Beyond Access: University Students' Experiences with Open Educational Resources

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April 2025

This thesis is submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy

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Author's declaration: This thesis is entirely my work and has not been submitted in substantially the same form for the award of a higher degree elsewhere.

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Abstract

As part of the growing open education movement, Open Educational Resources (OER) have gained increasing scholarly attention in recent years. Having been conceptualised in the early 2000s, research on OER remains in its early stages, with the majority of scholarship in this field being largely theoretical, focusing on conceptual and philosophical discussions. Even within the growing body of empirical research on OER adoption, most studies have relied on surveys and data analyses conducted in controlled experimental settings. There remains limited understanding of how different users independently engage with these resources in their learning, and a notable lack of systematic reflection and theory-driven inquiry into the OER phenomenon.

This study employs a phenomenographic approach to investigate how undergraduate students in a university in Oman experience OER. The study is based on interviews with a sample of twenty students from different specialisations. Interviews were subject to phenomenographic analysis to identify patterns of variation in the students' experiences using OER. Given the absence of a national and institutional OER policy in the setting of the study, this research aims to provide insights into students' independent use of OER, in an endeavour to inform and guide OER integration within the institution's curricula and information systems.

The study's findings are presented as an outcome space that identifies four distinct ways in which the participants experience the OER phenomenon. They use OER in the following ways: 1) as resources in guided formal learning; 2) as resources for self-directed support in formal learning; 3) as resources for self-directed support in integrated learning; and 4) as resources for lifelong learning. Overall, the progression from category 1 to category 4 reflects a shift from basic academic dependency to autonomous and future-focused engagement with OER. These findings imply that when commonly researched advantages of OER, such as cost-saving and enhanced learning outcomes, are not at the foreground of the experience of OER use, other, and arguably more impactful, perceived benefits are highlighted. In the context of this study, OER are primarily valued for their diverse modalities, particularly when compared to traditional resources. At a deeper level, OER enabled learners to assume a more active role in their learning. These results guide future endeavours in OER research and integration in higher education. The thesis contributes to the literature by offering empirical validation for the long-anticipated yet

underexplored potential of OER in fostering independent learning and enhancing learner agency. The study also contributes to the field of information-seeking behaviour by detailing the motivations and ways that undergraduate students use an important category of electronic resources, that of OER.

Acknowledgements

This thesis would not have been possible without the support, guidance, and encouragement of many individuals and institutions.

First and foremost, I would like to express my deepest gratitude to my supervisor, Professor Jan McArthur, for their invaluable guidance, patience, and unwavering support throughout this journey. Your insights and encouragement have been instrumental in shaping this research, and I am truly grateful for the knowledge and wisdom you have shared with me.

I extend my appreciation to the staff of the E-research and Technology-Enhanced Learning Programme at Lancaster University for their assistance and dedication, which made this academic journey smoother. My heartfelt thanks also go to my examiners for their time, constructive feedback, and thoughtful critique, which have helped refine this work.

I am deeply grateful to the University of Technology and Applied Sciences-Nizwa, where this study was conducted, for providing the resources and academic environment that enabled me to conduct this research. I also wish to sincerely thank the participants—university students—who took the time to contribute to this study. Your willingness to participate was crucial in making this research possible.

To my family—my father, brothers, and sisters—thank you for your unwavering support, patience, and belief in me. Your encouragement has been my source of strength throughout this process. To my dear friends, your kindness, motivation, and understanding have been invaluable, and I am forever grateful for your presence in my life.

Above all, I dedicate this thesis to my beloved mother, whose love, encouragement, and unwavering faith in me gave me the courage to embark on this journey. Although she left us too soon, her spirit has been with me every step of the way. This work is, in many ways, a tribute to her boundless love and support.

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List of abbreviations

HE	Higher Education
HEI	Higher Education Institutions
OER	Open Educational Resources
OEP	Open Educational Practices
MOOC	Massive Open Online Course
UNESCO	United Nations Educational, Scientific and Cultural Organization
UTAS-Nizwa	University of Technology and Applied Sciences-Nizwa
MIT	Massachusetts Institute of Technology
MENA	Middle East and North Africa

Chapter 1: Introduction

1.1 Introduction

The continuing advance of technology is opening new opportunities for various learners worldwide to gain knowledge and share information. However, students' use of the newly available virtual resources raises pressing issues regarding quality, access and costs (Hylen, 2006). Open educational resources (OER) represent one example of the sources of information recently established. OER refers to educational materials that are available online and protected under open licensing that allows free access, reuse, adaptation and redistribution (UNESCO, 2019). These resources comprise a wide range of educational materials, including textbooks, courses, tutorials, tests and instructional videos (Atkins et al., 2007). Since the emergence of the OER movement in 2001, many OER initiatives have been established in various places around the world. One of the most notable initiatives is the Massachusetts Institute of Technology's (MIT) OpenCourseWare (OCW), launched in 2001. This pioneering project set a precedent for other institutions by making course materials freely available online, thereby inspiring a global movement towards open education (Alkhasawneh, 2020). Following MIT, the Open University in the UK launched the OpenLearn project, which also provided free educational resources to learners worldwide. These initiatives have laid the groundwork for many other OER projects, demonstrating the potential of open resources to enhance educational access. In 2013, the Hewlett Foundation, a major funder of OER projects worldwide, listed five motives for supporting OER: (a) reducing educational costs, (b) providing an opportunity for quality learning, (c) promoting instruction and personalised learning, (d) providing access to all, and (e)

encouraging the production of localised content. However, Weller et al. (2015) noted that these aims must be considered only projected objectives until they are supported by evidence, which is still insufficient since OER research is a relatively new scholarly field. Thus, the need remains for more rigorous research investigating the adoption, application and effects of OER.

OER offer the potential to provide free, high-quality education (De Oliveira Neto et al., 2024). The literature on OER features many studies that have sought evidence proving these two benefits. In particular, research on OER's cost-effectiveness has focused on replacing traditional educational materials such as textbooks with OER, while studies on OER quality have typically evaluated these resources by measuring student performance and satisfaction when engaging with OER. Numerous scholars have found no significant difference in the performance of students when using OER (Griffiths et al., 2022; Hilton, 2016; Idrissi et al., 2018; Johnson et al., 2022). That said, other studies have reported that students were satisfied with the OER experience (Cheung et al., 2022; Trip et al., 2023; Weller et al., 2015, 2017), mainly because it saved educational costs (Hettige et al., 2022; Hilton, 2016; Oelfke et al., 2021; Weller et al., 2017). Less investigated aspects included Weller et al.'s (2015) evaluation of non-grade performance-related effects, such as increased interest and engagement with the content and boosted self-agency, personalised learning and learners' experimentation with new learning techniques. Panke and Seufert (2013, p.117) described OER as "provid[ing] the building blocks to construct personal learning environments", thus redefining the teacher's and student's roles in the learning experience. In this context, students become educational partners who participate in curating, modifying, and sharing learning resources catered to their contextual needs (Luo et al., 2020; Wiley et al., 2017). Such promising potential demands further exploration. Specifically, empirical evidence is needed to support such projected potentials. Focus has been on the cost

saving and performance benefits that draw attention from other arguably profound impacts of OER on learning and teaching practices. Not only is emphasis placed on predetermined benefits of OER, but these benefits are also typically studied in experimental settings, where the use of a particular (often preselected) OER or OER platform is examined. Otto et al. (2021, p.8) comment on OER empirical research:

> Concerning the research methods used in the studies, quantitative methods are prevalent at 63% of the population. In comparison, qualitative methods account for a relatively small share with almost 20% and are at a similar level to mixed-method approaches with a share of around 17%. When considering the three types of methods in more detail, it becomes clear that surveys and data analyses (descriptive and correlation analyses, experimental and quasi-experimental designs, data mining, and learning analytics) are primarily carried out in the quantitative field.

Realising more impacts of OER, I argue, requires investigating learners' use of OER in naturalistic settings and when learners choose to use OER among other resources. The context of this study, as will be detailed in section 1.2, serves this end as OER is not a formal part of the institution's curriculum, contributing to this field of OER research. To this end the study, using phenomenography, examines the various ways undergraduate students experience OER. Furthermore, a better understanding of students' engagement with OER as an information source contributes to a research area that focuses on human interactions with information resources amidst the growing use of accessible online resources, including OER.

1.2 Personal Motive and Practical Context

In my capacity as an educator, I have noticed a gradual transformation of learners' learning experiences and preferences over the past ten years due to the advent of new

communication and collaboration technologies. However, the greatest change occurred during the COVID-19 pandemic. On many occasions, students indicated an increasing reliance on open content and a willingness to accept greater responsibility for learning. The online experience opened their eyes to new ways of learning or acquiring knowledge. My observations aligned with Lee and Lee's (2021) conclusion that 'the compatibility of OER with online environments and its instant access make OER even more attractive during the pandemic' (p. 384). Even before the onset of COVID, Goldman et al. (2012) noted that students were becoming more exposed to online resources and tended to turn to them to resolve life and academic issues. Considering the reliable and varied content that OER have been reported to offer, exploring how today's learners use OER is a worthwhile endeavour. Most of the existing literature concerns the impact of OER adoption in experimental settings where researchers have tested the application of certain OER on a group of learners. However, it is questionable whether this testing is sufficient to realise the wide range of effects of OER adoption on learners. Therefore, I claim that realising a wide range of effects of OER adoption on learners requires paying more attention to how learners might independently use OER. A better understanding of students' engagement with OER could help OER providers create more usable open content and guide educational institutions in regulating the integration of OER into their systems. To explore these effects more fully, the current study focuses on the different ways learners independently use OER in naturalistic settings. This study aims to explore how university students use OER to enhance their learning experiences. The setting of the study is the University of Technology and Applied Sciences (UTAS-Nizwa) in Oman. UTAS-Nizwa is a leading institution in higher education dedicated to fostering academic excellence and innovation. Known for its comprehensive range of programmes in technology and applied sciences, the university aims to equip students with

practical skills and theoretical knowledge to meet the demands of a rapidly evolving global market (UTAS-Nizwa, 2025). UTAS-Nizwa promises an ideal setting for the following reasons:

1. The university currently has no OER use policies, and OER is not part of the educational system, serving the aim of examining the independent use of OER by learners.
2. The institution's emphasis on the integration of technological advancements into teaching and learning processes makes it an environment well-suited for examining the growing phenomenon of OER use to inform OER adoption.
3. Oman is located in the Middle East, a region considered part of the Global South. More research is needed about OER adoption in different contexts, as it is likely to be influenced by various social, structural and economic factors.

OER has the potential to provide accessible, high-quality educational content - especially in developing countries (Glennie et al., 2012), providing solutions to persistent educational challenges in these countries, including massification of higher education, increasing costs of enrolment and resources, and inconsistencies in the quality of education (Arinto et al., 2017). However, Oman, an Arabian Gulf country, is not a typical Global South country. Most Higher Education (HE) students study for free through either government Higher Education Institutions (HEI) or scholarships in a private HEI in the country or abroad. UTAS-Nizwa, the setting of the study, is a government HEI where textbooks and course materials are the main educational materials used in technical and applied sciences fields of Engineering, Information Technology, Business Studies and Mass Communication Studies. The courses focus on experiential, cooperative and project-based learning, which requires students to seek and search information to complete their assignments and projects. The students' primary information sources are textbooks, lecture notes, and interactions between students and teachers because they have

limited access to the university's academic databases. Therefore, alternative information sources are anticipated to be used by students such as online resources, including OER. Unlike other Global South contexts, the massification of higher education, rising enrolment and resource costs are not at the foreground of the OER utilisation experience. There are three studies I conducted as part of this PhD program, at Lancaster University, that directed my focus on OER use among UTAS-Nizwa students:

1. **Instructional Design of Arabic MOOCs:** While there has been much recent research into the quality of Massive Open Online Courses (MOOCs) designed for learners from multicultural backgrounds, little is known about the quality of localised MOOCs. Using Margaryan et al.'s (2015) Course Scanner questionnaire, an instructional design quality instrument based on the ten principles of instruction (Collis & Margaryan, 2005; Margaryan, 2006; Merrill, 2002), eight Arabic MOOCs from the most popular Arabic MOOC platform, Edraak, were evaluated in terms of instructional design quality. The results revealed that the overall instructional quality of these courses is low. Furthermore, they lack expert feedback and differentiation and exhibit little representation of collaboration and collective knowledge. The paper also highlights cultural factors that affect the design of localised MOOCs and suggests that more attention should be paid to the quality of MOOCs that have been localised for learners in a certain culture. This paper provoked my interest in open content and the role of culture in shaping the production and use of open content.
2. **Interaction Equivalency Theorem: Interaction in an Online Technical Writing Course During the COVID-19 Pandemic:** This paper explored students' interaction experiences in an online writing course during the COVID-19 pandemic. Analysis was

based on Anderson's (2003) interaction equivalency theorem, in which Anderson posited two theses that organised learner–teacher, learner–content, and learner–learner interactions in online courses. The paper examined the interaction perceptions of ten students, divided into two discussion groups of five students each, in an online course at a university of technology in Oman. Due to the emergency transition to online instruction during the COVID-19 pandemic, the online course taken by the study participants lacked proper preparation and theoretical background. The findings showed a student preference for learner–learner and learner–content interactions as opposed to learner–teacher interaction. Furthermore, the results highlighted the importance of unplanned informal interactions in the effectiveness of the learning experience in this context. The study illustrates that additional research is warranted on the role of informal modes of interaction in online learning, including how to incorporate them within existing formal modes, and support and direct the use of informal interaction in an era of open interaction and learning resources. Hence, I wanted to further explore our students' interaction with electronic content they *informally* used during the pandemic and how that is extended to the post-pandemic era.

3. **Open Educational Resources in the Middle East and North Africa (MENA) Region: A Literature Review:** This study conducted a narrative literature review to investigate the current state and trends of OER in the MENA region. It aimed to gain a comprehensive overview of OER adoption and identify gaps in research. The review's main finding was that although many international and regional OER initiatives have been launched in the region, OER adoption is still lacking in most MENA countries. Major factors that affect the sustainability of these projects include low awareness and an

absence of governmental and institutional policies that regulate and encourage OER adoption. Although each country in the MENA region has its own specificities, they share similar social, demographic, and economic attributes. However, generally, research on OER in the MENA region is lacking - especially empirical studies. Out of 24 papers used in the review, only 10 were empirical studies and only 6 papers addressed OER use in Oman. This scarcity of research on a continuously growing topic, OER, motivated me to explore OER's use in the context of the institution where I teach.

1.3 Research Context

My study is situated within the larger body of research on open education in higher education. The open education movement, characterised by its commitment to accessibility and inclusivity in education, prominently features OER as a cornerstone. Hylen (2006) affirms that although OER is a relatively new phenomenon, it could be considered a component of a broader trend in higher education toward openness, which includes more well-known and established movements like Open Access (OA) and Open-Source Software (OSS). She further explains that

> The two most important aspects of openness have to do with free availability over the Internet and as few restrictions as possible on the use of the resource. There should be no technical barriers (undisclosed source code), no price barriers (subscriptions, licensing fees, pay-per-view fees) and as few legal permission barriers as possible (copyright and licensing restrictions) for the end-user. The end-user should be able not only to use or read the resource but also to adapt it, build upon it and thereby reuse it, given that the original creator is attributed for her work. In broad terms this is what is meant with "open" in all three movements (p. 1).

OER are defined as teaching, learning, and research materials that are freely available and can be modified and redistributed under open licenses, which allows for their reuse, revision, remixing, and redistribution - often referred to as the "5R" characteristics (Wiley, 2007, 2014). This flexibility not only enhances the quality of educational resources but also significantly reduces the costs associated with educational materials, making them particularly beneficial for diverse learners. The historical context of the open education movement reveals that the principles of openness in education have deep roots, extending back to the establishment of universities and the promotion of learner-driven education (Margaryan et al., 2015). The UNESCO Declaration in 2002 marked a significant milestone in recognising OER as essential for fostering educational equity and access. This declaration emphasised the role of information and communication technologies in enabling the open provision of educational resources for non-commercial purposes, thereby promoting a culture of sharing and collaboration among educators and learners (UNESCO, 2002). However, while access to OER is crucial, it is not sufficient on its own to achieve the broader goals of the open education movement, which include enhancing learning outcomes and fostering educational innovation. Therefore, we witness a worldwide movement towards open educational practices (OEP), which emphasise the pedagogical use of OER, and is essential for realising the full benefits of open education. This study focuses on resources, rather than practices, to focus on the various ways these resources are used in a context where OER are not a formal part of the university curriculum.

1.4 Research Questions

This study uses phenomenography to understand the range of experiences university students in Oman exhibit regarding the use of OER. While the study focuses on students' experiences of OER in learning, it also contributes to the knowledge base on information

behaviour research. People's need for information and the way they seek, give and use it is studied under the term 'information behaviour' (Pettigrew et al., 2001), a wide area of research that focuses on human interactions with formal sources of information (e.g. library resources, written documents and information systems) and extends to informal sources such as everyday conversations (Case, 2006). With the advancement of technology and the growing availability of accessible online resources, online information seeking behaviour is a nascent phenomenon (Michael et al., 2014) that requires further study (De Groote et al., 2014). This study emphasises the potential of OER to be recognised as reliable and efficient. It further contends that a better understanding of students' engagement with OER as an information source can serve as a catalyst among higher education administrators, instructors and academic libraries in diverse contexts for investigating the experiences of their students in order to identify appropriate guidance and services. In the context of this study, which took place at the UTAS-Nizwa in Oman where institutional OER policy is lacking, the objective is to provide insight into the various ways students' use of OER can serve to guide the regulation and integration of OER in the curricula. Accordingly, the study poses three research questions:

RQ 1. What are the qualitatively different ways students at UTAS experience OER?

RQ 2. What relationships exist among the ways students at UTAS experience OER?

RQ3. What implications do these variations and their structural relations have on OER integration in UTAS?

1.5 Thesis overview

The thesis consists of seven chapters, each focusing on a distinct aspect of the study, leading to an in-depth examination of learners' experiences with OER use in the context of UTAS-Nizwa, Oman. Below is a thorough overview of each chapter.

The introductory chapter establishes the concept of OER and explores its historical background. It discusses my personal and practical motivations for conducting the study, particularly my decade-long observation of evolving learner experiences shaped by advancements in communication and collaboration technologies. The chapter also presents the research context, UTAS-Nizwa, where there are no existing policies governing OER, and its significance as a case study for independent learner engagement with OER. Furthermore, examining OER in Oman, a part of the Global South, is particularly important given the scarcity of research on OER adoption in these countries. The chapter concludes by clearly presenting the research questions and offering an overview of the thesis structure.

The second chapter, Literature Review, offers an in-depth examination of the current research on OER. It first presents an overview of the historical context and the current trends in OER research. The chapter, then, analyses the different ways formal learners engage with OER and reviews research on OER benefits such as cost-saving, learning outcomes, student satisfaction, and independent learning. In addition, the literature review explores the various factors that impact OER use, including learners, courses, and institutional characteristics and frames the use of OER as a type of information-seeking behaviour. It concludes with a summary of essential findings and gaps noted in the existing literature.

Chapter three, Theoretical Framework, outlines the theoretical foundation of the study, phenomenography. It starts by addressing the ontological and epistemological perspectives of phenomenography before focusing on key phenmenographic elements such as awareness, the second-order perspective, and variation. Section 3.4 argues for the choice of phenomenography for this study, and Section 3.5 discusses its limitations. The last section provides a summary that reinforces the significance of this framework in relation to the research objectives.

The Research Design chapter, Chapter 4, outlines the methodological framework. It starts with an overview of the study's context and the criteria for selecting participants in the first two sections. In the following sections, the chapter provides comprehensive details on data collection tools, which include online resource logs and interviews, as well as the methods used for data analysis. To ensure rigour in the methodology, the chapter also discusses the validity, reliability, and ethical factors related to the research. The chapter's summary highlights the overall design and its alignment with the study's objectives.

The fifth chapter, Findings, outlines the study's results. It begins by highlighting key points to be considered when reading the findings of a phenomenographic study. Section 5.3 presents the outcome space, discussing the structural and referential aspects of learners' experiences with OER. The chapter, then, details and exemplifies the four developmental categories of the outcome space: 1) OER as resources used in guided formal learning, 2) OER as resources used for self-directed support in formal learning, 3) OER as resources used in self-directed support in integrated learning, and 4) OER as resources used for lifelong learning.

Chapter six, Discussion, analyses the findings concerning the research objectives and theoretical framework. It explores the distinct ways in which undergraduate students engage with OER and the connections between these experiences. This chapter also emphasises the importance and implications of these results by offering insights into how OER involvement can guide institutional adoption and policy decisions. Finally, the chapter's summary wraps up this reflective examination and highlights the study's contribution to the existing literature.

The seventh chapter, Conclusion, presents a thoughtful synthesis of the study. It revisits the research questions and main findings while recognising the study's limitations and their

effects on the results. This chapter also highlights areas for future research, stressing the importance of wider research on OER adoption in various contexts.

Chapter 2: Literature Review

2.1 Introduction

This chapter provides a comprehensive review of the literature relevant to this study and contextualises the research within the evolving discourse on OER. The first section, 1.1 OER: Historical Background and Recent Research Trends, traces the development of OER and offers insights into its conceptual definitions and the broad areas of inquiry that have shaped its evolution. This section highlights the interdisciplinary nature of OER research and its connections to the wider open education movement.

The second section, 1.2 Learners' Utilisation of OER, narrows the focus to the core of this study: the ways in which formal learners engage with OER. The review begins by examining the engagement of formal learners with OER and explores the documented benefits of OER for students, including cost savings, improved academic performance, increased engagement, and enhanced satisfaction with learning experiences. Subsection 2.2.3 highlights the factors that influence learners' use of OER, encompassing individual learner characteristics, course and institutional attributes, and the broader context of faculty and institutional support.

Finally, Section 2.4 OER as a Form of Information-Seeking Behaviour examines the utilisation of OER through the lens of information-seeking behaviour. It situates OER use within broader patterns of students' engagement with electronic resources. This section explores how and why learners access OER, highlighting the motivations underlying their resource-seeking behaviour.

To locate relevant literature for this study, a comprehensive search was conducted using the Scopus database, accessed through the Lancaster University library portal. The search

strategy involved combining key terms related to OER—namely “Open Educational Resources,” “OER,” “open access resources,” OR “open access”—with terms related to the target population, including “formal learner,” “college students,” OR “university students.” I restricted the search to peer-reviewed studies, book chapters, and review articles. I examined each abstract thoroughly to determine whether the study was directly relevant to OER. Studies unrelated to higher education—such as those concerning K–12 or primary settings—were excluded, as they fall outside the scope of this research. In addition to the database search, the snowballing method was employed by reviewing the reference lists of selected articles to identify further relevant studies.

Through this review, the chapter establishes the theoretical and empirical foundation for this phenomenographic investigation. It emphasises the need for a nuanced understanding of learners’ lived experiences with OER. This review of literature presents background differences that could influence how university students experience the use of OER and guide the critical research decision regarding participant sampling. The review also contributed to the development of interview questions and provided context for interpreting the analysis results. Furthermore, by synthesising existing research and identifying gaps, the chapter positions the study within the evolving discourse on OEP, highlighting its potential contribution to both scholarship and practice.

2.2 OER: Historical Background and Recent Research Trends

OER has been one of the prominent concepts discussed under the evolving field of open education. According to the most basic definition of the term, OER include educational materials and resources, such as videos, online textbooks, examinations, whole courses, and software

(Atkins et al., 2007), which are available online under open licensing that permits their use, free access, modification and sharing (UNESCO, 2019).

Stracke et al. (2019) posited that OER originated in the common, firmly established practice of creating and sharing educational materials, as reflected in various terms in the literature, such as *open content*, *learning objects*, *reusable learning objects*, *reusable learning content*, and *open courseware* (Arinto et al., 2017). Historically, the concept of OER first emerged in 2002 in a UNESCO forum held on the *Impact of Open Courseware for Higher Education in Developing Countries*, which took place a year after the impactful Massachusetts Institute of Technology's OpenCourseWare programme was launched for the purpose of sharing course content. This forum defined OER as educational materials that are freely available for use and adaptation by a community of users for non-commercial purposes (UNESCO, 2002). This foundational definition set the stage for the subsequent development and proliferation of OER across various educational contexts. The most often cited definition was proposed by the William and Flora Hewlett Foundation, which described OER as

> teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge. (Atkins et al., 2007, p.4)

In 2019, UNESCO proposed five objectives of OER, which included (a) enhancing stakeholders' abilities to produce, obtain, repurpose, adapt, and redistribute open educational resources; (b) creating supportive governmental policies; (c) promoting inclusive and equitable

OER of high quality; (d) encouraging the development of OER sustainability models; and (e) promoting global cooperation in OER.

Although OER are freely accessible online, they are also licensed. Under open licensing, according to Wiley's (2007, 2014) framework, OER can be (a) retained and kept; (b) reused without modification; (c) revised, adapted, and modified; (d) remixed with other resources for use; or (e) redistributed and shared in their original or altered form. However, the openness of OER entails the lack of financial barriers as well as legal constraints (Hylen, 2006). Despite their potential to provide free access to high-quality resources for all users, several concerns related to applicability, sustainability and quality assurance surround OER adoption. In turn, such issues are the focus of OER research.

Upon its emergence two decades ago, the OER movement was characterised as follows: (a) focusing on establishing OER projects and theorising about the application and effect of OER and (b) suffering a lack of rigorous research (Weller et al., 2015). Since this beginning, there has been noticeable growth in the field of OER and rigorous research related to a wide range of topics, including the awareness and perceptions of OER and the impact, motives and barriers related to OER adoption. However, Otto et al. (2021) affirms that the majority of OER research still discusses conceptual and philosophical topics such as OER definition and related concepts, including Open Educational Practices, Open Pedagogy, openness and educational justice, and notes that there is insufficient focus on empirical work and even systematic overviews of such work.

The research on OER has evolved significantly in recent years, with several key themes and trends emerging that reflect the growing importance of OER in education. These trends not only highlight the transformative potential of OER but also address critical aspects of accessibility,

pedagogy, and policy within the educational landscape. The main research trends and themes in OER are summarised in the following points (Adil et al., 2024; Otto et al., 2021):

1. **Cost-effectiveness and Financial Accessibility**: A central theme in OER research is their potential to reduce the financial burden on students by offering free or low-cost alternatives to commercial textbooks. Research in this area highlights how OER can lead to significant cost savings for both students and educational institutions, while still maintaining high-quality educational experiences (e.g., Gazarian et al., 2020; Hilton, 2016; Hilton et al., 2013). This is particularly relevant for students from low-income backgrounds or for those who are otherwise financially disadvantaged.
2. **OER Impact on Student Learning Outcomes:** One prominent area of inquiry investigates the effect of OER on student performance and learning outcomes. This area explores whether the use of open educational materials enhances academic performance, with many studies showing that OER can either maintain or improve learning outcomes compared to traditional resources (e.g., Fischer et al., 2015; Hilton, 2016; Ikahihifo et al., 2017; Johnson et al., 2022). This line of research often emphasises how OER support diverse learning needs, promoting student engagement, retention, and success.
3. **Sustainability of OER Initiatives**: As OER adoption grows, ensuring the sustainability of these initiatives has become a key concern. This area of research examines how OER projects can be maintained over time, looking at factors such as collaboration, funding, and institutional support. It is also concerned with developing strategies that ensure the continuous creation, curation, and updating of OER, so that they remain relevant and useful.

4. **OER and Inclusive Education**: Another major focus of OER research is their role in fostering inclusivity and equity in education. By removing cost barriers and ensuring broad access, it is projected that OER have the potential to democratise education and make it more accessible to diverse learners. Studies in this area examine how OER expand access to high-quality educational resources, particularly for those in low-income communities or remote areas. There is also OER research focusing on how OER can address cultural and linguistic diversity. This research focuses on how OER can be localised to reflect the unique political, cultural, and economic contexts of different regions to make education more accessible and relevant to learners from diverse backgrounds (e.g., Lee & Lee, 2021; Mishra, 2017; Tlili et al., 2019) . This line of inquiry investigates the potential of OER to bridge gaps in education by offering resources that are inclusive and responsive to a global audience.
5. **OER Adoption and Integration in Educational Systems**: The adoption and integration of OER into educational systems is a growing trend aimed at enhancing teaching and learning. Research in this area investigates the factors that influence OER adoption, such as institutional support, educator and learner attitudes, and technological infrastructure (discussed in Section 2.2.3). Studies also explore how educators incorporate OER into their curricula and teaching practices by adapting materials to fit local needs and pedagogical goals.
6. **Quality Assurance and Evaluation of OER**: Given that OER can be created and adapted by a wide range of contributors, issues of quality assurance have become a key area of research. Scholars focus on developing methods for evaluating the quality of OER, ensuring that they meet academic standards. Research in this area typically assesses

criteria such as accuracy, relevance, clarity, and ease of use, with a view towards improving the reliability of these resources for educators and learners alike.

7. **Policy and Institutional Support**: The role of policy and institutional support in the adoption and integration of OER is a critical area of research that has gained increasing attention in recent years. Effective policies and supportive institutional frameworks are essential for fostering an environment that promotes the use of OER, which can improve educational access, equity, and quality. Research on this topic aims at the development of institutional and governmental policies that encourage the adoption and use of OER.
8. **Technological Innovations and OER Platforms**: Technological advancements play a critical role mainly in the dissemination and use of OER, and this is reflected in research focused on the development of platforms and tools that support OER creation, adaptation, and distribution. Related to this theme, scholars are also exploring how emerging technologies can expand the use and adoption of OER.

This study contributes to the area of adoption and integration in educational systems, but also touches upon issues related to supportive institutional policies and OER's impact on students' learning. It specifically examines the different ways undergraduate students experience the use of OER and what implications this variation in experiences has on the integration of OER in the university's educational system. However, the study emphasises OER use as a choice, as UTAS-Nizwa, the setting of the current study, has no institutional policy for OER use and OER materials are not formally used in the university. While the study focuses on students' experiences of OER in learning, it also addresses OER use as an information-seeking behaviour. That is, it explores learners' motivations and approaches towards OER use. Therefore, the

following sections present a review of the literature on both areas: learner OER utilisation and OER as an information-seeking behaviour.

2.3 Learners' Utilisation of OER

While a growing number of OER initiatives have emerged around the globe, little is known about exactly who uses and produces OER (Hylen, 2006). Finding a simple answer to this question is problematic, as there is a continuum of different producers (from organisations and institutions to individuals) and a broad range of users, including institutions, teachers, students, researchers and self-learners. Since the emergence of OER, more scholars have focused on institutions and educators' adoption of OER, while fewer of them have examined the learners' perceptions and adoption of OER. Nevertheless, Panke and Seufert (2013) suggested that "to fully understand the [OER] role in informal as well as institutional learning, we need to shift our attention towards the learner's use and adoption of OER" (p. 118). Focusing on learner engagement with OER is particularly critical because, according to Kanwar et al. (2010), OER is evolving into a learning resource after following early generations of OER that served more as a teaching resource, resulting in learners being the main users of OER rather than educators and institutions.

