tool for both academic and professional growth. They regarded OER as a 'resource hub or platform' that would allow them to progress professionally. OER are considered to be valuable for teachers' professional development (Pande, Singh, Intaratat and Mythili, 2019; Jaramiln, 2021; Jose, 2022). OERs provide teachers with a practical setting whereby they can critically examine their pedagogical practices, design and develop classroom materials, foster a culture of collaborative ownership and foster the growth of their professional agency (Jose, 2022). Notably, designating new contents and tools as OER taking into consideration the language and culture of diverse communities helps teachers to achieve recognition or reputation around the globe for their work (Kumar, Baishya and Deka, 2021; Karipi, 2020; Mishra and Singh, 2017).

The use of OER is viewed positively by teachers as contributing to increased student engagement in the classroom, as well as increased inclusivity and equity in the educational environment (McGreal, 2017; Deshmukh and Sahasrabudhe, 2020). Tang (2020) in his research interviewed the faculty members, and one of the interviewees also pointed out that by augmenting more traditional instructional mediums, such as books, with digital resources, the use of OER can help boost student engagement.

Another explanation for teachers' moderate attitude towards the adoption of OER is their opinion that educational resources are a public and academic asset (Verschraegen and Schiltz, 2007; Tosato, Arranz and Rubia Avi, 2014) solely developed and disseminated for all learners. Yu, Hu, Li and Xiao (2022) emphasized that sharing knowledge and resources helps to build both teachers' knowledge and abilities as individuals and transform teachers' knowledge into shared public knowledge. The majority of teachers feel that it is the responsibility of the academic community to

realize the right of every student to free and open access to educational materials (Krelja Kurelovic, 2016). This result is in line with the outcome of this research too.

The teachers were convinced that the sharing of resources is an essential part of both teaching and learning, in addition to the creation of new resources and the exchanging of those resources with others. Research studies by Torres, Boaron and Kowalski (2017), Cronin (2017), and Santosh (2017) posit that sharing OER offers teachers the possibility to gain and develop a diverse range of knowledge and learning. Maloney, Moss, Keating, Kotsanas and Morgan (2013) in their research corroborate that teachers' view of sharing resources across professional boundaries is both useful and appropriate. Also, Kim (2018) concluded that using and sharing OER will assist them in acquiring new skills in addition to refining the knowledge that they gained throughout the course.

Majority of the teachers considered that the use and sharing of OER support them in improving their content knowledge and pedagogical skills. Likewise, in the research study conducted by Orwenjo and Erastus (2021), 75% of the teachers agreed that the use of OER has brought out some changes in their instructional practice. They reported that OER encouraged them to adopt collaborative, active, and flipped classroom methods, alternative assessments, open textbooks, and practical examples to teach students. Murphy and Wolfenden (2013) and Kanwar, Kodhandaraman and Umar (2010) emphasized OER as an appealing tool, a 'learning platform', to improve teacher quality since it fosters pedagogical transformation (as cited in Cobb, 2018).

Although the result indicated that majority of teachers hold a moderate attitude regarding the question of whether or not the utilization of OER can be more advantageous than the use of conventional textbooks, previous studies have advocated that OER has emerged as a viable substitute for expensive textbooks for teachers (O'Neill, 2021; Tang and Bao, 2022). According to the findings of research conducted by Jhangiani, Pitt, Hendricks, Key, and Lalonde (2016), the majority of faculty who have made use of OER in the classroom believe that the quality of these resources is either equivalent to or higher than that of conventional, proprietary resources. Similar Findings were reported by Jung, Bauer, and Heaps (2017), who found that 80% of teachers viewed OER as either comparable to or better than traditional textbooks.

Another reason that seems to lead to teachers' moderate attitude towards the adoption of OER is the flexibility it affords them to adapt and customize the materials to their

pedagogical aims and requirements. This has also been pointed out in the qualitative data that the Creative Commons license permits the flexibility and adaptation of resources to fit the needs of the target audience, in addition to enabling the reuse of content in a manner that is both legally and ethically permissible. This has also been corroborated by the studies of Lantrip and Ray (2021), Fischer, et al. (2020) and Coleman-Prisco (2017) all of which revealed that the modification and customization of OER stimulate teachers to adopt OER. The findings of Delimont, Turtle, Bennett, Adhikari and Lindshield (2016) discovered that most teachers would rather use OER to teach their courses than a traditional textbook because of the flexibility it provides in terms of adapting the material to the needs of individual students (based on 5R's: retain, reuse, revise, remix, redistribute). Besides this, the findings of Nagashima and Hrach (2021) showed that teachers believed that the adoption of OER motivates them to enhance their instructional strategies since they have control over the materials and can customize them.

In spite of the significant reasons that lead to a moderate level of attitude towards the adoption of OER among the teachers, there appears to be a small number of participants in this study who have a negative attitude towards the adoption of OER. The findings of the study revealed that 19% of the respondent shows low negative and 4% have an extremely low negative attitude towards the adoption of OER.

The assumption might be that teachers who have a negative attitude towards the adoption of OER presumably still have a low understanding of the underlying benefits that are associated with the adoption of OER. As said by Tlilia, Ofosuband, and Zhang (2021), this is particularly relevant to nations in the Global South (developing countries like India), where a lack of awareness regarding OER is a major issue holding back the acceptance and adoption of OER. This is also supported by other studies like Tang and Bao (2022), Orwenjo and Erastus (2018) and Mtebe and Raisamo (2014). Besides that, teachers have the impression that OER is not of high quality and is not kept current and up-to-date, which has led to a negative attitude towards the adoption of OER (Tlili, Ofosu and Zhang, 2021; Tang, Lin and Qian, 2021; Bliss, Hilton, Wiley and Thanos, 2013). Previous research has highlighted that teachers are concerned about the additional time required to customize OER and also in localizing appropriate OER materials, which further leads to a decrease in their intention of using OER and develops a negative attitude towards the adoption of OER

(Jung Bauer and Heaps, 2017; Tlilia, Ofosuband, and Zhang, 2021; Freeman, Tang, Geary, 2022). Again, according to Ghosheh Wahbeh, Burgos, and Affouneh (2023), OERs may reduce the number of opportunities for individuals to innovate. This is allegedly due to the ease with which individuals can copy the work of others, as well as plagiarism or other academic dishonesty that can result in a negative attitude towards OER. Given the lack of a national OER policy mandating the adoption of OER, and the absence of institutional policies and strategies (Krelja Kurelovic, 2018), teachers may not feel compelled to use, distribute, or produce OER. Prior studies have remarked that teachers' negative views of OERs are largely rooted in their inability to locate appropriate OERs or understand effective strategies for incorporating them into classroom instruction (Hassall and Lewis, 2016). Another possibility of the negative attitude of teachers toward the adoption of OER is due to their concerns regarding the Creative Commons and the extent to which it can morally protect the resources they have created and shared (Tlili, Ofosu and Zhang, 2021). Moreover, the lack of funding and resource management, as explained by Akter and Mahbub (2020) is the reason behind teachers' negative impression towards OER adoption. Pulkar (2020) elaborated that there are cases when teachers get the impression that they have lost control of their resources to someone they are not familiar with. It is common practice to find that teachers are hesitant to allow others to adapt their materials in ways that they are not aware of. According to research by Tang, Lin and Qian (2021), low appraisals of OER adoption are because teachers believe they already have plenty of resources at their fingertips, many of which are free and easy to access, and thus see no reason to look for OER.

5.3. Findings and discussion of objective 2

Objective 2: To find out the significant differences between the attitude of teachers towards the adoption of OER with regard to gender, years of teaching experiences and academic rank.

Major findings:

i. There exists no statistically significant difference between the attitude of teachers towards the adoption of OER based on gender. According to the findings of the statistical analysis, the t-value is 0.571 with a df of 219, and the

p-value is 0.569, both of which are substantially higher than the level of significance of 5%.

ii. There exists no statistically significant difference between the attitude of teachers towards the adoption of OER in relation to their years of teaching experience. The findings of the statistical study indicated that the F value, which is determined to be 0.916, is less than the critical value when compared to the significance level of 0.05 (DF 2, 215 = 3.04).

iii. There exists no statistically significant difference between the attitude of teachers towards the adoption of OER with regard to the academic rank of teachers. According to the results, since F = 2.044 is less than the critical value (DF 2, 215 = 3.04) at the 0.05 level of significance.

