Enhancing Online Reading Lists for Tertiary Education

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Dedicated to my father (Peramuna Pathirage Piyadasa) who never saw this adventure and my mother (Weeramunda Sayakkarage Kusumawathee)

Abstract

Reading lists are a pedagogical tool widely used in tertiary education. Reading lists may provide pedagogical 'scaffolding' in which academics offer support to students through signposting and rich annotation on required readings. They thus have a critical role to play in transforming students into autonomous learners. However, it has been observed that existing Reading Lists software solutions support student learning in a partial, fractured way and are under-used in their role as a pedagogical tool. Therefore, this thesis examines the barriers to uptake of Reading Lists (i.e., reading lists that has been created using a special reading lists management software application) in universities, and, in particular, to explore possible interventions to improve academics' experience with Reading Lists. We employed a mixed-methods approach in which we performed user studies (for academics, librarians, and students), content analyses and prototype designs. The results of these studies have been published across six research papers comprising Chapters 2–7 in this thesis.

The first paper explores the types of resources that are linked in Reading Lists, in particular the inclusion of electronic materials. We identified that many academics struggle with successfully linking resources, and do not perceive the process to be user friendly. We recommended a number of interventions to improve the reading list experience for academics.

In the second paper, we examined in greater detail the make-up of Reading Lists at the University of Waikato. We investigated the experience of academics and librarians when creating Reading Lists and found that uptake of Reading Lists varies widely between different academic disciplines. We recommended developing discipline-specific support to increase Reading Lists numbers and to integrate pedagogical features to increase academic buy-in.

The third paper explores the students' experience with the Reading Lists, in particular, when accessing electronic materials. The results of our analysis found that the students appreciate the way that Reading Lists help in their learning and perceive Reading Lists to be a useful tool for their learning process. However, their use of Reading Lists features varied due to the lack of awareness, visibility and interaction difficulties. We recommend enhancing the usability and the pedagogical features of Reading Lists to increase students' engagement.

In the fourth paper, we explore in greater detail the pedagogical support that is offered in Reading List systems designed for tertiary teaching in a comparative study. The results of our

comparative analysis identified a need for Reading List systems' features that provide pedagogical support to better integrate into academic teaching. For these features to be truly beneficial, we identified a need to assist teachers to effectively use these tools in their daily practice.

In our fifth paper, we explore the academics' experiences with Reading Lists by focusing on their engagement with the specific aspects, such as creating a reading list, linking resources and the reading lists' notes. We found a need for streamlining the user workflow, improved usability, and better synchronization with other teaching support systems. We recommend improving the systems' usability by re-engineering the user workflows and to better integrate "the notes feature" into academic teaching.

In our final paper, we explore the academics' feedback for prototype design, in which we introduce a redesigned interface for Reading Lists system, in comparison to the existing interfaces of the Waikato Reading Lists system. The results of our analysis identify that our new prototype design is better than the existing interfaces and our design has been accepted by the majority of academics.

In conclusion, the research presented in this thesis has contributed to our understanding of the experiences of academics, librarians, and students as they engage with Reading List systems. Our investigation has identified obstacles that hinder the adoption of Reading List systems, shedding light on the challenges faced by users in embracing these platforms. Additionally, our findings have resulted in a proposed enhanced interface aimed at simplifying and streamlining the use of Reading List systems. This suggested improvement seeks to create a user experience for all individuals involved, encouraging wider acceptance and integration of Reading List systems into the higher education landscape. By deepening our understanding of the interactions between users and Reading List systems this research provides insights that can guide advancements in educational technology. Ultimately, we hope that these contributions will pave the way for efficient engagement with Reading List systems thus enhancing the overall teaching and learning experience.

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Gāravo ca nivāto ca – Santuṭṭhī ca kataññutā
Kālena dhammasavanaṁ – Etaṁ maṅgalamuttamaṁ

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Thesis-Related Research Publications

This thesis is 'PhD with publication'. The 'PhD with Publication' is a hybrid thesis model, which includes both published and unpublished material. The details of the publications produced as the results of this research are as follows:

Chapter 2: Published

Kumara, N., Hinze, A., Vanderschantz, N., Timpany, C. & Saravani, S.J. (2021). Resource Types linked in Academic Reading Lists, ACM/IEEE Joint Conference on Digital Libraries (JCDL), pp. 266-269, doi: 10.1109/JCDL52503.2021.00080.

Chapter 3: Published

Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2023a). Online Reading Lists: A Mixed Method Analysis of the Academic Perspective, International Journal on Digital Libraries 24, 23–44. https://doi.org/10.1007/s00799-022-00344-z

Chapter 4: Under Review

Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2023b). Online Reading Lists: Evaluating Students Experience, International Journal on Digital Libraries.

Chapter 5: Published

Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2023c). Reading Lists Systems' Pedagogical Features: A Comparative Analysis, 2023 ACM/IEEE Joint Conference on Digital Libraries (JCDL), Santa Fe, NM, USA, 2023, pp. 169-178, doi: 10.1109/JCDL57899.2023.00032.

Chapter 6: Accepted

Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2023d). Academics' Experience of Online Reading Lists and the Use of Reading List Notes, International Journal on Digital Libraries (to appear).

Chapter 7: Ready to Submit

Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2023e). Improving User Experience of Online Reading List Systems: An Academic Perspective, to be submitted to International Journal on Digital Libraries.

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Chapter 1

Introduction

1.1   Motivation

Typically, in tertiary teaching, reading lists provide students with references to required readings and other materials for their course work (Brewerton, 2014; Siddall 2016). They have long been a part of tertiary education as a pedagogical tool for creating and managing course reading lists and to make copyright compliance easier (Brewerton, 2014; Siddall & Rose, 2014; Stokes & Martin, 2008). Traditionally, reading lists used to contain references to text-based materials such as books, chapters, journals, articles, proceedings, websites, blogs, and magazines. The online version of reading lists now contains additionally a significant amount of non-textual information such as videos, audio recordings and other resources. They are therefore often referred to as Resource Lists or Online Reading Lists (RLs)[1]. In the last decade, RLs are often integrated into an academic library's offerings (Krol, 2019; Chad, 2018), and academics are supported by academic liaison librarians in managing lists. RLs may provide pedagogical 'scaffolding' in which academics offer support to students through signposting and rich annotation on required readings (Stuyf, 2002). Therefore, these lists represent an important channel of communication between academics, students and librarians and they have a critical role to play in transforming students into autonomous learners (Rowley, Hartley, and Larkin, 2008).

When looking at the RLs software landscape in tertiary education, we find that commercial RL solutions were first introduced in 2010 by several Virtual Learning Environment (VLE) providers (Cross, 2015). Parallel to the development of commercial solutions, some universities and independent organizations developed their own RL solutions, often as open-source products (Cross, 2015). One commonality of all these systems is a shared aspiration for seamless integration between the RLs solution, a VLE and Library Resource Discovery Tools (RDTs). In New Zealand, Copyright Licensing New Zealand (CLNZ, 2014) requires all universities in New Zealand to provide software solutions to enable electronic reporting on copyrighted material. To meet these reporting obligations with CLNZ, all eight New Zealand universities adopted RL systems in 2015.

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[1] In this thesis, we focus on the online version of reading lists that is created using a special reading lists management software application (i.e., Reading Lists – RLs). We explicitly mention the reading lists concept that we mean throughout the thesis where it's required.

The University of Waikato (UOW) library has been offering Waikato Reading Lists system (WRL) since 2016 (see Thesis Appendix C for introduction to the WRL system).

It has been observed that existing solutions support student learning in a partial, fractured way (Chad, 2018; Krol, 2019; Siddall & Rose, 2014; Taylor, 2019). It has further been observed that the RL systems are under-used in their role as a pedagogical tool (Brewerton, 2014; Siddall & Rose, 2014; Zhu, 2018; Taylor, 2019). Previous work has identified the need for a more detailed examination of RL systems, particularly in relation to enhancing academics and students' engagement (Cross, 2015; Cameron & Siddall, 2017; Krol, 2019; Marks, 2020; Siddall & Rose, 2014; Zhu, 2018).

1.2   Background

With the advent of the digital information era, the landscape of academic libraries in higher education has undergone significant transformation (McKiel, 2013; Saharkhiz, Valizadeh & Salamat, 2017; Uswyshyn, 2017). This transformation has led universities to offer students distinct mechanisms for seamlessly and efficiently discovering and accessing their resources (Walton, 2008; Walter 2013; Wang & Bai, 2016).

The following sub-sections discuss different mechanisms adopted by universities to enable discovery and access of resources, focusing on providing a better user experience.

1.2.1   Discovery and Access Mechanisms offered in Academic Libraries

As mentioned by the Walter (2013) quoted from Albanese, 2007; Cox, 2004; Library Journal, 2012; Slater, 2010; Wilkie & Harris, 2010, the existence of inadequate mechanisms for discovery and access were the critical obstacles highlighted by both librarians and vendors to the large-scale adoption of resources. In particular, most of the users faced obstacles in identifying the e-resources they required. After a disappointing beginning and a quiet time in between, in recent time a rebirth has happened of this e-resource accessing technology with the introduction of novel access modes, business and licensing models for academic libraries focusing on flexible discovery and access mechanisms. As depicted in the following figure, academic libraries mainly focus on five main mechanisms for discovery and access: Online Library Catalog (OPAC), RDTs, Vendors' Platforms, LMS and Reading List Systems.
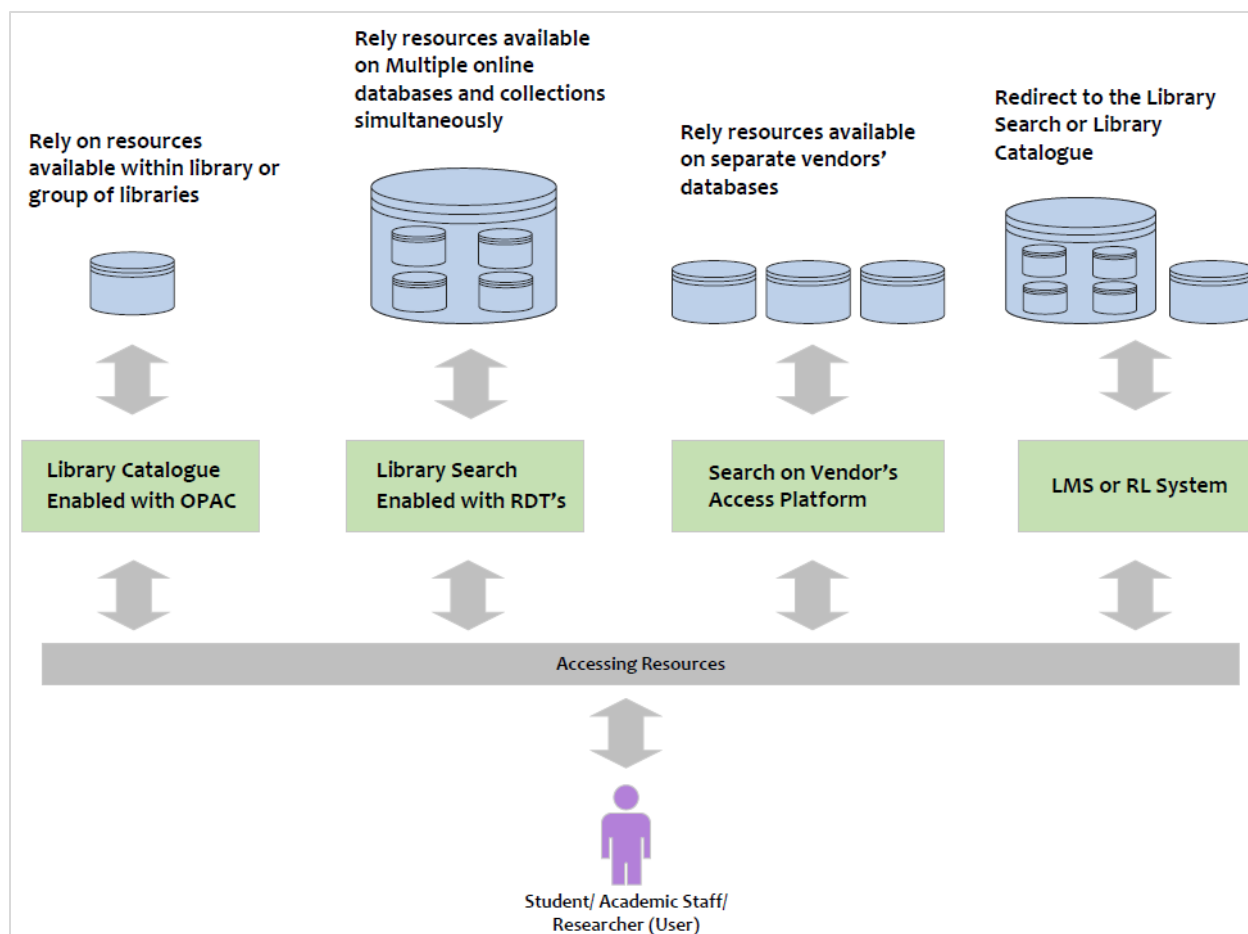
Figure 1.1. Access pathways to resources in academic libraries by the users

The OPAC is an automated library catalog system developed as a tool to locate the library's collection which allows users to quickly locate the required materials in the library or group of libraries using several access points (Fabunmi & Asubiojo, 2013; Ogbole & Morayo, 2017). Further, according to Walter (2013); Ogbole & Morayo (2017) and Vasileiou, Rowley, & Hartley (2012) the OPAC is the primary discovery and access mechanism used by most universities for e-resources and is considered to be the core of library functions and the gateway of library services as it facilitates the users to the various library services. As mentioned by Walter (2013) cited in Croft & Davis (2010); Smyth & Carlin (2012); Vasileiou, Rowley, & Hartley (2012), academic libraries and the users consider online library catalogs as a convenient mechanism for searching eBook titles. Further, they indicated inclusion of eBooks into the online library catalog has the possibility of increasing their use by up to 50%.