Potential learner users of OER include formal students registered in face-to-face, blended or distance learning programmes, along with self-learners. In particular, this study examines formal learners' engagement with OER. For the purposes of the current study, formal learners are defined as students who are enrolled in a formal educational institution to gain certification.

2.2.1 Formal Learner Engagement with OER

Weller et al. (2015) contended that OER allow users a "continuum of adaptation to develop" (p. 355). They can be shared as a single resource, a compiled textbook or courseware available in databases or repositories, and platforms to collections of open-access textbooks or courseware (Wiley et al., 2014). Documented facets of formal students' engagement with OER include the use of open resources to supplement their current study or replace traditional materials like textbooks with open-source textbooks or open courses. Much research on OER impact studied the effect of replacing traditional textbooks with open textbooks (Angelopoulou et al., 2022; Bliss et al., 2013; Cheung et al., 2023; Fischer et al., 2015; Hilton, 2016). Other studies investigated the use of other course-specific materials, including video and audio components as well as interactive exercises (Gazarian et al., 2020; Trip et al., 2023). When an interactive educational resource was used in a nutrition course, it was more frequently used, according to student respondents, and they preferred it over a hard copy or static PDF (Ward & Lindshield, 2020).

The results of a survey conducted in a university in Hong Kong found that OER are widely regarded as beneficial and frequently used for a variety of learning objectives, particularly when it comes to supplementing course materials and completing assignments and projects (Cheung et al., 2023). Zhang's (2024) study on second language students' use of OER in out-of-class learning showed the effectiveness of OER as supplementary materials. Cheung et al. (2023) suggest that OER use to supplement learning is dependent on students' diverse needs. They found that face-to-face students showed a higher level of perceived usefulness of OER for preparing tests and examinations, while distance learning students perceived OER as more helpful in supplementing course materials. There is OER-related research focusing on the

adoption of OER materials for content learning in areas such as language (Fischer et al., 2015; Zhang, 2022; Zulaiha & Triana, 2023), computer science (Angelopoulou et al., 2022; Johnson et al., 2022), nursing and medicine (Gazarian et al., 2020; Hettige et al., 2022; Murphy & Winters, 2020; Oelfke et al., 2021; Trip et al., 2023), business (Fischer et al., 2015; Levy & Tila, 2022; Oelfke et al., 2021), natural science and social science (Fischer et al., 2015; Oelfke et al., 2021). Few studies, however, investigated students' independent use of OER to supplement their classroom learning (e.g., Zhang, 2022). Seen et al. (2024) asked Science and Mathematics students about their use of external resources. 80% of students said they used OER and other online resources to view solved problems and gain a deeper understanding of the material. Similarly, OER were perceived as a tool for improving students' comprehension and reinforcing existing knowledge in a statistics course (Phillips et al., 2020).

Besides replacing and supplementing course materials, there are other reported ways of formal learners' involvement with OER. According to Weller et al. (2017), some formal students also use OER to study courses before enrolling in them. Surveying users across fifteen different OER projects, Weller et al. (2015) found out that 41% of the formal learners surveyed use OER to try out a subject before taking a paid-for formal course. Students also used OER for skill development. Other research showed that university students used OER to improve their reading and writing skills, ability to think critically and analytically (Shams et al., 2020), and research and problem-solving skills (Lin & Tang, 2017).

Yet a current engagement with OER is learners' involvement in creating OER. The constant transformation of education to student-centred learning (Kanwar et al., 2010) has led to an increasing interest in involving learners in the production of OER. For example, Osgood (2022) investigated engineering students' perceptions on composing complex abstract problems

in an open textbook. Similarly, Trust et al. (2023) explored students' motivation and perceptions in designing OER materials based on project-based learning. They concluded that changing students' roles from OER consumers to curators and creators enhanced motivation, enhanced attitudes toward learning, helped them meet course learning objectives, and promoted the development of critical skills for success in the twenty-first century. Similar results were obtained by Oakleaf and Dodd (2022) when they studied the effect of student-written textbooks in areas of recreation, sport, tourism, and leisure management. However, Oakleaf and Dodd (2022) concluded that while learners and educators benefited greatly from student-generated OER, academics need special assistance to successfully facilitate this activity.

2.2.2 OER Benefits for Learners

Much of the research conducted on learners' use of OER has addressed the efficacy of these resources. Because downloads and access do not indicate source effectiveness, scholars have sought robust evidence pertaining to OER efficacy and benefit for learners. The UK Open University and the Hewlett Foundation proposed various hypotheses, and launched a project aimed at developing robust evidence, and being related to OER effects such as improved learner's performance and satisfaction, more equitable access to educational resources, enhanced retention, and improved financial benefits for students (Weller et al., 2015; Adil et al., 2024), and based on a review of the literature, identified key benefits of OER involving increased access to knowledge, lifetime learning, pedagogical benefits and enhanced students' learning performance. This section reviews the literature on the perceived usefulness of OER adoption for formal learners.

Cost saving

Research studying the cost-saving effects of OER in different contexts indicated that OER adoption, whether in the form of open textbooks or other OER forms, decreases the cost students pay for traditional textbooks. Teachers and students involved in a large-scale OER initiative at eight community colleges across the United States reported significant cost savings when adopting open textbooks (Hilton et al., 2013). Reviewing nine studies on adopting open textbooks until 2015, Hilton (2016) ascertained that using these open textbooks saved students significant amounts of money. Farrow et al. (2025) reviewed OER publications from 2015 to 2023 and found that cost-saving effects are a key driver for using OER. In science fields where textbooks are usually more expensive, nursing students using various course-specific OER resources appreciated the free cost of materials . Students valued low-cost OER resources, especially as they usually escorted comparable learning performance (Fischer et al., 2015; Hilton, 2016; Ikahihifo et al., 2017; Johnson et al., 2022) and perceived OER quality (Bliss et al., 2013; Hilton, 2016; Oelfke et al., 2021) with traditional textbooks. For example, in a pilot study where OER resources were used in a programming course, Johnson et al. (2022) concluded that this initiative succeeded in introducing low-cost material with results as good as or better than when using high-cost textbooks. Oelfke et al. (2021) found a correlation between students' college level and their perception of OER cost saving. That is, students save more money as they advance at the college level.

Performance and Learning Outcomes

In terms of improved performance, Hilton (2016) synthesised the results of nine studies investigating the effect of adopting open textbooks on learning outcomes, including grades, exam scores, and completion/withdrawal rate. The review concluded that students' performance was

comparable to using traditional textbooks, with the advantage of saving costs. Similar results were obtained in more recent studies across different contexts, OER forms, and study subjects (Fischer et al., 2015; Griffiths et al., 2022; Idrissi et al., 2018; Johnson et al., 2022; Springer, 2019). Fischer et al. (2015) investigated whether the adoption of open textbooks had any influence on learning outcomes, including students' course completion and enrolment intensity, and class achievement across various content areas of mathematics, English, psychology, biology, chemistry, business, history, and education. The findings presented evidence for improved course completion rates, final grades, and enrolment intensity in courses using OER. Similarly, Idrissi et al. (2018) compared the success rates of students in a geometrical optics course using OER and a mathematics course without OER support. The results showed an increased success rate in the geometrical optics course throughout a three-year period. In writing courses, LeMire (2024) examined the outcomes of over 1,000 sections and reported that using OER textbooks increased class GPA. Similar results were obtained in a psychology course (Magro & Tabaei, 2019), a chemistry course (Springer, 2019), and a blended research methods and statistics course (Phillips et al., 2020).

Increased Students' Engagement

Another perceived benefit of OER in the literature is increased student engagement. In a mixed-method study conducted by Mayer (2023), the results showed that both students and faculty noticed a significant rise in student engagement when using OER. Reported engagement forms included becoming more involved in the classroom, taking a more active role in learning, attending classes, contributing to discussions, and interacting with the material on a deeper level. Furthermore, based on a large-scale survey of the users of different OER projects and repositories, Weller et al. (2015) reported evidence that OER improved non-grade forms of

performance among formal learners. Their findings included increases in students' engagement with the content and interest in the subject, and improvements in students' independence and experimentation with new ways of learning. Similar pedagogical benefits were obtained by Gazarian et al. (2020). They explain that adopting OER enhanced students' engagement with the course content by requiring learners to assume a more active role as course participants. Furthermore, the interactive nature of OER might contribute to students' increased engagement with these materials. Using OER with audio components and interactive activities, Trip et al. (2023) reported a high level of engagement with OER among nursing students. Hilton (2016) concluded that open textbooks were as much engaging or more engaging for students than commercial texts. Respondents in a study conducted by Kinskey et al. (2018) explained that compared to traditional textbooks, digital OER materials were more interactive and contained more supplementary materials, such as websites and videos.

Nonetheless, drawing conclusions about the effect of OER on learning outcomes also requires the consideration of other factors, such as design and context (Arinto et al., 2017; Clinton-Lisell, 2023; Hilton, 2016; Kılıçkaya & Kic-Drgas, 2021). Regardless, the results of research on the effect of OER on learning outcomes provide preliminary evidence that students could benefit from OER adoption (Phillips et al., 2020) and generally support that learning is not adversely affected by the implementation of customised OER (Springer, 2019).

Students Satisfaction and Perceived Quality

Another efficacy indicator is student satisfaction. Clinton-Lisell (2023) emphasised the importance of directly hearing student voices regarding their OER experiences instead of only relying on success rates and achievements. In many cases where OER utilisation did not lead to improved performance, students expressed positive perceptions about the learning experience

(Weller et al., 2015). The results of related studies similarly demonstrated that students perceived OER positively. For example, in a survey of users across OER platforms, users indicated satisfaction with their use of OER, with 83.5% stating they would use OER again and 80% responding that they would recommend that others use them (Weller et al., 2017). Furthermore, Hilton's (2016) review of nine studies on students' and teachers' perspectives on the use of open resource textbooks revealed that students generally had positive perceptions of OER in terms of cost-saving and quality. This finding is consistent with the reports of other studies (Hettige et al., 2022; Oelfke et al., 2021; Weller et al., 2017), which also found that students preferred OER due to convenience (especially in online courses) and ease of use because these materials are available anytime online. Investigating OER use, medical students indicated that the two main reasons for using OER are the availability of information at any time and ease of access to information (Hettige et al., 2022). In Gazarian et al.'s (2020) evaluation of students' perspectives on OER use, the overall satisfaction score was 4.01 on a 5-point Likert Scale. Students attributed their positive attitude to the ease to navigate and manage information using OER. Likewise Kinskey et al. (2018) reported that students preferred OER for their ease of use in terms of portability and easy access within a learning management system.

Learners' positive attitude towards OER is also linked to students' perceived quality of these materials. Research has shown that OER were considered of equal quality in different experimental settings. Bliss et al. (2013) concluded that most students and teachers perceived their OER to be at least equal in quality to traditional textbooks. The majority of teachers in eight community colleges across the United States believed that their students were equally prepared in the course with open textbooks compared to students in the same course before the adoption of these textbooks. Studies evaluating learners' perspectives showed that students trusted the

quality of OER (Ikahihifo et al., 2017) or even preferred the quality of the OER textbook over the commercial textbook (Magro & Tabaei, 2019).

While the previous studies point to the acceptance of OER, more evidence is needed owing to the numerous factors that may influence student perceptions. Lee and Lee (2021) cautioned that "different cultural, economic, political, and technological factors may affect the efficacy and users' perceptions of OER to facilitate institutional adoptions of OER" (p.384). Therefore, additional studies aimed at examining the use and effects of OER should be conducted in different contexts.

Independent Learning

The development of digital technologies has rationalised education, opening up new avenues for accessibility, interactivity, and customisation. OER is not an exception, and OER advocates view them as having the potential to reform teaching and learning. The body of literature on OER emphasises their significant potential to foster independent learning. OER are defined as freely accessible educational materials that can be modified and shared, reflecting the core values of open education, which seeks to expand learning opportunities for all (Tang, 2021; Zawacki-Richter et al., 2023). This accessibility is pivotal for promoting self-directed learning, as it allows learners to engage with educational content at their own pace, aligning with their unique needs and preferences (Shams et al., 2020; Tang, 2021). Nakajima and Ono (2017) linked OER use to motivation for self-study. According to their research, where they created a system that used OER video content to automatically create vocabulary and listening quizzes, the system has been successful in increasing students' motivation for independent study.

A key benefit of OER is their capacity to democratise education by removing financial barriers typically associated with traditional educational resources. Research has demonstrated

that OER can result in substantial cost savings for students while maintaining, and in some cases improving, educational outcomes (Hilton, 2016; Tang, 2021). For example, Hilton's (2016) review of multiple studies shows that replacing commercial textbooks with OER not only reduces costs but also enhances student learning experiences. This financial accessibility is especially important for independent learners, who may lack the resources to invest in costly educational materials.

The integration of OER into educational practices also aligns with the increasing focus on lifelong learning. Chen et al. (2022) projected that college students' use of OER can have an impact on how they develop their capacity and habits for lifelong learning. Systematic reviews of the OER literature (Adil et al., 2024; Farrow et al., 2025) have revealed that supporting lifelong learning is a key driver for OER use. As education systems evolve, OER offer a flexible framework that supports continuous learning outside of traditional classroom settings (Duran & Ramirez, 2021; Reinken & Kalinovich, 2022; Saykili, 2019). For example, Shams et al. (2020) found that students felt that using OER allowed them to use online resources that might not be directly related to coursework and helped them develop regular communication with other students on topics unrelated to the course. This is particularly relevant in the context of digital education, where learners can access an extensive range of online resources, facilitating informal learning that complements formal education (Gillet et al., 2022). The use of OER in this context not only empowers learners to pursue knowledge independently but also fosters a mindset geared toward lifelong learning and adaptability in a rapidly changing world (Lin & Tang, 2017). In this study, students particularly valued the benefit of OER use for their future careers. Cubides et al. (2024) found that using OER fosters flexibility and contextualised learning by allowing materials to be customised to meet particular needs. They explain that combining formal and informal

education enhances learning by using structured curricula with individualised learning pathways. The flexibility to adapt and remix OER could encourage learners to take ownership of their educational journey. This adaptability is crucial for independent learners, as it enables them to tailor resources to suit their specific learning contexts and preferences.

2.2.3 Factors Affecting Learner's Utilisation of OER

There have been many previous studies which deal with factors affecting learners' intention and behaviour of engaging in OER. Arinto et al. (2017) categorised the general factors that influence learners' intention to use OER as follows:

- Structural: factors that relate to infrastructure, the availability of OER, and governmental or institutional policies, strategies, programmes and procedures;
- Cultural: factors associated with language, cultural content, values, norms and practices; and
- Agential: factors pertaining to institutions and individuals (e.g. students, educators) involved in the formal learning process.

Specific to HEI, Fine and Read (2020) classified these factors into three categories: learners' characteristics, course characteristics, and institution characteristics. Below is a review of the literature on the influence of these factors. Table 1 presents a summary of these factors.

Learner Characteristics

Learner characteristics that could affect their intention of using OER include learner perceptions on the usefulness of OER, learner motivation, learners' computer literacy, and age (Angelopoulou et al., 2022; Fine & Read, 2020; Kim et al., 2019; Kılıçkaya & Kic-Drgas, 2021; Sandanayake, 2019; Terras et al., 2013). Wong et al. (2016) suggest that one of the major

Table 1 *Summary of factors affecting learners' utilisation of OER*

Learner characteristics	Course Characteristics	Institution Characteristics
- Perceptions on the usefulness of OER - Learner motivation - Computer literacy - Age	- Course materials are easy to use and relevant to their immediate workplace needs - Course delivery format	- Learners' satisfaction with: * Institution support * Faculty - Faculty motivation - Education Cost

factors influencing a learner's decision to engage with OER is their perception of the usefulness of these resources. There has been a lot of research on the perceived efficacy of OER (highlighted in the previous section). Learner perceptions of OER and their related benefits, such as cost saving and improved learning outcomes, can affect their engagement with OER (Kılıçkaya & Kic-Drgas, 2021; Sandanayake, 2019). Shams et al. (2020) reported that the perceived advantages of OER vary greatly among students in different disciplines and at different educational levels. For example, they found that social science students perceived the benefits of OER more positively than students in other academic disciplines. Students from various disciplines even showed a different usage pattern of OER types (websites on educational topics, audio files, animations, eBooks, video lectures, national and international lectures, presentation slides, online journals and data archives).

Another important learner characteristic is that of media literacy skills. Terras et al. (2013) affirm that learners' interaction with OER is highly influenced by their literacy skills, which enable them to make full use of the educational content available. Investigating students' motivation as a factor, Angelopoulou et al. (2022) concluded that "students with high motivation

to learn were likely to use the OER textbook more frequently than lower motivated students" (p. 775). Age was found to positively influence learners' future intentions to use OER (Kim et al., 2019), and that perceptions of OER increase with age (Fine & Read, 2020). While Shams et al. 2020 found that female students have a better perception of the benefits of OER than their male counterparts, other research found no significant correlation between OER perceptions and use, and learner characteristics of gender (Angelopoulou et al., 2022; Fine & Read, 2020; Hu et al., 2015; Yoo & Roh, 2019), students' income (Angelopoulou et al., 2022; Fine & Read, 2020), past academic achievement, and student seniority (Angelopoulou et al., 2022).

Course and Institution Characteristics

Various course characteristics play a role in learner intention and behaviour when engaging in OER. Korean university students indicated that they are more likely to engage with OER if they find them easy to use and relevant to their immediate workplace needs (Kim et al., 2015). Convenience and ease of use of OER materials are factors that students usually report for using them (Hilton, 2016; Ikahihifo et al., 2017). Course delivery format (traditional, online, blended) is another factor that was studied. Older research found that distant learners were more confident using OER (Petrides et al., 2011). This is supported by the findings of Fine and Read's (2020) research on the relationship between course modality and learners' use of OER. Nonetheless, Moon and Park (2021) cautioned that engagement with OER may be challenging for learners with disabilities due to their modality limitations. That is, existing OER might not support various types of interactions for such learners.

In relation to institution characteristics, Fine and Read (2020) indicated that university students' perceptions and use of OER are positively related to their current level of satisfaction with institution support, their preferences for lowering the cost of education, and their

satisfaction with faculty. Furthermore, faculty motivation for OER adoption can positively impact learner engagement with OER (Herbert et al., 2023).

2.4 OER Use as a Form of Information Seeking Behaviour

Information behaviour is defined as 'the totality of human behaviour concerning sources and channels of information, including both active and passive information seeking and use' (Michael et al., 2014, p.10). Historically, the discipline is related to the field of library and information science. Early research on information behaviour tended to concentrate on artefacts, information-seeking venues (such as libraries) and information sources (Allen et al., 2011). This focus on artefacts later shifted to the individual as a seeker and user of information (Allen et al., 2011; Bates, 2010).

Another shift that has affected information behaviour research is the advent of technology related to information seeking and use. Starting with the emergence of computers, then online databases and the Internet, and finally digital libraries and repositories, technology innovations have revolutionised the way people experience information seeking and use (Bates, 2010), and it is noted that their applications require further study (De Groote et al., 2014). While some research has been conducted on the use of online library resources (Desta et al., 2019; Oladunjoye et al., 2018), how students choose and use online resources is not well-understood (Bringman-Rodenbarger & Hortsch, 2020), and how they choose and use OER is especially under-researched.

2.4.1 Formal Learners' Use of Electronic Resources

The use of online resources, including OER materials, has become an integral part of the academic experience for university students. As technology continues to advance, it is likely that

the availability and accessibility of these resources will only continue to grow. Their current availability has made it easier for students to access information from anywhere and at any time. Online resources also provide a wider range of materials than traditional textbooks, including multiple interface types from PowerPoint files to interactive websites, smartphone applications, and virtual reality environments (Bringman-Rodenbarger & Hortsch, 2020). While this wealth of material has made online resources popular, it also implies that students need to be critical of the sources they use and ensure that they are reliable and credible. This cautionary observation notwithstanding, online resources are an important tool for university students, providing access to information, supporting academic research, and facilitating distance learning.

Previous studies have found that undergraduate students use electronic resources for academic research and to access information for their coursework (Baro et al., 2011; Dhiwar, 2021; Soria & Fransen, 2017). These studies suggest that electronic resources are an important tool for students to find and evaluate information for their academic tasks. For example, according to a survey conducted by the Babson Survey Research Group (Allen & Seaman, 2017), the majority of distance undergraduate students prefer using online resources to traditional texts for their academic work. The survey found that 96% of students use online resources for their coursework, with 86% of students accessing online textbooks and 81% downloading or viewing online videos. Additionally, 73% of students reported reading online articles and 67% used online simulations or educational games. While online resources for accessing course materials are especially important for distant learners (Gryshchenko et al., 2021), students generally use such materials as supplemental resources with or without the guidance of an institution or instructor. Song and Bonk (2016) contend that with the growing availability of online resources, ‘learners have increasing choice over the timing, location,

contents, and path of their learning. As such, it is vital to examine their learning goals, obstacles, and successes when accessing open online content in an informal manner.' (p. 2)

Previous studies have identified several factors that influence the choice of online resources among university students. These factors include computer literacy, user education, online searching skills, availability, and accessibility of resources. Various studies have found that computer literacy, user education and online searching skills are significant predictors of undergraduates' use of online resources (Amuda et al., 2020; Joo & Choi, 2015; Tewell, 2015). These results suggest that students who are more proficient in using technology and have received training on how to search for information online are more likely to use digital resources for their academic tasks.

Two other frequently mentioned factors influencing the use of digital or online resources are their availability and accessibility. Kofo et al. (2022) found that the undergraduate use of online learning resources is influenced by the availability of resources, whereas Bringman-Rodenbarger and Hortsch (2020) found that accessibility is an important factor affecting use. In an experiment to understand how students choose their favourite e-learning resources, the latter researchers used a self-review tool that was offered in three different interfaces: PowerPoint files, a website and a mobile application (app). The results showed that students used only one interface, with PowerPoint being the most preferred interface over the online website and mobile app. Students indicated that they preferred the PowerPoint interface for its convenience, ease of use and accessibility (Bringman-Rodenbarger & Hortsch, 2020).

While libraries have served as information sources for centuries, many students today find accessing and using online resources more convenient (Kumah, 2015). However, the valuable learning opportunities that they can provide are only guaranteed if students acquire

successful information-seeking skills and practices. Tiwary et al. (2024) concludes that even though students favour electronic resources, they require assistance in using them. Such assistance includes ensuring that every student has proficient online search skills and the capacity to evaluate the quality of online resources (Seen et al., 2024). Dsouza (2021) found evidence that the students who are aware of OER through library support services and institutional initiatives are utilising them more effectively. For an institution to provide such intervention and guidance, it must first understand how students engage with online resources, including OER.

As with other online accessible resources, empirical studies on OER choice comprehensively impact OER efficacy (Luo et al., 2020) and help design better OER.

2.4.2 Formal Learners' Use of OER

University students have been widely using OER for learning purposes. Students now use OER in various forms, including open-source learning tools and software, open courseware and materials, online courses, tutorials, open textbooks and open-source journals. Research on how and why undergraduate students use OER as a source is still under-researched. Existing work on OER utilisation among university students highlighted topics such as the forms of OER used or preferred by students, the purposes of using OER and the factors that influence this use.

Open course materials, open courseware, open e-books, and online dictionaries are among the categories of open educational resources that are widely regarded as being beneficial for university students (Cheung, 2019). Nagaiah and Shanmugam's (2023) study in rural universities in India emphasised that although there was a notable lack of awareness about OER, students used OER forms such as open-access journals, streaming videos, digital learning objects, and educational materials. Reported OER uses among university students ranged from

using them to prepare for their courses (Law, 2019), supplement their course content (Cheung, 2019; Cheung et al., 2022, 2023; Hu et al., 2015; Law, 2019), and to gain knowledge and skills necessary to advance their careers and professional development (Law, 2019; Nagaiah & Shanmugam, 2023). Research undertaken with the Open University students to examine their experience and motivations for using OpenLearn, an OER platform delivered by the university itself, showed that the platform is used among other objectives by students to choose their modules, and get a taste of college coursework before enrolling (Law, 2019). Hu et al. (2015) conducted a survey in a Chinese university and found that a significant number of university students have used OER mainly as a supplementary material. In addition to supplementing course textbooks, full-time students of the Open University of Hong Kong said they use OER for completing assignments and projects, and preparing for tests and exams (Cheung, 2019). Further OER uses by university students included helping them remain current on their subject, gaining knowledge on industry trends in technical domains, and supporting their personal learning (Nagaiah & Shanmugam, 2023).

Factors including ease of use, users' attitudes toward OER, and playfulness influenced students' intention to use OER (de Oliveira Neto et al., 2024; Hu et al. 2015). Specifically, Afolabi (2017) found that students who felt positively about OER did exceptionally well on an achievement test. Furthermore, it was found that the subjective evaluations of OER by students regarding their level of usefulness to them predicted the real learning gains related to those resources (Whitehill et al., 2019). Institutional support also determined students' use of OER (Hu et al., 2015). Dsouza (2021) found that regardless of their prior experience using electronic resources, students who are aware of OER through library support services and institutional OER initiatives are using them more effectively. While Terras et al. (2013) asserts that students' use of

OER is significantly impacted by their literacy levels, the results of a survey on university students emphasised how most students, even those with high levels of computer literacy, are not well-versed in OER, have little experience with it, and have only encountered a small number of well-known types of resources (Li & Wong, 2015).

2.4 Conclusion

This chapter has provided a comprehensive review of the literature on OER by situating the research within the broader context of open education and exploring key themes related to learners' engagement with OER. It began by tracing the historical development of OER, outlining their definitions, and highlighting recent research themes. The discussion then focused on the literature about learners' utilisation of OER, with emphasis on formal engagement, perceived benefits such as cost savings and improved academic performance, and the factors influencing OER use, including learner characteristics and institutional support. In the last section, the chapter explored OER as a form of information-seeking behaviour, focusing on research pertaining to the importance of understanding how and why students access and prefer OER over traditional resources.

This literature review also highlights several critical gaps and opportunities in the existing research on OER, particularly concerning learners' experiences and engagement. While significant progress has been made in understanding the production and dissemination of OER, there remains a notable lack of focus on how learners independently utilise these resources, particularly in contexts where their use is neither guided nor facilitated. Investigating the independent use of OER is essential for informing policymaking and improving the integration of OER into university learning systems to meet the diverse needs of students.

This review shows how the literature predominantly emphasises the perceived benefits of OER, such as cost savings and improved academic outcomes. However, there is less exploration of other potential benefits as perceived by learners in different educational settings. Such a focus, I contend, would highlight the importance of context in shaping how students value and engage with OER. Learners in varying environments may prioritise other factors, making it vital to adopt an alternative approach to understanding the diverse advantages OER may offer.

As technology continues to evolve, students increasingly turn to digital resources, including OER, as part of their academic routines. Understanding how and why students use these resources and the factors that drive them to choose OER over traditional materials is critical for institutions and libraries aiming to enhance their services. By addressing these research gaps, future studies can provide actionable insights that will better align OER policies and practices with the realities of learners' needs and behaviours.

This review has identified key gaps in the literature, particularly the lack of focus on independent learner engagement with OER and the need for context-specific research on OER benefits. These insights lay the foundation for the phenomenographic investigation in this study, highlighting the significance of understanding the diverse ways undergraduate students experience and utilise OER. The next chapter discusses the methodological foundations of the current study.

Chapter 3: Theoretical Framework

3.1 Introduction

The previous chapter reviewed the literature related to the phenomenon of learners' OER use. This chapter addresses the methodological underpinnings of the current study. In exploring the diverse ways undergraduate students experience OER, this study adopts phenomenography as its guiding theoretical framework. Phenomenography provides a lens for investigating the qualitative variations in how individuals perceive and interact with a specific phenomenon. Central to this approach is the recognition that experiences are not uniform but are shaped by the relational interplay between the individual and their unique context. This chapter outlines the theoretical foundation of phenomenography, addressing its ontological and epistemological underpinnings, its key principles, its relevance to this study, and its methodological limitations.

The chapter begins by explaining how I chose my research approach and the other approaches I considered when designing the study. Section 3.3 unpacks phenomenography's ontological and epistemological perspectives and emphasises its relational view of the world and its focus on understanding the different ways phenomena are experienced. This discussion highlights phenomenography's commitment to viewing phenomena from a second-order perspective, which prioritises how individuals conceptualise phenomena over describing the phenomena themselves. To provide a deeper understanding of this methodological approach, the chapter elaborates on core concepts of phenomenography, including awareness, variation, and second-order perspective, in Section 3.4.

The chapter then explains why phenomenography is particularly well-suited for this study in Section 3.5. Given that OER use is fundamentally a learning phenomenon,

phenomenography's historical focus on educational contexts and its ability to uncover diverse experiences align with the study's objectives. Furthermore, phenomenography's recognition of variation offers a realistic and nuanced framework for examining user experiences, particularly in contexts where no singular interpretation is sufficient.

The last section discusses the limitations of phenomenography. While the methodology offers significant insights, its reliance on interviews as a primary data collection method introduces challenges, such as the variability in participants' ability to articulate their experiences and the interviewer's influence on the depth of data collected. Moreover, concerns about the methodological rigour of phenomenography are acknowledged, providing a balanced view of its strengths and constraints as a theoretical framework. Altogether, the chapter sections establish the theoretical foundation of the study in an endeavour to employ a robust and reflective approach to understanding the phenomenon of OER use by undergraduate students. Through the lens of phenomenography, this research seeks to uncover the varied ways in which students engage with these resources, thereby contributing to both the theoretical and practical understanding of OER in higher education.

3.2 Selecting A Research Approach

Previous research has used different learning theories and approaches that have contributed to the understanding of OER. According to Panke and Seufert (2013),

> There is no one-size-fits-all theory that allows us to understand all aspects of the learner's use of Open Educational Resources. Instead, different theories can account for specific phenomena and are particularly valuable for analysing communities, individual behaviour or social practices (p.118).