Discussions:

The second objective of the study is to determine if teachers' attitudes toward OER adoption vary significantly by demographic factors including gender, years of teaching experience and academic rank.

- The first null hypothesis **($H_0$1)**, that there is no statistically significant difference between male and female teachers in the level of attitude towards the adoption of OER, is validated by the estimated p-value of the independent t-test being greater at the significant level of 0.05. This finding is corroborated by the findings of research conducted by Mishra (2017b), Alkhasawneh (2020), Behera, Kanth, Chowdary, and Kakarwada (2021), Tlili et al., (2022), Omolafe, Agarry, and Babalola (2022), and Manju (all in 2022). (2022). This previous research proved that gender is not a relevant factor when assessing the attitude of teachers towards the adoption of OER. However, in contrast to this, it was discovered in the research conducted by Issa, Ibrahim, Onojah, and Onojah (2020); Falode, Ilufoye, Awoyemi, and Usman (2018); and Coleman-Prisco (2017) that there is a significant difference between the levels of attitude held by male and female teachers regarding the adoption of OER.
- The second null hypothesis **($H_0$2)** that there is no statistically significant difference between teachers attitude toward the adoption of OER and their years of teaching experience is accepted. The present result is in line with the conclusions drawn by Mishra (2017b), who concludes that teachers' years of teaching experience do not affect their attitude towards using OER. Similarly,

Guillen-Gamez, Mayorga-Fernandez, Bravo-Agapito, and Escribano-Ortiz (2021) discovered that teachers' teaching experiences did not affect their views on technology adoption. Whereas, Thoms, Arshavskaya, and Poole (2018) reported that novice teachers have a more positive understanding of and attitude toward OER. Also, Mncube, Tanner, and Chigona (2021) came to the same conclusion, arguing that more experienced teachers are better able to accept and develop OER for pedagogy and research.

- The third null hypothesis **($H_0$3)** that there is no statistically significant difference between the attitude of teachers towards the adoption of OER in relation to the academic rank of teachers is confirmed. According to the research of Mishra (2017b) and Alkhasawneh (2020), professors, associate professors, and assistant professors all have roughly the same level of familiarity with OER regardless of their academic rank. Krelja Kurelovic (2016) came to a similar conclusion, that attitude on OER is not affected by teachers' academic ranks.

Researchers have found that in today's tech-savvy world, it's no longer unusual for faculty members of the higher education of both genders to make use of ICT (Alkhasawneh and Alanazy, 2015; Danko, Decman, Kerzic and Zorko; 2020). On the other hand, the rapid growth and uptake of technology into every facet of society, to the extent that it has become an integral component of our day-to-day lives, may have reduced gender differences in some ways. One of the probable reasons can be that the advantages of using OER are widely known among teachers of both genders (Santosh, 2017; Torto, 2019; Behera, Kanth, Chowdary and Kakarwada, 2021). It is likely that both male and female teachers are up-to-date on, and have experience with, the various open platforms and tools designed to facilitate education. According to the findings of Zaidi, Amir, and Bhatia's (2022) study, teachers agree that OER helps them to improve their teaching in the classroom and makes it easier for them to keep abreast of technological developments. More and more teachers are turning to online materials, which is evidence that OER is making a difference in the classroom. This indicates that once teachers of both genders see the value of OER, they will embrace it enthusiastically (Shibana, 2013). According to Mijares, Bustamante, Ayo, Anacio, and Jotic (2017), the attitude of university teachers towards OER can be predicted by the perceived ease of use as well as the perceived utility of OER. It is to be anticipated that

male and female teachers are equally motivated to adopt OER. Researchers in the past have inferred that the adoption of OER was driven by teachers' readiness and willingness to make contributions. According to the findings of Rao (2022), faculty members, both male and female, have an equal preference to utilize and contribute to OER. Similarly to Mishra's (2017b) findings, male and female teachers share an equivalent level of enthusiasm and willingness to participate in the adoption of OER. In their study, Falode, Ilufoye, Awoyemi, and Usman (2018) remarked that the lecturers are ready to adopt OER for their teaching because it will provide them with a plethora of knowledge on a single topic from a variety of authors; with the ability to reused and modified for their purposes. In the research conducted by Van Acker, van Buuren, Kreijns, and Vermeulen (2013), it was found that the gender gap in the intent to share digital educational resources is not statistically significant. Kanwal, Rehman, and Asif (2020) held the consistent belief that "educational excellence and prospects are not gender-dependent". This is because male and female teachers receive equal access to educational technology facilities in the classroom as well as training, particularly in higher education institutions (Arenas-Gaitan, Rondan-Cataluna, and Ramirez-Correa, 2010).

The current finding may have its roots in the fact that the use of technology is more widely accepted by university lecturers (Guillen-Gamez, Mayorga-Fernandez, Bravo-Agapito, Escribano-Ortiz, 2021). Lee's (2021) research found no substantial correlation between teachers years of experience in the classroom and how they feel about embracing technological advancements (OER). If this is the case, it seems that teaching experience has no bearing on the attitude toward OER adoption. Another finding pointed out that the length of teaching experience of a teacher is not a crucial factor in determining how they will feel about the use of technology adoption. (Saha, 2020).

The adoption of the most recent digital technology has moved faster in the higher education sector as a direct result of the COVID-19 epidemic. It has been stressed to teachers how important it is to make the most of these technological advancements, which have opened the door to new possibilities for reshaping education, teacher education, and educational institutions. Considering that the technical skills are necessary to use digital resources, studies have shown that university teachers are digitally competent to use, share and create OER (Dias-Trindade and Albuquerque,

2022; Basantes-Andrade, Cabezas-Gonzalez, and Casillas-Martín, 2020). This is owing to the fact that faculty members at all levels, regardless of gender, years of teaching experience, or academic rank, have been involved in the use and creation of OER. Another probable explanation is the intrinsic drive for personal and professional development inherent in the teaching profession. Higher education teachers, regardless of whether they are men or women, are less or more experienced, professors, associate or assistant professors, have a higher level of professional aspiration and are more likely to share their ideas and research with the public (Izzati, Nurchayati, Lolita and Mulyana, 2022). In addition, they viewed OER as a tool for academic and professional development that would help them stay connected with teachers elsewhere in the country and the world (Kiran, 2017). Studies found that irrespective of any demographic profile, university teachers, place a high value on the chances to share their resources and so expand their network, form new partnerships, and enhance their resources by continuously receiving feedback on their work (Ehlers and Kunze, 2021). Henceforth, in light of the above discussion, the first hypothesis regarding insignificant differences between the level of attitude of teachers towards the adoption of OER based on gender, teaching experience, and academic rank is valid.

5.4. Findings and discussion of objective 3

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.

Major findings:

i. It has been identified that 91% of the teachers have downloaded OER, but only 9% of them claim to have never downloaded any OER.

ii. The data revealed that 75% of the teachers have reused the content developed by others in their lessons without making any modifications. 25% of them, however, have not done so.

   - Among the total sample of users who have reused OER, it has been found that the majority of the teachers, i.e., 92% and 67% have reused articles from scholarly publications and textbooks in their classroom teaching. While 49% of the teachers have reused videos, 43% have reused modules;

34% have reused images, 27% and 11% of the teachers have reused blog posts and audio files.

- It has been discovered that most teachers about 98% assessed OER through Google Scholar, and 86% from Google Advanced Search. In addition to this, teachers accessed OER from NPTEL (37%) and Open Course Library (32%). While, 28% of respondents assessed OER from other sources, including Project Gutenberg, z-Library, SWAYAM, E-Gyankosh, Youtube, Shodhganga, Inflibnet, NCTEOER, NCERT, and Commonwealth of Learning (COL). The rest of the sources from where teachers assessed OER were OER Commons (23%); Coursera (21%); WikiEducator (20%); NROER (19%); MIT Open CourseWare and College Open Textbooks (11%); Khan Academy (10%). The least utilized sources by the teachers were MERLOT (4%); OSCAR (2%) and Connexions (1%) respectively.

iii. The data revealed that 10% of the teachers always accessed OER in their teaching, while the majority of the teachers (86%) accessed OER sometimes whereas only 5% of the teachers reported that they never used OER in their teaching.

iv. Majority of the teachers (71%) agreed that they accessed OER sometimes, 13% of the teachers claimed they always accessed OER and only 16% of them reported that they have never used OER for professional development.

v. Of the teachers surveyed, 67% said they have modified the content to make it more suitable for their needs, while 33% said they have never revised the original material. Again, only 13% of the teachers admitted to having translated OER content, while the remaining 87% claimed they have never translated any OER materials.

vi. The findings discovered that 39% of teachers engaged in the act of remixing or creating new content by combining the original or revised content with other similar content. Conversely, a majority of teachers, specifically 61%, reported that they have never remixed or created any content by merging it with other similar content.

vii. A majority of 65% of teachers have shared OER with others, while 35% have not shared OER with any individual.