It is evident that with the recent advancement of web technologies, the landscape in academic libraries has been significantly changed. Academic libraries have also expected a path toward a new generation of catalog systems. Their aspirations were realized with the introduction of the RDT which enables federated search whereby the search tool simply transmits the user's search query to each of several online databases simultaneously and displays the output in one interface (Agrey et al., 2021; Walter, 2013). As illustrated in Figure 1.1, when a user searches for a particular resource in Library Search, it may retrieve and display bibliographic records by accessing the Library Catalog, databases such as EBSCO (Ebesco, 2022), JSTOR (Jstor, 2022), ProQuest EBook Central (ProQuest, 2022) and institutional research repository simultaneously which would not be possible in the OPAC mechanism.

Apart from those two mechanisms, users have the freedom to directly login to the university licensed Vendors Platform i.e., aggregators and publishers' databases using the library credentials. As Walter (2013) indicated, in this mechanism, users have some advantages such as proper categorization according to the subject domains, and responsibility for maintenance lies with the eBook vendor instead of the library staff.

Accessing resources through the LMS and the Reading List system are other available mechanisms for students. If the resource is copyrighted, when the student logs in to their LMS portal, relevant resources for a particular course module are displayed and directed to the Reading List system. In this instance, to display particular resource in the LMS, it should be included in the predefined reading list in the Reading Lists system as the first step. Due to copyright license agreements universities are not allowed to load copies of reading files inside the LMS or store in their server (UOA, 2019; UOC, 2019). In the Reading Lists and LMS mechanisms, when the users access it, they will be redirected to the bibliographic records via Library Search.

All the above discussed discovery and access mechanisms have their own benefits and challenges. The following table summarizes the benefits and challenges of each mechanism from both the user's and academic library's perspectives.

Table 1.1. Benefits and challenges of the discovery and access mechanisms

Mechanism	Benefits	Challenges
Library Catalog	Single access point for all materials in the library (Ukpebor, 2012; Walter, 2013; Kuma & Ranjana, 2010; Mole & Mesagan, 2021). Advanced search facilities and other user-friendly features such as own shelve, bookmark, search by author, title, year, edition etc… (Wanigasooriya, 2008; Kuma & Ranjana, 2010; Mole & Mesagan, 2021) Rapid cataloging due to the vendor supplied records (Walter, 2013)	Some titles are available in both versions; therefore, libraries need to decide on creating separate records (Walter, 2013) MARC records of the titles which are supplied by vendors are not always able to be used directly for cataloguing (Walter, 2013) Do not have facilities to enter and search records by native languages other than English (Wanigasooriya, 2008; Eserada & Okolo, 2019) Difficulty of adoption according to the frequent changes in technology and Database conversion issues (Mole & Mesagan, 2021; Eserada & Okolo, 2019)
Library Search	Allow users to search multiple online databases simultaneously. (Walker, 2006; Walter, 2013; Agrey et al., 2021) Focus primarily on electronic full text (Jayapragash et al., 2016) Speed search due to centralized indexing and the quality of the results (Walker, 2006; Jayapragash et al., 2016) Permit users to add or remove access points and change their search scope (Popp & Dallis, 2012; Agrey et al., 2021) Social networking tools and features i.e., sharing, bookmarks, tagging, reviews, suggestions (Popp & Dallis, 2012) Visualization of results as graphical Representation (Walker, 2006; Popp & Dallis, 2012)	Does not eliminate the user's necessity of going through the multiple eBook interfaces, since its display discovery in a single page but when it comes to access redirect to different vendors' platforms (Walter, 2013) Though it is designed to access multiple databases in a single search, search might be limited based on the license agreements (Walter, 2013) Access privileges of the eBooks changed based on the authorization and access permissions (Welch, 2012; Walter, 2013) Issues in filtering of search results, many unnecessary information provided (Popp & Dallis, 2012; Welch, 2012; Walter, 2013) Higher cost involved in implementation and maintenance (Walter, 2013)
Vendors' Platform	Academic libraries do not need to invest on IT infrastructure since maintenance is becoming a vendor's responsibility (Walter, 2013) Classification of e-Books based on subject domains (Popp & Dallis, 2012; Walter, 2013)	Users must search required eBooks in several databases, one for each eBook vendor (Su, 2005; Walter, 2013) Users must maintain several logins for each vendor platform (Hodges, Preston, & Hamilton, 2010; Arch, 2012; Walter, 2013) Users face difficulties due to the inconsistencies and features of the different eBook interfaces (Arch, 2012; Walter, 2013)

LMS	Allow students to access required materials and information on their learning (Penha & Correia, 2019)	Due to the copyright and license agreements universities are not allowed to load copies of reading files inside the LMS (UOA, 2019; UOC, 2019)
	Allow active interactions between students and lecturers, interactions between students and learning materials (Penha & Correia, 2019)	
Reading List Systems	Capability to incorporate with Learning Management Systems (UOA, 2019)	Over supporting/ spoon feeding (Schucan & Pitman, 2020; Cameron & Siddall, 2015)
	Allow academics to create reference e-Books and reading guides for students and manage them in one place (Schucan & Pitman, 2020; Cameron & Siddall, 2015; UOA, 2019)	Various standards and layout in reading lists (Siddall & Rose, 2014)
	Allow academics to easily update and duplicate for future courses while tracking the students' use and engagement (UOA, 2019; UOC, 2019)	Students wanted more direction to their reading lists with subheadings and signposting to specific chapters and meaning of labelling (Siddall & Rose, 2014)
	Users find it easy to access required materials for their course in one place and better classification i.e., topic or weekly, will ease up users reading interest and engagement (Siddall & Rose, 2014; UOA, 2019; UOC, 2019)	If Reading Lists are required to be published in other formats, then this will lead to unnecessary admin works (Cameron & Siddall, 2015)

1.2.2 Context at the University of Waikato

The UOW offers students the five mechanisms discussed above to discover and access their resources seamlessly and efficiently. The University employs RLs as a mechanism for delivering learning materials to students, utilizing specialized reading list management software (i.e., Waikato Reading Lists System; UOW, 2022). This system empowers academic staff to curate and share educational resources with their students effectively. The advantage of integrating RLs within a Moodle (i.e., LMS) paper is the ability for lecturers to provide contextual guidance and structure for the designated learning materials. This contextualization can be organized within a weekly schedule, enhancing the student learning experience. Lecturers compile the necessary learning resources into the reading lists for each course, granting students convenient access. Students can retrieve these materials either by logging directly into the RL system account or through their Moodle account.

Currently, there's not much information about RLs adoption and the utilization of resources (such as eBooks and other copyrighted materials) by both academics and students in the teaching

and learning process. Several factors could contribute to the underutilization of RLs, including inconsistencies in access platforms, the time required to access resources, and challenges associated with the user-friendliness of RL systems as effective discovery and access tools. Furthermore, it's important to consider the role of inconsistencies and disciplinary differences in contributing to these variations. Disciplinary requirements encompass a range of academic aspects, such as the types of materials used, conceptual understandings, publishing trends, and the structure of degree programs and assessments. For instance, when examining the types of materials used, Krol (2019) and Brewerton (2014) noted significant differences. Engineering lists, as observed, tend to be concise and primarily consist of books. In contrast, humanities lists are considerably longer and heavily relied on articles. Similarly, Krol (2019) observed that in the education discipline, there is a wide variety in the resources used, whereas engineering tends to utilize fewer resources overall. This highlights how different academic fields shape the composition and structure of the RLs.

1.3   Research Aim and Questions

This section outlines the research questions for the work presented in this thesis. It first defines the aim of the research. It then refines into a number of research questions.

The aim of this research is *to examine the barriers to uptake of Reading Lists in universities, and, in particular, to explore possible interventions to improve academics' experience with Reading Lists*. To achieve the above aim, we sought answers to the following specific research questions (called Thesis Questions (TQ)) here to avoid conflict with research questions included in each publication:

TQ1: What is the RL landscape in tertiary education and the current state of RLs uptake in universities?

TQ2: What aspects of RLs hinder uptake and use by both academics and students?

TQ3: What type of intervention could address and rectify the issues identified in TQ2?

Each question above is developed in more detail and has been deliberated through the six research papers comprising Chapters 2–7 in this thesis.

1.4   Research Design

We use both quantitative and qualitative methodologies to identify the reasons for low uptake of RLs by academics. Subsequently, we utilized prototyping to propose and evaluate interventions aimed at increasing academics engagement.

The research relies on user studies (questionnaires and interviews), log analyses, comparative analyses, and prototype designs (paper and digital). The research contains three main steps, as explained in order in the following sections. Figure 1.2 illustrates the overview of the research design, which describes the framework of methods, and the techniques that we chose to conduct this study. This design sharpens the research methods suitable to the subject matter and addresses the research questions. The next sections talk through our research design in detail.
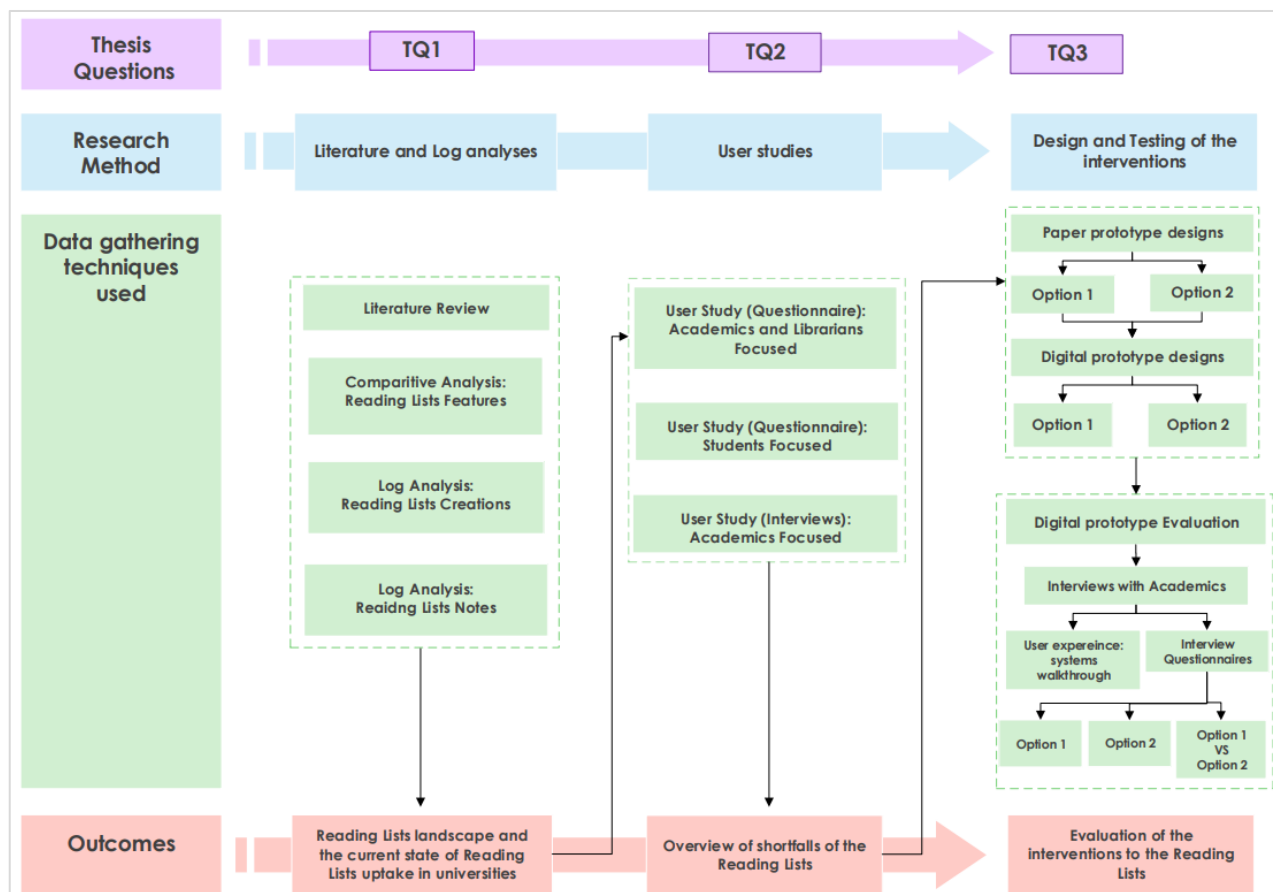
Figure 1.2. Overview of the research design

1.4.1 Identifying the RLs Landscape in Tertiary Education

Over the last couple of decades, considerable research interest has focused on the use of RLs in tertiary education. Widespread attention in this field of research was aroused by several factors such as significant changes in teaching practices and the changes in related technologies, especially the popularity of Virtual Learning Environments and Resource Discovery Tools. With these phenomena in the background, the research literature on the RL systems and their use in tertiary education are reviewed to understand the RLs landscape. Based on this literature review significant hurdles for academics and students to usefully engage with RLs are identified.