When choosing a theoretical framework to provide a lens through which this study might examine OER adoption, I also considered two other sociocultural theories: communities of practice (CoP; Lave & Wenger, 1991) and connectivism (Siemens, 2004). CoP emphasises the social contexts and acknowledges the role of the learner in knowledge acquisition and considers how people become part of an existing practice. The theory could provide a good theoretical framework for analysing open education settings where learners share and retrieve information within a particular social network (Panke & Seufert, 2013). In this study, I wanted to have a broader look at how and why undergraduate students use OER. Additionally, using OER is not an established formal practice within the university. Connectivism is a learning theory that accounts for learning in online environments. According to connectivism, knowledge is "distributed across an information network . . . stored in a variety of (digital) formats" (Panke & Seufert, 2013, p.120) and acquired when the learner connects to and shares information in a learning community (Kop & Hill, 2008). Connectivism does emphasise the principle of technologically empowered and socially contextualised learners but it focuses more on the level of learning networks. This focus on learning networks would ideally draw attention to how different electronic resources interplay, rather than underscoring one type of electronic resources. I endeavoured to explore how participants relate and interact with the phenomenon of OER in particular. Cossham (2018) suggests phenomenography for user studies 'where we want to know how our end users think about information and the information systems that we make available for their use' (p. 19). Phenomenography, as detailed in chapter 3, highlights the variations in ways individuals perceive the world around them (Marton & Booth, 1997). This approach, Cossham (2018) affirms 'is a more realistic approach for user studies than one which looks for a

single understanding because it allows for variation across a group of research participants' (p.21).

3.3 Ontological and Epistemological Perspectives of Phenomenography

Phenomenography is a tradition of empirical inquiry, which indicates that the nature of knowledge and the nature of reality are not the primary concerns of metaphysical theories and beliefs (Svensson, 1997). The focus, therefore, is on the specific assumptions pertaining to the empirical research. Svensson (1997) summarises this stance as follows:

> Phenomenography has its roots in the general scientific tradition, not in philosophy or some specific school of thought. It represents a reaction against, and an alternative to, the then dominant tradition of positivistic, behaviouristic and quantitative research. It makes its own ontological, epistemological and methodological assumptions with inspiration from and similarities to several older and concomitant traditions, without agreeing entirely with any of those. (p.171)

Phenomenographers acknowledge that learning, information seeking, and application involve mental processes, but the relationship between people and phenomena in the world is the focus of the research rather than these processes (Limberg, 2000).

Phenomenography's theoretical underpinnings stem from its distinct method of comprehending human experiences and perceptions of a particular phenomenon. Ontologically, phenomenography adopts a non-dualistic (relational) approach to view the world, suggesting that there is no strict separation between the internal world of individual experiences and the external world of phenomena. Rather, these two worlds are connected internally through a person's awareness of the world (Hajar, 2021). That is 'there is not the world *and* the way it is experienced, but the world *as* it is experienced' (Cossham, 2018, p.24). Phenomenography

opposes the separation between an “internal” realm of thought and an “external” reality, instead advocating for a connection between awareness and reality (Åkerlind, 2023). In this view, the “experiencer” and the world are inseparable. Consequently, a person’s knowledge and communicable understanding are limited to their own experience of the world - if something lies outside their experience, it is beyond their awareness or understanding (Hajar, 2021). Phenomenographers thus assert that only one world exists, with individuals constructing their unique understandings within it (Bowden, 2005; Marton, 1981, 1986, 1988). In phenomenography, subject and object are not separate entities; rather, understanding reflects the relational dynamic between the individual and the phenomenon they experience (Marton & Booth, 1997). Moreover, phenomenography recognises that individuals may have qualitatively different ways of experiencing the same phenomenon. This acknowledgment of variation is central to its ontological framework, as it suggests that reality is not uniform but is experienced differently by individuals based on their unique perspectives and contexts. Because input and thought processes are based on experience, Hajar (2021) explains that the way a particular phenomenon is conceptualised can change over time too.

Marton & Booth (1997) argue that knowledge is not merely a reflection of an objective reality but is constructed through individuals' interactions with the world. The epistemological stance of phenomenography is primarily characterised by its focus on understanding the different ways individuals perceive and interpret phenomena. This approach emphasises that knowledge is not a fixed entity but is constructed through individuals' experiences and interactions with the world. This view entails that “theory has no direct access to a specific phenomenon (reality) but is always related to awareness and sense-making” (Hajar, 2021, p. 1424). Furthermore, phenomenography emphasises the significance of the second-order perspective, which seeks to

understand how individuals conceive of phenomena rather than merely describing the phenomena themselves (Marton & Booth, 1997). The second-order perspective in phenomenography is a fundamental concept that distinguishes it from the first-order perspective. Marton (1981) discusses the distinction between the first-order and second-order perspectives, with the former focusing on how something 'really is', and the latter primarily interested in how phenomena are conceived of. Han and Ellis (2019) describe the unique emphasis of phenomenography on the second-order perspective, which aims to describe people's ideas about the world, as opposed to the first-order perspective, which seeks to capture the essence of the world. This approach underscores the relational aspect of knowledge, suggesting that understanding is shaped by the context in which it occurs and the individual's prior experiences. By prioritising the participants' perspectives, phenomenography aims to capture the richness of human experience and the variations that arise from different contexts (Feldon & Tofel-Grehl, 2018). Hajar (2021) describe this approach as “democratic” since the reflections of the study participants are used to view a phenomenon, as opposed to the opinions of the researcher or the general public (p.1425).

3.4 Key Characteristics of Phenomenography

Marton (1986) defines phenomenography as ‘a research method adapted for mapping the qualitatively different ways in which people experience, conceptualise, perceive, and understand various aspects of, and phenomena in, the world around them’ (p.31). However, the object of phenomenography has historically developed. ‘Traditionally, the object of study of phenomenographic research has been described as variation in human meaning, understanding, conceptions (Marton, 1981) or, more recently, awareness or ways of experiencing a particular phenomenon (Marton & Booth, 1997; Åkerlind, 2012, p.322). The key assumption underpinning

phenomenography is that there is a limited number of qualitatively different, but interrelated, ways in which people experience phenomena (Marton, 1981, 1986). Emphasising the intentionality of human behaviours (Yates et al., 2012), the phenomenographic approach adopts a non-dualistic ontology, assuming that knowledge is constituted through internal relationships between the research subjects and various aspects of the world around them (Marton, 1981). In phenmenography, 'the ontological question of duality is bypassed' and 'knowledge is assumed to be a construction through our interaction with the world' (Cutajar, 2017, p. 488). These collective relations are represented as variations in experiences of the phenomenon (Yates et al., 2012). Variations in experiences are attributed to different levels of awareness of a phenomenon, as subjects may experience different aspects of a phenomenon or the latter might not be in the foreground of their consciousness (Han & Ellis, 2019). Furthermore, experiences are relational due to their dependency on people's activity and the world around them (Yates et al., 2012). However, phenomenography is only interested in collective awareness and variation rather than individual experiences. Since this approach is concerned with people's awareness and perception of reality, it adopts a second-order perspective that is concerned with how individuals perceive a phenomenon rather than the nature of the phenomenon itself (Hajar, 2021). The following sections detail the main characteristics of phenomenography.

3.4.1 Awareness

Phenomenography is a qualitative research approach that aims to explore and describe the various ways individuals experience and understand phenomena. Central to this approach is the concept of awareness, which is defined as the capacity to perceive and comprehend different aspects of a phenomenon (Marton & Booth, 1997). Awareness in phenomenography is not merely a passive state; rather, it involves an active engagement with the phenomenon, allowing

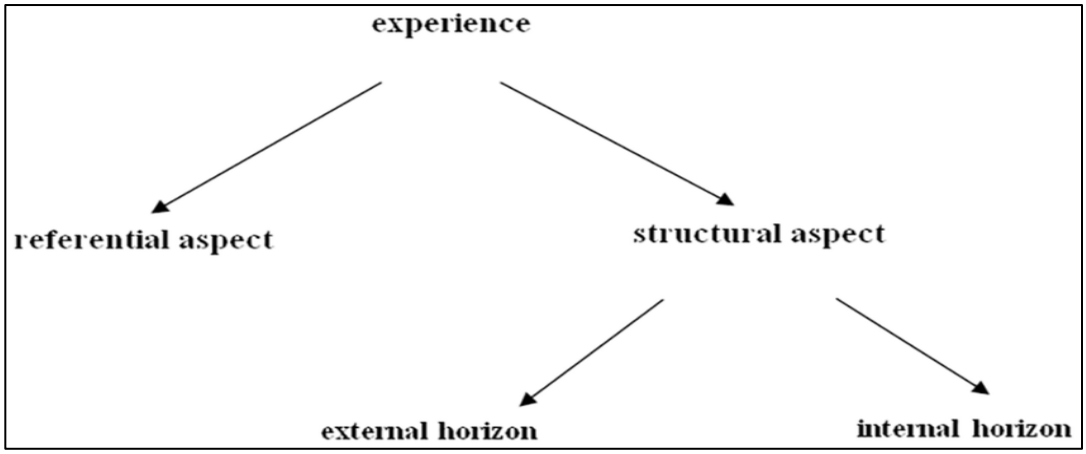
individuals to discern their experiences and understandings (Hajar, 2021; Marton & Booth, 1997). Furthermore, human awareness is inherently partial. According to phenomenography, different people have varying levels of awareness of different parts or aspects of a phenomenon (Åkerlind, 2024). Therefore, a way of experiencing a phenomenon can be characterised by the structure of the experiencer's awareness (Linder & Marshall, 2003).

One of the foundational elements of phenomenography is the "anatomy of experience" (Marton & Booth, 1997). The anatomy of experience provides a framework for understanding how individuals perceive and conceptualise their experiences. It is characterised by two primary interrelated dimensions shown in Figure 1:

1. The referential aspect: This pertains to **what** the experience is about — the meaning or content of the phenomenon being experienced. It focuses on the conceptualisation or understanding of the experience.

2. The structural aspect: This concerns **how** the phenomenon is experienced — the internal and external structures that shape the experience. It includes two subdimensions: internal horizon,

Figure 1 *The anatomy of experience*



Note: This figure is adapted from Marton and Booth (1997, p. 88)

which refers to the parts or aspects of the phenomenon that are discerned as relevant and brought into focus, and external horizon referring to the context or environment in which the phenomenon is experienced. ‘In this perspective, a way of experiencing something depends on which constituent parts are discerned and appear simultaneously in the learner’s focal awareness, and which parts or aspects recede into the background’ (Linder & Marshall, 2003, p. 273).

This phenomenographic view emphasises the importance of context in shaping awareness (Linder & Marshall, 2003). The understanding of a phenomenon is influenced by various factors, including personal experiences, educational background, and situational contexts. This contextualisation of awareness allows for a richer understanding of how individuals interpret their experiences. By examining the variations in awareness, researchers can uncover the diverse ways people engage with their environments and the implications of these differences for learning and development (Killam et al., 2024; Yates et al., 2012). Moreover, the hierarchical nature of conceptions in phenomenography suggests that individuals can develop increasingly complex understandings of phenomena as they become more aware of the critical aspects involved. This progression from simpler to more sophisticated conceptions reflects an individual's capacity to hold multiple important aspects in awareness simultaneously, enhancing their ability to navigate both familiar and new situations (Marton & Booth, 1997).

3.3.2 Second-order perspective

Phenomenography shifts attention from a first-order to a second-order perspective. The first-order perspective addresses the objective attributes of a phenomenon - essentially, what it is. In contrast, the second-order perspective looks into how individuals experience or conceptualise that phenomenon (Marton, 1981; Marton & Booth, 1997). This shift is significant because it redirects the focus from the phenomenon itself to the ways individuals interpret and understand

it. This distinction is essential for capturing individuals' subjective experiences and allows for exploring variations in understanding that arise from diverse contexts and backgrounds.

The second-order perspective emphasises the collective nature of conceptions in phenomenography (Marton & Pang, 2008). While individual experiences are central, the research often yields descriptive categories that capture variations within and across individuals (Marton & Booth, 1997). This collective helps developing a nuanced understanding of how different groups perceive a phenomenon and offers insights into both shared and divergent experiences. The second-order perspective also allows researchers to explore the relational dynamics between individuals and the phenomena they experience. This perspective acknowledges that individuals may have multiple conceptions of a single phenomenon, reflecting the complexity of human experience (Marton, 1981). For instance, in educational settings, phenomenography has been utilised to investigate students' varying conceptions of learning, and explore how these conceptions influence their engagement and understanding (Han & Ellis, 2019). By focusing on how individuals perceive and make sense of their experiences, phenomenography provides valuable insights into the subjective nature of knowledge and understanding (Marton, 1981; Marton & Booth, 1997).

3.3.3. Variation

Phenomenography is founded on empirical research on variation in students' learning outcomes (Limberg, 2000). Therefore, the emphasis on variation is a foundational principle of this approach. This focus is vital for capturing the depth and diversity of human experiences as (Marton & Booth, 1997) explain:

> the variation in ways people experience phenomena in their world is a prime interest for phenomenographic studies, and phenomenographers aim to describe that variation. They seek the totality of ways in which people experience, or are capable of experiencing, the object of interest and interpret it in terms of distinctly different categories (p.121).

Phenomenography focuses on collective variations among participants. In fact, its strength lies in its capacity to capture and present these variations holistically as an "outcome space" (Marton & Booth, 1997).

3.4 Phenomenography for this Study

Phenomenography differentiates between first-order and second-order perspectives, further emphasising the significance of variation. The first-order perspective examines the objective characteristics of a phenomenon, while the second-order perspective focuses on how individuals perceive and interpret it (Marton, 1981). This distinction is essential for understanding the subjective nature of experiences and the variations that emerge from diverse contexts and backgrounds. As Marton (1981) highlights, phenomenography seeks to describe the qualitatively different ways people experience a phenomenon, thus capturing the richness of human understanding. The focus on variation in phenomenography allows researchers to explore the diverse ways individuals experience and understand phenomena. By examining these variations, phenomenography offers profound insights into the complexities of human learning, ultimately enriching practices across various disciplines.

Phenomenography was developed in the 1970s by Marton and his colleagues at Goteborg University in Sweden, where empirical research was conducted on variations in students' experiences of learning outcomes (Limberg, 2000; Tight, 2016). Due to phenomenography's

emphasis on the experience of learning in various contexts, learning-related phenomena comprise the majority of the experiences that this research methodology examines (Edwards, 2007). An example of a learning-related field that uses phenomenography to an increasing extent is that of information and resource research. Yates et al. (2012) explain this growing interest:

> Information experience is emerging as a new focus in information research. A focus on experience offers a holistic approach to understanding peoples' engagement with information. It takes into account the interrelations between people and their broader environments in a manner which considers people and their world as inseparable. It also provides deep insights into the ways in which people relate to their informational life-worlds (pp. 96–97).

Cossham (2018) lists some reasons why phenomenography suits information user studies. First, phenomenography is ideal when it is critical to study how end users perceive and use information and information platforms and systems. Second, phenomenography's recognition of variation in conceptions and experiences across individuals and over time enables information providers to understand how users view information and information systems and hence guarantee that information systems will satisfy users' needs. Third, phenomenography's attempt to generate a (limited) range of possible ways of experiencing a particular phenomenon (the outcome space) is a more realistic approach for user studies than one that seeks a single understanding.

Phenomenography has been used in various information research studies. It has been employed to investigate phenomena such as the experience of an academic library (Salaz, 2015), information literacy (Bruce, 1998; Edwards, 2006; Forster, 2016; Johnston et al., 2014; Lupton, 2008; Williams & Wavell, 2007), and information-seeking behaviour (Limberg, 1999).

However, theory-based research on OER use as information resources is lacking. In their systematic research mapping study, Otto et al. (2021) found that

> most of the [OER] studies (almost 80%) focus on evaluating implemented projects, measures, or interventions. In contrast, hardly any contributions develop concrete recommendations for further designing, researching, or promoting OER. Also scarcely available are contributions on theory building or the elaboration of teaching or implementation strategies. Despite limitations that might be rooted in the search process, this indicates that empirical research on OER is still in its infancy and those new and compelling theories and models for OER have still to be established. For this very reason, this hitherto understudied aspect - at least in the context of educational technology - forms an opportunity to focus more on theories of pedagogical action and teaching concepts (p.12).

Phenomenographical studies on the use of accessible resources in general and OER in particular are relatively few. Limberg (1999) investigated the diverse experiences of high school students in obtaining and utilising information during a social studies learning assignment. He described three main ways that students seek out and use information, which are: a) fact-finding, b) balancing information to make the best decision, and c) scrutinising and analysing. In a study related to the production and utilisation of online accessible resources, Salaz et al. (2018) investigated the phenomenographic typology of open access experiences among faculty members who teach online. ‘Faculty members in this group experienced open access in five qualitatively distinctive ways: as resources for teaching; as a publication channel; as a social justice movement; as open source, and as ‘free for me’ (Salaz et al., 2018, p.125). However, there is a gap in phenmenographic research on learners’ experiences using OER. This study addresses this

gap by employing phenomenography as a theoretical framework for understanding undergraduate students' experiences of OER in their learning. With a focus on OER, it examines students' use and seeking of information (as in Limberg (1999)) from open access resources (as in Salaz et al. (2018)).

3. 5 Limitations of Phenomenography

Phenomenography is a qualitative research approach that seeks to explore and categorise individuals' conceptions or experiences of a particular phenomenon. While its emphasis on capturing variations in human experience provides valuable insights, the methodology is not without its challenges and limitations. Embracing a second-order perspective, phenomenography is criticised for lacking rigour, which throws into question the reliability and validity of its results (Moffitt, 2020). Critics have highlighted issues such as the dependence on interviews, the subjectivity of analysis, and the lack of theoretical and methodological rigour. However, Entwistle (1997) argues that 'many of the criticisms can be viewed, not as a dismissal, but as a caution to researchers about the pitfalls which lie in their path' (p. 132).

Phenomenographic research often relies on interviews as a primary method for exploring individuals' conceptions and experiences. While interviews can provide valuable insights into how people perceive their experiences, they come with significant limitations. The use of contextualised interviews has been criticised for their potential inability to provide truthful representations of oneself or the external world (Entwistle, 1997). This critique, Sin (2010) argues, stems from the inherent gap between language and meaning in interview data, which can make it difficult to interpret participants' responses accurately. Furthermore, there is a risk of equating participants' descriptions of their experiences with the experiences themselves, which can undermine the validity and reliability of findings (Guisasola et al., 2023). To mitigate these

risks, Entwistle (1997) proposes that 'the [interview] questions are posed in a way which allows the students to account for their actions within their own frame of reference, rather than one imposed by the researcher" (p.132). Researchers are also cautioned to exercise care when interpreting linguistic variations and word choices, as these do not always reflect differences in conceptual understanding (Säljö, 1997).

Despite its strengths, the interview-based nature of phenomenographic research introduces challenges that can affect the quality of data. Participants' ability to articulate their thoughts and the interviewer's skill in facilitating the conversation are critical factors that influence the depth and richness of the data collected. These interpersonal dynamics raise concerns about the reliability and validity of the findings, especially since phenomenographic studies usually lack sufficient transparency (Richardson, 1999). Moreover, the reliance on researcher interpretation during data analysis poses additional risks, as personal biases can influence the categorisation of conceptions (or experiences), even with methodological rigour. Transparent and reflexive approaches, where researchers recognise and minimise their preconceptions, are essential to address this issue (Ashworth & Lucas, 2000; Sin, 2010). Categories of description are provisional and subject to revision as further research challenges and refines them. Researchers must engage in thorough analyses of the relationships between categories, considering individual variations and the logical meaning of these differences (Entwistle, 1997). When describing the outcome space, Entwistle (1997) further emphasises that enough excerpts from the description categories must be provided in order to completely define their meaning and demonstrate any existing contextual relationships.

Phenomenography has also been criticised for lacking theoretical and methodological rigour. The absence of a clear epistemological foundation can lead to inconsistencies in its

application across studies (Ashworth & Lucas, 1998; Richardson, 1999). Critics argue that this lack of conceptual clarity may result in fragmented understandings of the phenomena being studied. In addition, researchers must navigate their biases to avoid results that are "partially phenomenographic"; that is when findings are skewed to align with existing categories rather than emerging naturally from the data (Ashworth & Lucas, 1998, p.420). These issues highlight the importance of systematic and transparent documentation of the research process. Ashworth and Lucas (2000) propose bracketing as a methodical strategy that enables researchers to register participants' perspectives by setting aside prior research findings, existing theories, and the researcher's own knowledge and beliefs. This is echoed by Ashwin et al. (2014) who note that researchers must be aware of their own understandings while analysing data to ensure that the focus remains on the participants' meanings.

3.7 Summary

This chapter has outlined the theoretical foundation for the study by focusing on phenomenography as the guiding framework. It began by exploring the ontological and epistemological foundations of phenomenography with emphasis on its non-dualistic and relational perspective, as well as its commitment to understanding the qualitative variation in individuals' experiences. The discussion highlighted phenomenography's focus on second-order perspectives, which prioritise how individuals conceptualise phenomena over describing the phenomena themselves.

The key principles of phenomenography, including awareness, variation, and the second-order perspective, were examined to provide a deeper understanding of its methodological approach. The chapter also explained why phenomenography is particularly suited to this study of undergraduate students' experiences with OER. Phenomenography's emphasis on learning-

related phenomena and its recognition of variation across individual experiences make it an ideal framework for capturing the diversity of student interactions with OER.

Finally, the limitations of phenomenography were addressed, with particular attention to its reliance on interviews as a primary data collection method and concerns about its methodological rigour. These challenges were acknowledged to provide a balanced view of the framework's strengths and weaknesses. Overall, this chapter has established the rationale for adopting phenomenography as the theoretical lens for this study, demonstrating its relevance and utility in uncovering the varied ways students experience and engage with OER.

Chapter 4: Research Design

4.1 Introduction

Understanding the experiences of undergraduate students with OER requires a comprehensive and structured approach. This chapter presents the theoretical and methodological framework underpinning the study, and details the research context, participant selection, data collection and analysis procedures, and considerations of validity, reliability, and ethics. Through this framework, the study seeks to uncover the varying ways students engage with OER in a context where such resources are not formally integrated into the curriculum.

The chapter begins by situating the research within its context in Section 4.2, which focuses on UTAS-Nizwa. This site provides a unique opportunity to investigate independent OER use, as it operates in an environment without institutional or national policies directing the integration or production of OER. The absence of these frameworks makes it particularly significant for exploring how students navigate and utilise OER autonomously to support their learning.

Section 4.3 introduces the participants and discusses the criteria and procedures used in selecting them to ensure a diverse range of perspectives. Particular attention is given to capturing the experiences of students from different specialisations and academic backgrounds, as these factors may influence their engagement with OER.

The chapter then outlines the data collection procedures in Section 4.4. It describes the design and implementation of the tools used. These included online resource logs to track students' engagement with online resources in general, including OER and semi-structured interviews for deeper examination of their experiences. Together, these methods provided a rich

and nuanced dataset necessary for phenomenographical analysis. It has also enabled me to focus on the phenomenon under investigation in a situation where participants are anticipated to use OER despite their lack of knowledge of the technical term, OER, and other related conceptions.

In Section 4.5, Data Analysis Method, the chapter explains the data analysis process, emphasising the importance of transparency in phenomenographic research. Given the absence of a standard framework for analysing phenomenographic data, I developed a seven-stage analytical model based on the work of Marton (1986) and Åkerlind (2012). This structured approach aimed to minimise subjectivity and ensure the integrity of the findings.

I detail the strategies employed to enhance the credibility and dependability of the study in Section 4.6. These include avoiding personal bias, consulting with experts and colleagues, transparently documenting decisions, justifying methodological choices, and incorporating direct quotes from participants to support the findings.

Finally, Section 4.7 addresses the ethical considerations integral to the study. It reflects on the hierarchical relationship between the researcher and participants. Acknowledging the ethical complexities inherent in research within an educational setting, I took particular care to ensure informed consent and the safeguarding of data, as well as to protect the privacy and rights of the students involved.

Collectively, these sections establish a strong basis for the study by guaranteeing a research process that is rigorous, ethical, and methodologically sound, while also making a significant contribution to the understanding of how undergraduate students encounter OER within a distinct educational context.

4.2 Study Context

The study was conducted at the UTAS-Nizwa, Oman, which has been my home institute for more than ten years. My position at UTAS-Nizwa facilitated greater access to people and data and ensured familiarity with institutional and cultural rules. Being an insider and the fact that I was also a doctoral student helped establish rapport with the participants, despite differences in age and background.

Approximately 4,500 students are enrolled across Diploma, Advanced Diploma, and Bachelor programs, pursuing various specialisations within four academic fields: Engineering, Information Technology, Business Studies, and Mass Communication. (University Of Technology and Applied Sciences, 2025). Table 2 shows the sub-specialisations offered by the four academic departments. The courses focus on experiential, cooperative and project-based learning, which requires students to seek and search information to complete their assignments and projects. Having limited access to academic databases offered by the university, the students rely on textbooks, lecture notes and student-teacher interactions as their primary sources of information. Therefore, online resources, including OER, are expected to provide alternative information resources.

This research site is ideal for investigating the independent use of OER to support formal learning. Whereas most OER learner use has been scrutinised in experimental settings where these resources are integrated into the educational system (Bliss et al., 2013; Ikahihifo et al., 2017; Magro & Tabaei, 2019; Trip et al., 2023), OER do not constitute part of the UTAS curricula and there is no national or institutional policy that guides their integration, utilisation and production. Facilitating the adoption of OER is therefore paramount.

Table 2 *Sub-specialisations offered by the four academic departments at UTAS-Nizwa*

Academic Department	Specializations
Engineering	Computer Engineering Electrical Engineering Mechanical Engineering Oil And Gas Engineering
Information Technology	Information System Software Engineering Network Computing Cyber And Information Security
Business Studies	Accounting Digital Marketing and Branding Marketing Sales and Retails Supply Chain and Logistics
Creative Industries	Design Mass Communication Fashion Design Photography

4.2 Participants

For this study, I recruited a sample of twenty participants to take part in interviews. Bowden (2005) suggested that for phenomenographic studies, sample size should produce data that is sufficient to allow for a wide range of variation and yet remain manageable. In this study, participants were undergraduate students aged eighteen years or older. In order to capture a wide range of experiences, I used a purposive sampling strategy that maximises the diversity of the sample (Booth, 2001). The participants were chosen to ensure thorough coverage of different factors, including academic major and year in school, since these factors are likely to influence students' experiences at UTAS-Nizwa.

The participants were recruited with different approachable media. An open call to participate in the study was sent through students' university emails and through course instructors (where allowed). A special invitation also targeted senior students with advanced research experiences, including final year students doing their graduation projects and students

with funded research projects, as they are expected to use a wider range of resources. Other participants from different majors and different school years were recruited to cover various experiences in using OER. A total of 42 students initially expressed interest in participating in the study; however, due to factors such as withdrawal of consent and incomplete responses in the resources' weekly logs, the final number of participants was reduced to 20. The sample demonstrated substantial coverage of variation in the participants' school year, academic major, and gender (see Table 3).

The volunteer participants were introduced to the study individually by sending a participant information sheet (Appendix 1) through email and WhatsApp. Two WhatsApp groups (one for females and another for males, due to cultural considerations) were formed after attaining participants' consent for the purpose of addressing students' queries and concerns about the study and participation in the study. Through these same WhatsApp groups, students were later instructed about what they are expected to do, in particular with regard to the weekly online resources' logs. An electronic consent form (Appendix 2) was designed using Google Forms and was sent to the participants to fill in and sign.

4.3 Data Collection Procedures

Data collection in phenomenography typically involves the use of qualitative methods to explore the different ways in which individuals experience a particular phenomenon. The primary method for data collection in phenomenographic research is semi-structured interviews since they allow for an in-depth exploration of the participants' experiences (Ashworth & Lucas, 2000; Marton, 1986). However, other methods such as focus groups, open-ended surveys, observations, written reports, think-aloud methods and document analysis can also be used (Booth, 2001; Edwards, 2007; Han & Ellis, 2019; Lamb et al., 2011). Booth (2001) posits that

Table 3 *Participants' details*

		Specialisation	Gender	Program	Level
1	**B1**	Business Studies	Male	Accounting	Bachelor
2	**B2**	Business Studies	Female	Accounting	Advanced Diploma
3	**B3**	Business Studies	Male	Accounting	Bachelor
4	**B4**	Business Studies	Male	Accounting	Bachelor
5	**B5**	Business Studies	Female	Human Resources	Bachelor
6	**B6**	Business Studies	Female	Accounting	Bachelor
7	**B7**	Business Studies	Female	Marketing	Diploma
8	**B8**	Business Studies	Female	Human Resources	Diploma
9	**E1**	Engineering	Male	Oil and Gas Engineering	Diploma
10	**E2**	Engineering	Male	Mechanical & Industrial Engineering	Diploma
11	**E3**	Engineering	Female	Electrical Engineering	Bachelor
12	**E4**	Engineering	Male	Mechanical & Industrial Engineering	Advanced Diploma
13	**E5**	Engineering	Male	Engineering	Diploma
14	**E6**	Engineering	Female	Electrical Engineering	Diploma
15	**I1**	Information Technology	Male	Software Engineering	Diploma
16	**I2**	Information Technology	Female	Software Engineering	Diploma
17	**I3**	Information Technology	Female	Software Engineering	Diploma
18	**I4**	Information Technology	Female	Software Engineering	Bachelor
19	**I5**	Information Technology	Female	Cyber and information Security	Advanced Diploma
20	**I6**	Design	Female	Design	Advanced Diploma

the methods used are determined by the research context and questions. This study uses semi-structured interviews as a primary source of data.

Participants were asked about their experiences using certain OER. Since students use, among other online resources, various forms of OER and may not be aware of the term, great caution is needed to ensure they are describing experiences related to the targeted phenomenon. (Daly et al., 2012; Green, 2005) posits that

> This focus on a specific phenomenon in the human world, and different ways of understanding that phenomenon, means that strict attention must be paid during research design to ensuring that participants are all commenting on the same phenomenon, not on different (even if related) phenomena (p.1300).

To ensure the previous, I observed students' weekly use of online resources for a month. Participants were asked to fill out a weekly log identifying the main online resources that served their learning needs. I designed an electronic form for each student on the University's Google Drive. The form required the participants to fill out the following information about each of these resources: a) the name or URL of the resource; and b) their specific goals for seeking the resource. The period covered four teaching weeks from 12th November to 9th December 2023. To further ensure covering variant used resources, the participants were also asked to fill out a form with the most common online resources they use in their learning. Furthermore, I reviewed the reference lists of students' assignments and homework. After the one month, the students were interviewed to talk about their experiences using the identified OER indicated in the forms or reference lists. The interviews were scheduled virtually and face-to-face based on the participants' preference and convenience. Interviews conducted physically (17) took place on the

university campus, and virtual interviews (3) were conducted via Microsoft Teams. Prior to the interview, I prepared notes on each student's use of OER.