- The results showed that the majority of teachers about 90% redistributed the OER with their students. Followed by, 39% of teachers shared the OER with their colleagues, 17% of teachers shared the materials with faculty from other universities. 6% of them also shared OER with other sources or organizations like NCTE, NROER, NCERT, journals for publications, NPTEL, e-PG Pathshala, and SWAYAM. Lastly, 4% of teachers reported that they had shared the OER materials with the Head of the institution.

viii. Only 32% of teachers have created OER, while the majority of teachers, which accounts for 68% of all teachers, have not created any content in the form of OER.

- Among all the OER creators, a majority of 72% of teachers have created their OER in the form of articles published in scholarly journals. Additionally, 45% of the teachers have created video content, 28% have created modules, and 23% have created lessons. A smaller percentage of teachers published their OER in the form of blog content (17%), images (13%), and audio recordings (11%) and textbooks (8%).
- 44% of the OER creators 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). 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 under 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) and 6% of teachers have released their OER materials under the CC BY-NC (distributes, remix and alter the original work by acknowledging the author but not for commercial purposes).
- According to the survey results, 62% of the OER creators reported that they are not engaged in any collaborative efforts with people from other

educational institutions in the creation of OERs. Nevertheless, it is worth noting that a mere 38% of OER creators are engaged actively in collaboration with other agencies or educational institutions for the creation of OER.

ix. The study revealed that 49% of the teachers preferred **CC BY-NC-ND** (download and distribute the content with others, acknowledge the author, not for commercial purposes and without any alterations); 44% of these teachers preferred **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% for **CC BY-NC** (distribute, remix and alter the original work by acknowledging the author but not for commercial purposes); 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); 34% of them preferred **CC BY** (reuse, remix, modify, distribute and use the content commercially with proper citation); meanwhile, only 14% of all teachers preferred **CC BY-ND** (distribute, used the content even commercially with a proper citation but cannot be modified by others).

x. According to the findings from the qualitative analysis, teachers used OER primarily for teaching and learning purposes, as well as to supplement existing materials. On the other hand, the reasons for creating OER were to disseminate knowledge, increase visibility, and be out of personal motivation or interest in creating OER.

Discussions:

According to the findings of the current research, the vast majority of teachers have used OER in their classrooms, either by downloading them or keeping copies of them. These findings are consistent with prior research which indicated that teachers use and retain OER for pedagogical purposes (Munisamy and Sivaraman, 2017; Hayman, 2018a; Forgette, 2020; Midha and Kumar, 2022; Manju 2022). Further, the qualitative analysis uncovered two reasons for utilizing OER: for teaching and learning purposes and using OER as supplementary materials. Teachers found that OER provided them with useful resources that could be used to complement and improve their existing

pedagogical practices. This has also been reported in the studies of Wiley and Hilton (2018), Butcher, (2011) and Orwenjo and Erastus (2021).

Our findings are consistent with those of Baas, Admiraal, and van den Berg (2019), who found that OER is used "as is", by the teachers. In addition, Baas and Schuwer (2020) discovered that teachers reuse OER to save time and effort. It is noted that the most common practice for reusing materials that are difficult or time-consuming to create is to obtain them from third parties and not make any modifications to them. According to Windle, Wharrad, McCormick, Laverty, and Taylor's (2010) observation, teachers tend to reuse resources that they have found to be more effective in a particular context. White and Manton (2011) also discovered that academics are the most likely to access a resource in its original form. They further elaborated that reusing the content of others has been an integral part of teaching practice in higher education, and the research suggests that reusing online content is becoming increasingly mainstream as technology becomes part of people's everyday lives. During an interview that was carried out by Ganapathy, Pei Wei, Vighnarajah, and Jui Jong (2015), respondents stated that they reuse resources that were developed by persons they know and trust. The research also indicated that teachers mainly reused textbooks and scholarly journal articles, which is consistent with the findings of other studies, including Ganapathy, Pei Wei, Vighnarajah, Jui Jong (2015), De los Arcos, Farrow, Pitt, Weller and Mcandrew (2016), and Hayman (2018a).

The research revealed that 67% of the teachers modified the original content to better meet their demands. According to a survey by Beaven (2018) teachers use materials that have been created by others or are available in online repositories, alter these resources and organize them sequentially, logically and coherently according to the goals of their classroom teaching session. As described by Baas and Schuwer (2020), teachers modify resources themselves if they need the resources to be more context-relevant. In another study that has been carried out by Pulkar (2020) teachers who reused materials adapted them to fit their pedagogical styles and the needs of their pupils. They stated that alteration enables them to reflect on their methods of instruction. Research conducted by Beaven (2013) as well as by Karunanayaka and Naidu (2017) provides more evidence in support of this argument.

Another result of this investigation that came into notice with respect to translating OER content from English to regional language or vice-versa, and remixing OER

content, the majority of the teachers reported that they had not remixed or translated any content. It can be assumed that the work of translating and remixing is not straightforward and needs reevaluation, is expensive, time-consuming and demands extra work (Karakaya and Karakaya, 2020; Rets, Coughlan, Stickler and Astruc, 2023). Fazzino and Turley (2019) and O'Neill (2021) conclude that there is very little practice among faculty members regarding the remixing of OER.

According to the findings of this study, 65 % of the teachers have distributed OER, most frequently with their students, then to colleagues and faculty members from other universities. Only a few of them have shared their work with other sources, such as the NCTE, NROER, NCERT, Journals for Publications, NPTEL, e-PG Pathshala, and SWAYAM. The findings of Baas, Admiraal, and van den Berg (2019); Ganapathy, Pei Wei, Vighnarajah, and Jui Jong (2015), Rako and Softic (2020) complement this conclusion that teachers frequently share resources with students and department team members.

According to the present study, 32% of the teachers have created content in the form of OER. This is in line with the research conducted by De los Arcos, Farrow, Pitt, Weller and Mcandrew (2016), where it was found that only a few teachers create and publish materials under an open license. Similarly, research by Ganapathy, Pei Wei, Vighnarajah, and Jui Jong (2015) at Universiti Sains Malaysia, a premier public university in Malaysia, found that more than half of English language instructors developed OER. These findings also correspond with those of other literature (Zagdragchaa and Trotter, 2017; Bond, Huddleston, and Sapp, 2021; McKerlich, Ives, and McGreal, 2013; Manju, 2022) which point out that the majority of the faculty members have not created OER. However, the reasons behind the creation of OER were also explored in the qualitative analysis. One major reason that is focused on by the OER creators is their intention to disseminate knowledge. They realized the need to provide these learning materials to the public at no cost. They thought that this would help to increase the availability of education for individuals all across the world. Secondly, they created OER to increase their visibility. They believed in the value of creating OER as a way to promote their work and research to a wider audience. That could make their work accessible to a global audience, which could boost their profile and credibility in the academic community. And the third reason is that many teachers were motivated to create OER due to their interests or passions. Some of the reasons

that have been highlighted by prior literature for contributing to OER were primarily internal and external factors such as the pleasure of contributing and sharing OER, the opportunity for professional development through self-reflection on teaching practices (Rodes, Gewerc-Barujel, and Llamas-Nistal, 2019). This could imply that intrinsic motivation is what pushes teachers to create OER (McKerlich, Ives and McGreal, 2013). Again, some teachers create OER to foster networking and collaboration (Cox and Trotter, 2017a).

It has been verified that the teachers assessed OER through Google Scholar and Google Advanced Search, which is comparable to the findings of Zagdragchaa and Trotter (2017) and Dudek (2022). Nonetheless, the study's findings also showed that some teachers assess OER by using platforms such as NPTEL, SWAYAM, E-Gyankosh, Youtube, Shodhganga, Inflibnet, NCTEOER, NCERT, and Commonwealth of Learning. This evidence is consistent with the findings of Munisamy and Sivaraman (2017). Besides this, teachers accessed OER sometimes in their classroom teaching and for their ongoing professional development. This is also confirmed in the findings that were obtained by Assiri and Alnatheer (2019); Midha and Kumar (2022); Dsouza (2021); Munisamy and Sivaraman (2017); Chen and Panda (2013).