A comparative analysis approach is employed in this study: we conduct a detailed comparison of the RL systems designed for tertiary teaching on the basis of their pedagogically supportive features together with other core features required for course list management for universities. The main goal of the study is to review all aspects of the systems in order to find out what pedagogical supportive features are available for academics and the students.

The transaction logs of RLs creation at the University of Waikato are analyzed in this research. The transaction logs record actual behaviors of academics in RLs creation at the University of Waikato. We use these logs to identify trends and patterns in user behavior. Our second transaction log analysis focuses on "lecturer notes" (notes given by the lecturer to the students for each linked item) of WRL. The purpose of the "notes" log analysis is to gain an in-depth understanding of how academics engage with a pedagogical supportive feature of the WRL. Some of the insights we derive through these log analyses need to be confirmed and clarified from the users.

1.4.2 Exploring RL Experience through User Studies

The second step of the research design is the conducting of user studies. The aim of these studies is to explore the academics', students' and librarians' experiences and opinions of use of RLs based on our insights from the log analysis as well as unanswered questions about RL use.

Our first user study is a questionnaire (for academics and librarians) that aims to investigate the experience of academics and librarians when creating RLs. The second user study is also a questionnaire (for students) that explores the students' experience with RLs, in particular, when accessing electronic materials such as eBooks via RLs. In addition to the questionnaires, there is the user study: interviews (for academics). We explore the academics' experiences with the RLs in

greater detail by focusing on their engagement with specific aspects of reading lists, such as creating a reading list, linking resources, and the use of reading list notes. These interviews provide academics with the opportunity to express their opinions and suggestions regarding the RLs use.

Based on the outcomes of all the above-mentioned studies, the final output of this step is a set of interventions to the RLs, which enhance the level of pedagogical support.

1.4.3   Design and Testing of the Interventions

The final step of our research is the design and testing of the prototypes, which are based on the above-identified interventions. Our prototypes include paper prototypes followed by a digital prototype.

First, we design and review a paper prototype for the RLs system. After review and revisions, the paper prototype is selected to be developed as a digital prototype. We named this digital prototype as the "Blue Lists" system. Parallel to that another digital prototype is designed, called the "Gray Lists" system. This is a reproduction of the existing WRL interfaces. The reason for this reproduction is that we planned to get the academics' feedback on the "Blue Lists" against the WRL without disclosing it as WRL. This helps us to receive unbiased feedback from the academics. Therefore, we could introduce them both as prototypes.

Our user study with the digital prototype (for academics) uses online interviews (one-to-one) to gather the academics' feedback on designed prototypes. Due to Covid lockdowns, we had to do an online walk-through of the interfaces. This provides academics with the opportunity to express their opinion and suggestions regarding the two digital prototypes (new interface and existing system).

We also ask another set of questions to gather the academics feedback on the comparison of both the systems.

1.5   Structure of the Thesis

This section explains in more detail how the Thesis Questions are addressed throughout the structure of this thesis (see Figure 1.3).
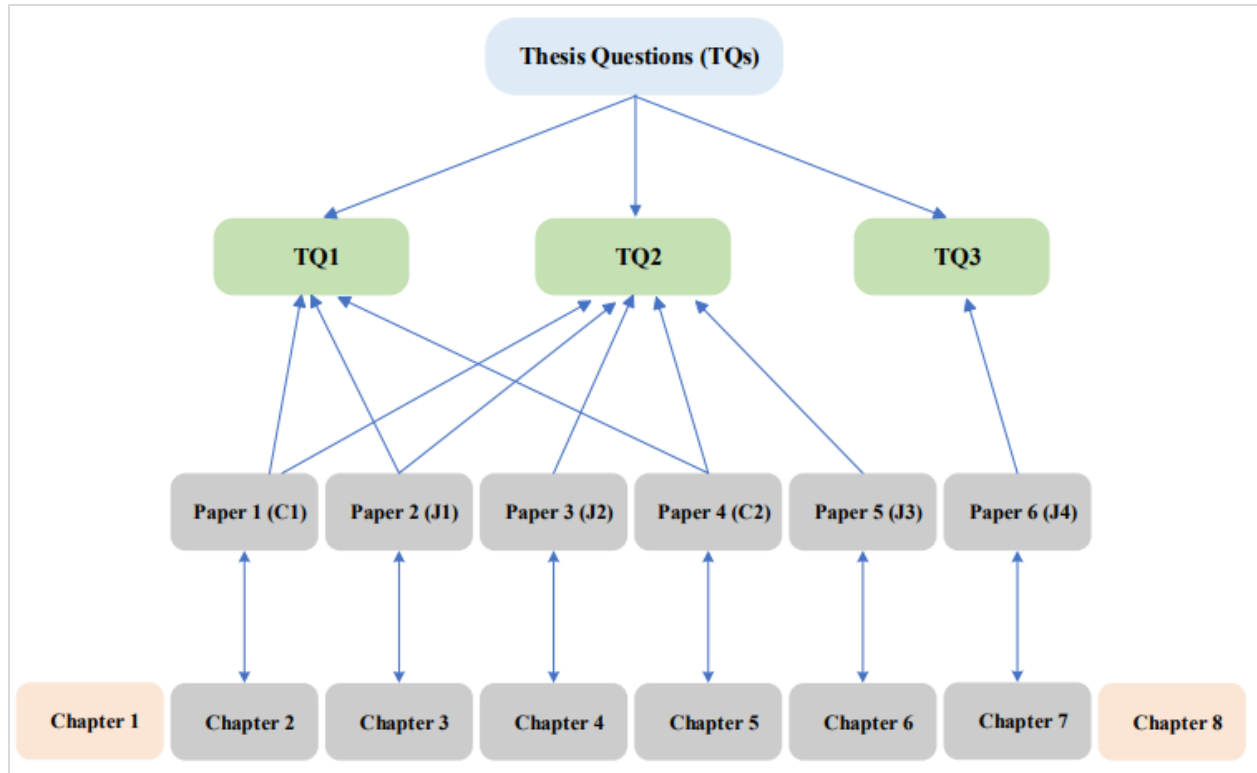
Figure 1.3. Thesis contributions in relation to each of the Thesis Questions

Note: Letter J indicates the Journal Papers, and the C indicates the Conference Papers

The main body of this thesis comprises nine chapters. **Chapter 1**, the Introduction, discusses the boundaries and complexities involved with the research and its intentions, by focusing on the motivation, and the research agenda. Furthermore, the research design includes the overarching research approach and main research steps. The main research steps include the study context, study method selection and justification, data collection, data preparation and pre-processing for analysis.

The core part of the thesis spans from **Chapter 2** to **Chapter 7** and looks closely at identifying the methods to increase the uptake of RLs in tertiary teaching.

Chapter 2 presents the insights of the first log analysis and the user study with academics. This chapter contributes to answering the first Thesis Question as well as the second Thesis Question.

Further insights of the above studies are discussed in **Chapter 3** with a paper entitled "Online Reading Lists: A Mixed Method Analysis of the Academic Perspective". This chapter also contributes to answering the first and the second Thesis Questions of our study.

To find out the students' experience in relation to the aforesaid second Thesis Question, we explore their experience with the RLs, in particular when accessing electronic materials via RLs. **Chapter 4**, the paper "Online Reading Lists: Evaluating Students Experience", presents the insights of this second user study.

Next, to have a broader understanding of the RLs software landscape, we explore the make-up of RL systems, especially how RL systems' features support the pedagogical needs of the academics and students. We conducted a detailed comparison of the RL systems designed for tertiary teaching on the basis of their pedagogically supportive features together with other core features required for course list management for universities. The outcome of this study also contributes to answering the first and the second Thesis Questions of our research. **Chapter 5**, the paper "Reading Lists Systems' Pedagogical Features: A Comparative Analysis", presents the insights of this comparative analysis.

Chapter 6, the paper "Academics' Experience of Online Reading Lists and the Use of Reading List Notes", presents the insights of our second log analysis and the third user study (interviews with the academics). In these studies, we explored the academics' experiences in greater detail by focusing on their engagement with the specific RL features, such as creating RLs, linking resources and the use of RLs notes. This chapter also contributes to answering the second Thesis Question of our research.

We particularly designed the interventions to the RLs to increase academics' buy-in. These were based on the findings of the studies discussed in Chapters 3 to 7. In our final user experience study, we evaluated these interventions with academics and collected their feedback. **Chapter 7**, the paper "Improving User Experience of Online Reading List Systems: An Academic Perspective", presents the insights of this study. This chapter contributes to answering the third Thesis Question of our research.

Chapter 8 discusses the contributions of this research and summarizes the answers to the research questions and the group of directions that were opened by the results of our studies.

Chapter 2

How Academics link Resources in Reading Lists

This first study identifies the types of resources commonly included in WRL system by the academics and summarizes their experience with linking resources. This chapter thus contributes to both answering the first Thesis Question (reading list landscape) as well as the second Thesis Question (support for staff).

The study explores the RLs used over a five-year period (2016 to 2020) across the eight faculties at the UOW. In a log analysis, we explored the types of resources that are linked in RLs. Through a questionnaire, the experience of the academic staff with linking teaching resources in RLs was surveyed. The analysis results of the questionnaire are presented in this chapter under three themes: 1. Preferred Resource Types to Include 2. Success linking eBook Content and 3. Perception of linking eBook Content. This chapter has highlighted a number of interventions to improve the RLs experience for academics.

The paper presented in this chapter was published and presented at the ACM/IEEE Joint Conference on Digital Libraries, 2021 (see C1 in Figure 1.3).

Kumara, N., Hinze, A., Vanderschantz, N., Timpany, C. & Saravani, S.J. (2021). Resource Types linked in Academic Reading Lists, ACM/IEEE Joint Conference on Digital Libraries (JCDL), pp. 266-269, doi: 10.1109/JCDL52503.2021.00080.

Resource Types linked in Academic Reading Lists

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Abstract

Reading List Systems are widely used in tertiary education as a pedagogical tool and for tracking use of copyrighted material. This paper explores the types of resources that are linked in reading list systems, in particular the inclusion of electronic materials. A mixed-methods approach was employed in which we first performed a transaction log analysis on reading lists across a university, covering five years (2016 to 2020). We then used a questionnaire to gain feedback from academics about their experience with linking resources. Our results show a growing number of digital resources being used in reading lists and indicate faculty-based differences in the types of resources linked. We also identify that many academics struggle with successfully linking resources, and do not perceive the process to be user friendly. The paper recommends a number of interventions to improve the reading list experience for academics.