4.3.1 Data Collection Tools

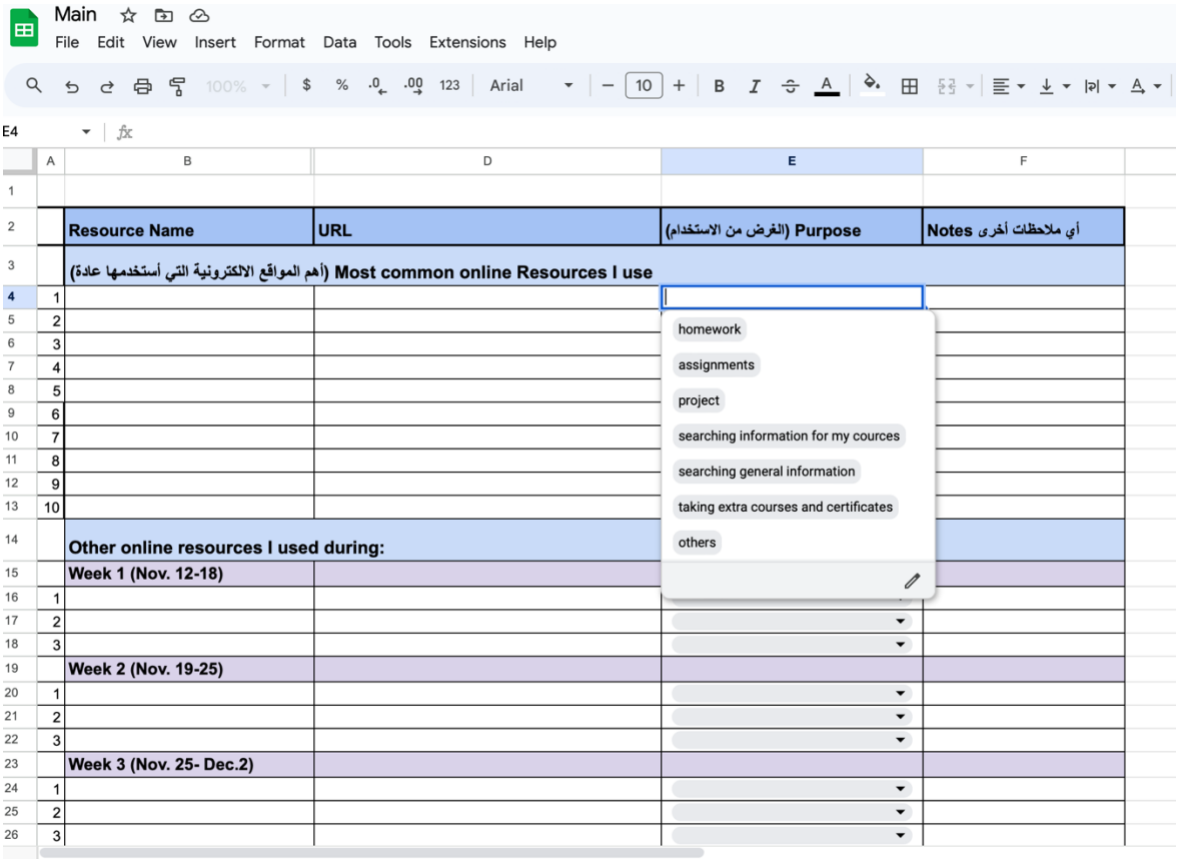
This section provides details about the tools used for data collection. Two types of tools were used: primary and secondary.

Online Resources Logs

The purpose of the log is to observe a student's use of online resources. Since OER can be easily confused with other online resources, there was a need to identify the kinds of OER students utilise. The logs provided a base for the interview questions for each participant. They assured me that the participants were describing their experiences using OER, the targeted phenomena. It also helped in elaborating participants' experiences through comparison with experiences using other online resources. Asking participants to compare experiences can be particularly useful (Daly et al., 2012; Green, 2005). Thus, participants were asked to discuss OER experiences and, in some cases, compare them to experiences with other types of resources.

The log consisted of two main parts. The first part asked about the most frequently used online resources. This offered a wide look at the online resources used by each participant. The second part requested the participants to list the main online resources for a four-week period, weekly. The form required the participants to fill out the name or URL of the resource and their specific goals for seeking the resource, as shown in Figure 2. I reminded the participants to fill in the logs every week.

Figure 2 *Online resources log*



Interviews

This thesis draws on the transcripts of twenty interviews conducted during a three-month period (mid-December 2023 to mid-March 2024). I conducted interviews with each participant either on the university campus or via video conference using Microsoft Teams. Only three participants opted for online interviews.

Phenomenographic interviews were designed to be semi-structured and to enable participants to freely express their experiences of the phenomenon under study. Since the term OER constitutes various levels of meaning and learners are not expected to know them all, the interview questions focused on participants' experiences rather than the conception of OER. Ashworth and Lucas (2000) signalled that

> one should be cautious when disciplinary conceptions are the object of study, as they often are in phenomenographic research. Clearly, given that research may be motivated by the desire to investigate an area of student difficulty, it may make sense to select certain key disciplinary concepts as the subject for research. However, it cannot be taken for granted that the identification of key concepts is unproblematic. The key concepts of a discipline are not always plain to 'experts' and the researcher can certainly not assume that the selected concepts will form the taken-for-granted basis of conversation with students (p. 299).

In such a case, interview questions should zoom in and out, focusing on the targeted phenomena, not any related phenomena, but also try to understand this experience within a wider context. Thus, two types of interview questions were used. The first type focused on the experience of using a particular OER, which I previously identified through observation of online resources participants' use. This category includes an open-ended question of *Talk about your use of a particular type of OER* (specific types of OER indicated in the filled-out forms or listed in the reference lists) and follow-up questions such as: *For which aspect of your programme or course did you use OER? How exactly did you use it? Why did you use this particular resource? How did you come to know about it? In what ways was it helpful?*

The second type concerned the contextual background of using online resources, which also uncovered participants' use of other OER not indicated by them in the weekly resource log. Type two questions included: *Talk about your use of online resources (when and why you use them); Are there social media accounts you use in learning? Do you use materials or databases created by your instructor, other instructors, or other students? What do you think of the course materials/ research resources provided by the university? What is a good educational resource?*

Talk about a project/assignment you have worked on and what resources you have used to complete the project/assignment. Talk about online courses/workshops you have taken; Why have you taken them? Here, I also used follow-up questions to explore students' experiences. The interview dialogues involved an ongoing negotiation of the meaning of the questions, the meaning of each participant's answers, the connection between those answers and the questions, and the overarching significance of the interview itself.

Through these two types of questions, I was able to explore the participants' ideas related to the phenomena, while they still reflect on their experiences without feeling limited to a specific topic or area. This way, I could see what lies in the background of the participants' experiences. As a researcher, my responsibility was to help the participants explore and clarify their thoughts. "While the respondent was the authority on his/her own ideas, I was accorded authority on the matter of what the interview was about and what was relevant to it" (Dortins, 2002, p.210).

4.4 Data Analysis Method

Data analysis is a systematic and rigorous process of examining qualitative data to identify and categorise the different ways in which individuals experience a particular phenomenon. Even though different people may perceive the same phenomena differently depending on the situation, phenomenography offers a way to look at the collective human experience of phenomena holistically. Åkerlind (2012) further explicates,

> The phenomenographic proposition, that ways of experiencing represent a relationship between the experiencer and the phenomenon being experienced, leads to the expectation that different ways of experiencing will be logically related through the common phenomenon being experienced. Thus, a core premise of phenomenography is the

> assumption that different categories of description or ways of experiencing a phenomenon are logically related to one another, typically by way of hierarchically inclusive relationships (p.116).

The data analysis process in phenomenography typically follows a set of procedures to ensure consistency and reliability in the analysis (Marton, 1981; Marton & Booth, 1997). The analysis begins with researchers thoroughly familiarising themselves with the data through repeated readings and immersion in the data to identify a set of different, logically-related, conceptual categories that represent the qualitatively distinct ways of experiencing the phenomenon under investigation (Han & Ellis, 2019). The collective ways of experiencing the phenomenon are named the outcome space (Åkerlind, 2012; Marton & Booth, 1997), and it constitutes both the categories (*categories of description)* and the way these categories are connected (*structural and referential relationships*) (Marton, 1986; Marton & Booth, 1997). Categories of description represent similar views and patterns exemplified by extracts from the participants' responses (Booth, 2001) and are often hierarchically related, leading to a better understanding of the phenomenon (Marton & Booth, 1997). However, categorisation should be performed inductively, with the categories being derived from the data rather than being predetermined (Bowden, 2005; Han & Ellis, 2019). The outcome space can also be logically presented based on its structural and referential aspects, which are the components of conscious perception of an experience (Han & Ellis, 2019; Marton & Pong, 2005). The referential component refers to what the phenomenon *means* to the subjects, whereas the structural component 'characterises the categories in terms of what is in the foreground and background in each category' (Ashwin, 2006, p.659). Marton and Booth (1997) outline three key criteria for evaluating the quality of a phenomenographic outcome space:

1. Each category should capture a unique aspect of how the phenomenon is understood.

2. The categories should be logically connected, often organised hierarchically in a way that reflects structurally inclusive relationships.

3. The outcome should be concise, representing the critical differences in experience observed in the data with the smallest possible number of categories.

4.5 Data Analysis Procedures

In this study, phenomenographic interviews were recorded and transcribed. Both the participants and the researcher are native Arabic speakers who communicate in Arabic outside the classroom, whereas English is the language of instruction within the classroom. I projected that, when a student expresses a preference for Arabic, the interview would be conducted in Arabic for a higher quality result. Based on participants' preferences, all interviews were conducted in Arabic. Therefore, I first translated the interview transcripts into English, and then the translated transcripts were checked by a colleague who was familiar with the research topic and context. After translation and checking, all data was exported to ATLAS.ti for data analysis to assist in managing and analysing data from the interviews. Data analysis is a non-linear process involving the formation and reformation of the categories of description and structural relations (Ashwin, 2006). Åkerlind (2012) further explains that "the whole process is an intensely iterative and comparative one, involving the continual sorting and resorting of data, plus ongoing comparisons between the data and the developing categories of description, as well as between the categories themselves (p.117-118). This constant comparison highlights the similarities and differences of the meaning aspect and the structural aspects of the participants' experiences (Limberg, 2000).

Acknowledging that the actual process is non-linear, I devised a seven-stage framework based on Marton (1986) and Åkerlind (2012). These stages are detailed in Table 4.

4.5.1 The Role of the Researcher-Translator

Translation in qualitative research is a critical process that involves not only linguistic conversion but also the interpretation of cultural nuances and contextual meanings. Many translation issues arise when researchers use their native language to conduct interviews and other qualitative methods before having to present their findings in another language, as translators not only seek lexical but also conceptual equivalence. Conceptual equivalence is when a research participant's narrative is technically and conceptually translated to produce an accurate translated communication (Squires, 2009). Translation is context-dependent, and the person who does the translation influences the method and quality of the translation product.

Since translation in qualitative research involves more than converting words between languages, it reflects the translator's perspective, adding an additional layer of subjectivity (Zhu et al., 2019). This process introduces "triple subjectivity" (Temple & Edwards, 2002) shaped by the interactions among participant, researcher, and translator, influencing the interpretation of qualitative data. Furthermore, since language has culturally specific meanings, and because translators might not be aware of the particular context, culture, and field of study of the findings, the exact meaning of research findings could be lost or altered (Flores, 2024). Playing the dual role of researcher and translator can mitigate such problems and could possibly guarantee that the translated passages capture the opinions and words of the participants (Zhu et al., 2019).

The role of the researcher as a translator in qualitative research interviews is multifaceted and essential for maintaining the integrity and authenticity of the data collected. Consequently,

Table 4 *Stages of data analysis in phenomenography adapted from Marton (1986) and Åkerlind (2012)*

	Stage	Description
1	Reading through transcripts	Reviewing transcripts with an open mind to possible interpretations. Subsequent readings become progressively focused on specific aspects or criteria, while maintaining openness to new insights. The goal is to understand the overall meaning by exploring different perspectives at different times.
2	Selecting utterances based on criteria of relevance	Identifying and marking utterances relevant to the research question. While the meaning of some utterances may be self-evident, interpretation generally depends on the context from which the utterance was drawn.
3	Forming a data pool	Narrowing the focus to key excerpts from all interviews that relate to the phenomenon under investigation. These selected excerpts form a data pool, serving as the foundation for the next step of analysis.
4	Shifting attention to the data pool instead of individual accounts	Shifting focus from individual interviews to the meanings embedded in the data pool. The researcher moves beyond individual accounts, examining the collective 'pool of meanings' found in the data. Each excerpt is interpreted in relation to both its original context and the broader data pool, with interpretations dynamically shaped by these two perspectives.
5	Bringing quotes together into categories based on their similarities	Grouping quotes based on their similarities, examining ambiguous cases, and clearly defining the criteria that differentiate each group.
6	Differentiating categories from one another in terms of their differences.	Distinguishing categories by analysing their differences. Groupings may either precede detailed descriptions or evolve through iterative comparison and validation of tentative category descriptions.
7	Arranging and rearranging of codes and forming the outcome space	Refining categories and developing the final framework. Codes and categories are tested against the data, adjusted, and retested until changes stabilise, and a coherent system of meanings is achieved.

the translation process becomes more complex, as they must navigate the challenges of being both "insiders" in language and culture with their participants and "outsiders" to their readership. This complexity requires a reflexive approach, in which researchers must be highly aware of their positionality as both translators and interpreters of the data. Reflexivity recognises the influence of the researcher's background, assumptions, and expectations on the research process and outcomes. Turhan and Bernard (2022) highlight the importance of reflexivity in understanding the insider and outsider dynamics that influence data collection and analysis, suggesting that researchers adopt strategies such as providing untranslatable phrases in their original language to preserve meaning and supplying more justifications for translation decisions.

The majority of published cross-cultural literature lacks a detailed description of translation processes (Flores, 2024; Willgerodt et al., 2005; Zhu et al., 2019). This dominant approach has led to insufficient theoretical and methodological understandings of how to preserve overall rigour and coherence in dual language studies while maintaining cultural sensitivity (Willgerodt et al., 2005). In such studies, Qun and Carey (2024) point out that the act of translation often goes unnoticed in qualitative research, leading to a "disappearing translator" phenomenon that obscures the researcher's intervention in the data. The researcher, as a translator in qualitative interviews, can enhance the credibility and authenticity of their qualitative findings by adopting reflexive practices and acknowledging the visibility of their role as translators.

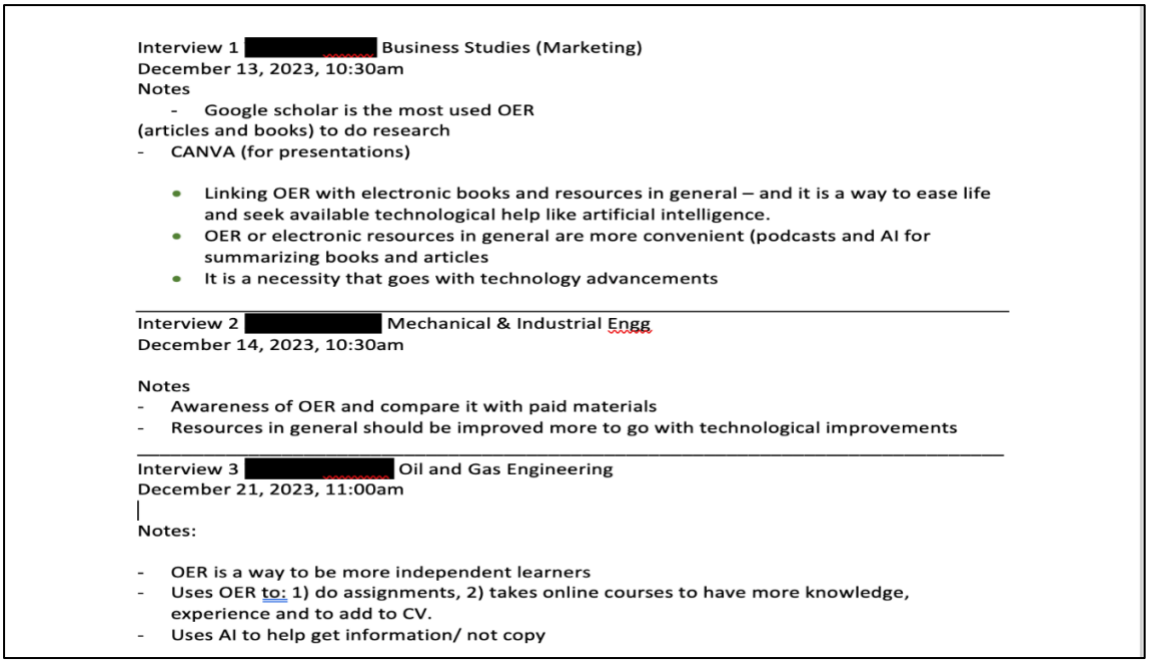
4.5.2 Data Analysis Stages

In my phenomenographic study, I followed a systematic and detailed approach based on Marton (1986) and Åkerlind (2012) to analyse the data. Below is an elaboration of the stages and procedures involved in this process. Figure 7 outlines these stages.

Stage 1: Reading Through Transcripts

This stage marked the beginning of my data analysis process. During this initial stage, I refrained from coding the data. Instead, my focus was on making very general notes to capture how participants perceived and utilised OER. An example is shown in Figure 3. To maintain focus on the study's objectives, irrelevant sections of the transcripts were identified and eliminated. These sections included portions where participants discussed topics unrelated to OER usage. This stage involved multiple rounds of close interaction with the interview transcripts. Translating the transcripts fostered a thorough engagement with the content as it required repeated listening to the audio recordings, cross-referencing them with the written

Figure 3 *Making general notes about how participants perceived and utilised OER*


Interview 1 [redacted] Business Studies (Marketing)
December 13, 2023, 10:30am
Notes
- Google scholar is the most used OER
(articles and books) to do research
- CANVA (for presentations)

- Linking OER with electronic books and resources in general – and it is a way to ease life and seek available technological help like artificial intelligence.
- OER or electronic resources in general are more convenient (podcasts and AI for summarizing books and articles
- It is a necessity that goes with technology advancements

Interview 2 [redacted] Mechanical & Industrial Engg
December 14, 2023, 10:30am

Notes
- Awareness of OER and compare it with paid materials
- Resources in general should be improved more to go with technological improvements

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Interview 3 [redacted] Oil and Gas Engineering
December 21, 2023, 11:00am

Notes:

- OER is a way to be more independent learners
- Uses OER to: 1) do assignments, 2) takes online courses to have more knowledge, experience and to add to CV.
- Uses AI to help get information/ not copy

transcripts, and ensuring the accuracy of participants' utterances. The translation process was not just a technical task but an integral part of the analysis process. Playing the role of a researcher-translator particularly served the phenomenographic analysis since it enhanced my understanding of the participants' responses and allowed me to listen to the interview recordings and read the transcripts multiple times during the translation process. Reading and re-reading all the interview transcripts a number of times is necessary to identify the key aspects of a phenomenon (Alsop & Tompsett, 2006). In particular, the translation process facilitated:

Deep Engagement with Participants' Narratives: Translating the transcripts from Arabic to English allowed me to engage deeply with the data, as the process required me to carefully analyse each word, phrase, and sentence. This step-by-step translation ensured that I revisited the participants' responses multiple times, leading to a more profound understanding of their experiences, and perspectives.

Sensitivity to Cultural Contextual Nuances: As a bilingual researcher, I was able to recognise and interpret cultural references, idiomatic expressions, and subtle linguistic cues that are often embedded in Omani Arabic. These elements might not have been immediately apparent to a non-native translator. This process helped me appreciate the depth of the participants' responses and the context shaping their narratives. Table 5 shows examples of how being a researcher-translator provides better alignment between cultural/contextual factors and translation choices.

Iterative Reflection: The act of translation required me to repeatedly reflect on the content, questioning and clarifying the meaning of certain responses. This iterative process allowed me to uncover layers of meaning and identify underlying themes that might not have been immediately apparent during the initial transcription or data collection stages.

Table 5 *Examples of cultural and contextual references and considerations taken in translation*

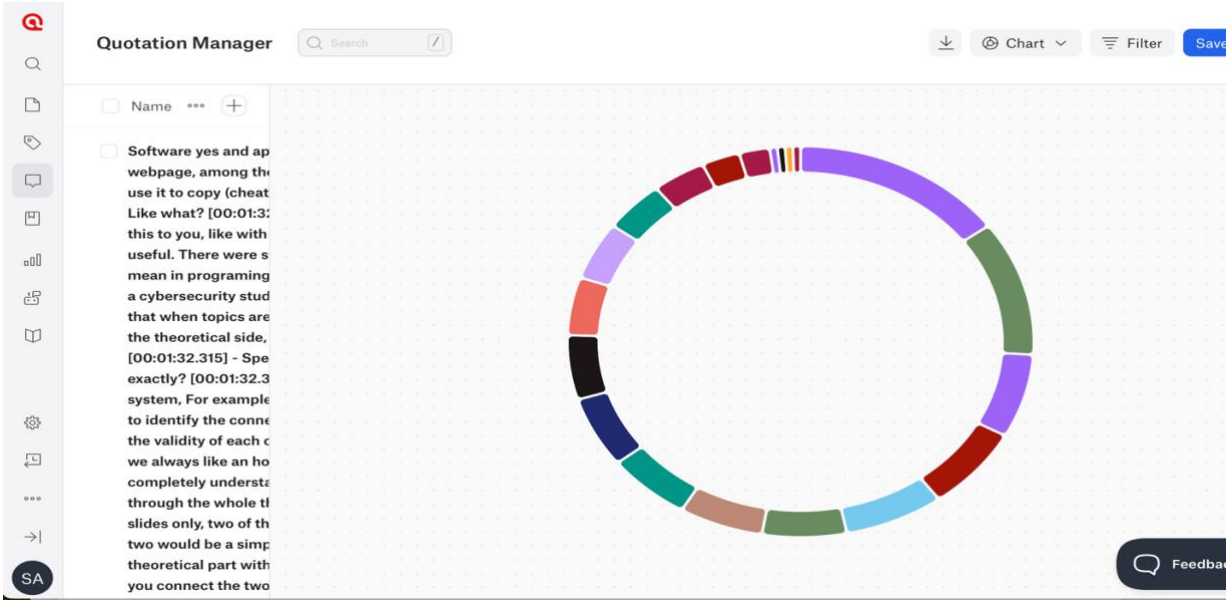
Type of Reference	Example	Translation considerations
Cultural	Participants' use of "religious" expressions	Arabic religious expressions carry a wide range of pragmatic functions, such as marking the end of a conversation, persuasion, hedging, expressing agreement, reiterating ideas, and showing respect (Al-Rojaie, 2021). These expressions were translated with careful attention to their contextual use and intent to maintain their function and cultural resonance.
	Students used a regional Arabic dialect.	Oman is home to diverse Arabic dialects. Using the same regional dialect as participants facilitated smoother communication, fostered trust, ensured nuanced understanding, and ultimately enhanced the accuracy of translations.
	A student explained why she used an OER to learn programming, saying: "Mine is to build a device that tracks camel movement near roads. When it [the device] detects some movement, it sends an alert message to car drivers." **(I4, Software Engineering)**	A translator familiar with Omani culture would recognise this example as tied to a significant local issue - camel-related traffic accidents. Understanding this cultural context ensures the student's intent and the problem's significance are conveyed accurately.
Contextual	A student described how often he uses external resources: "It depends on time. The last two semesters, I was very busy, I had six courses and that was not easy for me. It is true we have 18 weeks but as the time increased, the courses content increased as well. Some courses were removed, from 12 to 10 but the content of these two courses was added to the other courses. This is what's happening generally in all the courses. Like in Diploma, they only have 10 courses out of 12 and the same in advanced diploma." (B1, Accounting)	This quote becomes clearer when contextualised by the university's recent merger of two higher education institutions. The merger led to changes in the academic calendar (18 teaching weeks) and course structures (a reduction in courses but with content redistributed). The translation was refined to include this background information for improved clarity: "It depends on time. The last two semesters, I was very busy, I had six courses and that was not easy for me. It is true we have 18 weeks [now, after the merger], but as the weeks increased, the course content also increased. Some courses were removed [the number decreased] from 12 to 10, but the content of those two courses was added to the remaining ones. This is what's happening across all courses. For instance, in the Diploma program, there are now 10 courses instead of 12, and the same applies to the advanced diploma."

Building a Stronger Connection to the Data: Translating the transcripts also fostered a personal connection with the participants' experiences. This gave me an opportunity to immerse myself in their experiences and foster empathy and a deeper appreciation for their perspectives. Such a connection was invaluable in shaping my interpretations and ensuring that my analysis remained grounded in the participants' lived experiences and was minimally influenced by my prior experience, knowledge and beliefs (Ashworth & Lucas, 2000).

Stage 2: Selecting Utterances Based on Relevance

Once I had a general understanding of the transcripts, I moved on to selecting relevant utterances. The transcripts were exported into **ATLAS.ti**, a qualitative data analysis software, to streamline the process of organising and coding the data. At this stage, I engaged in random and preliminary coding, tagging general themes related to OER and aligning them with the research questions. This process helped me begin identifying patterns within the data, as shown in Figure 4.

Figure 4 *Patterns within the data are identified using ATLAS.ti. A colour represents related codes.*



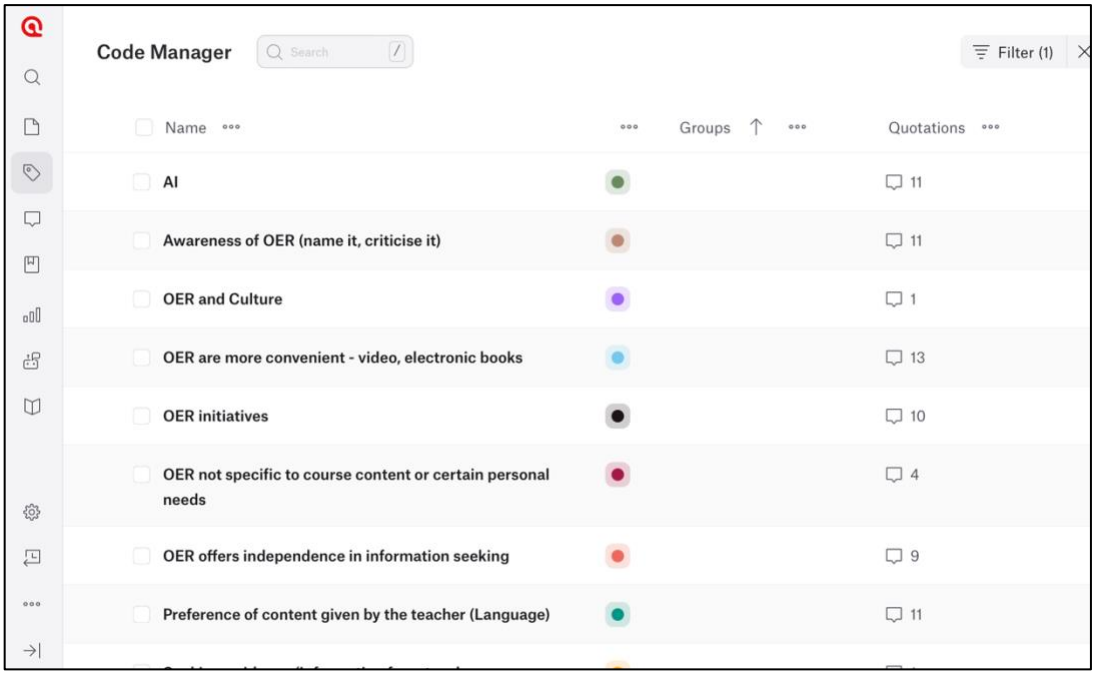
Stage 3: Forming a Data Pool

Following the initial coding, I created a focused and structured data pool. The data pool was formed by gathering relevant quotes and assigning more specific codes to them as shown in Figure 5. These quotes were extracted directly from the interviews and served as the foundation for subsequent analysis.

Stage 4: Shifting Attention to the Data Pool

At this stage, I concentrated on analysing the data pool instead of individual participant accounts. I carefully read through the quotes within the data pool, paying close attention to their nuances. The coding and recoding process became more rigorous as I refined the codes to better reflect the themes emerging from the data.

Figure 5 *Assigning specific codes to quotes*



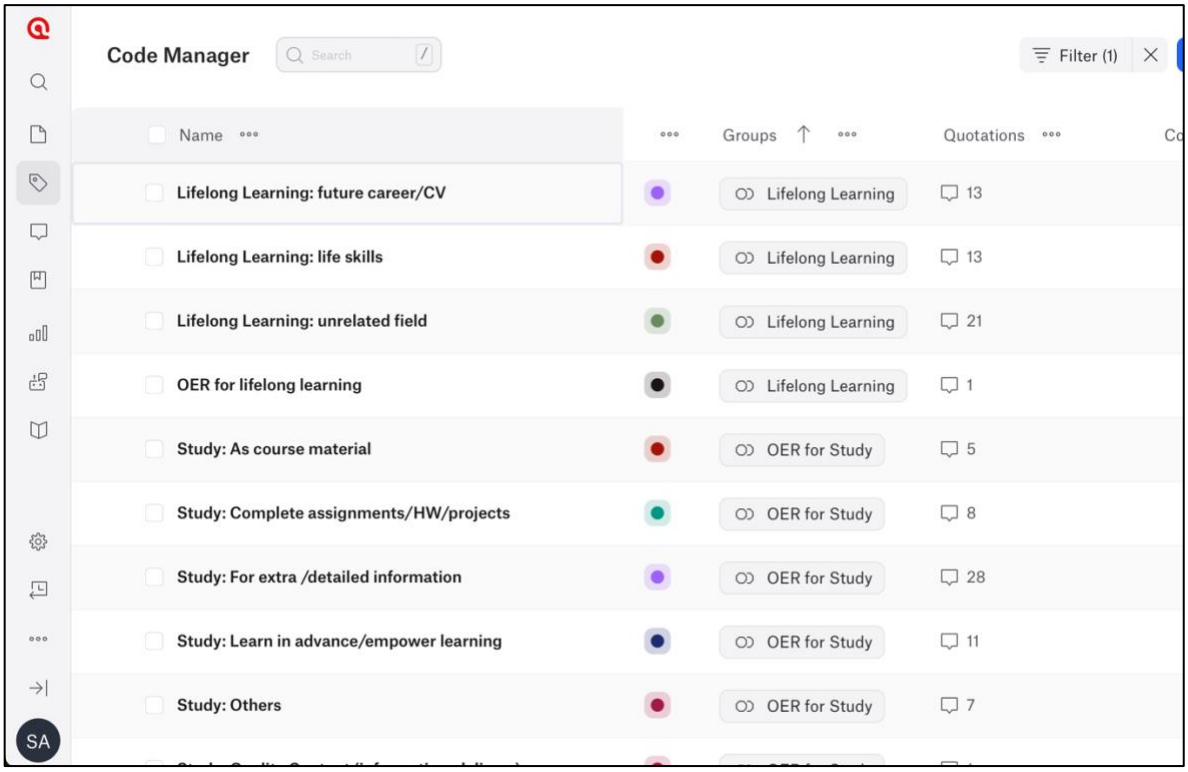
Stage 5: Grouping Quotes into Categories Based on Similarities

As I progressed, I began identifying similarities among the quotes, leading to the formation of initial categories as shown in Figure 6. The existing codes were reorganised to reflect patterns of similarity, enabling the development of potential categories. This step helped in organising the data more systematically.