Teachers who have contributed to OER have primarily shared their work in the form of articles in scholarly journals, videos, modules, and lessons. A relatively small sample of teachers has created OER textbooks, photos, audio, and blog content. Additionally, it has been revealed that they 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 CC BY (reuse, remix, modify, distribute and use the content commercially with proper citation), CC BY-SA (reuse, remix, modify, distribute, use the content even commercially but have to publish the work under the same license conditions). And least under CC BY-ND (distribute, used the content even commercially with a proper citation but cannot be modified by others), CC BY-NC-ND (download and distribute the content with others, acknowledge the author, not for commercial purposes and without any alterations) and the CC BY-NC (distribute, remix and alter the original work by acknowledging the author but not for commercial purposes). However, only a small proportion of OER creators were actively engaged in collaborative efforts with other agencies or educational institutions to create OER.

The CC BY-NC-ND license (downloads and distributes the content with others, acknowledges the authors, not for commercial purposes and without any alterations) is the one most preferred among the teachers. This result was corroborated by the findings of Frass, Cross, and Gardner (2013) as well as Nobes and Harris (2019). It is followed by 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), CC BY-NC (distribute, remix and alter the original work by acknowledging the author but not for commercial purposes), CC BY-SA (reuse, remix, modify, distribute, use the content even commercially but have to publish the work under the same license conditions) and CC BY (reuse, remix, modify, distribute and use the content commercially with proper citation). However, the least preferred CC license according to our study is found to be CC BY-ND (distribute, used the content even commercially with a proper citation but cannot be modified by others). Considering their concerns about their work being used for commercial purposes, it is probable that the majority of the teachers chose to publish their work with a non-commercial provision (Nobes and Harris, 2019).

5.5. Findings and discussion of objective 4

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.

Major findings:

i. The findings related to access are:
   - 98% of the teachers have access to home internet connection facilities. Only 2% of them do not have access to an internet connection at their homes.
   - Again, 99% of the teachers answered that they have access to an internet connection at their department or institution, and only 1% of the teachers said they do not have an internet connection at their department or institution.

- 79% of the teachers reported that an ICT resource centre is available at their department/institution; while 67% had access to software tools such as learning management tools to deliver content.
- On the other hand, 21% of the teachers have personal blog pages to share content.

ii. The findings related to permission are:

- 71% of the teachers claimed that their institutions had a well-defined IPR and copyright policy, and
- 74% stated that their institutions do not possess the copyright over the content developed by them.

iii. The findings related to awareness are: Overall, 44% of the teachers exhibited a moderate level of awareness regarding the concept of OER, open licenses, and CC licensing.

- The data revealed that 68% of the teachers demonstrated a strong understanding that OERs refer to free and open resources available on the internet.
- 55% of them were aware that OERs are either similar to or fall under the public domain and 62% knew that OERs are digitally available resources that have been published under Creative Commons licenses.
- 45% of the teachers were aware that Creative Commons licenses are free and easy-to-use copyright licenses.
- 49% and 44% of the teachers agreed that Creative Commons licenses transform “all rights reserved” into “some rights reserved” and protect the moral rights of copyright holders, respectively.
- Lastly, only 21% were aware of applying Creative Commons licenses to their work.

iv. The findings related to capacity are: 48% of the teachers showed an overall moderate level of ICT competencies.

- It is found that more than half of the teachers (58% and 62%) have a high level of competence regarding the ability to understand basic computer concepts and the ability to locate the necessary educational resources on the internet.

- However, it has been revealed that most of the teachers have a moderate level of competence in areas such as the ability to create web pages (48%); ability to install and configure application software (56%); ability to create, upload and edit multimedia (57%); ability to navigate different search engines (49%).
- On the other hand, only a small percentage of teachers, specifically 7%, have a high level of competence to share and upload OER on the web.

v. The findings related to availability are: About 56% of the teachers showed a moderate level of availability in terms of relevance or quality of the OER content.

- The result highlighted that most of the teachers hold a neutral perspective on the following statements: satisfaction with the quality of the free and open educational resources that were developed by others (64%); OER content is relevant to their teaching context (65%); the quality of OER is inferior to the proprietary resources (63%); 61% of the respondents remarked that OER content is presented at a reading level appropriate for higher education students; and 57% believe that OER provides useful and authentic sources of information.
- 62% of the teachers showed a neutral opinion 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.
- More than half of the teachers 65% and 63% agreed that they used to ensure the quality and authenticity of the OER before use.

vi. The findings related to volition are: The result indicated that 59% of teachers displayed a high level of volition, which relates to their personal motivation to adopt OER.

- 64% of teachers agreed that they would be encouraged to adopt OER if they received professional credit.
- A significant proportion of teachers (52%) reported feeling confident about adopting OER, while 69% expressed eagerness to learn more about OER.
- More than half of the teachers i.e., 57% and 52% expressed motivation to create and use OER.

Discussions:

According to the analysis of the present research, the majority of teachers have access to an internet connection both at their homes and in the institutional departments. It has been verified beyond a reasonable doubt that teachers do have access to the software tools necessary to deliver content, as well as the provision of an ICT resource centre within the department or institution. On the other hand, the result shows that a smaller percentage of teachers have their own personal website or blog. In a nutshell, the findings demonstrated that the vast majority of teachers have access to at least some of the minimal infrastructure resources needed for the adoption of OER. Studies conducted by Perryman and Seal (2016), Wolfenden, Auckloo, Buckler, and Cullen (2017), Zagdragchaa and Trotter (2017), and Appiah, Essel, and Amankwa (2020) all found similar outcomes of having access to infrastructural facilities to adopt digital OER. According to Percy and Van Belle (2012), to ease the process of localizing and adopting OER content, access to basic ICT infrastructure is essential.

The findings also demonstrated that educational institutions have clear policies regarding IPR and copyright, although the vast majority of teachers believe their institutions do not retain copyright rights to the materials that they personally create and distribute.

Also, it has been discovered that the majority of teachers have a modest level of awareness of OER. The overwhelming majority of teachers had a solid grasp of the concept that OERs relate to the free and open resources that can be found on the internet or the web. The teachers are aware that OERs) are defined as those resources that may be accessed online and either have been published under CC licenses or are considered to be in the public domain. They are aware that CC licenses are "free, easy-to-use copyright licenses" that change the rights that are reserved from all rights reserved to certain rights reserved, thereby safeguarding the moral rights of copyright holders. These findings are consistent with earlier works which reveal that teachers are aware of the concept of OER (Ganapathy, Chee Pei Wei, Vighnarajah, and Jong, 2015; Santosh, 2017; Ozdemir and Bonk, 2017; Nwesri, 2019; Awujoola and Phillips, 2020; Joshith, 2020; Midha and Kumar, 2022). Rolfe (2012) discovered in his research that academic staff members had a clear knowledge of what OER means which may be indicative of a more enthusiastic adoption of these efforts. However, it is interesting to find out that even though teachers were aware of OER and CC licenses only a small

percentage of the teachers (21%) were aware of how to apply a CC license to their work. This finding is consistent with the findings of Mishra and Singh (2017), who found that while teachers value open licensing of OER, they have some concerns about their capacity and knowledge to assess licensing conditions when adopting or modifying OER. Similarly, Awujoola and Phillips (2020) also reported that teachers have no idea how to assign their work under a CC license.

The ability to effectively implement digital technology into pedagogical practices is becoming increasingly vital. The finding reveals that teachers possessed a moderate level of ICT competencies to adopt OER. More than half of the teachers displayed a high level of competency in their ability to understand fundamental computer concepts and locate relevant online educational resources. While, fewer than two-thirds of the teachers exhibit the competence to create web pages, install and configure application software, create, upload, and edit multimedia, and navigate different types of search engines. On the other hand, a relatively small percentage of teachers, precisely 7%, have the high level of competence necessary to share and upload OER on the web. This result corroborates the findings of Okonkwo and Ikpe (2013); Softić (2018); Cebi and Reisoglu (2020); Saud (2021); Jorge-Vázquez, Náñez Alonso, Fierro Saltos, and Pacheco Mendoza (2021); Muammar, Bin Hashim and Panthakkan (2022) that tried to evaluate the professional digital skills of faculties in higher education institutions in their teaching and educational practices.