***Keywords*:** eBooks, Reading Lists, academic library, digital library, digital reading material

2.1 Introduction

Reading lists provide students with references to required readings and other materials for their course work. They have long been a part of tertiary education and are often integrated into academic library services (Chad, 2018; Krol, 2019). Since 2014, Copyright Licensing New Zealand (CLNZ) requires all NZ universities to provide software solutions to enable electronic reporting on the use of copyrighted material. In our research, we are interested in 1) what types of resources are being included in academic reading lists - reading lists that has been created using a special reading lists management software application -, 2) the proportion of physical or digital material linked in reading lists, and 3) academics' mastering of linking eBook content.

The remainder of the paper is organized as follows: Section 2 gives a brief overview of related studies on reading lists. Section 3 introduces the study methodology, while Section 4 presents a summary of the study results. The paper concludes with a discussion of insights in Section 5.

2.2 Related Work

Reading lists have been studied across the teaching disciplines within universities (Brewerton, 2014; Zhu, 2018; Walsby, 2020) and across selected faculties (Beasley, 2016; Neill & Musto, 2017; Cameron & Siddall, 2017; Krol, 2019; Taylor, 2019). Most studies focus on identifying challenges for academics in creating and maintaining lists that are created using a special reading lists management software application for tertiary teaching (Brewerton, 2014; Beasley, 2016; Neill & Musto, 2017; Cameron & Siddall, 2017; Zhu, 2018; Krol, 2019; Taylor, 2019; Walsby, 2020). However, the content of reading lists has rarely been explored (Cross, 2105; Cameron & Siddall, 2014) and where it has, studies do not distinguish between digital and print material. Cameron and Siddall (2014) found that books contributed on average 74% of reading list material at the University of Northampton. While 13% of these books were available as eBooks, only 3% were labeled as such. Krol (2019) found that books and eBooks were included in 96% of all reading lists at the University of West London. Librarians at Loughborough University gave anecdotal evidence that engineering reading lists were typically short and mostly books, whereas humanities lists were longer and used more articles (Brewerton, 2014). Overall, an analysis of reading list content and an understanding of the ease of linking to (digital) material is missing.

2.3   Method

We used a mixed-methods approach to investigate what types of resources are being included in reading lists, the extent of physical and digital material included, and the ease of linking eBook content. We first performed a transaction log analysis (Jansen, *et al.,* 2008) of reading lists from five years at a New Zealand university. We then used an online questionnaire for academics to identify how they engage with reading lists (RL).

Context of Investigation. Our study reviewed RLs and academic RL creators across all eight faculties of the university (approximately 13,250 students and 622 academic staff). At the time of investigation, this university comprised eight faculties: Faculty of Art and Social Sciences (FASS), Education (FEDU), Science and Engineering (FSEN), Waikato Management School (WMS), Māori and Indigenous Studies (FMIS), Computing and Mathematical Sciences (FCMS), Health, Sport and Human Performance (FHSHP) and Law (FLAW). We use these faculty labels throughout this paper. Reading lists were trialed in 2015, and then introduced university-wide in 2016.

Log Analysis. The RL transaction logs were extracted as tables of summary data, covering 1 January 2016 to 31 December 2020. The logs were cleaned to remove duplication and draft RLs. We assessed information regarding the course, year, semester, list creator, list status, number of items, and the type of items included in lists.

Questionnaire. We invited participation in the survey from academics who had been identified in our log analysis to have been involved in RL creation (305 potential participants). The questionnaire comprised closed and open-ended questions exploring RL set-up and use. We received responses from 73 academics; here we focus on resource linking only.

2.4   Results

We first present selected results of our log analysis, which is then compared to feedback from academics obtained from our questionnaire.

2.4.1. Results and Analysis of Log Data

The log analysis undertaken explored trends in reading list use across the eight faculties of a NZ university. Each of the eight faculties provided the following number of reading lists: FEDU (183; 60), FASS (168; 72), WMS (166; 56), FSEN (117; 4), FHSHP (27; 12), FLAW (20; 6), FMIS (20;

8), FCMS (5; 3); data from 2019. The number after the semicolon refers to the number of academics who created the reading lists.

Resource Type. We investigated the total number of items included in RLs per year by type of media (see Figure 2.1).
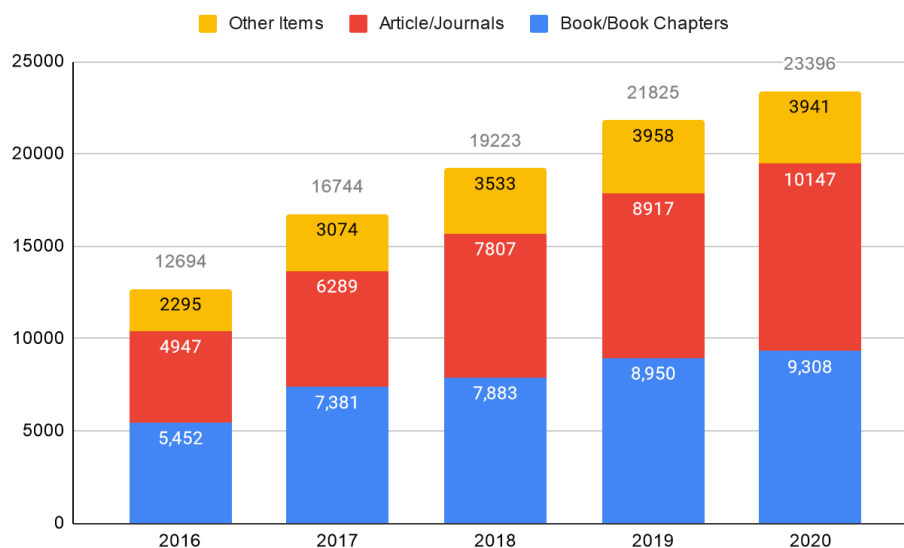
Figure 2.1. Total number of items in the reading lists

Figure 2.1 shows a gradual increase each year in the total number of items included in the RLs (34% from 2016 to 2017, 14% in 2018, 13% in 2019, and 9% in 2020). In the initial two iterations of RLs (2016/2017), books and chapters were the majority of linked resources (43% in 2016 and 44% in 2017). However, by 2018/2019, articles and journals were about the same proportion, and by 2020, they have become the largest proportion of linked resources (43% of RL content in 2020).

Increased Digital Resource Inclusion. We explored in more detail the medium of items that were contained within the reading lists by their types: books/chapters (see Figure 2.2), journals/articles (see Figure 2.3), and other resources (see Figure 2.4), distinguishing online and physical versions. We have removed all duplicate reading lists to prevent redundant counting. Additionally, some lists may include both physical and digital versions of an item, offering alternatives to users or accommodating their preferences.
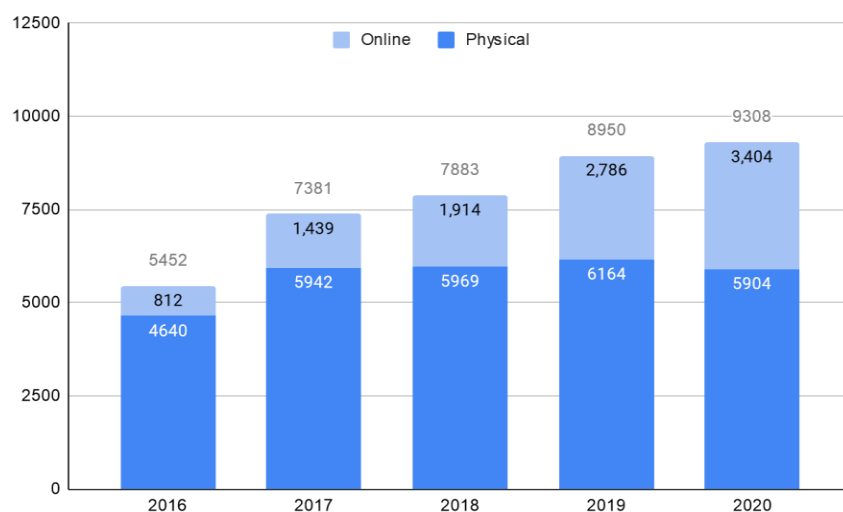
Figure 2.2. Books and chapters (physical vs online) in reading lists

As can be seen in Figure 2.2 to 2.4, the growth in resources included in reading lists over this five-year period was predominantly due to inclusion of increased numbers of digital resources. Digital/online resources grew from 15% to 27% over the five years for books/chapters, from 82% to 93% (articles/journals), and remained stable at about 82% for other resources. We note that the portion of eBook content across all RLs rose from 6% in 2016 to 14% by 2019.
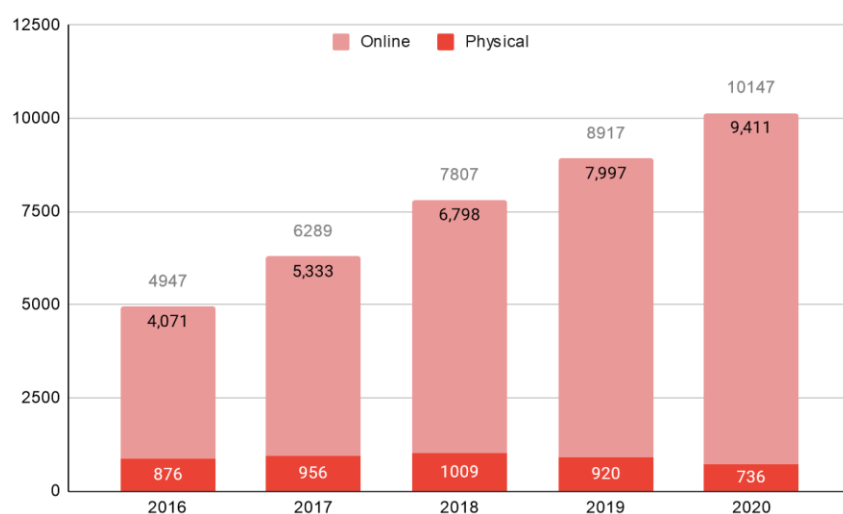
Figure 2.3. Articles and Journals (physical vs online) in reading lists
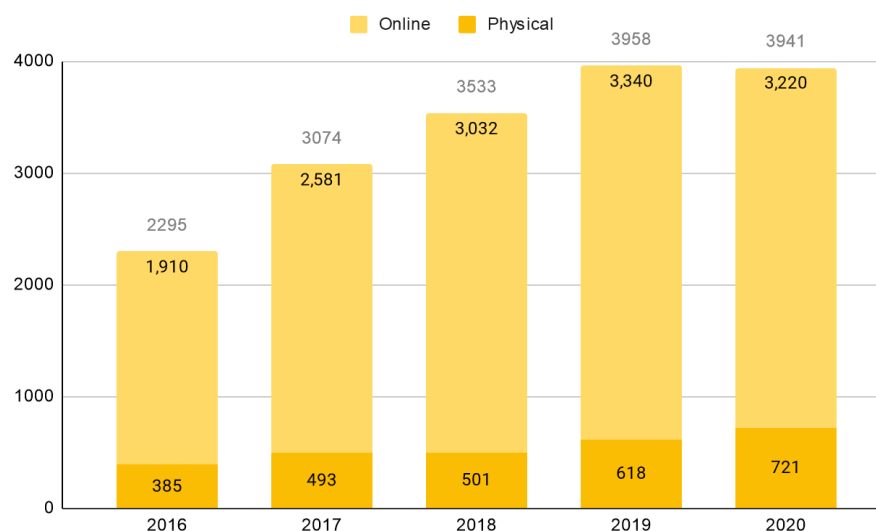
Figure 2.4. Other resources (physical vs online) in reading lists

Taken together, digital resources in reading lists increased from 6,793 items (54% of total reading list content) to 16,035 items (69% of all RL content). By contrast, physical resources increased from 5,901 items to only 7,361. In comparison to digital resources, physical resources also increased as content for reading lists over the years, however, their proportion of resources included in reading lists decreased overall (from 46% of all content in 2016 to 31% in 2020).