Stage 6: Differentiating Categories Based on Differences

To refine the emerging categories, I focused on distinguishing them from one another. The sorting and resorting of codes became a continuous process as I compared the evolving categories with one another and with the original data. This iterative process of comparison allowed for a deeper understanding of how each category was unique in its characteristics.

Figure 6 *Grouping codes and forming initial categories*



Stage 7: Arranging and Rearranging Codes to Finalise the Outcome Space

Finally, the analysis resulted in forming the outcome space. The outcome space was finalised by analysing both the referential aspects (what the categories represent) and the structural aspects (how the categories relate to each other). This step involved continuous refinement to ensure that the differences among the categories were clearly defined, resulting in a coherent and meaningful outcome space that accurately represented the participants' varied experiences and perspectives regarding OER use.

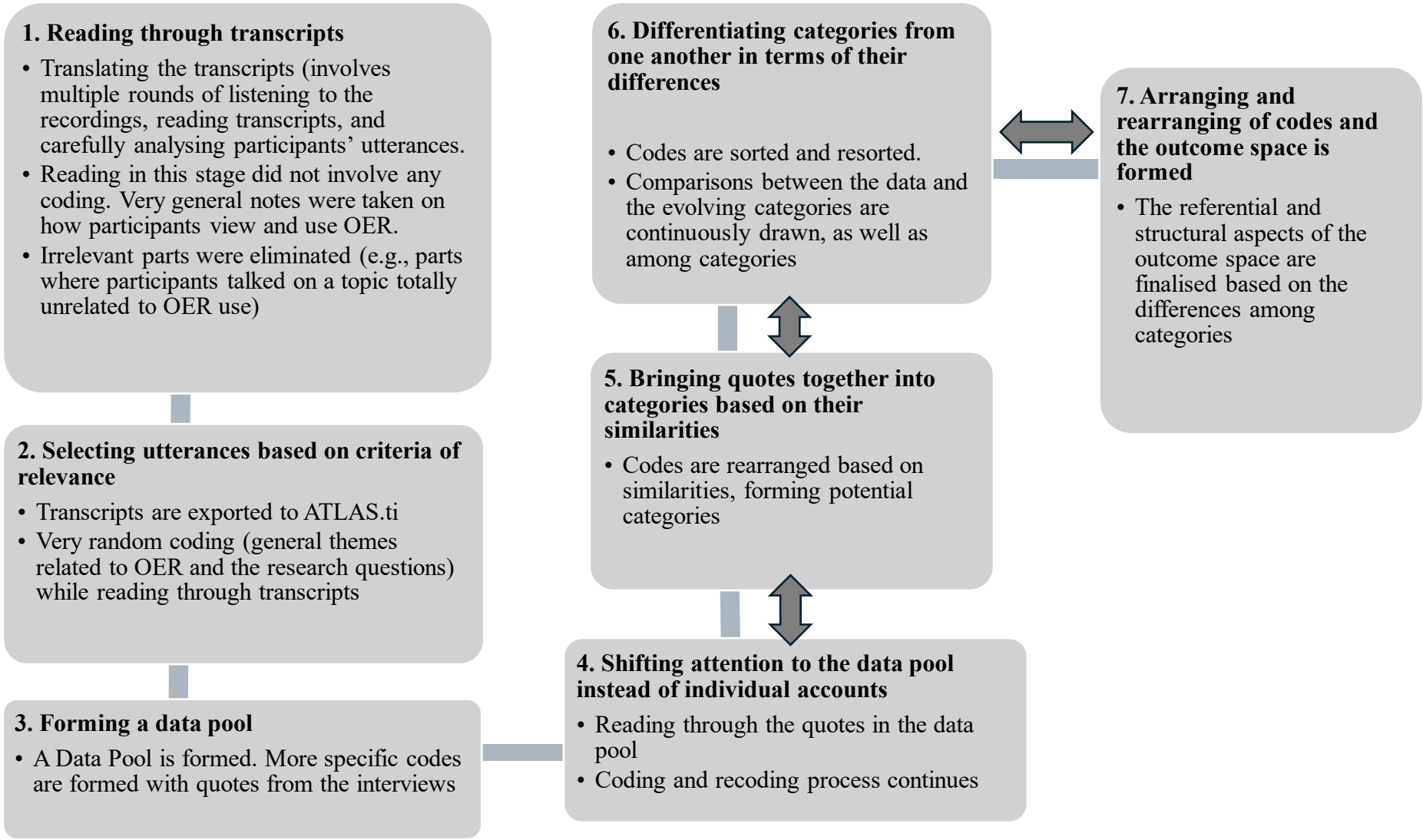
4.6 Credibility and Dependability of the Research

Since the researcher's role in phenomenography is crucial in interpreting and categorising participants' experiences, there is a risk of researcher bias and influence on the analysis and interpretation of the data. This risk is even higher with an individual researcher conducting the study, as has occurred in the present thesis. To enhance the reliability and validity of my results, I implemented the following strategies:

1. Avoiding Personal Bias: I maintained reflexivity throughout the research process, regularly reflecting on my role as a researcher and the potential influence of my assumptions or preconceptions on data interpretation. To reduce my influence as a researcher during the data collection and analysis, I practised the following based on Sin's (2010) recommendations:

a. I focused on the specific words and phrases participants used, avoiding assumptions about their meanings. When clarification was needed, I asked follow-up questions to ensure I understood their intended meanings.
b. I refrained from introducing new vocabulary into the conversation and did not correct participants' wording, even if more precise terms could have been used.

Figure 7 *Summary of the data analysis stages*



c. I provided participants with ample time and space to reflect and respond after each question. I deliberately avoided showing agreement or disagreement through facial expressions, instead maintaining an attentive, empathetic, and neutral presence.

2. Consultation with Experts and Colleagues: I sought feedback from experienced researchers and colleagues familiar with phenomenography. This allowed me to validate my interpretations and ensure that my findings were consistent with established practices in the field.

3. Transparent Documentation: I provided a detailed account of my data collection and analysis procedures, including the rationale for methodological choices. This transparency ensures that my research can be critically reviewed.

4. Justification of Decisions: I explicitly justified decisions at every stage of the study, from participant selection to the formation of categories of description, ensuring that each step aligned with the research's objectives and methodology.

5. *Provision of Quotes*: For valid phenomenographical results, Åkerlind (2012) maintains that 'a strong emphasis must be placed on a researcher's ability to argue persuasively for the particular interpretation that they have proposed' (p.124). For this end, I included quotations under the descriptions of each category so that readers can see how the transcripts backed up the categories.

4.7 Ethics

In this research, where the researcher is an insider, there are ethical issues related to power must be considered. The hierarchical relationship between me (a teacher) and the participants (students) can impact their willingness to participate, their ability to openly voice

their thoughts and their independence in other matters of decision-making (Israel et al., 1998). Therefore, it was highly important to acquire their voluntary, informed consent so they do not feel pressured to participate but rather were free to decline. I respected participants' autonomy by making it clear that they could withdraw from the study at any time without fear of negative consequences. Before any data collection began, I provided participants with a clear and thorough explanation of the study's objectives, methods, procedures and benefits. I obtained their informed consent, ensuring they fully understood their rights and the scope of their involvement.

Furthermore, shared personal and sensitive data or any other privileged information must be carefully used and protected to ensure confidentiality and privacy (Fleming, 2018). Therefore, I adhered closely to established codes of research ethics, ensuring that the confidentiality of both participants was preserved at all times. To protect anonymity, I employed pseudonyms and altered identifiable details, making it impossible to trace responses back to individuals or organisations. Furthermore, I implemented secure methods for storing sensitive data, ensuring that only authorised individuals could access it. This safeguarded the privacy of participants and upheld their trust in the research process.

4.8 Summary

This chapter presented the theoretical and methodological framework guiding the study, providing a systematic and transparent approach to comprehending the diverse experiences of undergraduate students at UTAS-Nizwa with OER. By situating the study within its specific context and describing the processes and considerations that informed its design, the chapter demonstrated how the research was tailored to address the unique dynamics of a setting where OER use is independent and unguided by formal policy.

The study context highlighted the significance of UTAS-Nizwa as a research site, emphasising its relevance in exploring self-directed engagement with OER in the absence of institutional integration policies. This was followed by a description of the participant selection process that ensured a diverse sample of students whose experiences could reflect a broad range of interactions with OER.

The chapter also detailed the data collection procedures, which utilised online resource logs and interviews to generate comprehensive and nuanced data. This was complemented by an in-depth explanation of the data analysis process, including the development of a seven-stage framework to ensure transparency and minimise researcher bias. Strategies to enhance validity and reliability were outlined, highlighting the measures taken to ensure the rigour and credibility of the findings. Finally, ethical considerations were discussed, addressing the hierarchical relationship between researcher and participants and emphasising informed consent, privacy, and the safeguarding of participant data.

This chapter established the methodological rigour and ethical foundation of the study and ensured, as much as possible, that the research process adhered to the highest standards of qualitative inquiry. The detailed framework presented here not only supports the reliability and validity of the findings but also demonstrates the study's commitment to transparency and ethical integrity. The next chapter will present the findings derived from this rigorous process, offering insights into the diverse ways undergraduate students experience OER in their learning.

Chapter 5: Findings

5.1 Introduction

This chapter presents the findings of the phenomenographic study that explores the experiences of university students in using OER. The study aims to uncover the different ways students engage with and experience OER in learning. This study aims to examine these variations in experience in a setting where OER is not formally integrated into the educational curriculum of the institution but rather independently used by educators and students. Examining the phenomenon using phenomenography (with its unique definition of awareness and second-order perspective) in a naturalistic setting, I contend, reveals different aspects of the OER phenomenon and allows for a broader look at OER's potential benefits than that which is usually focused on in experimental settings. Adhering to the phenomenographic tradition, the chapter presents the findings through the outcome space, which is the collective way of experiencing the phenomenon (Åkerlind, 2012; Marton & Booth, 1997). The outcome space highlights two key facets: a) four categories showing four variant ways university students experience OER (*categories of description)*; and b) the way these categories are connected (*structural and referential relationships*) (Marton, 1986; Marton & Booth, 1997). The findings are presented in a structured manner, with each section contributing to a comprehensive understanding of the outcome space and its elements, supported by quotes from the interviews. It should be noted that the excerpts are translated from Arabic and that, for the purpose of conveying the intended meaning, the language in the excerpts is notably more structured than how spoken language usually is.

The chapter is organised into four key sections. Section 5.2, Structuring Phenomenographic Findings, highlights key points to be considered when reading the findings of a phenomenographic study. These points include the developmental and inclusive nature of the categories of the outcome space and the fact that these categories capture the collective experiences of the entire group rather than individual experiences (Ashwin, 2006).

Section 5.3, Outcome Space, presents the heart of the phenomenographic approach by presenting the four qualitatively distinct ways in which students experience the use of OER. These categories capture the range of variation in students' experiences with OER. This section defines these four categories, providing a visual representation of the outcome space and emphasising how the categories relate to one another.

In Section 5.4, Structural and Referential Aspects, the chapter explores the structural and referential dimensions of the outcome space. While the structural aspects refer to how students organise their experiences of using OER, including the internal and external relationships that shape their engagement with these resources, the referential aspects focus on the meaning that students attribute to OER. This section provides an explanation of these two dimensions, which are critical to understanding the variations in students' experiences.

The last section, Description of Categories, offers a detailed examination of the four categories of experience identified in the outcome space. Each category is described in depth, with specific attention to the differences between them. This section also highlights the three dimensions of experience that differentiate the categories: *the motive of OER use, the role of the learner, and forms of use*. This section includes direct quotes from participants to enhance understanding, reflecting their experiences and showcasing the diversity within each category. Together, these sections provide a comprehensive account of the study's findings and offer

insights into the varied experiences of university students in using OER. By exploring these experiences, the chapter contributes to the broader discourse on OER and their potential in reforming learning in HEI. It provides valuable insights into how undergraduate students utilise OER by centring the analysis on participants' voices, which informs the discussions and implications in the following chapters.

5.2 Structuring Phenomenographic Findings

When reading the findings of phenomenographic research, there are a few points to consider. First, the following outcome space displays categories of description in a sequential order, with the initial experience representing the simplest and least encompassing, while the final experience is the most intricate and inclusive. Phenomenographic perspective highlights how context shapes awareness (Linder & Marshall, 2003), with personal experiences, education, and situational factors influencing how phenomena are understood. These variations reveal the diverse ways individuals engage with their environments and phenomena around them (Killam et al., 2024; Yates et al., 2012). Individuals develop more complex understandings of phenomena as they become aware of different aspects involved. This shift from basic to more complex experiences shows the individual's capacity to hold multiple important aspects of the phenemonon in awareness simultaneously (Marton & Booth, 1997).

It is crucial to emphasise that the phenomenographic findings in this paper provide just one possible arrangement of outcome spaces. In such a case of "multiple legitimate interpretations", it is important that the researcher make a compelling case for the specific interpretation they have suggested (Åkerlind, 2012, p.330). This section provides descriptions of the categories with quotations from the data for the readers to examine. Additionally, these categories are not evenly distributed among participants; instead, they capture the collective

experiences of the entire group (Ashwin, 2006). Therefore, more than one of the description categories in this study may be present in a single interview. Furthermore, the various relationships between a set of people and a particular phenomenon are being examined and described in a limited number of different categories. This implies that the categories describe experiences of the phenomenon of interest rather than individuals (Limberg, 2000) and that the emphasis is on the differences between the categories rather than the categories themselves (Ashwin, 2006).

In the following sections, I first present the outcome space, showing four various ways of experiencing the use of OER by undergraduate students. Following the description of the outcome space, I then explain the structural and referential aspects of the outcome space and then describe each category with quotes describing experiences of relationships between participants and phenomena. I highlight here the variations between the categories.

5.3 Outcome Space

Four qualitatively different ways of describing the experience of OER use were constituted in the analysis of the interviews.

1. OER as resources used in guided formal learning
2. OER as resources used for self-directed support in formal learning
3. OER as resources used for self-directed support in integrated learning
4. OER as resources used for lifelong learning

Table 6 sets out the outcome space and how the different categories of use are arranged within it. The structural aspects focus on the changes in what is in the foreground and background of the

Table 6 *Structural and referential aspects of the outcome space*

		Referential (*Increase in Level of Engagement*) →		
		Guided engagement	**Self-directed engagement**	**Setting their own learning goals**
Structural (*Increase in Scope*) ↓	**Formal**	OER as resources used for guided formal learning	OER as resources used for self-directed support in formal learning	
	Integrated (formal, nonformal)		OER as resources used for self-directed support in integrated learning	OER as resources used for lifelong learning

accounts. Structural aspects represent how directly related OER use is to the students' current academic studies. The referential aspects focus on the level of students' engagement in OER use, which shifts from guided engagement to more advanced involvement in the learning process. The following sets out each category and highlights the variation among them.

The categories within the outcome space are organised in a hierarchical structure. This means the first category does not include experiences of any other categories, while the fourth category encompasses the experiences of the preceding three. However, this hierarchy does not imply a developmental sequence; instead, individuals' ways of experiencing OER may change depending on the context and purpose for OER use (Ashwin, 2006; Moffitt & Bligh, 2024). That is to say, 'participants have not needed to progressively move through each [category] in turn, from Category 1 to Category 4' (Moffitt, 2020, p.9). A significant change occurs in category 2 where students begin to assume more responsibility for their learning and show independence in seeking information and searching for resources.

5.4 Structural and Referential Aspects

The outcome space can be presented as in Table 6, with structural and referential aspects of the OER experience by undergraduates. Structural aspects represent the *relatedness* of OER use to the students' current academic study. In this research, structural aspects range from information seeking being related to formal learning only, to being related to an integrated form of learning (that is, both formal and non-formal). Referential aspects represent *meaning* of OER use. Referential aspects, in this study, relate to the level of students' engagement with OER ranging from basic engagement where students' use of OER is guided and directed, to an engagement where OER use is self-directed and regulated for the purpose of supporting formal learning, to an autonomous and future-focused engagement with OER where students set their own learning goals that are not necessarily tied to their academic studies.

5.5 Description of Categories

The findings yielded four categories in the outcome space: category 1: OER as a source used for guided formal learning; category 2: OER as a source used for self-directed support for formal learning; category 3: OER as a source used for self-directed support for integrated learning; and category 4: OER as a source used for lifelong learning. In this section, these four categories are described, highlighting differences among them. The description is based on three dimensions of experience, which are:

Motive for using OER describes students' accounts and experiences on the motive of their use of OER (e.g., completing assignments and course tasks, developing skills necessary for academic and professional success).

Role of the learner explains how students describe the role they assume in the learning process (e.g., students are seekers of alternative and enhanced content, students as evaluators of their needs and weaknesses).

Forms of use describes students' experiences on the specific purposes for using OER under each category (e.g., using OER as basic course material, using OER to enhance the learning experience).

Each category, that is each dimension of experience under the four categories, is "exemplified" with quotes from the data in 'the tone of the phenomenographic tradition; not by describing phenomena, but by describing experiences of relationships between participants and phenomena' (Moffitt, 2020, p.10).

5.5.1. Category 1: OER as Resources Used in Guided Formal Learning

The accounts of students that were aligned with this category described OER as a basic learning material. Students used OER as direct substitutes for traditional textbooks and other course materials. There was a focus on the purpose of seeking OER as being used to complete compulsory coursework. This ranged from the open resource being used as either a basic replacement for course materials (Core Curriculum OER) or as a resource to complete required academic tasks (Supplemental Coursework OER). In both cases, the resources are usually recommended by the course tutors themselves without students being involved in searching for and choosing these resources. The materials are used as primary resources rather than alternative materials. Table 7 summarises the variation in the three dimensions of experience: motive for using OER, role of learner, and forms of use, which are explained and exemplified in the following section.

Dimensions of Experience

Motive for using OER: Students' accounts describe the motive for their use of OER as to gain basic knowledge required for passing a study level, including passing exams, completing assignments, projects and course tasks:

> *in one of the assignments, we were required to read a research paper related to the topic we are studying and to summarise it.* **(B 5, Human Resources)**

> *We were required to do programming in the mini-project. Like they taught the theoretical part, and we were asked to apply that in the project.* **(I 4, Software Engineering)**

> *Most of our courses are practical and don't have a theoretical part to them. So the [course] handouts had links to websites. We study from there… we study the materials we find there, on that website.* **(I 6, Design)**

Role of learner: Through their accounts of using OER in this category, students described their role as users of a resource suggested by the tutor and under the guidance of the tutor.

> *It is part of the curriculum to download this app and use it. We use it all the time … this programme, I mean, is part of the course basically. Other programmes that are not part of the course… are extra, or for self-learning…* **(I 3, Software Engineering)**
> *Sometimes I use books, but electronic books mostly…Teachers would mostly give us the book titles and ask us to search for them…We find some of them on the internet, as PDF*

files. We then go to other libraries when we cannot find them there. **(B 8, Business Studies)**

Forms of use: Under this category, students used OER types including software, tutorials and videos (mostly on YouTube), websites, and open journals for research purposes. Such resources were used in two main forms: OER as a core curriculum resource and OER as a resource to complete compulsory coursework.

1. **Core Curriculum OER:** Students of the university studying specialisations related to technology and applied sciences reported a wide use of open-source software and other educational materials, including technical tutorials. Students acknowledged that although textbooks are the most common course material in the university, instructors are increasingly embracing the use of open resources as required course materials. They further emphasised that OER provide continually improved resources. In technical specialisations, they are used as a course material to stay aligned with evolving trends in technology. For example, Information Technology students use open-source programming language software.

> *We use Spyder in Programming … and G Creator also in programming. We, as software engineering majors, have almost all our courses in programming. This is what we do. So we use this programming software in almost all our courses and work on and rely on it throughout the semester. Even in exams, when there is a practical test, we use these software programmes. We, of course, download them*

for free on our laptops or personal PCs and use them. **(I 2, Software Engineering**)

Moreover, OER, including open textbooks, guides, graphic resources and tutorials, are used as course materials for subjects of a practical nature, such as Design and Photography.

As design students, most of our courses are practical and don't have a theoretical part to them…The main source we use is YouTube because we find tutorials there. That's why we use it so much. Even our tutors totally understand that everything is digitalised and that there are a lot of technological advancements. So they share with us websites that are useful for us, but mostly tutorials, and we watch these. Sometimes, we spend most of the class time watching a tutorial [on] certain tactics … for photography or for design. For example, using the Illustrator, [we learn] how to draw using this method or that method. There is a lot, there is a huge number of tutorials you find on YouTube... It is a whole world there. You won't find these somewhere else. So that is why it is very important for us. **(I 6, Design)**

2. **Supplemental Coursework OER:** Still with some guidance from course tutors, students also use OER for completing study tasks like homework, assignments and projects. The following examples show different students' experiences related to using OER to complete tasks. For example, student **I 5** explains her use of tutorials and ready-to-use configuration codes to complete practical class tasks, assignments, and projects, and how she applies theoretical content respectively.

we find resources online when class time is not enough to finish a certain task or in case there was [a programming] error. Not all tutors would point out your errors; they leave it to you to figure it out. We turn to the internet, then. As I told you, we sometimes have errors with connections, or if we don't know how to make the configuration for a device to operate it. For example, if you want the WiFi to work in all the building levels, you have to have it configured. Like we haven't learned the configuration of a certain device, like here at the university, we are limited to devices like a laptop, router, switch … so they teach us how to do the configuration of these, not all devices out there. Like we wanted to do the configuration for alarms, cameras, so we had to go [to the internet] …You can find a lot of materials on YouTube, for example. There are websites, sometimes we find, on the internet, [where] some teachers share configurations of certain devices, and we just copy them. We mostly use YouTube… there are about three or four content creators…[who are] knowledgeable in this field, so we usually watch their videos. **(I 5, Cyber and Information Security)**

Students **B 5** and **I 4** described their use of OER as a source to complete coursework. They use open resources such as open journals and tutorials to assist them in completing their assignments and practical projects.

For example, I remember one of the assignments we were required to read, it is related to research…Now there is a big focus directed to research. So in one of the assignments, we were required to read a research paper related to the topic we are studying and to

summarise it. We were given two options: to either use Google [Scholar]or to read from a traditional book…Honestly, I chose Google because it is an easy process, and tasks can be completed quickly…So this is it, in short, I mean Google helps us accomplish our tasks very quickly, and most importantly, with efficient results. **(B 5, Human Resources)**

For example, last semester we were required to, like we had studied AI, but the course was mainly theoretical, we didn't learn programming. But we were required to use programming in the mini project. Like they taught the theoretical part, and we were asked to do programming in the project…There is a website on AI which is called Kaggle… There are codes and descriptions of each code. You could use all the data and information there for free. Our tutor recommended it to us, so we could do the AI mini project. You find everything there. We only needed some technical support when one of the methods did not work on our laptop… [even then] we searched YouTube on how to install that on our devices. **(I 4, Software Engineering)**

Students also used OER for technical purposes such as translation, paraphrasing, and preparing presentations. **B 7** describes her use of a free-to-use online graphic design tool to save time and effort in completing coursework.

I use CANVA. CANVA makes designing presentation shows and advertisements much easier. It offers free templates for educational purposes. They are ready-made, and you just add your content. It makes interesting visuals. You can easily make your own graphics. It offers many features: wallpaper, backgrounds, posters, videos, and

presentations. Instead of using Microsoft PowerPoint, which is not used much now, people use CANVA now. **(B 7, Marketing)**

As English is not their first language, students use language software to help them understand and complete their coursework.

Yes, the most common software students use is for translation. When they find it hard to understand [because of language] …they translate. This is the first type of resources, the second [type of] resources that helps them is paraphrasing [software and other software that]… help with grammar and spelling. **(B 2, Accounting)**

Table 7 *Summary of Category 1: OER as resources used in guided formal learning*

Category 1: OER as resources used in guided formal learning	
Dimensions of experience	
Motive of use	Gain basic knowledge required for passing a study level
Role of the learner	Guided use of resources for formal learning
Forms of use	OER as foundational academic resources: - *Core Curriculum OER*: Resources used as foundational course materials that directly align with the curriculum. - *Supplemental Coursework OER*: Resources that aid students in completing required coursework or mandatory assignments.

5.5.2 Category 2: OER as Resources Used for Self-directed Support in Formal Learning

Accounts in this category described the experience of using OER as a supplementary study material for formal learning. When students use OER as supplemental learning resources, they are enhancing and reinforcing their understanding of course content beyond the primary materials provided by the original course material and their course tutors. These resources include additional readings, practice problems, instructional videos, and tutorials. By accessing a variety of perspectives and explanations, students can clarify difficult concepts, practice their skills, and deepen their comprehension of the subject matter. This category highlights the role of OER in providing diverse and engaging materials that support differentiated learning preferences and help students achieve a more thorough and comprehensive understanding of their course content. This use ranges from compensating for what a student views as a missed or deficient course content to a desire to enhance their learning experience.

In this category, students use OER to find additional resources, such as tutorials, videos, and practice exercises, to supplement their primary course materials and reinforce their understanding of the subject. In contrast to category 1, information seeking is initiated and directed by students themselves based on personal needs. Here, the student's goal for information-seeking goes beyond completing compulsory coursework to voluntarily pursuing additional resources. A key characteristic of experience accounts under this category is that students make evaluative judgements of the course materials and realise there are other alternatives available. A summary of category 2 with its dimensions of experience is presented in Table 8. The three dimensions of experience are exemplified below.

Dimensions of Experience

Motive for using OER: Accounts of students under this category depicted their motivation for using OER as to augment learning and deepen their understanding of the subject matter. Their goal is to either improve their performance in their studies or to generally gain wider knowledge.

> *When I have some free time, like during the weekend, I usually go and search, when I feel I need to know more about a topic or an area … [where] I don't have a full understanding of a topic, I usually go and search for more, like a lesson on YouTube* **(B6, Accounting)**

> *In general, I feel that as a student … as an IT student, I should know a lot of things related to computers. So I need to learn more, especially in the field of apps and software. If you are an IT student, then you should know a lot about that…I don't know, I feel that when I come across a certain software, I try my best to learn how to use it…I don't say I should spend much time and energy learning it… [but] It is good to be familiar with as many programmes and software, or at least the most used and most common ones. Because eventually this will be useful for you, you get more experience.* **(I 3, Software Engineering)**

Role of Learner: Accounts of OER use in this category show that learners assume more responsibility for their learning. Students described their role as seekers of alternative and enhanced content. They view the course content as insufficient, hence the need for supplemental resources.

For me, I didn't choose this major. I think to myself, since I am here now and to be able to continue, I have to do this right, not only come to college, learn whatever, and go. What we learn here in the university is not enough, not all the time, to be honest… You should do it on your own, either through the internet, courses, workshops, or to go back to the course material, but this doesn't always have everything… There are a lot of resources, so you have to go and search for such details. You have to do that on your own. They won't give you everything. As an IT student, it is your responsibility; you have to do it for yourself. **(I 5, Cyber and Information Security)**

[YouTube] is very useful for self-learning, for those who like to do self-learning. I feel that students don't only rely on what is given by the tutors… tutors are not able to teach everything, there is simply no time. **(I 6, Design)**

Students not only seek what they view as enhanced course content but also decide what best suits their needs and learning routines and preferences.

If a student feels too shy to approach the teacher when they need some explanation, or even sometimes he doesn't even want to ask a classmate, he just depends on himself and begins searching for information independently…Most students are open to this... I mean, for example, using the Internet, you just type in what you need and you get it... I feel it is much easier than going to someone or trying to contact someone. Just depend on yourself. All is there in your hands. **(E 1, Oil and Gas Engineering)**

Forms of use: Students' accounts under this category described using OER, such as tutorials, videos, and websites. For the goal of augmenting learning, students used OER for different specific purposes. They used open resources to supplement textbooks and lectures in cases where students a) need to compensate for missed course content (Catch-Up OER), b) to compensate for deficiencies in information provided by the original course material (Gap-Filler OER), and c) to enhance their learning experience (Enrichment OER).

1. **Catch-Up OER (using OER to compensate for missed course content):** Students used OER for additional practice that helps students apply their knowledge and improve their skills. Students access additional problem sets and exercises through OER platforms, which offer a variety of problems with instant feedback, helping them to practice and master the material. Students also use OER as remedial resources that help them catch up on prerequisites they may have missed.

> *YouTube is like the sea; you can find everything. I learn everything from YouTube. For example, I had a calculus course last semester. I suffered with calculus; it was hard for me. So I just type in the topic I want [on YouTube] and I find a lot of information, videos with tutorials from different people, explaining using different styles.* **(I 1, Software Engineering)**

> *I basically don't use it [the application] to solve math problems, but to double-check my answers or if I am looking for another way to solve a problem, or if I missed a class one day and I need to catch up. The instructors will simply start from where they have reached. So you have to do that yourself. You sometimes*

need such applications. I also use tutorials because I know these will give me a comprehensive explanation instead of an isolated piece of information. It is like a whole lesson, and it will provide me with different ways to solve a problem. **(E 2, Mechanical Engineering)**

2. ***Gap-Filler OER*** **(using OER to compensate for deficiencies in course content):**

College students used OER to address and compensate for what they perceive as deficiencies in their original course content. The reported types of course deficiencies include a focus on theoretical knowledge rather than practice, a lack of depth in certain topics, outdated content, and limited perspectives. The following gives examples of OER use in these cases.

Students used OER to apply theoretical knowledge:

There are a lot of programmes, software and applications… I am a cybersecurity student … So, for example, we find that when topics are explained here in college, the focus is mostly on the theoretical side … For example, if we have a projector, we have to identify and know all the connections and the validity of each outlet. We have to know these precisely. So … an hour-and-forty-minute class is not enough to completely understand the whole thing. You have to go through the whole thing again after class… The tutor explains the theoretical part with a diagram on the board so the only way you connect the two [theory and practice] is either you record it [what the teacher says] or you can turn to other resources like you watch a tutorial, or a video from another website where you find a step-

by-step explanation. We use YouTube a lot; it is really helpful. As Cybersecurity students, we find almost everything we want there, hours-long videos with detailed explanations. **(I 5, Cyber and Information Security)**

you can find anything you want there [on YouTube] …I mean, even in photography, the camera, like I sometimes have some problems in my camera, I just go to YouTube and see how to do so and so, how to fix this or that, what and how to do it exactly. And I get a lot of videos. **(I 6, Design)**

When the original course content lacks depth, students turn to supplementary OER materials that provide more comprehensive explanations and cover additional topics. For topics that are not well covered in their courses, students use specialised tutorials available on platforms which often provide in-depth lectures and materials on specific subjects.