Another finding showed that more than half of the teachers who responded to the survey in this study agreed that there is a moderate level of availability in terms of the relevance or quality of the OER content. Less than two-thirds of the sample provided a neutral response that OER content are relevant to their teaching setting, and that the quality of OER are inferior to that of proprietary resources. In support of the result, Mishra and Singh (2017) observed teachers being a little sceptical of OER quality and using their criteria to determine what is appropriate in their course. The lack of appropriate OER resources that are relevant to the teachers' curriculum is seen as a significant problem by teachers (Admiraal, 2022). Nonetheless, Van Allen and Katz (2020) held the belief that tech-savvy teachers can adapt OER to create curricular content that is more contextualized, interesting and relevant to traditional curriculum resources. Findings from the present survey also highlighted that most teachers held a neutral view of OER quality in comparison to that of proprietary resources. According

to Parrish and Kuna-Parrish (2018), there is a widespread belief that free resources are inherently of lower quality. In contrast to this result, research by Jhangiani, Pitt, Hendricks, Key, and Lalonde (2016) indicated that teachers viewed OER as being of equal or higher quality than traditional proprietary resources. To this, Loglo and Zawacki-Richter (2019) interviewed professors at a Ghanaian university, where one of them remarked that open resources do not mean it is less credible than proprietary resources; in fact, some open resources and books are funded by reputable organizations or governments, making them even more credible and quality than the traditional proprietary materials because it has been subjected to a rigorous academic review process before being published.

This result is aligned with the previous survey (Forgette, 2020) which pointed out open resources are generally appealing to the students as they are prepared taking into consideration the understanding or reading level appropriate for higher education students (Ozdemir and Bonk, 2017, Lantripa and Ray, 2021); the contents are clear and comprehensive (Jhangiani, Dastur, Le Grand and Penner, 2018, Westermann Juárez and Venegas Muggli, 2017) and even free from grammatical, spelling and typological errors. According to the findings of Bliss, Robinson, Hilton, and Wiley (2013), teachers regarded OER to be well suited to the learning objectives of critical reading courses for students in higher education levels. Furthermore, teachers can customize the content of OER to fit in with the requirements of the course.

Almost two-thirds of teachers stated that before using OER; they verify the quality and authenticity of the OER. As shown in the study of Phalachandra and Abeywardena (2016), 56% of teachers indicated a preference to evaluate the quality of the OER use by first determining the authenticity and credibility of the material. When incorporating OER into classroom instruction, Mishra and Singh (2017) discovered that it is necessary to do a self-critical evaluation to determine the level of quality and authenticity offered by OER. Earlier research studies (Hussain, Chandio and Khan Sindher, 2013; Parker and Herrington, 2018) have also revealed findings that are comparable to this one, in which teachers believed that OER provides helpful and authentic sources of information.

Lastly, this research found that a moderate level of volition (personal drive) to use OER is possessed by fewer than half of the teachers (41% 'agree' and 45% ‘neutral’). This resonates with the sentiment conveyed by Rolfe (2012), Mishra and Singh (2017),

Karunanayaka and Naidu (2017), Martin and Kimmons (2019), Pande, Singh, Intaratat and Mythili (2019), and Deshmukh and Sahasrabudhe (2020), all of whom postulate that teachers were motivated to access OER as well as create OER for their respective courses, even in local languages. The teachers agreed that their institution ought to encourage and recognize their contributions to the adoption of OER.

5.6. Findings and discussion of objective 5

Objective 5: To ascertain the relationship between the factors that influence OER adoption and the attitude of the teachers towards OER adoption.

Major findings:

i. The result showed that access to the internet at home (rpb=0.009, p=0.894); access to the internet at department/institution (rpb=0.096, p=0.155); ICT resource centre in department/institution (rpb=0.038, p=0.578); software tools like learning management tools to deliver content (rpb=-0.031, p=0.651) and having a personal webpage/blog to share content (rpb=0.012, p=0.854) have a negligible or insignificant correlation with teachers' attitude towards OER adoption. The correlations between these variables were not significant since the p-value exceeded 0.05 levels. Thus, it proved the null hypothesis and found no correlation between access to infrastructural facilities and the attitude of teachers toward the adoption of OER.

ii. A defined IPR and copyright policy (rpb=0.055, p=0.416) and the institution having the copyright over the content (rpb=0.029, p=0.673) have a weak or insignificant correlation with teachers' attitudes toward OER adoption. Since the p-value exceeded 0.05 level of significance, it accepts the null hypothesis that there is no correlation between permission and the attitude of the teachers toward the adoption of OER.

iii. The study revealed that there is a moderately significant positive correlation between teachers' awareness and the attitude of the teachers toward the adoption of OER. The Pearson correlation coefficient (r) is calculated to be 0.469, at a p-value less than 5% level of significance (0.00<0.05).

iv. There is a moderately significant positive correlation between teachers' capacity and the attitude of the teachers toward the adoption of OER. The

Pearson correlation coefficient (r) is calculated to be 0.565, at a p-value less than 5% level of significance (0.00<0.05).

v. There is a moderately significant positive correlation between the availability of OER content and the attitude of the teachers toward the adoption of OER. The Pearson correlation coefficient (*r*) is calculated to be 0.540, at a *p*-value less than 5% level of significance (0.00<0.05).

vi. There is a moderately significant positive correlation between teachers' volition and the attitude of the teachers toward the adoption of OER. The Pearson correlation coefficient (*r*) is calculated to be 0.453, at a *p*-value less than 5% level of significance (0.00<0.05).

Discussions:

(a) The correlation analysis determined a weak or negligible insignificant correlation between access to the infrastructural facility and teachers' attitudes towards OER adoption. However, the interview analysis revealed diverse perspectives from the teachers when asked if access to infrastructural facilities influences the adoption of OER. Although some interviewees expressed the belief that access to infrastructure is a prerequisite, it is not an essential factor that affects their choice to adopt OER. They stated that high-quality ICT facilities and equipment are required for the adoption of OER but that does not necessarily guarantee the use or creation of OER. Few of the interviewees expressed concerns about broadband connectivity in hilly areas, which made it challenging for them to access a reliable internet connection. Overall, the participants confirmed that access to infrastructure is a must for the adoption of OER, but it is not sufficient to persuade teachers to create or use OER without the necessary technical skills, awareness and other important factors. These findings were validated by the earlier research carried out by de Oliveira Neto, Pete, Daryono, and Cartmill (2017), in which it was discovered that the location of the internet connection does not influence OER adoption. Access to an internet connection at various locations (whether at home, in the department, or at any other place) might not be a defining factor in determining whether or not individuals use OER. Similarly, it has been demonstrated that the specific kinds of hardware devices, internet speeds, and internet stability teachers have access to do not significantly impact

whether or not they use OER. Therefore, it is possible to state that even though access to ICT infrastructure hardware (computers, mobile devices, etc.) and internet connectivity (broadband, Wi-Fi, etc.) can be described as an enabling factor for OER adoption, it is not an influencing factor that might affect a person's attitude towards OER adoption. The reason may be that most central universities surveyed in this study can meet the primary infrastructure access needed for teachers to use OER, making it less of an issue in terms of OER adoption. As de Oliveira Neto, Pete, Daryono, and Cartmill (2017) stated, if HEI has a required level of ICT provision, the OER adoption rates should not be driven by infrastructure concerns but by other factors. Also, according to the findings of Mtebe and Raisamo (2014), the facilitating condition, which included organizational and technical infrastructure, did not significantly impact the attitude of instructors to embrace and use OER. Consequently, the factor "access" did not play a significant role in determining teachers' attitudes towards adopting OER in the higher education setting, particularly in the case of central universities, where the minimum level for ICT infrastructure is attained among all teachers.