For comparison, we provide here an overview of books and chapters (physical vs online) included in readings lists created by the eight faculties (data for A Semester 2020 only). We see that the proportion of physical vs online (i.e., books vs eBooks) vary across faculties: FASS (36.7% eBook material), FEDU (44.2%), WMS (44.1%), FSEN (68.6%), FHSHP (48.6%), FMIS (33.3%), FLAW (40%), FCMS (21.4%), ordered by faculties equivalent to Figure 2.5.
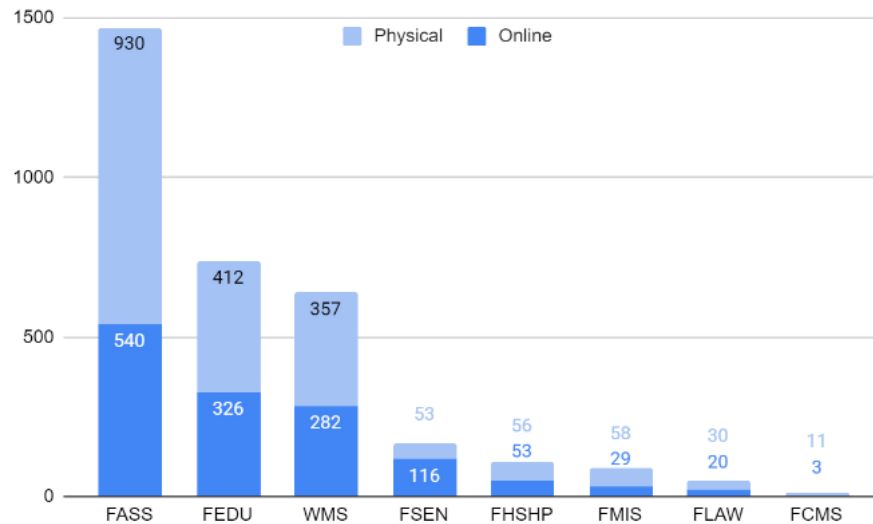
Figure 2.5. Books/Chapters linked in RLs by faculty (Semester A / 2020 only)

2.4.2. Results and Analysis of Questionnaire

Through our survey, we explored the experience of academic staff with linking teaching resources in reading lists. We received responses from 73 participants, representing almost a third of the total number of academics who were invited to participate. We did not receive an equal number of participants from each faculty. The faculties were represented in the survey feedback as follows: WMS (18), FMIS (4), FLAW (5), FHSHP (2), FEDU (16), FCMS (4), FASS (23), and FSEN (0). One participant did not provide sufficient details, and their results were excluded from the analysis.

Preferred Resource Types to Include. We analyzed 185 responses from 72 participants to the question: What materials have you included in reading lists? Results see Figure 2.6.
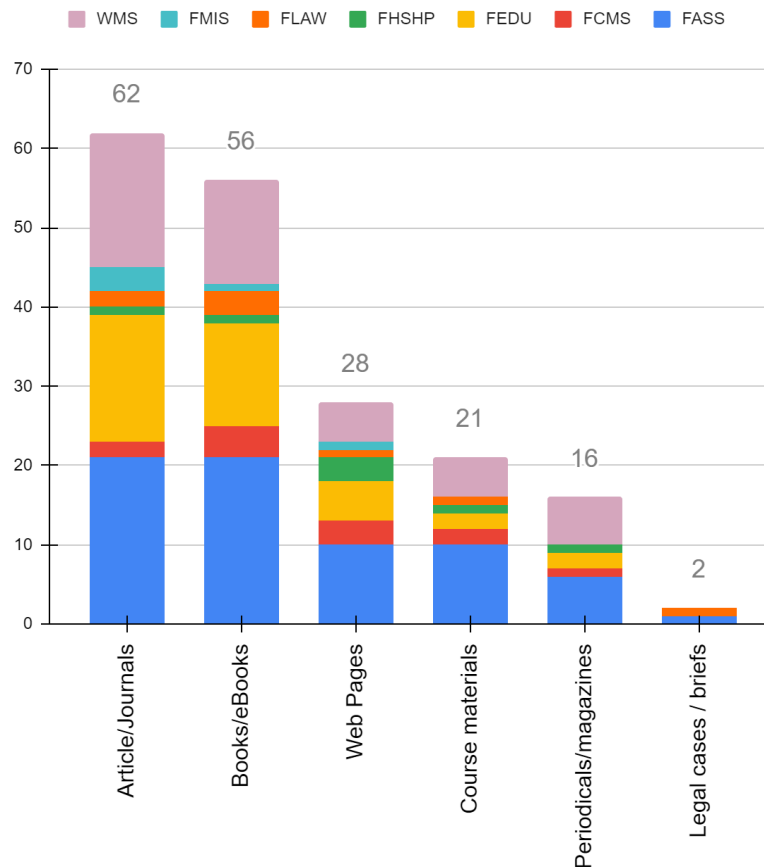
Figure 2.6. Teaching materials included by academics (n = 73)

Note: Respondents were permitted to express more than one option.

The majority of the respondents (62 of 72) indicated they had used academic articles/journals as well as books/eBooks (56 of 72), making these the most commonly included types of teaching materials (see Figure 2.6). Note the resources classified as 'other' in the log study (Figure 2.1 and 2.4), are here distinguished in more detail as web pages, course material, magazine, and legal cases. We found that the top three resources were common across all seven analyzed faculties. The most-mentioned teaching materials were different for faculties, with articles/journals for FASS, WMS, FEDU, and FMIS, and books/eBooks for FLAW and FCMS. Surprisingly, web pages were the most often mentioned resource for FHSHP, but the respondent number was very low.

These preferences may reflect the preferences of particular academic fields. However, given the small number of respondents in some faculties, and because neither participant numbers nor reading list numbers are equally distributed across faculties, a comparison by faculty is

indicative at best. However, these results do provide some cursory indications of the types of resources commonly included in reading lists by academic disciplines across a single university.

Success linking eBook Content. We analyzed responses from 72 participants to the statement; I have successfully linked eBooks with my reading lists. We focus here on linking eBook content as, different to inserting other bibliographical references or Webpage URL, these require the use of the libraries eBook reading system (as an active link needs to be created vs a bibliographical entry). Figure 2.7 shows that 43 of 72 academics were able to successfully link digital materials in RLs and that 29 were not. We note that while most of the FASS academics were successful (19 of 23), 11 of 18 WMS academics were not successful in linking digital materials. Similarly, across other faculties we see a mixed picture, except FCMS who did not report any issues.
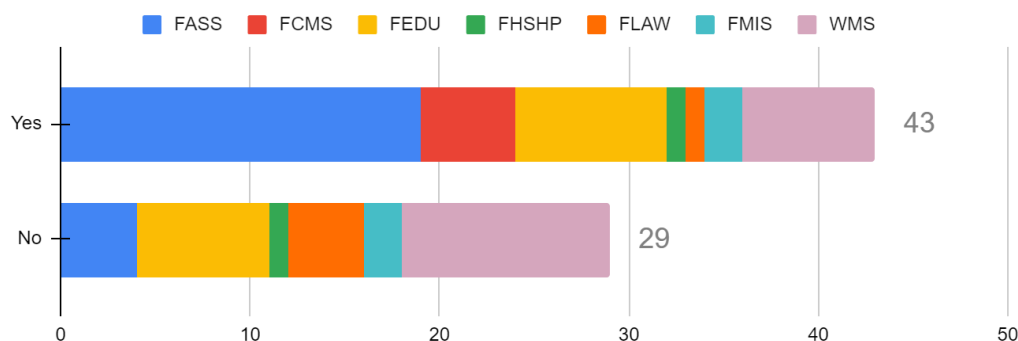
Figure 2.7. Academics who successfully linked digital material in RLs (n = 73)

When asking academics for reasons for being unsuccessful in the linking of digital material, we identified two categories of answers:

1) *Participants had issues with using the RL system*: Nine participants responded that they did not know how to link eBooks with the RLs though they were aware that that functionality was available. Other reasons that were provided also indicate the need for improving the linking process, such as confusion about the linking process (9), preference for other methods [of providing material] (8), and difficulty of the linking process (4). Six academics expressed a lack of awareness of the functionality of linking eBooks (6).

2) *Participants chose not to provide access to digital/online material for students in their reading lists*. Reasons given included not using eBooks in the course (5), preference for print books

instead (2). Some access issues were mentioned, i.e., the library does not have the eBooks (1), or the book was not available in eBook format (1). One participant said they circumvented the RL system, by link[ing] directly to the eBook itself, not [via] the reading list software (1). Another participant asked for assistance and reported that a librarian had linked eBooks and other teaching materials for them. Reasons unrelated to the RL system were also cited, such as "I don't remember whether I have or not" (1) and the impression that "the use of eBooks appears to be being discouraged, in favor of expensive textbooks" (1).

Perception of linking eBook Content. Academics were asked to respond to the statement, '*I found linking an eBook to the reading list to be simple and clear*' using a Likert scale. Positive responses were given by 24 academics, 18 remained neutral, and negative responses were given by 23 academics, see Figure 2.8). The impression that WMS academics struggled more with the RL system than, e.g., FASS academics, is confirmed in these answers (7 of 18 from WMS strongly disagree). Looking at the participants' detailed feedback, the most common reason given for providing a negative response was that they felt they needed (more) guidance, and that the system was difficult/confusing to use. Many who were neutral, explained this was because they felt they would forget how to use the system if they did not use it regularly.
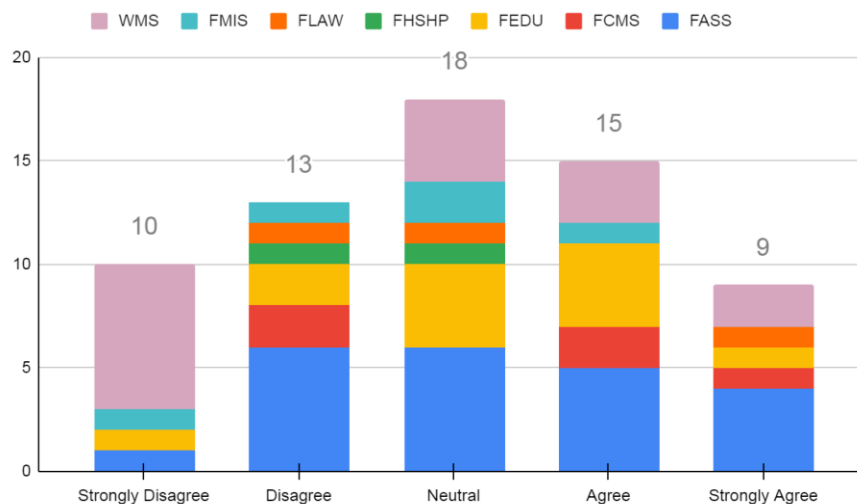
Figure 2.8. Linking eBooks in RL is simple & clear (n=65)

2.5 Discussion

Existing work on RLs rarely reports on lists content (Cross, 2015). Our results confirm anecdotal observations that types of materials linked in RLs vary between faculties (Brewerton, 2014). However, further investigation is required to understand if academic disciplines have different requirements for RL systems. The proportion of both book and eBook content we found differs from previous reports (Cameron & Siddall, 2014). While the portion of eBooks we found in RLs (14% by 2019) matches the reported 13% of available eBook content in Cameron & Siddall (2014), in that study only 3% of linked resources were found to be eBooks. This increased number of eBooks being linked may be due to greater awareness and acceptance of eBooks in the seven years since the other study was performed. Furthermore, we note that our overall portion of books/eBooks (at 40% in 2020) was much lower than the 74% reported in Cameron & Siddall (2014). This difference may be due to their study focusing on foundation degree courses, which may rely more heavily on textbooks. Similar to prior work (Brewerton, 2014; Beasley, 2016; Neill & Musto, 2017; Cameron & Siddall, 2017; Zhu, 2018; Krol, 2019; Taylor, 2019; Walsby, 2020), we also observe the challenges academics face when creating reading lists. However, we add the observation of academics facing particular challenges of linking eBooks (beyond the challenges of the RL system in general). We found that the difficulties with linking their eBook content varied across faculties. Reasons for these different responses will need to be explored further. In any case, the poor usability of the reading list system analyzed here echoes the observations of other studies and outlines the need for further research.

2.6 Conclusion

This paper explored types of resources linked in reading lists, with particular focus on electronic materials, and the ease of linking eBook content. Using a mixed-methods approach, we identified a growing number of digital resources linked in reading lists, as well as an indication of faculty-based differences in the types of resources used. We observed that many academics struggle to link eBook material, and do not perceive the RL system to be user friendly. We recommend improving the RL creation process, streamlining the eBook linking process, and better integrating the reading lists with university teaching support systems known to the academics (e.g., library systems). Consideration may need to be given to faculty/discipline specific needs, but further research is needed. We currently explore wider issues with reading lists, taking into account user

experience and satisfaction with the creation of reading lists and the inclusion of pedagogically relevant materials across academic disciplines at a single university.

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Chapter 3

How Academics use Reading Lists

Building on our previous work, the material presented in this chapter serves as an extended article of the research previously published (Chapter 2), delving deeper into the findings and presenting additional insights on the subject matter.