We need [to take extra courses] … if we want to do more practice related to our major to gain some skills and experience. We should not limit ourselves to what we learn as part of our university courses. There are topics and points that are not covered there. So when we have time or get the opportunity, we take these [courses]. For example, I took a course on AI from Kaized Youth Organisation… It's a student's initiative. They have introduced us to artificial intelligence… Generally speaking, our course materials cover the basics, like very basic information. There are sometimes no details, but on the internet, I find detailed information to the extent that surprises me sometimes… our course materials don't usually have everything, because they either cover a specific topic

or cover topics which require detailed explanation, in a very brief way. **(I 2, Software engineering)**

Well, for example, there was one course… about a year ago … The handout had the name of the book from which the content was taken … The idea is, in the course handout, information was given to us as points, but you find the detailed explanation in the book with examples. **(B 3, Accounting)**

OER also provided students with the advantage of accessing up-to-date information and software. Continuously updating course content and software in specialisations related to information technology is necessary but sometimes is not done as rapidly as technological advancements grow. Students seek open resources and software to learn about cutting-edge technologies.

I see college [course content] as an obstacle to my success because almost everything and all the lessons are outdated. Because technology advances, programming is advancing too. For example, there are programming libraries that basically were closed by their companies because they are outdated. But we still use them here…The problem is that teachers seem to know this one thing. When we suggest a new software, they just don't accept it. **(I 1, Software Engineering)**

Regarding the computer languages, we really need to learn new languages here at the university. They limit us to certain languages that might not be helpful for us later…The

solution is to introduce us to more languages… Furthermore, these programmes, the ones we use now at the university, are outdated… I mean, when you put them up for specialists in the field, I mean, they would know that these are very basic programmes. We can, using more advanced programmes, even if it requires more effort, we can do better things. When you try and look for the best programmes out there, programming software, you find so many cutting-edge programmes. A lot of software emerges all the time. When you talk to someone specialised in this field, in an IT company or even those organising initiatives in this area, you find out that they use more advanced software. These software programmes… are easy to use and learn. And it takes us very little effort to learn them. So why not teach us on these programmes… When you ask an IT student, I mean, who only depends on the curriculum [and] doesn't search more and doesn't take extra courses. Such students will be familiar with 3 to 4 languages only. I find this unacceptable. So, we are trying to search and learn on our own. **(I 2, Software Engineering)**

Students also used OER to gain diverse perspectives and explanations that enrich their understanding of the subject matter. When a course presents a limited perspective, students sought out OER authored by different experts to gain a broader understanding. These resources can offer diverse viewpoints on subjects, helping students understand more diverse contexts and perspectives.

There are cases where I go to the tutor and tell them there is a different point of view on the topic, other than what we talked about during the class. So, we keep arguing, and the

tutor would say that both points of view are correct, but this is how it is taught here. So YouTube offers me different perspectives, sometimes more convincing points of view than what we are taught here by the tutors at the university... as a strategy I follow, for example, sometimes when a teacher explains a topic from a certain point of view, I'll hold to that [view] because this is what I will use in the exam, but I might not use it when I go for a job interview or when I discuss this idea with another person. In this case, I would use the strategy or point of view that I find suitable for my way of thinking and which I find more logical… I like to do things the right way. So, when there is a task which is graded and I know I would spend some time on it, I won't spend that whole time [on just completing it]... I like to spend time understanding it deeply. I always try to go deep into topics and see different perspectives... **(B3, Accounting)**

Table 8 *Summary of Category 2: OER as resources used for self-directed support in formal learning*

Category 2: OER as resources used for self-directed support in formal learning	
Dimensions of experience	
Motive of use	Augment learning and deepen understanding of subject matter
Role of the learner	self-directed support for formal learning
Forms of use	OER for content enhancement and gap-filling: - *Catch-Up OER*: Materials used to compensate for missed course content due to absences or other interruptions. - *Gap-Filler OER*: Resources that address deficiencies or inadequacies in the existing course content. - *Enrichment OER*: Resources aimed at enhancing the overall learning experience by providing additional perspectives, in-depth explanations, or advanced materials.

3. **Enrichment OER (using OER to enhance learning experience):** Students used OER to engage with interactive educational materials such as quizzes and multimedia resources that make learning more dynamic and engaging. They benefit from the availability of OER in various formats (e.g., text, video, audio).

> *…for some lessons, we study curves, statistics, so I use them [videos] mostly in such lessons because, as we know, human nature differs. For example, another student and I in the same class…; my classmate might understand the lesson from the tutor, but when I'm in the same class with her, I find it difficult to understand the tutor's explanation. In such cases, I go to YouTube and watch tutorials and explanations on the subject and immediately absorb the material…I can say it is the way the tutor explains the material. This is it…there are YouTube clips that explain in a way that is different from how the tutor explains it, and maybe I can understand better that way.* **(B 5, Human Resources)**

> *We usually search for extra resources on our own. Whoever finds out about a channel that he/she finds useful, they would share it with others. We share resources. For example, we had a course last semester where we had difficulty understanding the content, how a certain machine works and what exactly it is used for. So, we search YouTube and watch videos. They were very helpful even for reviewing for exams. For some topics, I think [watching videos is] easier than reading text. Visual content is usually more useful for me to remember and to retrieve information.* **(E 3, Electrical Engineering)**

In addition, summaries and review materials available as OER helped students prepare for exams and quizzes. These resources often highlight key points and provide concise overviews of important topics.

> *[what I look for in a good source is], first, the material is presented in an interesting way, and whether the resource is concise, like it gives you the key information you need. For example, I don't like very long videos… I can't sit and watch a one-hour-long video. A 15- or 20-minute video is long enough because it would give you the most important information, so it is more useful. Third, whether it [the source] is different, not only in the presentation style but also in the type of information it provides.* **(E 3, Electrical Engineering)**

4.5.3. Category 3: OER as Resources Used for Self-directed Support in Integrated Learning

Students' accounts under this category show that they utilised OER to develop interpersonal and life skills that are essential for academic and professional success. These resources cover a wide range of topics, including language skills, communication skills, analytical skills, teamwork, and leadership. Students use OER materials such as workshops, webinars, and self-help guides, which offer practical advice and strategies that students can apply in real-life situations. Students indicated that by engaging with these resources, they have the opportunity to enhance their emotional intelligence, resilience, and problem-solving abilities, which are essential for navigating both academic and everyday life challenges. This category is characterised by students seeking information which are indirectly related to their studies and

academic specialisations. Like in category 2, students use OER as supplemental learning materials but take a self-directed approach to searching for resources based on their personal needs. They look for information that is not directly related to their subject but rather something they believe will aid their understanding of it. In the context of this study, these include language and interpersonal skills such as communication and leadership skills. Table 9 summarises the dimensions of experience in category 3.

Dimensions of Experience

Motive for Using OER: Participants' accounts under this category describe their motivation as to seek information and develop skills that they view as necessary for their academic and professional success. For example, B6 describes her motivation for taking a course on interpersonal skills. She thinks developing such skills complements her academic learning. Likewise, E1 and B2 value the role of OER, such as online courses and OER platforms, in supporting knowledge and interpersonal skills development.

> *I am studying Accounting, but those who didn't study it will find it hard to learn. It is a very specialised kind of science. Still, as an accountant, you are also required to possess different types of skills indirectly related to accounting… like organisation skills, interpersonal skills, problem-solving skills, leadership, [and] strategy development skills.* **(B 6, Accounting)**

> *[Taking online courses] is not only for your future [career] but also for increasing your knowledge and improving your personality, I mean, to have the ability to deal with different situations.* **(E 1, Oil and Gas Engineering)**

It [the platform] was useful for us as students and even as job seekers. You can learn a lot of skills there… **(B 2, Accounting)**

Role of learner: Descriptions of students' experiences under this category show the role of students as evaluators of their needs and weaknesses, and seekers of resources to improve in specific topics and skills, which are normally not taught as part of the formal curriculum. Students' learning here is self-initiated and self-directed.

personally, I am a little bit shy so I have difficulty talking in front of people so it is my responsibility to search or take courses to, for example, help me improve in this area to be able to speak in front of people, I mean, and to come in close contact with others, this would improve my communication skills. **(B 2, Accounting)**

I have taken courses on different topics like different personality skills. I led a student's charity group and wanted to work on my personality, so I took some courses… I have recently taken an online course on leadership. **(E 2, Mechanical Engineering)**

Forms of use: Students used OER such as online courses, educational websites, courseware and MOOCs to learn skills that assist them academically and skills that complement their academic specialisation. There are two forms used:

1. **Supportive Skill-building OER:** These are resources that students used to acquire essential academic skills, such as critical thinking, research, or time management. Students used OER to improve general skills that assist them academically. A

prominent example is students' use of OER to enhance their English language skills. As English is the language of instruction in the said university (students all speak Arabic as their first language), many students said they use OER to improve their English skills. B 6 describes her use of OER in preparing for an English proficiency test required by the university.

> *This is a programme we used; it was very helpful when I was preparing for the IELTS exam. It has speaking exercises, like short stories. I listened to those, I practised listening and pronunciation.* **(B 6, Accounting)**

> *[The App is used] for improving your personality and your English language skills…I mean, the more you can use English, the more confident you are. It strengthens your personality.* **(E1, Oil and Gas Engineering)**

Another example is presentation skills.

> *I use YouTube the most. For example, if I have a presentation on a particular topic, I may take some information, but I mostly like to see how different people speak. Because I find it useful like… YouTubers especially … have different ways on how they present their content, ways that attract the listener. So, I like to watch these… like how to start your presentation, the phrases you can use. I find this very useful for me.* **(E3, Electrical Engineering**)

2. **Specialisation-aligned Skill OER:** These resources are used to develop skills that complement a student's academic focus or area of specialisation. For example, B 3 depicts how specific interpersonal skills are necessary for a student specialised in accounting.

   I also work on improving my analysis skills; this is a widely required skill. As auditors, analysis skills are required. I have good analysis skills in general, but I need to know how to apply these skills in accounting. Now, even if I learn Excel, I want to use that for analysis as well, how to analyse, how to find problems and how to solve them. So, I am working on this as well. **(B 3, Accounting)**

Table 9 *Summary of Category 3: OER as resources used for self-directed support in integrated learning*

Category 3: OER as resources used for self-directed support in integrated learning	
Dimensions of experience	
Motive of use	Develop skills necessary for academic and professional success
Role of the learner	Self-directed support for integrated learning
Forms of use	OER for developing transferable skills: - *Supportive Skill-building OER*: Resources students use to acquire essential academic skills, such as critical thinking, research, or time management. - *Specialisation-aligned Skill OER*: Resources used to develop skills that complement a student's academic focus or area of specialisation.

5.5.4 Category 4: OER as Resources Used for Lifelong Learning

The accounts of students that were aligned with this category described OER as resources for lifelong learning. Students think more broadly about what learning actually is, including where, when and how it happens. In this category, OER is a way for students to keep learning and growing outside the traditional classroom. These students used OER to achieve personal and professional goals through continuous, voluntary, and self-motivated pursuit of information. These resources support students in pursuing personal interests, staying current with industry trends, and continuously developing new skills and knowledge. OER use in this category is different from the previous three categories in that a student's role is not merely supporting their academic learning goals but rather setting their own learning goals beyond formal education goals. Students' OER use under this category is marked by the ability to widen their knowledge, extend their investigations, become more self-directed, and assume greater control over their learning. As summarised in Table 10, students used OER as resources to improve career-related skills and abilities, and resources to explore new fields or interests beyond their primary academic specialisation. The following exemplifies the dimensions of experience in this category.

Dimensions of Experience

Motive for using OER: Students use OER as a means to continue learning and expanding their knowledge beyond formal education settings. They pursue their professional and personal development. Students retain knowledge because they take part in several learning activities that support one another.

This [learning a programming software] could help me participate in competitions, or in the future, this could be my plan B, to provide me with income, like designing Apps for companies. So, while my experience may not be comprehensive yet, at least I will have taken the first steps, and I am intending to continue learning. **(I 3, Software Engineering)**

I am [taking extra courses] because I am not only focusing on studying, I am interested in other things, like my father's business that I help him with…I also give time to that, I give it a lot of learning and thinking too; what it needs, planning it, what to do next. So, I don't put all my attention on college courses only. I honestly think if I just sat and studied, I wouldn't have achieved much. So, I pay attention to learning other things at the same time. **(B4, Accounting)**

I follow them on Instagram. They organise online courses… I took all sorts of courses, whether I needed or knew the topic or not. Because now …I want to learn about different things and gain more knowledge; to know a little about everything. This is what I, I mean, this is my goal. I want to have ideas from here and there so I can have a wide and varied knowledge foundation. **(E 5, Engineering)**

Role of learner: Students have a wider view of what learning is and seek an approach to learning directed towards professional and personal development. They set new learning goals based on personal evaluation of needs that correspond with technology advancement and the global

business market. They do not limit themselves to their formal education but rather realise the significance of integrating formal and informal learning.

> *This is what I call 'contemporary learning'… Contemporary learning means that you should be able to cope with the advancements and developments happening around the world. One of the most important advancements is programming. When you hear about projects nowadays, you realise they all require knowledge of programming, they need to use the internet, phones, so this is the trend now.* **(E 3, Electrical Engineering)**
>
> *[The academy offers] everything related to IT. Even if you are not a [formal] student, if you are applying for a job and want to prepare for it. For example, if it is a job related to Cybersecurity, it could help you with that.* **(I 5, Cyber and Information Security)**
>
> *Well, the more I take courses, the more I learn, the more I gain experience… So, it assures me that by the time I graduate from college, I will have the knowledge and experience needed to qualify me… to be ready to apply for a job.* **(I3, Software Engineering)**

Forms of use: Two prominent purposes within this category are utilising OER to a) improve skills and abilities pertaining to students' future careers and b) develop new interests straying from the specialisations they are studying at college. Students utilise OER for professional development, gaining certifications and knowledge that improve their skills and advance their careers. These are detailed below:

1. **Career Advancement OER:** Students use career advancement OER to improve skills and abilities pertaining to their future careers.

I use Instagram. There are people who are specialised in electrical engineering, my major. They post lessons, videos on certain topics, questions you might encounter…. [but] most of them are not related to electrical engineering per se. They address issues related to how to prepare a student for a job. Most of the topics revolve around that, actually… [In the university], they frankly don't provide much regarding that. This is not the primary focus here. I started reading about how to be ready for a job. I took courses, I mean, on interviews; interview questions. It was very different from what we have studied here. There are some similarities, of course, but there are a lot of differences. Even people who gave us these courses advised us not to rely on what we had learned in the university courses because it is a different world out there, after you graduate. You have to search and learn on your own about what will be useful for you later. **(E3, Electrical Engineering)**

Some of the software we use at the university is not used in the workplace. I most probably won't be using these later, or maybe I simply won't have access to the same applications in the place I am going to work. So, I should learn some other alternative software. **(I 3, Software Engineering)**

2. **Exploratory Interest OER:** Students used these resources to develop new interests straying from the specialisations they are studying at college. Students use these resources to pursue personal interests and gain knowledge in fields that do not relate

to their academic specialisations. Instead, they develop an interest in various fields and areas.

[I took courses] on AutoCAD, and printing… 3D printing. These are not in-depth courses. I love to learn these topics. I am interested in ***prefabrication****. I follow Instagram accounts on the same subject. I just wanted to learn something new. These courses could be very helpful even for those who want to start their own business in this field. They just need to dig deeper and learn more.* **(B 1, Accounting)**

I also took courses on a very trendy topic, which is trading. Now it is all about trading, artificial intelligence and the connection between them. These two fields are very related now. AI can predict future trends, so it can provide you with this information. Some people don't even have to look for a job. They can get money out of this. Learning how to use this connection is really very useful for people seeking a source of income or who have no job. I have tried it, and it worked for me. **(E2, Mechanical Engineering)**

… I also started learning about businesses and enterprises, freelancing... now I entered the field of stock markets… I attend workshops online and sometimes in person. Also, I have started my own business… Currently, I am very interested in the fields of engineering, freelancing, and entrepreneurship, especially entrepreneurship. I want to learn so many things… This is the age at which you gain knowledge. If you don't do that now, when will you do it? A person learns

best in their 20s and 30s. They can build themselves and their lives the right way. After your 30s, I don't say it is impossible to learn, but you would have set your foundations. So, I am doing this now. **(E 5, Electrical Engineering)**

Students practising this high-level form of self-directed and independent information seeking exhibited understanding and awareness of key issues related to the OER phenomenon, such as openness and resource quality. Students showed knowledge of terms like *open source* and *open access*.

It [Kaggle] is a platform for programmers to share their codes there; they upload their codes there for everyone. It is an open source. It is from different programmers who upload their codes there, and you can download these codes; you can also download data from there. **(I 4, Software Engineering)**

In their description of their experiences under this category, students also exhibited the possession of an advanced level of information literacy skills. It is worth mentioning that this does not imply that OER use in subsequent categories lacked the utilisation of information literacy skills but rather the use in this category requires the use of advanced media skills. For example, students' accounts showed that they effectively evaluate OER and compare different OER to other types of resources. Some compare the quality of OER to paid resources and express preference for certain OER platforms over others, as expressed in the following quotes. For example, E 4 describes a platform created by one of the university tutors. He compares the open-access materials and the paid materials on the platform:

You find some information out there [in the platform], but you do not get all the information you need in the open-access material. You have to pay to get everything, which is reasonable! He [the platform creator] also worked hard on the platform and the machines he uses are very expensive; these printers are very expensive. You don't get the whole thing for free, unlike when you pay for it. When you pay for it, you will have access to all the information and maybe get the chance to try the machines yourself firsthand. **(E 4, Mechanical Engineering)**

E 5 highlights a common challenge with OER: the difficulty of determining whether a resource is appropriate for their level of knowledge. Unlike paid materials, which are often structured systematically with clear progression and levels, OER can vary in complexity, organisation, and quality. He describes his experience using a paid platform:

For example, if I write about trading [on YouTube], I get a lot of videos about trading. I don't know which suits my level. In Ex-nas [a paid platform], I started from zero until last time, I could make 300 to 400 riyals applying what I have learned from the platform. So you learn gradually, unlike when you learn randomly from YouTube. YouTube is good, but it is usually unorganised. **(E 5, Electrical Engineering)**

I1 compares two OER platforms:

I don't usually take [IT] courses from Coursera. Those need commitment, long courses with many modules, and so on. I often take courses from Udemy, and I usually only take

the part I need for a course. Sometimes, for example, if I want to learn a certain feature that we have studied in programming, and that we don't usually get on YouTube, I search on Udemy about this feature, and I usually get it there. I think there is more content [on Udemy]. Coursera, for example, doesn't have content on Flitter. You typically find more updated content [on Udemy]. **(I1, Information Technology)**

5.6 Conclusion

This chapter provided a detailed account of the findings of a phenomenographic study on the experiences of university students in using OER. Table 11 summarises these findings. The chapter identified four distinct categories of experience: 1) OER as resources used in guided formal learning, 2) OER as resources used for self-directed support in formal learning, 3) OER as resources used for self-directed support in integrated learning, and 4) OER as resources used for lifelong learning. Through the identification of these four distinct categories, the study has

Table 10 *Summary of Category 4: OER as resources used for lifelong learning*

Category 4: OER as resources used for lifelong learning	
Dimensions of experience	
Motive of use	Expand knowledge beyond formal education
Role of the learner	Autonomous learning goals setting
Forms of use	OER for personal growth and lifelong learning - *Career Advancement OER*: Resources used to improve career-related skills and abilities, preparing students for future professional opportunities. - *Exploratory Interest OER*: Resources used by students to explore new fields, hobbies, or interests beyond their primary academic specialisation.

illuminated the variation in students' experiences of using OER. Furthermore, the structural and referential relationships of these experiences have been outlined, explaining the way these categories are connected and offering a nuanced perspective on how students engage with and make sense of these resources. By examining the differences between the categories across three dimensions— *the motive of OER use, the role of the learner, and forms of use*—this chapter has also highlighted the differences between the four categories. Including participant quotes has provided valuable insight into students' lived experiences, emphasising the importance of their voices in understanding their use of OER.

Overall, the findings of this chapter contribute to the growing body of knowledge on OER and its role in higher education in general. The findings are presented in this chapter:

- provides theory-based empirical evidence for non-performance-related benefits of OER. In the context of HE, these benefits include increased learners' engagement with the subject and promoted learner agency.
- gives a detailed account of how and why undergraduate students use OER as an information resource. Despite the notable technological advancements in the field of information production, dissemination and use, there is a lack of research pertaining to the use of electronic resources in general and OER specifically.

These findings set the stage for the subsequent chapters, where the significance and implications of the results will be discussed.

Table 11 *Summary of the findings*

OER are used as			
Category 1	Category 2	Category 3	Category 4
Recourses used in guided formal learning	Resources used for self-directed support in formal learning	Resources used for self-directed support in integrated learning	Resources used for lifelong learning
Dimensions of Experience			
Motive of use			
Gain basic knowledge required for passing a study level	Augment learning and deepen understanding of subject matter	Develop skills necessary for academic and professional success	Expand knowledge beyond formal education
Role of the learner			
Guided use of resources for formal learning	Self-directed support for formal learning	Self-directed support for integrated learning	Autonomous setting of learning goals
Forms of use			
OER as foundational academic resources: *Core Curriculum OER*: Resources used as foundational course materials that directly align with the curriculum. *Supplemental Coursework OER*: Resources that aid students in completing required coursework or mandatory assignments.	OER for content enhancement and gap-filling: *Catch-Up OER*: Materials used to compensate for missed course content due to absences or other interruptions. *Gap-Filler OER*: Resources that address deficiencies or inadequacies in the existing course content. *Enrichment OER*: Resources aimed at enhancing the overall learning experience by providing additional perspectives, in-depth explanations, or advanced materials.	OER for developing transferable skills: *Supportive Skill-Building OER*: Resources that help students acquire essential academic skills, such as critical thinking, research, or time management. *Specialisation-Aligned Skill OER*: Resources tailored to develop skills that complement a student's academic focus or area of specialisation.	OER for personal growth and lifelong learning *Career Advancement OER*: Resources designed to improve career-related skills and abilities, preparing students for future professional opportunities. *Exploratory Interest OER*: Resources used by students to explore new fields, hobbies, or interests beyond their primary academic specialisation.
Common OER Types used			
Open software, tutorials, open-access articles		Open courseware, online courses	

Chapter 6: Discussion

6.1 Introduction

This study aims to explore the variations in students' experiences using OER in an HEI where OER are not used as a formal learning resource. It examines students' accounts of how they actually use and engage with OER as optional resources of information used alongside their formal textbooks and course materials. In such a context, the focus is on students' lived experiences using OER (not the phenomenon itself), allowing for the realisation of a wider range of OER potentials in comparison to settings where specific benefits of OER, such as cost effectiveness and improved performance, are predetermined and hence experimentally examined. The study participants' reflections are used to view the phenomenon, as opposed to the opinions of the researcher or the general public (Hajar, 2021). This shift of focus is achieved using phenomenography as this approach redirects the focus from the phenomenon itself to the ways individuals interpret and understand it, enabling us to explore variations in experience that arise from diverse contexts and backgrounds. This chapter discusses the findings in the light of three research questions:

1. What are the qualitatively different ways undergraduate students experience OER?

2. What relationships exist among the ways undergraduate students experience OER?

3. What implications do these variations and their structural relations have on OER integration in UTAS?

This chapter discusses the findings of the study and their broader significance in the context of OER and higher education. Drawing on the phenomenographic approach, this

discussion addresses the variations in undergraduate students' experiences of OER and examines the implications of these findings on OER integration in HE in general and the site of the study (and other similar contexts). The chapter seeks to provide a comprehensive analysis of how students engage with and perceive OER, highlighting the complexities of their experiences.

The first section, 6.2 Variations in Learners' Experiences Using OER, summarises the findings and presents the outcome space with its four distinct categories of description. This section unpacks the hierarchical relations across the four categories based on three dimensions of experience: *the motive of OER use, the role of the learner, and forms of use*. This explanation serves as the foundation for a critical discussion in the subsequent section.

Section 6.3, Significance and Implications of the Outcomes, discusses the broader significance of the findings, focusing on their contribution to OER research and their implications for integrating OER in higher education. It reflects on how the insights gained can inform institutional practices and policies, particularly in contexts similar to the study site. Through this discussion, the chapter addresses how understanding students' diverse experiences of OER can support more effective and inclusive implementation strategies. Through linking the findings to the existing literature and practical contexts, this chapter aims to deepen understanding of OER's role in higher education and to provide practical guidance for OER integration.

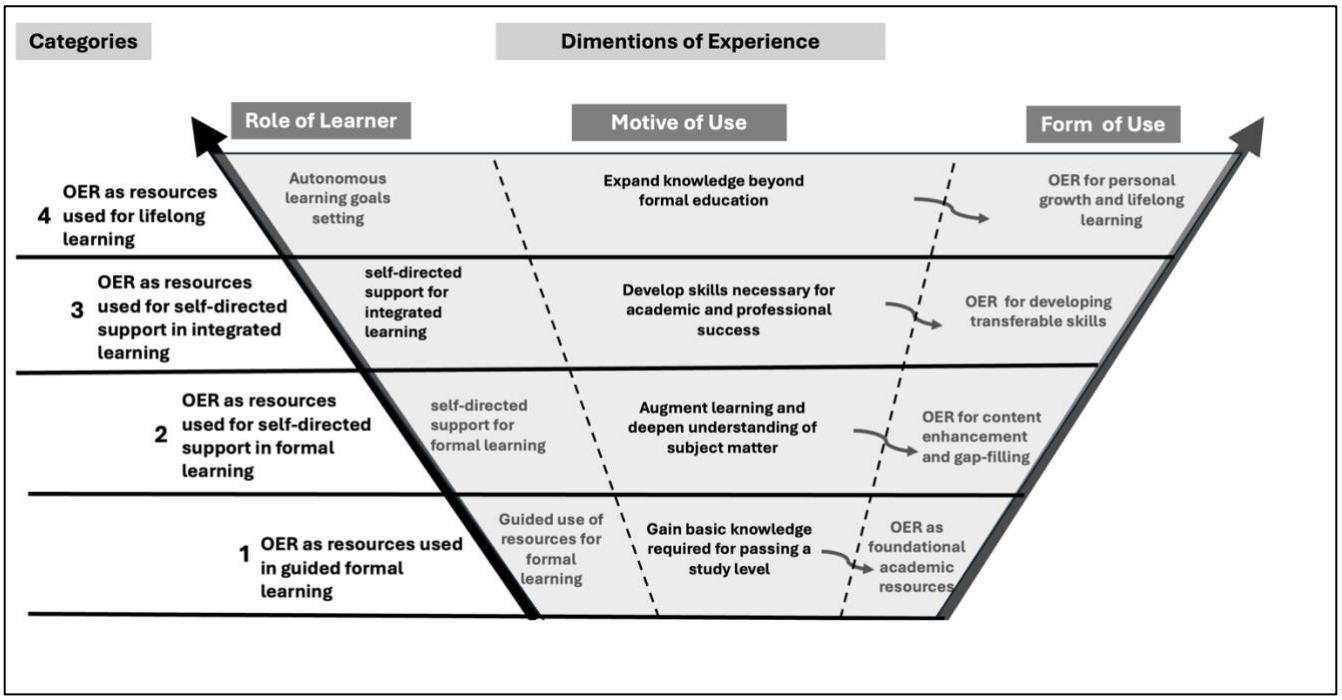
6.2 Variations in Learners' Experiences Using OER

This section explains the qualitatively different ways undergraduate students experience OER and the relationships among them. Four different categories of description were identified as a result of the data analysis, each providing a different perspective on how the OER use is experienced. These four categories are:

1. OER as resources used in guided formal learning
2. OER as resources used for self-directed support in formal learning
3. OER as resources used for self-directed support in integrated learning
4. OER as resources used for lifelong learning

Students' experiences differ in these four categories in terms of three main dimensions of experience: *the motive of OER use, the role of the learner, and forms of use*. These categories show a progression rather than presenting different or comparative types of uses, indicating a growing awareness as we proceed from the lowest to the highest category of description. Collectively, these categories provide a thorough understanding of undergraduate students' experiences related to OER use. A hierarchical representation of these four categories is shown in Figure 8, which also highlights how participants' accounts of OER use vary amongst categories. This hierarchy is present across the three dimensions of experience and includes the three dimensions that differentiate each category. The hierarchy among phenomenographic categories illustrates their interconnectedness and demonstrates how category 4 encompasses and builds upon categories 1, 2, and 3. This interconnected structure highlights a progression of inclusivity, where some categories are broader and integrate elements of others within them. It is important to emphasise that this hierarchy does not reflect a value assessment of understanding; no level is considered "better" or "worse" than another. Instead, it focuses on the relational nature of the categories, emphasising how some are more inclusive in scope, forming a structure of hierarchical inclusiveness. The following analysis aims to clarify the qualitative differences across the four categories based on the three dimensions revealed in the findings.

Figure 8 *Variations in learners' experiences using OER*



6.2.1 Motive for Using OER

The hierarchical relation in the dimension of Motive for Using OER among undergraduate students across the four categories can be understood in terms of increasing complexity, depth, and scope of the motives for OER use. Each category builds upon the previous one, with higher categories encompassing the motivations of the lower ones while adding more expansive purposes. In category 1, based on their accounts, students used OER for **gaining basic knowledge required for passing a study level**. This represents the most basic level of motivation, where students use OER primarily for instrumental and survival purposes within their academic context. The focus is narrow and immediate, centred on achieving short-term academic goals such as passing exams, completing assignments, or fulfilling course requirements. This use is characterised by minimal engagement. It is task-oriented and driven by

extrinsic motivation (grades or deadlines). In category 2, the motivation shifts from merely meeting academic requirements to enhancing personal understanding. Students utilise OER to **augment learning and deepen their understanding of the subject matter.** At this level, students use OER to enrich their learning experience and develop a deeper grasp of their subject beyond what is minimally required. Motivation in this category builds on the first category (students still aim to meet academic requirements) but expands to include curiosity and intrinsic motivation for understanding the subject. Motivation in category 3 reflects a broader and more future-oriented motivation. Students seek OER to **develop skills necessary for academic and professional success** and use OER not only to improve academic performance or subject understanding, but to acquire transferable skills (e.g., critical thinking, problem-solving, research abilities) that they perceive as essential for their long-term academic and career success. Motivation in this category encompasses the motives in the first two categories while adding a focus on personal growth, application, and preparation for future roles. In category 4, students described their motive for using OER as to **continue learning and expand knowledge beyond formal education.** This represents the highest and most expansive level of motivation, where students use OER for lifelong learning and intellectual curiosity beyond the boundaries of formal education. Here, students set their own learning goals and focus on personal enrichment, self-directed learning, and staying informed or relevant in a rapidly changing world. This level subsumes the previous three as it includes using OER for academic success, deep understanding, and skill development, but transcends them by embracing learning as a continuous, self-motivated pursuit.