(b) Secondly, the present result demonstrates a weak or negligible insignificant correlation between permission and the attitude of the teachers towards OER adoption. The findings from the qualitative data indicate that both OER users and creators have expressed their support for the formulation of guidelines or policies that would promote OER use and creation in Indian educational institutions. They believe that such policies would enhance the adoption of OER, and that acceptability is essential for the successful integration of OER into higher education. Even, some teachers cited the example of UGC's policy on MOOCs, which has been successful in driving the creation of online content. However, it remains uncertain; if such policies would influence the attitude of teachers, as one of the OER creators indicated that they had created OER despite having no OER policy or guidelines. Nevertheless, previous research has shown that permission is a significant factor in influencing whether or not a teacher will adopt OER (Cox and Trotter, 2017a). Moreover, Kasinathan and Ranganathan (2017) reported that to promote the adoption of OER, it is necessary to develop a policy in which legal permission would be granted to any copyrighted work as an open license by

default. Like, Hodgkinson-Williams, Arinto, Cartmill, and King (2017) have noticed that faculty members rarely create materials in collaboration unless there is an explicit institutional policy mandating it. However, in contrast, to the above previous literature and supporting the current findings de Oliveira Neto, Pete, Daryono and Cartmill (2017) found no significant association between lecturers' perceptions of their institutions' OER-related policies and their use of OER. This led them to conclude that permission (institutional policy) would be a crucial factor for OER creation but not for OER use. Wolfenden, Auckland, Buckler, and Cullen (2017) found that the uptake and engagement of OER among teacher educators is still uncertain, even after the provision of explicit institutional support for OER. It further explained that the use of OER among them is the product of individual initiative rather than coordinated effort. This indicates that the presence of institutional IPR copyright policies or legal permission to use or develop OER does not have any connection with individuals' attitudes regarding the adoption of OER.

(c) This study's result indicated a moderate positive and significant relationship between the two variables, i.e., OER awareness and the attitude of the teachers towards OER adoption. This has been further pointed out during the interview, where the teachers emphasized how important it is to be aware of OER and understand the technologies behind them to effectively adopt and develop them. They reasoned that awareness of OER and attitude towards OER are inextricably related concepts that cannot be separated from one another. Lack of awareness may lead to misperceptions and misinformation, such as the idea that creating OER means losing copyright; and an individual's attitude towards OER depends on their familiarity with the concepts. They highlighted the need to know various OER platforms and tools, as well as an understanding of ethical issues related to OER for effective adoption of OER. This is in line with other studies like Cox and Trotter (2017b); Praveen Kumar and Vasimalairaja (2019); Nascimbeni and Burgos (2019); Awujoola and Phillips (2020); Karataş, Yılmaz, Karataş and Banyard (2022); Marín, et al (2022) which posits that awareness of OER and CC license considerably influences the attitude towards OER held by the teachers. A sufficient level of awareness is one of the enabling factors that contribute to the adoption of OER (Mtebe and Raisamo, 2014). Also, Torto (2019) reported that

the awareness of OER predicts the behavioural intention of faculty members to use OERs. The researchers went on to clarify that once faculty members have sufficient knowledge of OERs, they will readily adopt them. A comprehensive understanding of OERs is necessary for their uptake and utilization. According to the findings of the survey conducted by Ehlers and Kunze (2021), a favourable attitude is a direct outcome of having a high level of awareness about OER. This finding suggests that awareness has a significantly strong correlation with attitude. In addition, Tlili, Jemni, Khribi, Huang, Chang, and Liu (2020) emphasized that it is a crucial responsibility to grow awareness of open licensing and OER to encourage increased engagement with and adoption of OER. Al Abri and Dabbagh (2018) after reviewing 36 prior researches (from 2010 to 2017), concluded that most of the faculty held inconsistent attitudes towards OER since they lacked awareness of OER. Jameela's (2014) research showed a similar trend, concluding that the decline in OER adoption can be attributed to teacher educators' low level of OER awareness (as cited in Mishra and Singh, 2017). Elder, Larson, Thornton, and Cross (2020) also found that awareness of institutional OER initiatives enables teachers to engage more in open educational practices and be willing to explore OER. Contrary to the findings of the aforementioned literatures, Mishra and Singh (2017) found that, despite having relatively low levels of awareness of OER, Indian teachers displayed positive attitudes towards creating and sharing OER.

(d) The correlation analysis indicated a moderately significant positive correlation between teachers' capacity and attitudes toward adopting OER. Moreover, the interviews conducted with the teachers indicate that teachers' ICT competence significantly influences both their adoption and attitude toward OER. Teachers who are comfortable and confident in their technological abilities are more inclined to have a positive attitude toward adopting OER. They considered that ICT capacities can make the utilization of various technologies easier, which would make them better adopters. Previous research supports this argument (Kiran, 2017; Torto, 2019; Tillinghast, 2020). Individuals who possess digital skills can access, use, produce, and even disseminate digital resources, as was proved by several research studies that focused on digital competence and the adoption of ICT (Vijaya Kumari and D'Souza, 2018; Karwande, 2020; Li et al.,

2021; Hassana and Mirza, 2021). This point of view is also backed by Ramirez-Montoya, Mena, and Rodrguez-Arroyo (2017), who believe that digital competence is the driving force behind the acceptance of educational innovation through the creation of OER. In an interview conducted by Marín et al. (2022), it was pointed out by one of the interviewees that the IT literacy among staff members who are directly involved in the digitalization process is the single most crucial factor that has an impact on digital adoption (including OER). It was also noted in Kiran's (2017) research that teachers' attitudes toward OER were influenced by their expertise with digital tools. Thus, positive attitudes towards OER were found to be strongly correlated with instructors' proficiency with ICT, such that more excellent proficiency led to even more enthusiastic attitudes. Hood and Littlejohn (2017) argue that for teachers to expand their use of OERs, they need to be familiar with the technology, have access to a setting that encourages the use of OERs, and feel comfortable using them. Anuratha (2020) remarked that it is essential to achieve digital competency to equip faculty members with training in using digital tools to prepare them for innovative educational resources (such as OER). As described by Kasinathan and Ranganathan (2017) teachers need to acquire digital literacy skills to adopt OER; moreover, their ability to create and share OER might be influenced by proprietary technology environments.

(e) It is also depicted that moderately significant positive correlations exist between teachers' availability of OER content and their attitudes toward adopting OER. Likewise, the qualitative data also revealed that teachers' attitudes toward OER adoption are greatly influenced by teachers' perceptions of OER's quality and availability. Teachers are less likely to use OER if they believe they are of low quality or are irrelevant to their classroom needs. Teachers are more likely to adopt and use OER if they have access to high-quality resources that fit their needs. Therefore, the availability of high-quality OER can positively impact teachers' attitudes toward their adoption. Previous studies by Arinto, Hodgkinson-Williams and Trotter (2017); Mishra (2017); Cox and Trotter (2017a); Tang, Lin and Qian (2020); Cai, Dong, Li and Wong (2023) all came to similar conclusions. Evidence from the literature suggests that the availability or quality of resources is an essential factor in determining an individual's intention to use OER, implying

that an individual's attitude towards adopting OER depends on the content's availability and quality. According to Mishra (2017a), the extent to which OERs are used at a given institution depends heavily on teachers' perceptions of the quality of those resources. Faculty members were reported to be more worried about the quality of OER materials before adopting them for use in classroom teaching, as observed by Allen, Seaman, Poulin, and Straut (2016). The lack of context-relevant, high-quality OER prevents educators from choosing and supporting the usage and creation of OER (de Hart, Chetty, and Archer, 2015). Teachers' attitude toward the adoption of OER relies on their perceived relevance and quality of OER (McKerlich, Ives and McGreal, 2013; Baas, Admiraal and van den Berg, 2019). Cai, Dong, Li, and Wong (2023) noted in their recent study that teachers were more likely to use OER if its content was relevant to the lesson's topic and appropriate for the student's intellectual level.

(f) Last but not least, in terms of the correlation between volition and attitude towards OER adoption, the current study's findings have led to the conclusion that there is a significant moderate positive correlation between teachers' volition to use or create OER and their attitude towards the adoption of OER. During the interview, teachers verified that their level of motivation is a key factor that influences their attitude toward the adoption of OER. They believe that their outlook on making use of or creating OER would not improve unless there is an intrinsic drive among them. They asserted that individual motivation and the desire to acquire knowledge are the primary drivers behind the adoption of OER. They emphasized the interrelated nature of motivation and attitude, asserting that the cultivation of a positive attitude is conditioned upon the presence of motivation. Thus, from the qualitative data, it has been recognized that motivation plays a critical role in shaping their attitudes toward OER adoption. These findings are in agreement with the research that was carried out by Cox and Trotter (2017a); Arinto, Hodgkinson-Williams and Trotter (2017); Torto (2019). It has been opined that an individual's volition becomes the most important factor in determining whether or not they will use or create OER if they have the necessary access, permission, awareness, capacity, and availability to participate in OER practices (Reed, 2012 and Rolfe, 2012; Baas, Admiraal and van den Berg, 2019). Individual volition, which includes personal beliefs and interests, plays a

role in determining whether or not he or she will adopt OER (Cox and Trotter, 2017a; Rodés, Gewerc-Barujel, and Llamas-Nistal, 2019; Mishra, 2017). This plays a role in forming an individual's attitude toward OER adoption. Moreover, previous research in ICT revealed that more favourable attitudes toward ICT use were associated with effective and more motivated users (Sipilä, 2009; Zamir & Thomas, 2019). Research by Moukali (2012) showed that positive views for adopting technology-rich blended learning among faculty members were more likely when they were offered incentives to do so, whereas negative attitudes were more common when no such incentives were offered. Even the findings of Veletsianos (2015) conclude that personal motivations are a significant driver of openness in the higher education setting. All this literature has pointed out that motivation (rewards or incentives, reputation, or a sense of satisfaction to use or create OER influences teachers' attitudes toward adopting OER.