In the previous chapter, we observed that many academics struggle to link eBook material in RLs, and do not perceive the RL system to be user friendly. This chapter therefore explores the makeup of RLs created in the official Reading List Systems across the UOW and the experience of academics and librarians when creating RLs. It also contributes to answering the first and the second Thesis Questions of our study.

The log analysis undertaken explored the trends in RLs creation over the period of four years by the academics across the eight faculties of the UOW. The questionnaire surveyed the academics and academic liaison librarians' experience with the RLs use. Our results of the transaction log analysis and the questionnaire are presented in this chapter under five themes: 1. Reading Lists over Time 2. Items in Reading Lists by Type 3. Academics' & Librarians Experience with the WRL Set-Up 4. Academics' & Librarians' Experience with digital material in the WRL and 5. Academics' & Librarians' Experience with using WRL. This chapter recommends a number of interventions to increase RLs' numbers and academic buy-in.

The material presented in this chapter has been published in the International Journal of Digital Libraries (see J1 in Figure 1.3).

Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2023a). Online Reading Lists: A Mixed Method Analysis of the Academic Perspective, International Journal of Digital Libraries 24, 23–44. https://doi.org/10.1007/s00799-022-00344-z

Online Reading Lists: A Mixed Method Analysis of the Academic Perspective

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Abstract

Reading List Systems are widely used in tertiary education as a pedagogical tool and for tracking copyrighted material. This article explores the make-up of Reading Lists created in the official Reading Lists system across a whole university. We investigated the experience of academics and librarians when creating Reading Lists. A mixed-methods approach was employed in which we performed a transaction log analysis on Reading Lists at a single university, from 2016 to 2020. A questionnaire was then answered by both academics and academic liaison librarians about their experience with Reading Lists. The results of our analysis found that uptake of Reading Lists varies widely between different academic disciplines. Academic engagement with Reading Lists was found to show only incremental growth over time, and overall satisfaction by academics with the Reading Lists system was low. We explore implications for Reading Lists implemented through Digital Libraries, and recommend developing discipline-specific support to increase Reading Lists numbers and to integrate pedagicial features to increase academic buy-in.

Keywords: Online Reading Lists, Digital Library, Tertiary Education, Academic Engagement, eBooks

3.1 Introduction

Reading lists have long been part of academia (Stokes & Martin, 2008; Brewerton, 2014) and may provide pedagogical 'scaffolding' in which academics offer support to students through signposting and rich annotation on required readings (Stuyf, 2002). They thus have a critical role to play in transforming students into autonomous learners (Rowley, Hartley, & Larkin, 2008). Educators have noted the opportunity for managing and tracking reading materials in digital libraries (Al-Anazi et al., 2014; Akbar et al., 2011; Agosti *et.al.*, 2008) and for integrating digital libraries in academic learning environments (Margaret, 2003; Virkus et al., 2009; Rezaei, 2006; McMartin et al., 2008). In the last decade, Online Reading List Systems (RLs) are often integrated into an academic library's offerings (Krol, 2019; Chad, 2018), and academics are supported by academic liaison librarians in creating RLs. Copyright Licensing New Zealand (CLNZ, 2014) requires all universities in New Zealand to provide software solutions to enable electronic reporting on copyrighted material. To meet these reporting obligations with CLNZ, all eight New Zealand universities adopted RL systems in 2015.

Previous work has identified the need for a more detailed examination of RL systems, particularly in relation to enhancing academic engagement (Cameron & Siddall, 2017; Cross, 2015; Zhu, 2018). In this article, we explore RLs creation across the University of Waikato (UOW) and seek answers to three specific research questions:

RQ 1: How many RLs were created each year within each faculty?

RQ 2: What are academics and librarians' experiences with RLs?

RQ 3: What materials are included in RLs?

The remainder of the article is organized as follows: The following section gives an overview of related work on RL systems. We then explain our study method, the results of our study and data analysis. In the discussion, we compare our study insights with those of related work. The final section presents insights and recommendations from our study.

3.2 Literature Review

The use of RLs in tertiary teaching across individual universities (Brewerton, 2014; Zhu, 2018; Walsby, 2020) as well as within parts of a university (Beasley, 2016; Neill & Musto, 2017; Cameron & Siddall, 2017; Taylor, 2019; Krol, 2019) has been well reported. A number of studies

include a longitudinal approach. Krol (2019) reported that the University of West London saw an increase in RLs from 4% in 2013/14 to 100% of courses by 2018/19. Few other studies have reported 100% saturation of RLs uptake by academics across a teaching division let alone an entire university. Taylor (2019) found that at the University of Worcester 95% of modules had RLs in 2018/19, after first introducing RLs in 2014/15. More typically, Beasley's (2016) study at the University of Auckland found that RLs creation varied among faculties due to their disciplinary needs. The willingness of academics to engage in RLs creation seemed to vary across the different studies. Cross (2015) at Nottingham Trent University highlighted that staff time constraints were a key barrier to the uptake of the RLs at their institute. Beasley (2016) found that familiarity with the system, staff time constraints, and perceived usefulness of the system were also hindrances at the University of Auckland. Krol (2019) discussed resistance and lack of interest by academics. Despite RLs being created for all courses with the help of library staff, the academics' engagement with the RLs creation remained low due to a cited lack of time (Krol, 2019).

Most studies identified significant hurdles for academics to overcome in order to usefully engage with RL systems. While Zhu (2018) found that the academics valued the facility of the sharing of copyright material via the RLs, 40% were dissatisfied with the overall RLs' functionality, stability and ease of use. Consultations with staff at the University of Manchester identified the need for improved functionality of the system as well as integration into the learning management software, better support for users, and marketing to their users of the potentials and capabilities of the system (Walsby, 2020). Neil & Masto (2017) found that academics at the Dublin Business School wished for better integration of RLs with their learning management system, and also identified time constraints as the main barrier for academics to use the RLs. Other factors highlighted as hindrances to RLs uptake were the discipline and lecturing experience of the academics. Taylor (2019) agreed with her colleague Devine (2017) in arguing that the RLs needs to go beyond being a repository of teaching materials but should become a teaching tool in its own right. However, in what way RL system and a learning management system would integrate has not been addressed.

Academics also reported concerns that the RLs may not provide enough cost benefits for them and their students. Brewerton's (2014) study at Loughborough University found that some academics were not convinced that their efforts in maintaining the RLs were appropriate in comparison to the perceived benefit to the students. Cameron & Siddall (2017) even noted

concerns voiced by academics about RLs effectively "spoon-feeding" students and observed a lack of effective communication between librarians and academics.

The content of RLs is reported sparingly (Cross, 2015). The literature also touches on the types of content found in RLs (Cameron & Siddall, 2017; Krol, 2019) and where it has, studies do not distinguish between digital and print material. Cameron & Siddall (2017) found that books contributed on average 74% of RLs material at the University of Northampton. While 13% of these books were available as eBooks, only 3% were labeled as such. Krol (2019) found that books and eBooks were included in 96% of all RLs at the University of West London. Librarians at Loughborough University gave anecdotal evidence that engineering RLs were typically short and comprised mostly books, whereas humanities lists were longer and used more articles (Brewerton, 2014). We observe that many of the available publications are reports reflecting on an institute's journey and did not use log analysis. Table 3.1 provides an overview of the discussed studies on academics' use of the RL systems. While eight out of the nine studies focused on academic experience with RL systems, only two studies used a detailed log analysis. Of these two, Beasley (2014) focused predominantly on a single semester. Krol (2019) covered a four-year period (2016-2019) but limited the study to a single faculty (Computing and Engineering). The generalizability of their results is therefore limited. In addition, only four of the nine studies covered all faculties at universities. Finally, only two studies included librarians' views, with Cross (2015) exploring the technical challenges, and Beasley (2016) limiting the focus to two faculties. Therefore, integration of the views of academic liaison librarians' experiences with RLs remains open.

Table 3.1. Summary of the user experience on RL systems

| Author | Aim of the Study | Specific Focus | | | Methodology | | | | | | | |
| | | Users General Experience of Use of RL Systems | Use of Specific Function/s of the RL Systems | Implementation challenges | Method | | | Study Population | | Participants | | |
					Log Analysis and Period Covered	Questionnaire	Interviews/ Focused Groups	Represents all Faculties	Represents Selected Faculties/Programme	Academic Staff	Library Staff	Students
Brewerton (2014) Loughborough University, UK	To understand how Reading Lists are perceived by both students and lecturers	✓	-	-	-	-	✓	✓	-	✓		✓
Cross (2015) Nottingham Trent University, UK	To review the key components of the introduction of a new resource list management system	-	-	✓	-	-	✓	✓	-	✓	✓	✓
Beasley (2016) The University of Auckland, NZ	Explore the factors that affected the academic engagement with the implementation of the Reading List systems.	✓	-	-	RL reports for Semester 1 2016	-	✓	-	Faculty of Education and Social Work Faculty of Engineering	✓	✓	-
Neill & Musto, (2017) Dublin Business School, Ireland	Explores faculty perceptions of the Reading List Systems	✓	-	-	-	✓	✓	-	Business, Art and Law	✓	-	-
Cameron & Siddall (2017) The University of Northampton, UK	Access the academics' experience of the Reading Lists and **Ordering Process**	✓	✓	-	-	✓	✓	-	Health, Education, Business, Social Sciences and the Arts	✓	-	-
Zhu (2018) Auckland University of Technology, NZ	Explore factors Influencing Lecturers' Intention to Use Reading Lists	✓	-	-	-	✓	-	✓	-	✓	-	-
Taylor (2019) The University of Worcester, UK	Examines the concerns of academics about Reading List systems	✓	-	-	-	✓	-	-	Postgraduate Certificate in Learning and Teaching in Higher Education	✓	-	-
Krol (2019) The University of West London, UK	Determine to what extent students and academics are engaging with the Reading Lists	✓	-	-	RL reports for period of 2016-2019	✓	✓	-	School of Computing and Engineering	✓	-	✓
Walsby (2020) The University of Manchester, UK	Implementing a Reading List strategy	✓	-	-	-	✓	✓	✓	-	✓	-	-
Our Study	Explores the make-up of Reading Lists across a whole university and the experience of academics and librarians when creating RLs.	✓	✓	-	RL reports for period of 2016-2019	-	✓	✓	-	✓	✓	-

3.3   Method

This section describes the study context, method, data collection, data preparation and pre-processing for analysis. Our study employs a mixed-methods approach (Venkatesh et al., 2013) including a transaction log analysis, and two questionnaires.

3.3.1   Institutional Context

The UOW has 13,076 students and 649 academic staff (UOW, 2019). Our study was conducted across all eight faculties, including Art and Social Sciences (FASS), Education (FEDU), Science and Engineering (FSEN), Waikato Management School (WMS), Māori and Indigenous Studies (FMIS), Computing and Mathematical Sciences (FCMS), Health, Sport, and Human Performance (FHSHP) and Law (FLAW) (see Appendix A for particularities of the each of faculty). In addition, six academic liaison librarians participated. Academic liaison librarians work with academics to provide individual assistance for teaching and research. They also provide individual assistance with reference services, system support services and copyright tracking. To make the services more decentralized, each faculty is assigned with two academic liaison librarians.

The UOW library has been offering Waikato Reading Lists system (WRL) since 2016 (see Thesis Appendix C for an introduction to the WRL system). WRLs are typically created for each course instance, being assigned to different semesters and years, such as Summer Schools S and T, Semesters A and B, whole year Y courses, and Semester C (all other periods). Most students attend Semesters A and B, with fewer in Summer Schools S, T. Y, and C are rarely used, mostly for postgraduate studies.

3.3.2   Study Method

The first phase of our mixed-methods study consisted of a transaction log analysis (Jansen et al., 2009) of WRL creation over four years. The second phase of the study used online questionnaires for academics and librarians, which were designed based on the findings of the first phase of the research. The transaction logs recorded actual behaviors of academics' in RLs creation at the University of Waikato. We used these logs to identify trends and patterns in user behavior. Some of the insights we derived through these trends needed to be confirmed and clarified through insight from users. Our questionnaire aimed to explore the users' reasons for the trends we had been able to identify from the log analysis. Our questionnaire was designed to gather data on academics and librarians' experiences and opinions of use of reading lists based on our insights

from the log analysis as well as unanswered questions about reading list use. Following ethics approval, the online questionnaire was emailed to selected academics and the academic liaison librarians. We here describe the data collection process for the two phases of our study.

Phase 1: Log Analysis

The raw data from the WRL transaction logs (including information about the lists creation and content) were automatically processed and collated into tables of summary data. Any RLs that were deleted from the system do not appear in the logs. Table 3.2 describes the preparation of the transaction log data for analysis.