The four categories reflect a progressive development in the motives for using OER, moving from immediate and extrinsic goals (e.g. passing exams) to intrinsic, expansive, and

lifelong goals (e.g. continuous learning). Higher categories build on and incorporate the motives of lower categories while broadening their focus and purpose. This dimension reflects an increasing level of autonomy, self-regulation, and complexity in information seeking and learning behaviour, with students gradually transitioning from being task-driven learners to becoming autonomous and lifelong learners.

6.2.2 Role of the Learner

The Role of the Learner dimension reveals hierarchical progression in how learners engage with resources and take responsibility for their learning. This dimension highlights an increasing level of independence and reflection that students demonstrate as they transition from being dependent on instructor-led guidance to becoming more autonomous learners. At the lowest category, students act as **users of a resource suggested by the tutor or under the guidance of the tutor.** At this level, students are dependent on their instructors and the course curriculum to direct their learning. They use OER resources suggested by tutors and follow the structured guidance provided by their formal academic programmes. In their use of OER in this category, students show limited agency in that they passively consume information without actively seeking alternative resources or engaging in self-assessment. The role of the learner, as expressed in students' accounts in category 2, is as **exploratory learners seeking alternative and enhanced content to support their formal education.** Students assume a more active role in their learning by seeking additional or enhanced content to complement what is provided by their instructors. They begin to explore alternative resources to gain deeper insights or to fill perceived gaps in their formal education. While students still refer to guidance from their formal academic programmes, students demonstrate greater initiative in finding and utilising resources they perceive as necessary for academic success. In addition to seeking academic success, the

learner's role in category 3 adds a layer of self-assessment and goal-oriented learning. Students focus on skill-building and professional preparation rather than solely academic success. In this category, learners act as **seekers of resources to improve in certain topics and skills which are normally not taught as part of the formal curriculum.** They take on a strategic and reflective role in their learning process by actively evaluating their personal strengths and weaknesses and identifying specific knowledge or skill gaps. These learners seek out OER resources to address areas that are often beyond the scope of formal curricula. The role of the learner in category 4 presents the most complex level of learner agency. Students use resources not only to support their formal and non-formal learning but also to set new learning goals and decide their own learning paths based on personal evaluations of their needs and the demands of the global business environment or technological advancements. They align their learning with long-term, real-world trends and actively use OER to remain competitive and adaptable. The progression in the Role of Learner dimension represents an increasing level of agency, reflection, and adaptability in the learner's approach to using OER. There is a progressive shift from dependence on tutors to higher autonomy and self-regulation, with each higher role building upon the skills and responsibilities of the previous ones.

6.2.3 Forms of Use

The hierarchical relationships within the four categories in the Forms of Use dimension show a growing complexity in the use of OER in learning. This progression goes from utilising OER as a primary academic resource to employing it for wider personal and professional development. In category 1, students described their use of **OER as foundational academic resources (basic need level)**. Here, OER serve as a substitute for traditional textbooks or lecture materials, functioning as a complementary or replacement resource within the formal curriculum.

These resources address the core needs of learners by directly supporting their required coursework to meet the immediate academic requirements. Two forms of use go under this category: a) core curriculum OER (resources used as foundational course materials that directly align with the curriculum) and b) supplemental coursework OER (resources that aid students in completing required coursework or mandatory assignments). **OER for content enhancement and OER for gap-filling** are the two forms used in category 2. OER utilisation in this category goes beyond the foundational level by compensating for gaps in learning or enhancing the overall understanding of the course content. These resources cater to students seeking to catch up, address deficiencies, or deepen their learning experience. This level builds on the foundational materials by offering tailored support and enrichment to the provided course materials. In this category, OER is used to a) compensate for missed course content; b) compensate for deficiencies in course content, and c) enhance the learning experience by providing additional perspectives or advanced materials.

OER use in the next category, category 3, goes beyond academic enhancement to using **OER as a resource for developing transferable skills that are essential for both academic success and professional readiness**. Examples of these skills include critical thinking, research, problem-solving, or technical skills required in their field of study or future careers. In category 4, **OER is used as a resource for career and personal growth**. Students rely on OER to stay updated with industry trends, acquire new competencies, and expand their knowledge in areas relevant to their interests and personal goals. This form of use reflects a self-motivated, future-oriented perspective in which learning transcends formal education and becomes a continuous pursuit. Under this category, students use OER to a) improve skills and abilities pertaining to their future careers, b) develop new interests straying from the specialisations they are studying

at university. Overall, the hierarchy in the Types of Use dimension captures the development of OER usage from a narrow academic focus to an expansive, self-motivated tool for growth and advancement.

6.3 Significance and Implications of the Outcomes

The findings of this study illustrate that undergraduate students at UTAS-Nizwa experience the use of OER in four variant ways, ranging from least complex to more inclusive. They utilise OER as resources used in guided formal learning, for self-directed support for formal learning, for self-directed support for integrated learning, and for lifelong learning. This study examines how students use OER in a natural setting and in conjunction with other electronic materials and course textbooks. Using a phenomenographic lens, I contend that different aspects of the OER phenomenon are highlighted when these resources are used as an option rather than using them in experiential settings.

Marton and Booth's (1997) theory of the role played by variation in the experience of a phenomenon, and in explaining different understandings of the same phenomenon, led to a shift in the practice of phenomenographic research. Previously, the aim of phenomenographic research had been to unpack the different ways of understanding a phenomenon within a sample group. Now, additional analysis became expected in the form of simultaneously unpacking the different component parts of the phenomenon, as experienced within the sample group, and how different patterns of awareness of some component parts, and lack of awareness of others, is associated with the different ways of understanding the phenomenon found within the group (Åkerlind, 2018, p.2).

Instead of concentrating on the phenomenon itself, phenomenography examines how individuals experience this phenomenon in the world around them. Cossham (2018) argues that

this is particularly important for resource production and provision because materials are not created for libraries, platforms and repositories but for end users. The outcome space's structural and referential aspects illustrate what participants in the study perceived as important in their experiences using OER. In discussing the significance of the study outcomes, I focus on how a phenomenographic examination of undergraduate students' experiences using OER draws attention to different aspects of the OER phenomena, and that the very long focus on OER cost-saving advantages has limited the potential of OER. I argue that because of their modality, OER were a preferred alternative source for the participants. It is also OER modality that induced independent learning opportunities. Independence was not only evident in students seeking to promote their skills and lifelong learning, and their pursuit of deeper learning in their academic specialisations. In the following sections, I discuss the study contributions, unpacking in turn how this perspective relates to current points of emphasis in the literature and, thereby, considering the implications of this study for OER integration in Higher Education Institutions.

6.3.1 The OER Phenomenon: A Formal Learner's Perspective

In this section, I explain how the use of phenomenography helps provide a lens for a more comprehensive examination of the OER phenomenon as perceived or experienced by formal learners. While the OER phenomenon under this very concept is almost 25 years old, it is still mainly discussed from conceptual and philosophical perspectives (Otto et al., 2021). Such conceptions as OEP, Open Pedagogy, and issues including openness and educational justice shape the common view of the OER phenomenon. As significant as such issues are, this predominant focus overlooks an equally important angle of the OER phenomenon, and how it is viewed and actually used by end users. Disregarding issues pertaining to OER licensing, creation, publication, integration and adoption that are usually discussed and debated by

scholars, academics, educational institutions and policymakers, learners use these resources that they find available and accessible. Attention shifts towards learners' use of OER were acknowledged as early as OER started to be more of a learning resource rather than a teaching resource (Kanwar et al., 2010; Panke & Seufert, 2013). However, research on OER utilisation by learners still lacks systematic reviewing and reflection (Otto et al., 2021). OER users' experience could give valuable insights into the phenomenon. Looking both ways, up-down and down-up, reveals wider aspects of the phenomenon as experienced and perceived by various stakeholders involved. Marton and Booth (1997) explain that

> The variation between different ways of experiencing something … derives from the fact that different aspects or different parts of the whole may or may not be discerned and be objects of focal awareness simultaneously. As … a rule not all the relevant aspects of a phenomenon and of the situation in which it is embedded are discerned and present simultaneously in focal awareness. It is generally the case that some of them are abstracted, separated, isolated (pp.112-113).

This leads logically to the conclusion that a person will be aware of some aspects of a phenomenon but not others if they have experienced variation in some of those aspects but not others (Åkerlind, 2018). Different ways of experiencing or comprehending a phenomenon as a whole result from these various patterns of awareness and lack of awareness of its constituent parts (Marton & Booth, 1997).

Awareness is a common subject investigated under OER. It is traditionally discussed within the literature of OER as users' knowledge of the concept *per se*, the forms of OER used, or is studied in the context of users' awareness of the existence of, and perceptions and attitudes towards certain OER or an OER platform. Based on this view, examining an individual's

awareness of the OER would reveal a limited view towards the phenomenon. In the context of this study and based on the data, an alternative approach would limit the examination of the phenomenon in cases where the study participants talked about their experiences using resources that they described as 'open', 'peer-reviewed', 'reliable', 'unpaid', or 'created and shared'. However, such a view of awareness ignores the fact that a lack of awareness of the concept (and related concepts) of OER does not imply that learners are not using these educational materials. On the contrary, releasing and mainstreaming a vast amount of educational material does imply that these resources are potentially used by different users from various contexts and backgrounds and that they are using them for various purposes. A phenomenographic perspective allows for the exploration of other aspects of the phenomenon identified by the experiencers, which is not predetermined by the researcher or previous research. Linking it to experience, phenomenography provides a more comprehensive look at users' awareness and therefore allows for a deeper examination of the phenomenon as perceived by the experiencer. Phenomenography emphasises that there are different levels of awareness. To phenomenography, variations in experiences occur due to differences in levels of consciousness of a phenomenon because subjects experience different aspects of it (Han & Ellis, 2019) depending on their activity and the world around them (Yates et al., 2012). This view of learners being conscious of, or are experiencing different segments of the phenomenon, suggests that different learners use OER differently; online learners might use OER differently than face-to-face learners, and formal learners may use OER differently than informal learners. For example, Weller et al. (2017) found differences in OER use - including motives, purposes, and topics - between formal and informal learners. Therefore, an investigation of different learners' experiences emphasises unrevealed aspects of the OER phenomenon. The following sections

discuss two aspects of the OER phenomenon highlighted by OER users in the context of the study: OER modality as a central perceived benefit and the role of these resources in promoting learner agency.

6.3.2 OER Modality: A Central Perceived Benefit of OER

Participants generally described their use of OER as using educational materials that are accessible and electronic. The element of these resources as being 'electronic' is heightened by students in this context. Here, students valued other perceived benefits of OER. For example, participants talked about using OER instead of textbooks or library books more than they talked about the cost-saving benefits of these resources. That is, in this context, OER were not mainly used for their cost-saving benefits but for their accessibility and convenience. While previous research has frequently highlighted the significant cost-saving potential of OER articularly when such savings are coupled with improved learner performance (Gazarian et al., 2020; Hilton, 2016; Hilton et al., 2013), findings of this study suggest a different primary motivator. In this context, participants did not emphasise financial savings as the main reason for using OER. Instead, accessibility and convenience emerged as the dominant factors. This contrast indicates that, although cost benefits remain an important feature of OER in many settings, learners' engagement with OER is not solely, or even primarily, driven by economic considerations in some settings. Rather, the modality of OER—the ease of access, flexible formats, and on-demand availability—can be a more compelling influence on their use, especially in contexts where financial barriers are less pronounced.

Where cost-saving is not at the foreground of learners' experience in this context, students mainly described their use of OER as a better/more convenient alternative for course materials and textbooks or as a supplemental material besides their course material. Similar

results were reported by Kinskey et al. (2018) indicating that although cost was mentioned as a common reason for not buying textbooks, students more frequently gave the explanation that they could finish their assignments satisfactorily without a textbook, which "indicates that instructional method might be more of an issue than cost" (p.190). Moreover, Tang (2021) emphasised that OER researchers realise that concentrating solely on the advantages of cost savings limits the potential of OER in online learning. In this context, students are attracted to another perceived benefit, that of convenience.

The findings of this study are consistent with previous research that has linked students' preference for OER to factors such as convenience, ease of use, and accessibility (Gazarian et al., 2020; Hettige et al., 2022; Kim et al., 2015; Oelfke et al., 2021; Weller et al., 2017). Similar to earlier studies highlighting that 21st-century learners tend to favour electronic resources (Tiwary et al., 2024) and value their availability and accessibility (Bringman-Rodenbarger & Hortsch, 2020; Kofo et al., 2022), participants in this research frequently cited convenience as a key reason for using OER. However, the present study also found that students' preferences were shaped by the suitability of OER for their specific fields of study—particularly in applied sciences and technology. This aligns with prior work suggesting that the tendency to use OER can vary by subject (Weller et al., 2017; Shams, 2020) , indicating that disciplinary context may interact with modality-related benefits to influence learners' choices. In this study, students opted for using OER because they perceived these resources as being better and more convenient. In fact, students showed a preference for OER over conventional course materials and textbooks in some cases. They opted for OER because, firstly, in its electronic form, it suits certain topics better, like technology and technical specialisations. Secondly, OER modality makes them more convenient to use than traditional textbooks in completing their tasks and assignments. Related to

the former, previous research found a link between the tendency to use OER and the subject studied. For example, Weller et al. (2017) found that science is the most popular subject studied via OER among formal learners, and computer science and economics among informal learners. In this context, where students study specialisations of engineering, business studies, design and information technology, students showed a preference for using OER, especially among Design and Information Technology students. They attributed this inclination towards OER to the fact that their subjects are primarily practical and that they learn better through technical tutorials than textbooks or teachers' lectures. Tavakoli et al. (2020) explains that when addressing particular learning needs, such as procedural learning tasks, videos may be more appropriate. There are a lot of instructional and lecture videos available online for a lot of subjects, and these range from short video tutorials to full-length MOOCs.

Research on students' use of electronic resources in general showed that undergraduate students use such resources to obtain information for their coursework and conduct academic research (Baro et al., 2011; Dhiwar, 2021; Soria & Fransen, 2017). More specifically to OER and in a formal education setting, Cheung (2019) found that university students used OER to complete their assignments and projects. The findings of the present study mirror these results, as participants similarly reported using OER primarily to support coursework requirements, including assignments, projects, and other academic tasks. Due to their modality and accessibility, students used OER for different purposes. OER use as a substitute for textbooks and course materials is encouraged by tutors through adopting OER as the main course materials for their courses. Besides using them as a substitution for textbooks and course materials, participants also reported using OER as resources to complete compulsory academic work such as assignments and projects.

In addition to using OER as basic academic materials, students, in this context, see that OER are convenient as supplemental resources to deepen their understanding of the course content. This echoes previous research affirming students' use of OER as a supplemental material (Cheung, 2019; Cheung et al., 2022, 2023; Seen et al., 2024; Weller et al., 2015). Although previous studies have supported that using OER as supplementary resources is pedagogically beneficial when combined with original textbooks (Idrissi et al., 2018; Magro & Tabaei, 2019; Phillips et al., 2020; Springer, 2019) or teacher assistance (Zhang, 2024), in this context, where textbooks are also used as course material, students offered detailed accounts of how they utilise OER as supplementary materials. First, they use OER to compensate for missed course content. Some participants valued OER as a source they could turn to catch up on prerequisites they may have missed. OER provided additional practice, especially for those facing challenges with some subjects. The second and predominant use is to compensate for what students view as insufficiencies in the course content. Such deficiencies include insufficient emphasis on practical exercises in courses related to technical applications. Students required not only step-by-step tutorials but also the repetition of these tutorials, both of which can be challenging to accomplish during class time. Students also sought OER for a deeper understanding of some of the topics that they think are not well-covered in the course material or textbook provided. Another course deficiency that students reported is that of outdated course content. In courses where students use software and programmes as learning materials, students needed updated versions of such programmes and updated content on how to use them. In specialist teaching topics that are constantly evolving, course materials and textbooks are not ideal to address such rapid change. Similar results were obtained by Nagaiah and Shanmugam (2023) where the students surveyed indicated that they used OER to stay up-to-date on their

subject and know the trends in technical fields. Participants also reported using OER to supplement their course materials in cases where these materials offered limited views and perspectives on topics. Students sought variations in information and approaches regarding the topics they are studying.

Students use OER not only because it provided improved content but also because participants perceived OER to have the potential to provide an enhanced learning experience. Participants talked about advantages such as gaining simplified and to-the-point information in a shorter time. For example, a student could learn more from a 15-minute video compared to a longer lecture in college. Using OER, students not only can choose the content they need as individuals, but also can choose among various media that cater for their learning preferences. This advantage has been linked to online resources in general. Song and Bonk (2016) contend that because of the accessibility of online resources - OER included - students now have more control over the timing, location, contents, and path of their learning. Specific to OER use, previous research reported evidence that OER use was linked with increases in students' engagement (Gazarian et al., 2020; Hilton, 2016; Trip et al., 2023) and interest in the course content (Weller et al., 2015). The present study supports these findings, as many participants reported extensive use of video-based OER, which they found particularly engaging and well suited to their learning needs, thereby reinforcing the role of varied media in enhancing interest and participation. In addition to the flexibility this form of OER could provide learners in terms of time and location, participants appreciated the interactive quality of such visual and audio resources, which supports the practical nature of the subjects they study. Besides enhanced students' engagement, student participants described their use of OER for independent learning. Although still under-researched, some previous research reported evidence that OER improved

students' independence and experimentation with new ways of learning (Weller et al., 2015) by assuming a more active role for the learner (Gazarian et al., 2020). This potential for OER to offer a more individualised and independent learning experience is further discussed in the next section.

6.3.3 OER and Promoted Learner Agency

This study examined variation in the ways university students experience the utilisation of OER. The outcome space shows that students' accounts of experiences shifted from using OER as basic materials used for replacing textbooks, and complete compulsory coursework to supplementary resources used to augment learning, and learn skills necessary for academic and professional success, and promote lifelong learning. Out of the four categories of the outcome space, in three of the categories, students described their use of OER as independent. Based on students' accounts, it is OER modality and accessibility that allow personalised learning and induce learners' agency and independent learning. As OER are not part of formal educational resources used in this context, participants mostly sought OER based on personal choice. Hu et al. (2015) argue that OER are "expected to bring changes to higher education worldwide" (p.957). While such changes commonly include the provision of free, high-quality education to everyone (de Oliveira Neto et al., 2024), they are also expected to involve subsequent changes in learning, such as increased learners' self-agency and personalised learning (Weller et al., 2015). Although previous research showed that promoting independent learning as one of the perceived benefits of OER (e.g. Adil et al., 2024; Cubides et al., 2024; Farrow et al., 2025; Gillet et al., 2022), this transformative potential remains underexplored. OER could provide the components needed to build individualised learning environments (Panke & Seufert, 2013) where students assume more responsibility for their learning (Gazarian et al., 2020; Luo et al., 2020; Wiley et

al., 2017). In formal education settings where course materials are predetermined, learners are left with a limited choice on what and how to learn. However, in this study, students reported using OER mostly independently. A wide range of uses pertaining to the use of OER were for the purpose of augmenting learning. Participants showed indicators of being critical of the course content provided by the university. Students turned to OER when textbooks and course materials were perceived to be brief, insufficient, outdated, or provided limited views and perspectives. Although not specific to OER (as students have long turned to supplementary resources to enhance learning), the openness and accessibility of OER have made it easier for students to reach diverse high-quality content. Yet a broader view of openness is achieved through the ability for learners to combine formal and informal learning (Cubides et al., 2024).

In addition to using OER in providing improved content that supports their formal academic study, participants also utilised them in their nonformal learning endeavours. Categories three and four of the outcome space describe students' experience in using OER to promote learning indirectly related or totally unrelated to their academic study. Participants use OER as a source to learn academic and professional skills and for lifelong learning. These applications emphasise two ways OER can transform higher education learning. First of all, by seeking to learn life skills, students realise the importance of skills that are not usually studied within typical academic pathways. For example, in this context where the language of instruction is not the students' first language, improving language skills is of high priority. Students reported using OER to improve their English language skills to help them perform better academically. While the university provides an English language foundation programme for first-year students, they do not find it sufficient to navigate advanced science and technology courses. Participants also outlined that OER helped them develop other interpersonal skills they perceived as

necessary for both their academic and professional success. In this context, for example, participants reported using OER to learn interpersonal skills such as communication, analytical and problem-solving skills to assist them in both academic and personal life.

Not only did students use OER to develop skills to enhance their performance in their academic, professional and social life, but they also used OER for planning and setting their own learning goals. This use highlights the potential of OER to provide an environment where all learners have access to quality education, especially those without access to formal education. It aligns seamlessly with one of OER's most well-established advantages. Access to knowledge and other educational materials is essential for enhancing personalised and lifelong learning (Marton & Booth, 1997). While formal education has always been studied in predetermined paths, OER could also provide various and wider learning paths for those enrolled in formal institutions. One of the predominant uses of OER in the context of this study is to support lifelong learning. Although it remains scarce, previous research has shown that OER do support lifelong learning (Adil et al., 2024; Reinken & Kalinovich, 2022) . In this context, students described experiences in contextualising OER for personalised needs and emerging trends. They seek OER as they realise that the labour market is undergoing significant and swift changes, and that they, accordingly, should be competitive, adaptable, and skilled. OER are indeed contributing to the personal learning environment of students. This echoes with Lin and Tang's (2017) findings which showed that using OER encouraged a mindset focused on adaptability and lifelong learning in a world that is rapidly changing. Furthermore, in a study conducted by Shams et al. (2020), for example, students utilised OER to learn topics that are not directly related to their academic specialisations.

6.4 Implications

This study has provided a look at how students use OER in a natural setting, and with an interplay within a wider context of various electronic materials and course textbooks. Choosing to use OER provides a broader perspective on their overall impact, as it allows for a more comprehensive evaluation of their benefits and influence on various aspects of learning. In this study, for example, students not only use OER as supplementary resources but sometimes prefer them to formal course materials mainly because of their accessibility and modality. This realisation requires universities to firstly, pay more attention to help students use and select resources through enhancing their information literacy and increasing their awareness of reliable resources. Secondly, universities should have policies for OER adaptation and creation to encourage the production of resources specifically directed to their students. The findings of this phenomenographic study on the diverse uses of OER among university students have significant implications for higher education. These implications relate to institutional policy, faculty support, student engagement, and the broader educational goals of fostering lifelong and independent learning. In this section, based on the findings of the study, I discuss these implications. By addressing these areas, I contend that universities can enhance the accessibility, adoption, and effectiveness of OER in higher education.

6.4.1 Implications for Higher Education

The increasing availability and accessibility of OER can offer higher education learners various ways to enhance their learning experiences. In many cases OER, which include free and openly licensed materials such as textbooks, videos, tutorials, and other digital content, have the potential to provide richer and cost-effective alternatives to traditional learning resources. For

undergraduate students, especially those in technical and interdisciplinary fields, as shown in the findings of this study, OER present unique opportunities to engage with course content, acquire academic and professional skills, and pursue personalised learning paths.

One of the key barriers to the adoption of OER is the lack of institutional support (Henderson & Ostashewski, 2018). This points to the need for universities to develop permissive policies that encourage both faculty and students to use and create OER. Institutions should create a supportive environment that incentivises faculty to modify their courses using OER and engage in OEP. Such policies could include recognising contributions to OER development in performance evaluations, promotions, or tenure decisions. In addition, academic libraries and institutional initiatives can play a role in raising awareness of OER and OEP, and helping both students and faculty effectively discover and utilise OER (Dsouza, 2021). By building collaborative efforts between libraries, departments, and faculties, universities can create a robust framework for OER integration.

Since HE educators can significantly influence the adoption and use of OER by curating, customising, and integrating these resources in their courses, understanding the importance of this role underscores the need for institutions to offer sufficient training and support. Research (e.g., Kimmons, 2016; Tang, 2021) emphasises the importance of professional development programmes that focus on building educators' competencies in finding, adapting, and implementing OER in their teaching. Universities should integrate OEP into these programmes, offering educators contextualised and practical experiences with OER. Workshops and collaborative sessions can foster peer learning and the sharing of best practices in OEP in general and OER in particular. Moreover, the role of educators must evolve to emphasise the guiding of students in using OER for independent learning. Rather than diminishing the role of teachers,

this shift highlights their expertise in curating and modifying resources that empower students to take more responsibility for their learning.

The study also highlights the diverse ways in which students use OER, depending on their learning context. These differences necessitate tailored strategies to meet the unique needs of each group. For instance, universities can provide curated OER collections that align with specific course content and other needs such as developing general academic and professional skills. Understanding students' skills, perceptions, and competencies is also vital for designing effective intervention strategies. Support services should help students navigate and utilise OER in their learning and personal development (Afolabi, 2017).

A key implication from the study's results is the necessity for assisting students in acquiring digital literacy and independent learning abilities. The study showed that more advanced use of OER required the use of advanced media skills. According to Hu et al. (2015), university orientation programs can familiarise students with web-based learning tools, including OER. This ensures they are equipped to effectively utilise OER for both academic and professional development. Similarly, HE institutions should work to promote lifelong learning by encouraging the use of OER as resources that extend beyond formal education. By integrating OER into career development initiatives, universities can help students see their significance for professional growth and ongoing learning.

The varied uses of OER among university students highlight the importance of addressing barriers to OER adoption. One major challenge participants of the study described is the discoverability and accessibility of resources. Institutions must find ways to guide and simplify access by creating centralised repositories and integrating OER into Learning Management Systems. Systematic and guided use of OER ensures students use OER that cater

for their needs and suit their level of learning and helps them save time and effort exerted in searching for suitable OER. Moreover, universities must invest in technological infrastructure to ensure reliable access to OER for all students.

Finally, fostering OEP, especially collaborative OEP, can significantly enhance OER adoption and impact. For example, universities can encourage faculty and students to co-create OER and form partnerships with other institutions and organisations to enable the sharing of resources and best OEP. Collaborative efforts not only expand the availability of OER but also build a culture of openness and innovation within higher education. The diverse uses of OER among university students - as core course materials, basic coursework resources, supplementary materials, tools for skill development, and resources for lifelong learning – highlight the transformative potential of OER in higher education. Universities can realise the potential of OER in improving teaching and learning by addressing institutional barriers, supporting educators and students, tailoring OER to diverse learner needs, and fostering a culture of OEP.

6.4.2 Implications for OER integration in UTAS-Nizwa and Universities of Similar Contexts

This study explores how undergraduate students utilise OER in learning. The findings identify four various ways students use OER: as resources used in guided formal learning, as resources used for self-directed support in formal learning, as resources used for self-directed support in integrated learning, and as resources used for lifelong learning. The various ways students engaged with OER across these four categories highlight the potential of OER in supporting diverse learning requirements and needs. These findings can inform OER integration endeavours in the setting of the current study. The university can play a critical role in maximising the impact of OER by adopting strategies that enhance their accessibility, quality,

and integration into formal and nonformal learning contexts and therefore can better equip students for academic success and lifelong learning in an ever-evolving educational and professional landscape. At its basic level, the university could develop curated OER collections aligned with university courses and OER that can serve students' professional and personal learning goals. The following specifies the results' implications on OER integration in the setting of the study. It can also give insights about OER adoption in similar contexts.

Implications for OER as Resources Used in Guided Formal Learning

Based on the participants' accounts, OER were utilised as core learning resources, especially by students specialised in technical disciplines like information technology, engineering, and design, where the use of up-to-date and detailed explanations is essential in learning. In their electronic format, these materials provided the advantage of offering flexibility and accessibility at any time and from anywhere. This feature was particularly useful for subjects learned through technical tutorials and step-by-step videos. In such cases, students could revisit these materials when and wherever they needed. Furthermore, students' ability to pause, replay, and practise alongside these resources enabled self-paced learning, which is necessary for mastering complex technical concepts and skills. The study participants also used OER to bridge gaps in traditional course materials by providing additional context and perspectives that helped students effectively complete their coursework, such as assignments and projects. Therefore, for the university to maximise the potential of OER as core learning resources, it can modify existing OER, create localised OER or partner with other HE institutions and technical experts to create and curate high-quality, field-specific materials that align with the needs of their students. These resources can be integrated into the university's learning management system or library system to ensure seamless access for both students and faculty. For an effective use of these

resources, the university should also organise workshops and training sessions to familiarise students and educators with OER and demonstrate how they can be effectively used as core learning materials or as resources to complete coursework. To ensure that OER content is regularly updated to reflect the latest advancements in the technical disciplines, the university could collaborate with local open-source communities, individual OER initiatives and publishers.

Implications for OER Resources Used for Self-directed Support in Formal Learning

In the context of this study, OER are mainly used as supplementary materials to augment learning and enhance the learning experience mainly due to their accessibility and multimodal design. For example, students used OER with diverse formats such as videos and infographics to complement course content. These materials, according to participants, cater to different learning preferences. Students' integration of OER with traditional learning materials led them to engage more deeply with the course content, resulting in a better understanding and promoting personalised learning that aligns with their interests and needs. The university can play a significant role in supporting students in using OER to supplement formal course materials. First, the university can create centralised repositories of OER that align closely with course syllabi and learning outcomes to ensure that students have access to supplementary materials tailored to their studies. Second, faculty members should be encouraged to identify and recommend OER that complement teaching and enhance the overall learning experience. Third, the institution can also invest in developing its own multimedia OER that reflect institutional expertise and support high-quality, diverse learning formats. Institution-provided OER ensure that students access expert-reviewed content that aligns with academic standards, and helps them save time spent searching for reliable and suitable materials. This proactive approach will ensure that students can confidently use these resources to enhance their learning.

Implications for OER as Resources Used for Self-directed Support in Integrated Learning

When describing their experiences with OER, students reported that these resources empowered them to take charge of their learning by allowing them to focus on specific academic or professional skills beyond their formal coursework. For instance, students can use OER to develop technical, communication, or problem-solving skills that support their academic success and align with their career aspirations. The personalised nature of OER enables students to explore areas of interest at their own pace. This feature is particularly valuable in dynamic fields, where skills need constant updating, as is the case with the participants of the current study. Moreover, the availability of diverse OER allows students to acquire knowledge that complements their academic curriculum. In many cases, OER is used to bridge the gap between theoretical concepts and practical application in technical and practical subjects. Therefore, collaboration with industry partners to develop OER that focus on in-demand skills relevant to the job market could lead to the provision of helpful resources for students. By providing skill-development OER, the university can help students obtain certifications in specialised areas such as programming, digital marketing, or data analytics, as well as helping them enhance their employability. Mentorship programmes that connect students with faculty members or industry professionals can further focus and guide students in utilising OER to build their skill sets. The university should acknowledge the role that OER could play in bridging academic learning with professional applications and preparing students for successful careers.