5.7. Findings and discussion of objective 6

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.

Major findings:

i. The analysis of the interview data revealed that there is significant effectiveness in adopting OER in higher educational institutes of North-East India. According to the comments provided by the interviewed teachers, OER can potentially improve the quality of teaching and learning both for students and teachers.
   - The teachers who were interviewed identified several benefits of adopting OER in the teaching-learning context. These benefits include providing stakeholders with a broad availability of educational resources, enabling personalization of the content, promoting active and self-directed learning, expanding knowledge paradigms, fostering a culture of knowledge sharing, and a cost-effective approach for both students and teachers.
   - As per the responses provided by the interviewed teachers, OER can function as a constructive tool for the professional growth of teachers in the

realm of higher education. The identified effectiveness of OER adoption in professional development includes the expansion of opportunities for collaboration and innovation, improvement of teachers' pedagogy practices, boosting of teachers' reputation, and improvement of teachers' digital literacy.

ii. This study reveals the challenges encountered in the adoption of OER as identified by the interviewees. These challenges were classified into several sub-themes, including technological, inadequate informational, institutional, academic, ethical, and miscellaneous challenges.

- Technological challenges: Teachers have highlighted a lack of technical skills and an unreliable internet connection as the two key technological challenges that limit them from using or creating OERs.
- Inadequate informational challenges: Limited knowledge of OER and lack of understanding of open licenses and CC licenses were the inadequate informational challenges in the adoption of OER.
- Institutional challenges: The lack of institutional support, the lack of recognition, the limited funding, and the lack of operational OER policies were the institutional barriers that prevented the smooth adoption of OER.
- Academic challenges: Time-consuming and workload pressure are some of the academic challenges that hamper the successful adoption of OER.
- Ethical challenges: Copyright infringement is the primary ethical challenge that teachers claim in the adoption of OER.
- Miscellaneous challenges: Teachers have also reported some additional problems like a lack of positive attitude, lack of motivation to create OER, concerns over the OER's quality, limited availability of OER for certain topics, problems with customizing the content and resistance to accept change.

Discussions:

As a result of the analysis of the qualitative data, it has been discovered that all the interviewed teachers believed the adoption of OER to be effective within the context of teaching and learning in higher education. The findings have demonstrated that

teachers really feel that OER have the potential to assist in students' learning as well as their professional growth.

According to the interviewees, OER offers an extensive array of educational materials that are created by different experts from across the globe, catering to all educational levels and benefiting both students and teachers. OER has opened the door to many new resources which has improved students' learning experiences as noted in the previous studies of Chae and Jenkins, 2015; Henderson and Ostashewski, 2018; Parrish and Kuna-Parrish, 2018. These resources offer educational opportunities and support research activities. As stated by one of the interviewees, OER is an online platform that provides a wealth of information sources. According to Stacey (2007), OERs unlock knowledge capital by adding views from diverse cultures and contexts.

The effectiveness of OER is determined based on its ability to facilitate the customization of learning materials by end-users, in a way that best suited their needs, which is one of its enabling features. During the interview, teachers responded that OER can be customized to fit our learning needs and settings, thereby boosting students' engagement and motivation. An interviewee gave an example of how a teacher might remix Khan Academy videos to create personalized learning experiences that allow learners as well as teachers to learn at their own pace. This viewpoint is also consistent with the findings of previous research studies. According to Tang (2020), and Chae and Jenkins (2015), teachers put significant value to OER since they let the content be reused and remixed to adjust to the needs of individual learners, increasing student engagement and active participation in the classroom.

OER's freedom to adapt content allowed teachers to see it as a powerful tool for self-directed and active learning. OER allows for interactive learning environments that meet a variety of learning styles. Similarly, Stacey (2007) expressed the same matter, stating that OER allows autonomous and self-directed learning, fostering self-regulation and self-reliance among learners.

Teachers have also mentioned that OER broadens individual knowledge perspectives. By leveraging these resources, one can widen their knowledge beyond the confines of the four walls of the classroom environment; which enables the integration of multiple ideas and standpoints into a single content. Supporting this argument, Ashalatha (2021) also posits that OER expands knowledge beyond limits through its immense features like personalization, efficiency, and collaboration.

Based on the assertions of the interviewees, OER promotes a culture of knowledge diffusion in the academic environment. By allowing teachers to exchange resources, OER can promote knowledge sharing. This approach can boost resource development and quality. Previous research studies, such as Krelja Kurelovic (2016), Henderson and Ostashewski (2018), as well as Datt and Singh (2021), also indicated that educators mentioned accelerating a collaborative culture of knowledge sharing as a positive aspect of adopting OER. An interviewee expressed the viewpoint that while copyright and intellectual property rights serve to protect knowledge, this also represents knowledge as a form of property, thereby limiting its usage by individuals. Whereas, OER is instrumental in broadening the intellectual perspectives of both students and educators (Mikroyannidis and Papastilianou, 2021).

It has also been discovered that the most useful advantage of utilizing OER is that it is cost-effective, providing an alternative to expensive traditional textbooks and educational resources. Teachers have asserted that this makes learning more accessible and affordable for teachers, as well as for students belonging to low-income backgrounds. The results of this study correspond with the outcomes of Chae and Jenkins (2015) and Manju (2022), in which the faculty members considered that the adoption of OER provides financial aid to their students because it is offered at no cost. It is also concluded from the analysis of the interviews that teachers were concerned about the price of the books or journals which cost hundreds or thousands of dollars, making it practically impossible for them and their students to purchase them. It is also brought to our attention that even universities do not have subscriptions to some publications. In such circumstances, the adoption of OER can be shown to be a viable option because it reduces both the cost and the investment that is required to acquire access. As noted by Tang (2020) OER repositories provide teachers with easy access to cost-free educational resources that would otherwise be of high cost in copyright-restricted sources.

Apart from its role in facilitating teaching and learning, OER can also play an important part in the ongoing professional development of teachers. Based on the interview, it appears that teachers concur that OER represents a valuable approach to professional development. The use and creation of OER offer an opportunity to foster collaboration within the sector of higher education. OER support global collaboration, establishes professional networks among teachers, enabling them to exchange valuable

knowledge and perspectives, acquire new insights from others in their field, promoting continuous learning and development among teachers. This result is in alignment with the findings of previous studies conducted by Chae and Jenkins (2015), Tang (2020), and Manju (2022), wherein teachers stated that the use of OER enables them to network with fellow academics on a national and international scale. According to Adil et al. (2022), OER initiatives in educational settings can prove to be effective in promoting professional development and partnerships among faculty members.

Teachers hold a belief that these professional networking and collaborative work environments, further, can facilitate mutual learning among teachers, leading to the improvement of their pedagogical practices. As expressed by an OER creator the creation of OER engages them to reflect upon their pedagogical practices and to think creatively and develop innovative approaches to teaching and learning. It became apparent through interviews with teachers that they believe professional networking and collaborative work can encourage reciprocal learning among them, leading to enhanced pedagogical practices. As expressed by one of the OER creators, the process of developing OER prompts them to engage in introspection regarding their pedagogical techniques and come up with new, creative strategies for teaching and learning. In addition, there is evidence in the published research to suggest that OER helps to enhance pedagogical practices (Chae and Jenkins, 2015; Manju, 2022; Kumar, Baishya, and Deka, 2021; Weller, De Los Arcos, Farrow, Pitt, and Mcandrew, 2015; Sáenz, Hernandez, and Hernández, 2017). Participants in the interviews reported that OER assists teachers in achieving global recognition for their work. However, they were sure that such endeavours do not guarantee to result in promotion in their careers. Kumar, Baishya, and Deka (2021); and Karipi, (2020) disclosed similar results in their research. University teacher digital skills development is a noteworthy benefit that has been recognized by interviewees. The growing popularity of OER holds promise for revolutionizing the field of education and enhancing the technological skills of teachers. The use and creation of OER can augment their ability to generate, adapt, and distribute digital content. The use of digital technologies has eased them in adapting and integrating digital tools into their pedagogical approaches. Jongsermtrakoon and Nasongkhla (2015); Delgado, Samaniego, Salinas, Acosta, and Avila (2020); Edelsbrunner, Steiner, Schön, Ebner, and Leitner (2022) also observed that these resources are significant in strengthening future teachers' digital competencies.