Table 3.2. Preprocessing steps for analysis

Step	Description
STEP 1	Removed all *RLs* created in 2015 because Summer School 2015 lists were created as part of the pilot phase and *RLs* were fully published for teaching in 2016 Semester A onwards.
STEP 2	Removed all *RLs* whose status was indicated as "Draft". The remaining *RLs* (Published and Archived) were used for teaching at least once.
STEP 3	Removed all duplicate *RLs* to prevent redundant counting.
STEP 4	Introduced a column labeled "Faculty" to identify the *RLs* created by each faculty.

Phase 2: Questionnaires

The study population for the questionnaire consisted of the UOW academics and the librarians who were involved with WRL as list creators in at least one case; 305 academics were identified. The questionnaires comprised closed and open-ended questions and were constructed under three main themes (see Appendix B):

- Experience of the WRL set-up
- Experience in linking an eBook or other teaching materials in WRL
- Experience of the ongoing use of the WRL

The electronic questionnaire was emailed to 305 academics in June 2020; the survey ran for two weeks. A total of 73 replied to the questionnaire within the stipulated time period. This

sample (73 respondents of 305) represents a response rate of about 24%. For an online survey of this kind of domain, conventionally, a response rate of 20% - 30% is considered a good result and is similar to other surveys in this field. In addition, 10 academic liaison librarians were identified based on their departmental responsibilities, who also received a customized questionnaire (see Appendix C). A total of 6 replied to the questionnaire within the given two-week period.

3.4 Results and Analysis of Transaction Log Data

This section presents the results of our log analysis. RLs may be *newly created or rolled over* (i.e., re-published year on year). RLs *owners are then either new owners or owners of rolled-over* RLs.

3.4.1 Reading Lists over Time

Figure 3.1 shows the total number of RLs created across all eight faculties. The overall number shows an upward trend (except for the sudden decline in 2020). We believe the decline in 2020 was predominantly due to the move to online teaching during Covid lockdown in New Zealand (taking full effect in B Semester 2020).
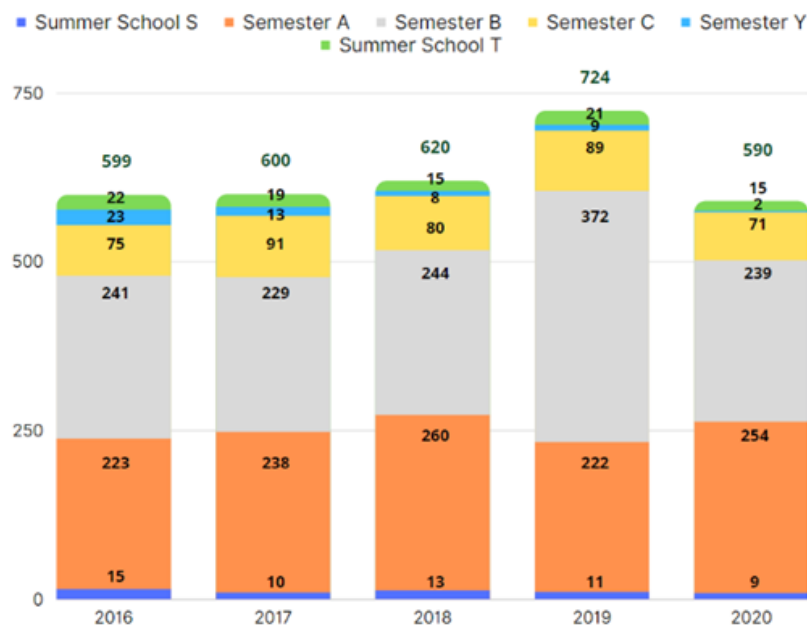
Figure 3.1. RLs active in each semester grouped by years

To further explore this behavior, we analyzed the RLs in each faculty. We found that RLs numbers were higher in the four faculties FEDU, FASS, FSEN, WMS (~100 RL per year, see

Figure 3.2), compared to the other four faculties FMIS, FCMS, FHSHP and FLAW (less than 30 RLs).
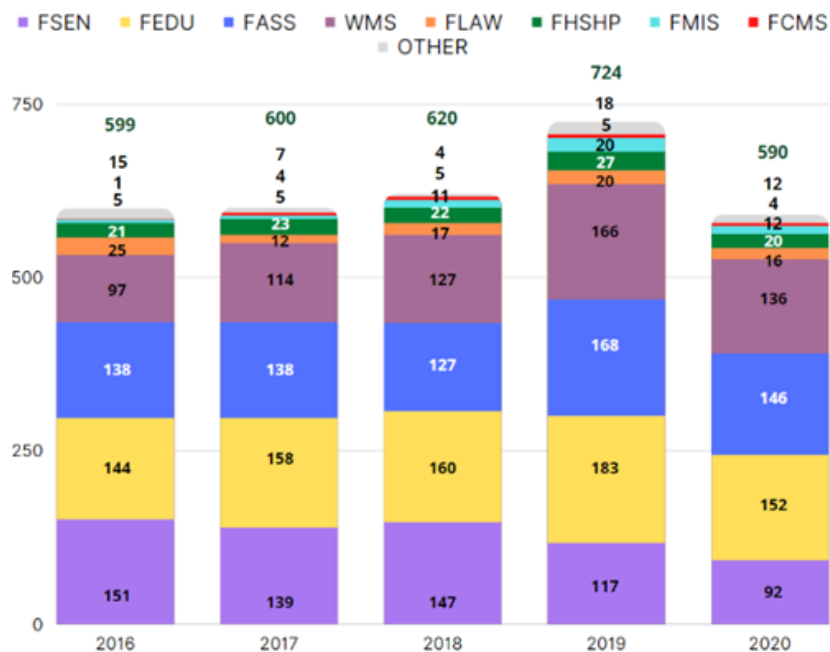
Figure 3.2. RLs created by each faculty grouped by years

The number of RLs evaluated in relation to the number of courses offered within each faculty appears in Figure 3.3. The fluctuating numbers of RLs may therefore be explained by changing the numbers of courses offered. A comparison across faculties shows the following percentage of courses with RLs: FCMS 3%, FASS 30%, FLAW 31%, FMIS 37%, FSEN 47%, WMS 55% FEDU 63%, FHSHP 63%. We particularly observe that FCMS has a very low RLs percentage (e.g., 2% in 2020). While the faculty offered a considerable number of courses (170 in 2020), only a few staff (3 of 50+ in 2020) were engaged with the creation of 4 RLs (see Figure 3.4). The reason may be that FCMS does not use many copyrighted materials and the WRL thus does not cater to the disciplinary needs of FCMS.

FASS
Papers with RLs · Papers without RLs

	2016	2017	2018	2019	2020
Papers without RLs	475	445	430	385	412
Papers with RLs	138	138	127	168	146

WMS
Papers with RLs · Papers without RLs

	2016	2017	2018	2019	2020
Papers without RLs	377	325	254	135	190
Papers with RLs	97	114	127	166	136

FEDU
Papers with RLs · Papers without RLs

	2016	2017	2018	2019	2020
Papers without RLs	238	177	143	105	105
Papers with RLs	146	158	160	183	152

FSEN
Papers with RLs · Papers without RLs

	2016	2017	2018	2019	2020
Papers without RLs	112	116	123	133	163
Papers with RLs	151	139	147	117	92

FCMS
Papers with RLs · Papers without RLs

	2016	2017	2018	2019	2020
Papers without RLs	186	186	169	154	166
Papers with RLs	1	4	5	5	4

FLAW
Papers with RLs · Papers without RLs

	2016	2017	2018	2019	2020
Papers without RLs	34	48	48	44	63
Papers with RLs	25	12	17	20	16

FMIS
Papers with RLs · Papers without RLs

	2016	2017	2018	2019	2020
Papers without RLs	55	51	37	34	47
Papers with RLs	5	5	11	20	12

FHSHP
Papers with RLs · Papers without RLs

	2016	2017	2018	2019	2020
Papers without RLs	10	10	10	16	27
Papers with RLs	21	23	22	27	20

Figure 3.3. UOW papers offered in 2016-2019 with and without RLs, sorted by faculties
Note: At the UOW, the term 'Papers' refers to the subject, course or a module
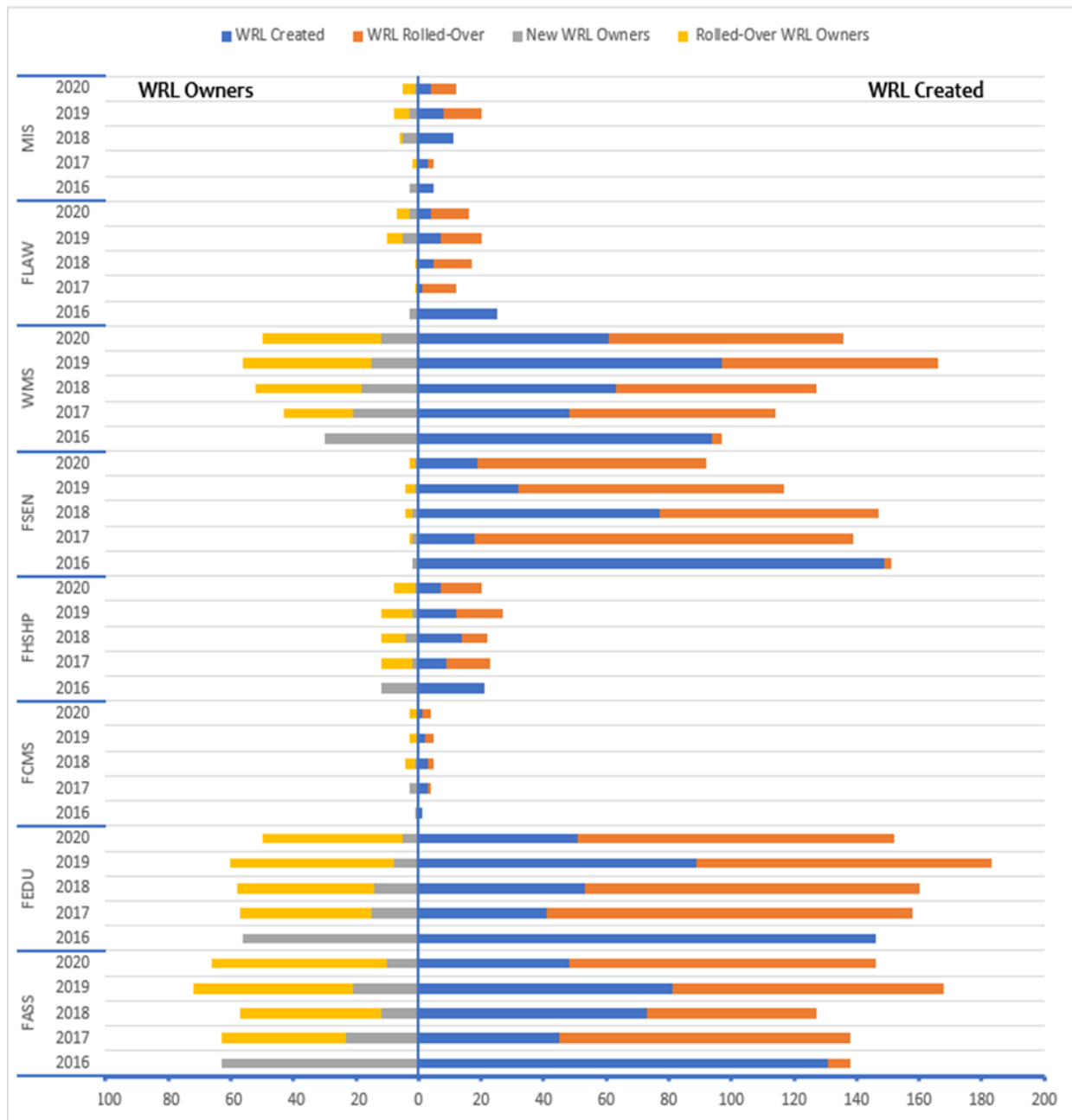
Figure 3.4. WRL created overtime by academics

Overall, RLs numbers at the UOW rose in small increments over the five-year period, despite variation in the contribution of each faculty. We identified two causes for high RLs numbers in faculties: the overall number of courses offered, and the number of academics engaged with WRL. Faculties that have many RLs often had many academics involved in creating RLs (e.g., FEDU see Figure 3.4). For example, FASS added a considerable number of new RLs each year, involving

many academics (60 to 75). Untypically, only a few staff (between 2 and 4) were involved in creating the large number of RLs in FSEN, which turned out to have been created by librarians. After an initial push in which 150 RLs were created, most RLs were being rolled over each year.