Implications for OER as Resources Used for Lifelong Learning

Apart from concentrating on enhancing their academic learning, the participants of the study used OER in fostering a blend of formal and informal learning and setting new learning goals that focus on gaining skills and knowledge necessary for personal development and

lifelong learning. Students described that this approach is particularly beneficial in today's interdisciplinary and rapidly evolving job market, where adaptability is key. The availability of OER enabled students to explore topics outside their formal academic paths, broaden their knowledge, and prepare for diverse career opportunities. The university can support students by integrating OER and providing students with access to materials that extend beyond its structured courses. Supporting and guiding the use of open resources to learn beyond academic curricula not only enhances employability but also encourages a culture of continuous learning necessary to help students remain competitive and informed long after graduation. To support continuous learning, the university can create interdisciplinary OER collections that cover emerging topics such as artificial intelligence, programming, sustainability, and digital transformation and literacy. Through collaboration with alumni and industry professionals, the university can also curate OER that address real-world challenges and reflect current market trends. Students also suggest that the university provide graduates with ongoing access to OER through alumni portals, allowing them to continue learning and developing professionally even after leaving the institution. This strategy benefits students by providing them with reliable resources for continuous learning and personal and professional growth.

6.5 Conclusion

This chapter explored the different ways undergraduate students experience OER and the broader significance of these variations in the context of higher education. Through a phenomenographic analysis, the study identified four qualitatively distinct ways in which students engage with OER, each representing a different level of engagement. The outcome space, which illustrates these categories and their structural relationships, provides a framework for understanding the variations in students' experiences. The discussion in Section 6.2

highlighted these variations based on three dimensions: *the motive of OER use, the role of the learner, and forms of use,* across the four categories. It also explained the hierarchical progression in OER use from resources to substitute academic resources to resources for personal growth and continuous learning. Building on the previous section, **Section 6.3** examined the significance and implications of these findings for OER integration in HE and the institution where the study is conducted. The discussion emphasised the study's contribution to understanding students' engagement with OER as electronic resources and how their experiences of OER shape their learning. It also discusses how these insights can inform more effective OER integration in higher education in general and the context of UTAS-Nizwa specifically.

Specifically, the chapter explained how employing a phenomenographical approach served the aim of the study in examining students' various experiences in using OER. First, phenomenography's unique perspective on awareness highlighted aspects of the OER phenomenon as used in the context of the study. Different awareness levels of the phenomenon (attributed to different aspects experienced) reveal different ways of experiencing it (Åkerlind, 2024; Han & Ellis, 2019). This perspective allowed a deeper examination of awareness of the OER phenomenon compared to how it has been researched using surveys and learning analytics (Otto et al., 2021). Next, the second-order perspective highlighted the OER users' perspective in describing their relation to the phenomenon as opposed to focusing on describing the phenomenon itself, which is usually looked at from a researcher's or producer's point of view.

This study highlights two key aspects of the OER phenomenon. The first aspect concerns OER modality as a primary motivation for using OER. Contrary to settings where OER cost-effectiveness or improved academic performance drive OER adoption, this study finds that students primarily engage with OER due to their modality. Specifically, the flexibility and digital

nature of these resources align with students' growing preference for electronic learning materials, a trend reinforced by rapid technological advancements. This preference is particularly pronounced among students in technology and the applied sciences disciplines, as seen in the context of this study. The accessibility and adaptable format of OER allowed learners to personalise their educational experiences and tailor their study resources to their individual learning needs and preferences. Consequently, this realisation stresses the importance of integrating and developing OER that evolve alongside technological progress to ensure their continued relevance and effectiveness.

The second aspect relates to the impact of OER on learner agency. The study indicates that the accessibility and flexibility of OER not only support formal education but also encourage students to take greater responsibility for their own learning. This manifests in two ways: first, by using OER to supplement and enhance their structured academic coursework, and second, by independently exploring new areas of knowledge beyond their formal curriculum. This shift towards self-directed learning suggests that OER can play a transformative role in higher education by fostering a more learner-centred approach and expanding the possibilities for personalised, lifelong learning.

Chapter 7: Conclusion

7.1 Introduction

This chapter reflects on the significance of the findings. It summarises the key findings of this study and discusses their implications. By revisiting the research objectives and the main results, this chapter aims to synthesise the contributions of this study and position them within the broader academic and practical context. The limitations of the study are also examined, and suggestions for additional research are provided.

7.2 Personal Reflections and Summary of Findings

This research initiative originates from a growing personal academic and professional interest in the impact of technology and technological advancements on learning processes, classroom dynamics, and students' interactions with both instructors' content and information resources. This interest is deeply rooted in my firsthand experience and continuous observation, developed over more than a decade of professional engagement in education. Throughout this period, the educational field has undergone profound transformations, shaped by several significant global developments. Among these changes, three key phenomena have been particularly noteworthy:

- **The increasing integration of technology into education:** Over the past decade, digital tools and platforms have become an integral part of teaching and learning, reshaping pedagogical approaches and instructional methodologies.

- **The COVID-19 pandemic and the subsequent acceleration of online learning**: The crisis necessitated a swift and large-scale transition to remote and digital learning environments, further highlighting the role of electronic resources in modern education.
- **The emergence and widespread adoption of artificial intelligence (AI) in recent years**: AI-powered tools and applications have introduced new dimensions to learning, offering adaptive learning experiences, automated feedback mechanisms, and alternative sources of academic support.

These developments have gradually redefined the role of the instructor and the educational content they provide, and consequently the students' role in learning. Traditionally, the tutor was perceived as the primary source of knowledge, but contemporary students now have access to an expansive array of digital resources beyond the classroom. Given this shift, it is imperative to explore the learning resources that students rely upon, ensuring that they receive adequate support and guidance to navigate the vast and often overwhelming information landscape effectively. OER, recognised for their potential to offer high-quality, freely accessible learning materials to a diverse audience, warrant particular attention in this context. As a valuable category of educational resources, OER have the capacity to support student learning in an increasingly digitalised academic environment. Consequently, further investigation into the role and utilisation of OER is essential to fostering an effective use of these resources by providing the necessary assistance and direction from institutions and educators.

Having been conceptualised in the early 2000s, research on OER remains in its early stages, as just over two decades have passed since their conceptualisation. To date, the majority of scholarship in this field has been largely theoretical, focusing on conceptual and philosophical discussions. This emphasis is unsurprising, given that OER are deeply intertwined with a range of

fundamental concepts, such as their own definition, OEP, Open Pedagogy, open licensing, and broader other notions and issues related to openness. Even within the body of empirical research on OER, there is a notable lack of systematic reflection and theory-driven inquiry into the phenomenon. Studies in this area often do not adopt a structured theoretical framework, limiting the depth and scope of their findings. Moreover, my own review of research concerning learners' engagement with OER has revealed that most studies have taken an experimental approach, primarily investigating pre-defined benefits and barriers associated with OER use such as cost-effectiveness and financial accessibility of OER and their impact on student learning outcomes. Clinton-Lisell (2023) stresses the importance of directly incorporating student perspectives in OER research, advocating for an approach that goes beyond merely assessing success rates and academic achievements.

Given these gaps in the literature, there is a pressing need for research that examines OER use within authentic learning environments. Moreover, employing theoretical frameworks that allow for a broader and more nuanced analysis would enhance our understanding of the impact of OER. Such an approach would not only provide deeper insights into how OER are experienced across diverse educational contexts but also contribute to a more substantial realisation of their potential to enhance learning experiences on a wider scale.

The fact that OER is not formally used in the institution where the study is administered warrants an ideal natural setting for exploring the non-formal use of these resources by students. The study aimed to inform the integration of OER into the institutions' academic system (and other similar contexts) by exploring the various ways undergraduate students use OER. Realising the significance of the learners' perspectives towards the phenomenon (not the nature of the phenomenon itself), the study uses phenomenography as a theoretical framework.

Phenomenography emphasises that there is a limited number of qualitatively different, but interrelated, ways in which people experience phenomena (Marton, 1981, 1986). Employing this approach, I sought to uncover the various ways undergraduate students collectively experience and engage with the OER phenomenon. This approach informed the research design and particularly helped me formulate my research questions and carefully plan my interview procedures. This approach guarantees that participants are addressing the targeted phenomenon but still have authority over their ideas and experiences related to it. The data analysis procedure was also influenced by this approach, revealing an outcome space with four distinct ways the participants experience OER, which are as follows:

1. OER as resources used in guided formal learning
2. OER as resources used for self-directed support in formal learning
3. OER as resources used for self-directed support in integrated learning
4. OER as resources used for lifelong learning

The outcome space presents an interconnected structure that highlights a progression of inclusivity, where higher categories are broader and integrate elements of others within them. The hierarchical relation across the four categories can be understood in terms of increasing complexity, depth, and scope of OER use. This progression is evident across three dimensions of *the motive of OER use, role of the learner, and forms of use* (exemplified with quotes in chapter 5 and explained in detail in chapter 6). Overall, the progression from category 1 to category 4 reflects a shift from basic academic dependency to autonomous and future-focused engagement with OER. At the lowest category, students use OER as a substitute for traditional academic resources, with their use tied closely to short-term academic goals such as completing assignments and passing exams. As students' experience advances (in categories 2 and 3), they

employ OER for content enhancement and skill development, reflecting increasing self-direction and strategic thinking. At the highest level, OER is used as a tool for personal growth and lifelong learning. This use demonstrates a significant transformation in the scope and depth of its use and in students' role in the learning process. This hierarchy captures the development of OER usage from a narrow academic focus to an expansive, self-motivated tool for growth and advancement. However, it is important to clarify that this hierarchy is not a judgment of value. That is no level is considered inherently "better" or "worse" than another.

7.3 Study Contributions

The findings of the study revealed that, when commonly researched advantages of OER, such as cost-saving and enhanced learning outcomes are not at the foreground of the experience of OER use, other, and arguably more impactful perceived benefits are highlighted. In this context and based on the four categories of the outcome space, OER:

1. are primarily valued for their diverse modalities, particularly when compared to traditional educational resources. Unlike conventional textbooks and printed materials, OER are available in accessible, electronic, and multimedia formats, making them especially effective for learning in technical and applied sciences disciplines. These fields integrate both theoretical knowledge and practical application, requiring interactive and dynamic learning resources. Furthermore, technical and applied sciences are rapidly evolving fields, with frequent advancements in technology and practices. While traditional resources often become outdated quickly, making it difficult to keep them current, students use OER as valuable resources that have continuous updates and revisions.

2. have enabled learners to assume a more active role in their learning. OER offer resources that align with students' individual needs, abilities, and learning preferences and the modality properties of OER support various learning preferences. They also offer content in multiple formats such as text, audio, video, and interactive simulations. In this context, a major shift in students' experience occurred in category 2 of the learning outcome as students start practising an increasing level of learner agency. It begins with their self-directed use of OER in supporting their formal learning to utilising these resources (in category 2), to building wider personal learning goals that go beyond their academic goals (in category 4).

These findings show that OER availability in accessible, electronic, and multimedia formats is a central factor for their use. The features attract not only nonformal learners but also formal learners. Although textbooks and course materials are provided free of cost in the context of the study, the participants still showed a preference for using OER. Regarding the broader context of OER production, OER should be developed in accordance with evolving technological advancements, which shape both the ways in which educational resources are accessed and utilised, as well as the disciplines and specialisations that gain prominence. As new technologies emerge, they transform learning methodologies and the skills required in various fields. As a result, OER should adopt a proactive approach, adapting to the evolving needs of various scientific disciplines and professional sectors. This alignment will enhance the relevance, accessibility, and effectiveness of OER in diverse educational and professional contexts. Furthermore, when integrating OER into HEI curricula, attention should be paid to offering resources that support students' academic needs. For example, in addition to their availability any time and from anywhere, the study participants preferred OER because they offered detailed

visual explanations and up-to-date information on technical subjects. Students substitute textbooks with technical tutorials and videos.

The results also offer empirical validation for the long-anticipated yet underexplored potential of OER in fostering independent learning and enhancing learner agency. OER accessibility is essential for encouraging self-directed learning because it enables students to interact with instructional materials at their own pace, according to their individual needs and preferences. Furthermore, the availability of OER provides students with opportunities to access alternative resources beyond those offered by their institutions. This flexibility allows them to select materials that best align with their learning preferences, needs, and academic goals based on their own evaluation and judgment. The findings of this study show that OER not only enable learners to explore knowledge independently but they also foster a lifelong learning mindset and adaptability in a constantly changing world. In this context, students utilise OER to enhance skills and competencies relevant to their future careers while also exploring new interests beyond their chosen university specialisations. This highlights the important role universities can play in supporting and guiding students in their use of OER, fostering a culture of lifelong learning and interdisciplinary exploration.

In the field of information and information seeking behaviour, the findings detail the motivations and the various ways undergraduate students use an important category of electronic resources, OER. Understanding this use is vital as students are increasingly using electronic and open-access resources to replace textbooks and printed materials. In the current study, the outcome space showed four collective ways of OER use: as foundational academic resources; as content enhancement and gap-filling resources; as resources for academic and professional skill development; and as resources for career and personal growth. This can inform OER integration

into the library catalogue and learning management systems of HEIs. Libraries can develop curated OER collections aligned with university courses by involving both faculty and students, who are able to share and recommend useful OER. It also could support students' endeavours in learning independently by either providing or guiding the use of resources for skill development, personal growth and ongoing learning.

7.3 Study Limitations

In this section, I critically examine the limitations of this phenomenographic study, which explored variations in undergraduate students' use of OER. While the study sought to provide a comprehensive understanding of the phenomenon, certain methodological and contextual constraints must be acknowledged. These limitations mainly arise from the inherent subjectivity of qualitative research, the contextual specificity of the sample, challenges encountered during the data analysis process, and the exclusion of certain individual experiences from the outcome space. By addressing these limitations, I aim to provide a transparent account of the study's scope and rigour, while acknowledging areas that may influence the interpretation and applicability of the findings. Such reflection is essential for situating this research within the broader landscape of phenomenographic inquiry and for understanding the boundaries of its contributions.

Despite my efforts to minimise subjectivity, as outlined in Chapter 4, it remains an inherent limitation of qualitative research. While I implemented strategies to enhance the validity and credibility of the findings, the subjective nature of the research process (Creswell, 2007) cannot be entirely eliminated. Subjectivity influenced the data collection phase, as the interviews were structured around questions crafted by me and conducted under my guidance. Furthermore, subjectivity was central to the data analysis process. Since this is an individual dissertation, I was

mainly responsible for interpreting the data, although I sought input from my supervisor, a colleague, and an external expert during the categorisation process. This approach mirrors, but does not entirely replicate Åkerlind's (2012) concept of *dialogic reliability checks*, where agreement is reached through discussion and critique. The potential for interpretive bias on my part must also be acknowledged. Despite detailing steps to mitigate this bias in the methodology section, it is important to recognise that the findings are shaped by the context of their production and cannot be entirely objective.

This research has relied exclusively on data collected from students at a technology and applied sciences institution in Oman. Prior studies suggest that learners' perceptions and use of OER vary across disciplines and contexts (e.g., Shams et al., 2020). Consequently, a more diverse sample - including participants from various disciplines, universities, and countries - could have revealed broader dimensions of the phenomenon. For instance, Tang (2021) suggests that cultural differences across countries might influence the interpretation of findings. However, I do not claim to generalise these findings beyond the studied context, as such generalisability is neither the aim nor a valid outcome of phenomenographic research (Salaz et al., 2018). Instead, transferability, or the extent to which the findings may be relevant in other contexts, offers a more suitable lens for understanding the applicability of this study (Sin, 2010). Nevertheless, the localised nature of the findings aligns with the context-dependent framework of phenomenography, as discussed in the theoretical framework chapter. This limitation is inherent to the methodology and cannot be avoided.

Furthermore, the data analysis process in this study was particularly challenging due to its iterative and nonlinear nature, which required extensive evaluation to develop a holistic understanding while minimising personal bias. Identifying similarities and differences in the data

to construct categories and distinguish their structural and referential aspects was both demanding and complex. This challenge was compounded by the fact that the analysis was primarily conducted by me as a sole researcher, a limitation of this doctoral study. Although I sought feedback from my supervisor, a colleague, and an external expert, a more collaborative approach involving multiple analysts throughout the process could have enhanced the robustness of the analysis. Nonetheless, engaging deeply with the data and employing ATLAS.ti software significantly aided the coding, annotation, and mapping of quotations, which proved instrumental in navigating the complexities of data analysis.

Another limitation of this study lies in the exclusion of certain participant experiences that could not be integrated into the outcome space. As discussed in Chapter 3, some experiences were excluded because they were mentioned only by individual participants and did not align with the holistic variations captured in the outcome space. Phenomenography, by its nature, emphasises constructing a holistic representation of variations rather than documenting individual experiences. While this approach ensures coherence within the outcome space, it may oversimplify complex phenomena by categorising experiences into a limited number of conceptions. The inability to incorporate unique individual perspectives might be seen as a limitation, especially given the emphasis on capturing the full range of participants' experiences. However, this exclusion is consistent with the study's theoretical framework, which prioritises holistic variation over individual narratives.

While this study has provided valuable insights into the variations in undergraduate students' use of OER within a specific institutional context, it is important to acknowledge its limitations. The inherent subjectivity of qualitative research, the contextual specificity of the sample, and the challenges involved in data analysis all stress the complexity of conducting

phenomenographic research. In addition, the exclusion of certain individual experiences highlights the methodological emphasis on holistic variation, which may inadvertently oversimplify complex phenomena. Despite these limitations, this study contributes to the understanding of OER use by shedding light on students' diverse experiences and perspectives. By addressing these limitations transparently, I hope to inform future research and encourage a critical approach to interpreting and applying these findings in different educational contexts.

7.4 Future Research Directions for Open Educational Resources in Higher Education

The findings from this phenomenographic study on the diverse uses of OER among university students open numerous avenues for future research. As the use of OER continues to grow, it is essential to explore how these resources can be more effectively integrated into higher education to maximise their impact. Future research should address gaps in understanding the contextual, technological, pedagogical, and institutional factors that influence the adoption and utilisation of OER. Below are detailed directions for future inquiry.

7.4.1 Contextual Variations in OER Use

The study reveals the diverse ways students use OER based on their learning needs and environments. For instance, students specialising in technology and engineering preferred open educational videos, technical tutorials, and open software, as these resources align with the dynamic and evolving nature of their fields. Future research should investigate how contextual factors - such as course delivery modes, institutional infrastructure, and disciplinary differences - shape OER usage. Future studies should explore how students in different academic disciplines perceive and utilise OER. For example, investigating whether STEM students rely on OER

differently than those in the humanities or social sciences can provide valuable insights. Understanding these disciplinary differences will help develop targeted OER strategies that better align with the specific needs of each field. Related to cultural and regional influences, future studies should examine how geographic, cultural, and economic contexts influence students' adoption of OER. Research could explore differences in OER usage between institutions in high-income and low-income regions, particularly in addressing issues of access and equity.

7.4.2 The Impact of OER on Learning Outcomes

One of the critical areas for future research is to further explore the impact of OER on student learning outcomes. While some empirical evidence suggests that OER can enhance learning (detailed in Chapter 2), more rigorous and theory-based empirical studies are needed to validate this claim. More reflections and critical reviews are needed too. Furthermore, comparative studies that compare the learning outcomes of students using OER versus traditional textbooks, should account for variables such as discipline, course level, and student demographics. Future research should also explore the long-term impact of OER on students' academic performance, skill development, and career paths through longitudinal studies. This will provide insights into how sustained OER use influences educational and professional outcomes over time. For example, do students who frequently use OER exhibit greater adaptability and success in professional settings? Research could also investigate OER lifelong learning benefits such as exploring how OER contribute to students' ability to engage in lifelong learning after graduation, or whether access to OER fosters continued skill development and knowledge acquisition in professional and personal contexts.

7.4.3 Student Perspectives and Behaviours

Students' perceptions, behaviours, and competencies influence their engagement with OER (Amuda et al., 2020; Joo & Choi, 2015; Kılıçkaya & Kic-Drgas, 2021; Sandanayake, 2019; Tewell, 2015; Wong et al., 2016). Future research should focus on understanding dimensions like digital literacy, barriers to OER use, and personalised learning to adapt OER strategies effectively. In digital literacy, research can examine the digital literacy skills students need to effectively search for, evaluate, and use OER. Research could also explore how these skills vary among different student populations, such as undergraduates, graduate students, and adult learners, for example. Moreover, further studies should be dedicated to investigating the challenges students face when using OER, such as technological barriers, lack of guidance, or difficulty finding relevant resources. Identifying these barriers can inform strategies to improve student support. In the area of personalised learning, future research could explore how OER can be used to create personalised learning experiences that cater to individual students' needs, and learning preferences.

Future research should also explore OER use through the lens of information-seeking behaviour to understand how learners discover, evaluate, and engage with electronic open resources. Investigating the strategies students and educators use to find OER can provide insights into the accessibility and discoverability of these materials. One more area that research should examine is the factors influencing users' trust and selection of OER, including perceived credibility, relevance, and ease of use. Understanding these behaviours can inform the design of more user-friendly platforms, improve metadata and search functionalities, and enhance the overall effectiveness of OER in meeting learners' information needs.

7.4.4 Institutional Policies and Support Mechanisms

Existing research shows that institutional support plays a crucial role in facilitating the adoption and integration of OER (e.g., Hu et al., 2015). Future research should examine the effectiveness of various institutional policies and support mechanisms and the impact of institutional policies on OER adoption. Further research is also needed on different forms of support like funding for OER creation, faculty incentives, and the integration of OER into curricula. Comparative studies across institutions with different policy environments could yield valuable insights. Research should also be conducted on library support services such as investigating the role of academic libraries in raising awareness of OER and providing training and support for their use. Research could also examine how libraries collaborate with faculty and students to co-create and curate OER collections. Institutional support could also be informed by research on OER cost-effectiveness through analysing the cost-effectiveness of OER initiatives compared to traditional educational resources. This could include examining the financial impact on institutions, educators, and students.

7.4.5 The Role of Educators in OER Adoption

Since educators can play a central role in the effective use of OER, research should focus on understanding how educators engage with OER and identifying barriers that hinder their adoption of these resources. First, research is needed on educators' role transformation and how educators' roles evolve when using OER to promote independent learning among students. Research could also explore the pedagogical approaches that support this transition and their impact on student outcomes. It could further investigate the factors that motivate or discourage educators from adopting OER. This could include exploring their perceptions of the quality, reliability, and ease of use of OER, as well as institutional barriers such as workload and lack of

incentives. Researchers should also examine effective models of professional development that enhance educators' skills in finding, adapting, and integrating OER into their teaching practices. For example, studies could assess the impact of workshops, peer collaboration, and online communities of practice on faculty engagement with OER.

7.4.6 OER Design and Accessibility

Another area that requires further investigation is OER design. While OER are often praised for their open access, usability and accessibility issues remain among the most significant challenges. Future studies should focus on improving the design, discoverability, and user experience of OER. For example, studies should investigate how improved search tools can make OER more easily discoverable for educators and students. This can include examining the role of institutional repositories and other platforms in curating and promoting OER. Furthermore, more research should be conducted on how universal design principles can be applied to OER to make them more accessible to learners with diverse needs, including those with disabilities. Another research area to investigate is how emerging technologies, such as artificial intelligence (AI), augmented reality (AR), and virtual reality (VR), can be integrated into OER to enhance their interactivity and engagement.

7.4.7 Promoting Collaboration and Co-Creation

Collaboration to create and use OER can lead to more effective and accessible educational resources. Future research should explore how such collaborations can be fostered and what impact they have on education. One area of focus is student-faculty collaboration, investigating how students and faculty can co-create OER and the benefits of such collaborations for student engagement, learning, and skill development. Research should also investigate cross-institutional collaborations and partnerships and their potential in sharing OER and best

practices. Research in this area could also examine the role of international collaborations in addressing global educational challenges. Another key focus is community-driven OER initiatives, which examine how educators and learners collaborate to create resources that are relevant to their specific contexts.

7.4.8 The Role of Emerging Technologies

The evolving integration of technology with OER creates new research opportunities. One key area for exploration is artificial intelligence, which could enable the development of adaptive OER that adjust in real time to meet individual learners' needs. Another promising direction is the use of gamification and virtual reality in OER and their potential in enhancing student engagement and improving learning outcomes. Future studies should also focus on how these emerging technologies can make OER more accessible and interactive, and how such OER can shape the future of digital education.

7.4.9 Addressing Equity and Inclusion

OER and equity is a prominent area that has been addressed by previous research. Future research related to this topic should further address inequalities in OER access and investigate ways that make OER accessible and beneficial for all learners. One important focus is how OER can support underserved student populations, including those from low-income backgrounds or underrepresented groups in higher education especially in Global South countries. Moreover, adapting OER to different languages and cultural contexts is another topic that requires further investigation. Another key area of research that requires further exploration is the role of OER in fostering gender equity and inclusivity in education. By examining these issues, research can help create more equitable and inclusive educational resources.

The increasing utilisation of OER by undergraduate students and the greater incorporation of these resources in higher education institutions open new avenues and topics for future research. By exploring the contextual, pedagogical, technological, and institutional dimensions of OER, we can contribute to a deeper understanding of how these resources can contribute to teaching and learning. These studies will not only address existing challenges but also pave the way for innovative practices that can assist in making education more accessible, equitable, and effective for all learners. As institutions continue to embrace OER, there is a pressing need for rigorous research that guides efforts and maximises the impact of these resources on students and educators worldwide.

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Appendices

Appendix 1 Participant Information Sheet

Participant information sheet

A Phenomenographic Investigation of the Ways University Students in Oman Experience Open Educational Resources

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection

I am a PhD student at Lancaster University and I would like to invite you to take part in a research study about students' experiences in using Open Educational Resources in University of Technology and Applied Sciences, Oman.

Please take time to read the following information carefully before you decide whether or not you wish to take part.

What is the study about?
This study aims to aims to investigate the various ways undergraduate students experience and utilize Open Educational Resources (OER). OER are educational materials that are available online and protected under open licensing that allows free access, reuse, adaptation and redistribution.

Why have I been invited?
I have approached you because I am interested in understanding the different ways you and other undergraduate students at University of Technology and Applied Sciences use open educational resources in learning. I would be very grateful if you would agree to take part in this study.

What will I be asked to do if I take part?
If you decided to take part, this would involve the following throughout a semester: 1) Fill out a biweekly form with 3 to five main online resources that served your learning needs. 2) have two interviews (one in the middle of the semester and one towards the end of the semester). Each interview will last 30 to 45 minutes and focus on your experience in using certain online resources. I might also ask access to the references list of your homework, assignments or course project.

What are the possible benefits from taking part?
If you take part in this study, your insights will contribute to our understanding of the various ways students experience open educational resources and how these resources support students independent learning. This understanding is vital to inform and guide OER integration in the university curricula and information systems.

Do I have to take part?
No. It's completely up to you to decide whether or not you take part. Your participation is voluntary. **If you decide not to take part in this study, this will not affect your studies and the way you are assessed on your course.**

What if I change my mind?
If you change your mind, you are free to withdraw at any time during your participation in this study. If you want to withdraw, please let me know, and I will extract any ideas or information you contributed to the study and destroy them. However, it is difficult and often impossible to take out data from one specific participant when this has already been anonymised or pooled together with other people's data. Therefore, you can only withdraw up to 2 weeks after the second interview.

What are the possible disadvantages and risks of taking part?
It is unlikely that there will be any major disadvantages to taking part. Taking part will mean investing a total of 60- 80 minutes for both interviews and a total of approximately 20 – 30 minutes for forms filling.

Will my data be identifiable?
After the interview, only I, the researcher conducting this study will have access to the ideas you share with me.

I will keep all personal information about you (e.g. your name and other information about you that can identify you) confidential, that is I will not share it with others. I will remove any personal information from the written record of your contribution. All reasonable steps will be taken to protect the anonymity of the participants involved in this project.

How will we use the information you have shared with us and what will happen to the results of the research study?
I will use the information you have shared with me only for my PhD thesis and other publications like journal articles. I may also present the results of my study at academic conferences or related policy-making meetings.

When writing up the findings from this study, I would like to reproduce some of the views and ideas you shared with me. I will only use anonymised quotes (e.g. from my interview with you), so that although I will use your exact words, all reasonable steps will be taken to protect your anonymity in **our publications.**

How my data will be stored
Your data will be stored in encrypted files (that is no-one other than me, the researcher will be able to access them) and on password-protected computers. I will store hard copies of any data securely in locked cabinets in my office. I will keep data that can identify you separately from non-personal information (e.g. your views on a specific topic). In accordance with University guidelines, I will keep the data securely for a minimum of ten years.

What if I have a question or concern?
If you have any queries or if you are unhappy with anything that happens concerning your participation in the study, please contact me at s.alsulaimi@lancaster.ac.uk or my supervisor, **Dr. Jan McArthur**, at **j.mcarthur@lancaster.ac.uk.**

If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can contact Dr. Brett Bligh, Department of Educational Research, at **b.bligh@lancaster.ac.uk.**

This study has been reviewed and approved by the Faculty of Arts and Social Sciences and Lancaster Management School's Research Ethics Committee.

Thank you for considering your participation in this project.

Appendix 2 Consent Form

INTERVIEW CONSENT FORM

Project Title: Phenomenographic Investigation of the Ways University Students in Oman Experience Open **Educational Resources**

Name of Researchers: **Salwa Khamis AL Sulaimi**
Email: **s.alsulaimi@lancaster.ac.uk**

Please tick each box

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily	☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time during my participation in this study and within TWO weeks after I took part in the study, without giving any reason. If I withdraw within two weeks of taking part in the study my data will be removed.	☐
3. I understand that any information given by me may be used in future reports, academic articles, publications or presentations by the researcher/s, but my personal information will not be included and all reasonable steps will be taken to protect the anonymity of the participants involved in this project.	☐
4. I understand that my name/my organisation's name will not appear in any reports, articles or presentation without my consent.	☐
5. I understand that any interviews will be audio-recorded and transcribed and that data will be protected on encrypted devices and kept secure.	☐
6. I understand that data will be kept according to University guidelines for a minimum of 10 years after the end of the study.	☐
7. I agree to take part in the above study.	☐

Signed: **Yes**☐ _____ Name of Participant ____/11/2023 Date

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent_____ **Date** _____ Day/month/year

One copy of this form will be given to the participant and the original kept in the files of the researcher at Lancaster University