The adoption of OER in higher education is still hampered by a number of challenges, despite the fact that using OER can result in significant cost reductions, increased access to educational materials of a higher standard, greater collaboration and innovation, increased knowledge dissemination, and deeper reflection on teaching practices, etc.

The biggest challenge that teachers perceive as prevalent and significant is the issue of unstable internet connectivity. According to teachers, the ability to effectively utilize OER is dependent upon a robust and reliable infrastructure, encompassing stable internet connectivity and compatible technological devices. Despite the presence of a reliable Wi-Fi connection or robust internet infrastructure, some teachers have stated that they have experienced intermittent internet disruptions or power outages due to weather-related issues at their academic institution. Mtebe and Raisamo (2014), Sáenz, Hernandez, and Hernández (2017), Kasinathan and Ranganathan (2017), and Cox and Trotter (2017a) came to the similar conclusion that the absence of an internet connection is the most significant barrier to the use and creation of OER. Another primary technological barrier to the adoption of OER by higher education teachers is the lack of technical knowledge and skill about various digital technologies. Proficiency in technical skills such as software applications, file formats, and multimedia editing is often required for the creation, modification, and sharing of OER. The absence of these competencies may impede the use and creation of OER. Also, according to some teachers, senior faculty members might at times possess insufficient abilities to effectively utilize innovative modern technologies. This has also been supported by previous findings by Atenas, Havemann, and Priego (2014); Wong and Cheong Li (2019); Orwenjo and Erastus (2018).

Lack of awareness of OER, insufficient knowledge of open licenses and CC licenses is also major barrier. Participants in the interview are of the opinion that teachers who are not aware of the concept of OER may have trouble locating these materials and efficiently utilizing them. They remarked that the concept of OER is still unfamiliar to many of their other colleagues. Although some of them expressed that they knew of OER and CC licenses, they couldn't create OER because they didn't know how to apply them to their work. This outcome is consistent with what Mtebe and Raisamo (2014), Cox and Trotter (2017a), Mishra and Singh (2017), Orwenjo and Erastus (2018), Pounds and Bostock (2019) and Balouva (2020) found in their studies.

Insufficient support for OER adoption from the institutional level can pose a challenge for teachers seeking to integrate OER into their teaching process. Moreover, teachers who contributed to OER also reported that the creation of OER is often ignored and unacknowledged by other people. The absence of recognition can often be a demotivating factor when it comes to the successful adoption of OER. This result corresponds with the findings of Cox and Trotter (2017a), Chae and Jenkins (2015), Tang, Lin, and Qian (2021), Skidmore and Provida (2019) and Mishra (2017b). Another issue that emerged from the analysis of interview data is the lack of appropriate funding to either embrace or promote OER practices. The use or creation of OER requires a certain amount of financial investments with regard to technology, infrastructure, and training, as found in previous literature studies by Mishra (2017b); Mishra and Singh (2017); and Onwubere (2013).

The lack of an OER policy is another institutional barrier to the adoption of OER by teachers. A lack of defined guidelines and policies for the creation and usage of OER may discourage them from investing their time and effort into the creation of OER. One of the participants remarked that UGC has led faculty members to develop and even integrate MOOCs into the curriculum, so faculty are actually creating and doing so, however in the case of OER, no such mandatory guidelines have been provided, hence limiting their ability to create such resources. The lack of an institutional or national OER policy has resulted in a 'self-restrictive practice' in the use or creation of OER among teachers, as claimed by researchers such as Cox and Trotter (2017a), Mishra and Singh (2017), Wong and Cheong Li (2019), Ngimwa and Wilson (2012), Henderson and Ostashewski (2018).

The process of localizing OER, searching for trustworthy and appropriate resources is a time-consuming act. Along with this, the process of creating OER requires a substantial amount of time, taking into account many aspects such as quality, relevance, accessibility, and presentation. Moreover, because of work commitments and other responsibilities in research, teaching, and administration, teachers felt overburdened to contribute to OER. This finding of the study is in agreement with the results of other researchers, such as Karunanayaka and Naidu (2017), Cox and Trotter (2017a), Mishra and Singh (2017); Martin and Kimmons (2020); Forgette, (2020); Nagashima and Hrach (2021).

One of the primary ethical concerns raised by teachers pertains to the risk of copyright infringement, which might lead to academic dishonesty and violation of the original authors' rights to their intellectual property. During the interview, the teachers emphasized the issue of possible plagiarism or unauthorized use of the content without appropriate attribution by certain users. The majority of other research studies similarly demonstrate that teachers expressed fear regarding copyright violation and plagiarism (Nagashima and Hrach, 2021; Ofoegbu, Asogwa and Ogbonna, 2021; Wong and Cheong Li, 2019; Balouva, 2020; Kumar, Baishya, and Deka, 2021; Kopp, Linschinger and Neuböck, 2022). However, regarding ethical concerns, an OER creator has further expressed that plagiarism is not unique to OER and is a pervasive issue across all educational contexts. Many anti-plagiarism tools help to identify and prevent plagiarism, which may help to mitigate concerns related to the misuse of OER.

The main challenge to the adoption of OER is the lack of positive attitudes among teachers towards the creation or use of OER. The studies conducted by Orwenjo and Erastus (2018), Tang, Lin, and Qian (2021), Ngimwa and Wilson (2012), and Tang (2020) have yielded similar results. Moreover, the lack of desire and motivation among teachers to use OER and create their own OER could potentially impede the broad adoption of these resources. Teachers have expressed the opinion that our academic community lacks the motivation to embrace an open-access culture. This finding resonates with the findings of prior research carried out by Kopp, Linschinger and Neuböck (2022); Datt and Singh (2021), Alkhasawneh (2020); Tlili et al. (2020); Hu, Li, Li and Huang (2015). Many teachers who are considering adopting OER were sceptical about its quality. Teachers have voiced concerns regarding the resources' accuracy and quality. Since anyone can create and share OER, making sure they are up-to-date and accurate can be challenging. Chae and Jenkins (2015), Balouva (2020); Atenas, Havemann, and Priego (2014). Pounds and Bostock (2019); Tang, Lin, and Qian (2021), Mtebe and Raisamo (2014) Belikov and Bodily (2016); Percy and Van Belle (2012); Skidmore (2019) agree that quality assurance is a difficult part of creating and using OER. Teachers have further shown their discontent with the limited availability of high-quality OER materials for certain subjects or specialized courses. They believed it is difficult to discover materials that were relevant to their classes because not all courses or topics had access to a range of OER repositories or databases. The findings are consistent with and corroborate the investigations carried

out by Chae and Jenkins (2015), Orwenjo and Erastus (2018), Thapa and Hansen (2022); Belikov and Bodily (2016); Datt and Singh (2021), Hu, Li, Li and Huang (2015). It has been indicated that the task of customizing OER might be difficult and complex at times. Teachers have remarked that it takes a great amount of time, effort, abilities, and knowledge to adapt or translate the material so that it fits into a particular context. However, a few of the teachers mentioned that not all OERs were licensed for reusing or modifying the content. This is especially true with materials published under the CC-BY-NC-ND license, which places restrictions on the adaptation of OER. Literature such as Atenas, Havemann, and Priego (2014); Pounds and Bostock (2019) have also drawn attention to this fact. Last but not least, interviewed teachers perceived that a prominent reason for the slow pace at which new technological innovations are adopted in the field of education is the teacher's resistance to embrace change. They may be reluctant to attempt something new in the classroom if the teacher has been using the same approaches for a long period. This finding is supported by the studies of Ngimwa and Wilson (2012); Mishra (2017b) and Parrish and Kuna-Parrish (2018).