3.4.2   Items in Reading Lists by Type

Figure 3.5 shows that the total number of items in the WRL increased gradually each year. We observe that at the beginning (2016-2017) book/book chapters contributed far more items than the other two categories (43% in 2016 and 44% in 2017). However, by 2018/2019, articles/journals had risen to about the same proportion, and by 2020, they had become the largest proportion of linked resources (43% of RLs content in 2020).

We further explored the proportion of online and physical items included in the RLs (see Figure 3.5). We observe that the growth in RLs resources was mainly due to the increased inclusion of online resources over the five years. Taken together, online resources in RLs increased from 6,791 items (54% of total RLs content) to 16,072 items (69% of all RLs content), while physical resources increased from 5,903 (46%) items to only 7,324 (31%).
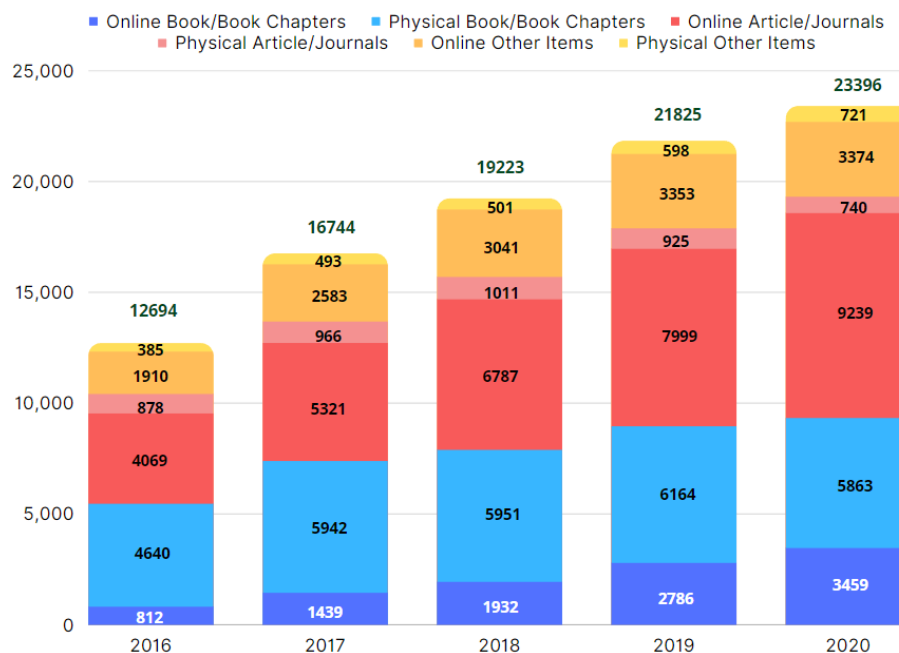
Figure 3.5. Total number of items in the WRL (2016-2020)

When comparing the items linked in RLs from different faculties (see Figure 3.6) in 2020, we observe field-based differences in the RLs composition. One group of faculties mostly linked articles/journals (FLAW 55%, FHSHP 55%, FEDU 52%, WMS 46%), another group had mostly

books/chapters (FSEN 86%, FMIS 55%, FASS 51%). Most prominent here is FSEN with 86% books/chapters. Finally, FCMS was the only faculty to mainly link other items (55%).

When comparing the RLs linking of paper-based items (physical) and the online/digital material for each faculty in 2020, the majority of faculties is predominantly including online/digital material (FHSHP 77%, WMS 76%, FCMS 72%, FLAW 71%, FEDU 71%, FASS 62%, FSEN 58%), with FMIS being the only faculty with only 48% of online/digital material.
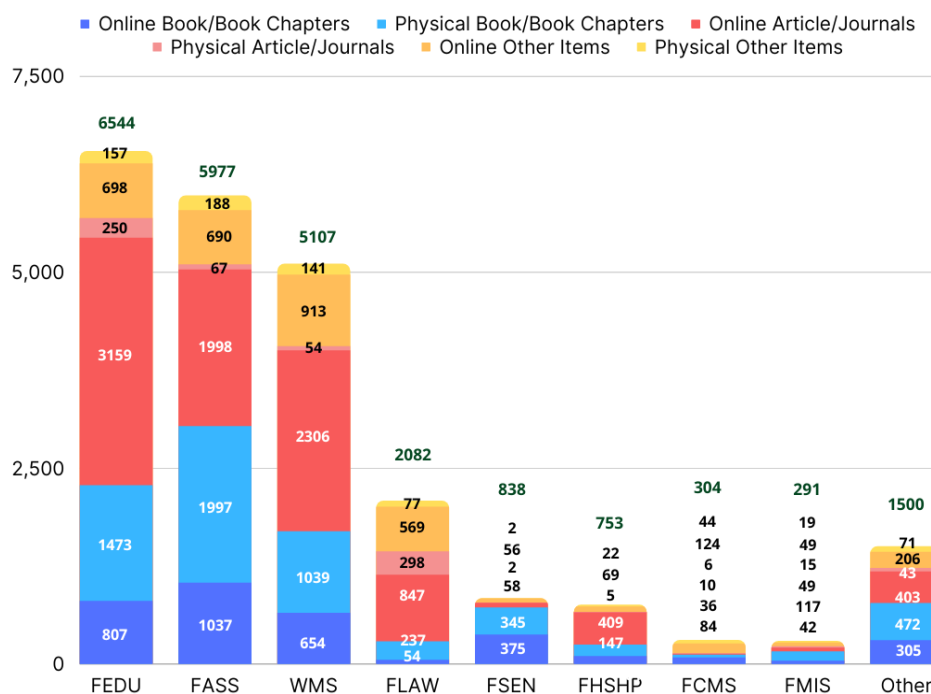
Figure 3.6. Number of items in faculty RLs 2020

When analyzing the format of items included in RLs, we find that all faculties used online/digital articles/journals more often than the physical version (FSEN 97%, FASS 97%, FEDU 93%, FCMS 63%, WMS 98%, FMIS 77%, FLAW 74%, FHSHP 99%). Similarly, other items were predominantly digital (72% to 97%). The picture is more nuanced for books/chapters: most faculties use predominantly physical books/chapters (FLAW 81%, FMIS 74%, FASS 66%, FEDU 65%, WMS 61% and FHSHP 59%) and only two faculties use predominantly digital books /chapters (FSEN 52%, FCMS 70%).

3.5   Results and Analysis of Questionnaires

The questionnaires investigated the experiences of academics and academic liaison librarians, respectively, with WRL under three sections: the WRL set-up, linking an eBook or other teaching materials, and ongoing use of the WRL. We received responses from 73 participants, representing 7 of 8 faculties and thus almost a third of the total number of academics who were invited to participate (see Figure 3.7). We did not receive an equal number of participants from each faculty. The faculties were represented as follows: FASS (24), WMS (18), FEDU (15), FLAW (5), FCMS (4), FMIS (4), FHSHP (2) and FSEN (0). In addition, one academic participant did not indicate their faculty. 6 of 10 librarians responded to the questionnaire.
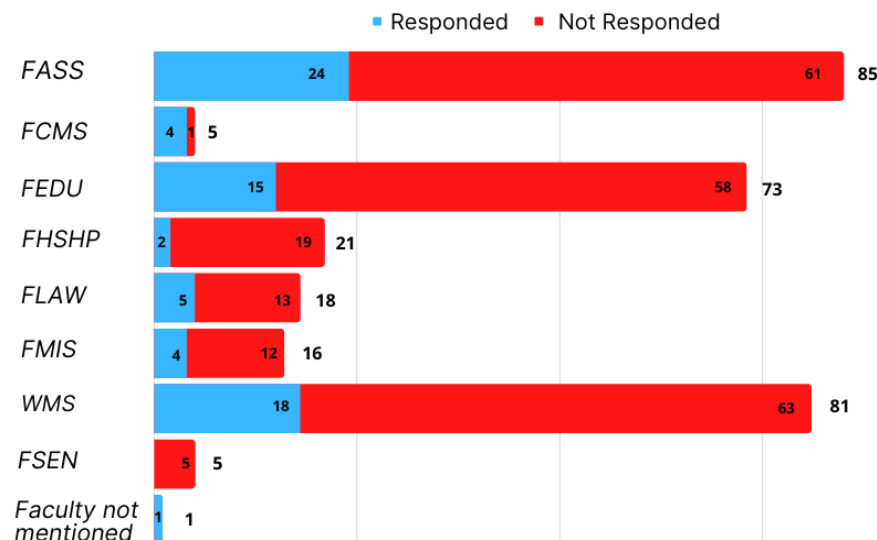
Figure 3.7. Respondents (academics) sorted by faculty

3.5.1   Academics' & Librarians' Experience with the WRL Set-Up
Use and Structure of Reading Lists

Figure 3.8 shows that 36 of 73 (47%) academic respondents sought the help of others when setting up the WRLs, and about one-third of all respondents (24 of 73, 33%) had someone else setting up the RLs for them (more than one response was permitted).
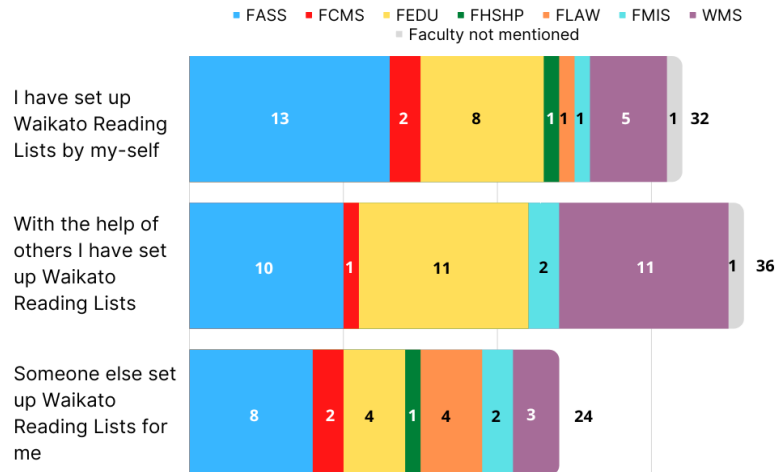
Figure 3.8. The WRL set-up by the academics (n = 73)

Figure 3.9 summarizes the kind of help the respondents sought when setting up the RLs, which was gathered through an open-ended question. Eight responses were identified as irrelevant to the question asked. Out of all the valid responses, help seeking for the initial set-up of the RLs was the most common factor for most of the faculties. We observe that the three highest factors (initial setup, uploading materials, and linking materials) were the basic functionalities of the WRL.
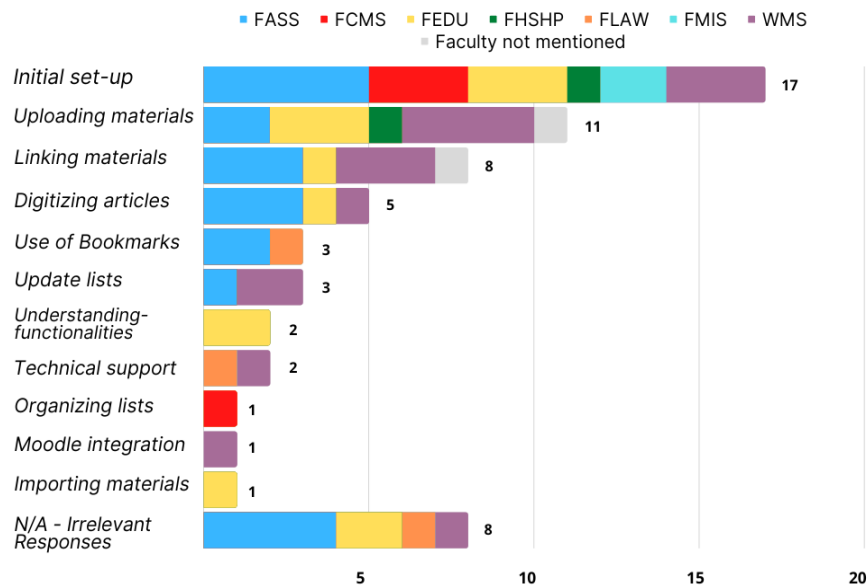
Figure 3.9. Help sought by the academics (n = 53)

Note: Respondents are permitted to express more than one reason

All six academic liaison librarians acknowledged that they set up RLs on behalf of academics (see Figure 3.10). When comparing the help provided by the librarians to academics, we see tasks such as copyright guidance, linking of material, troubleshooting and guidance for linking online material such as eBooks and chapters.
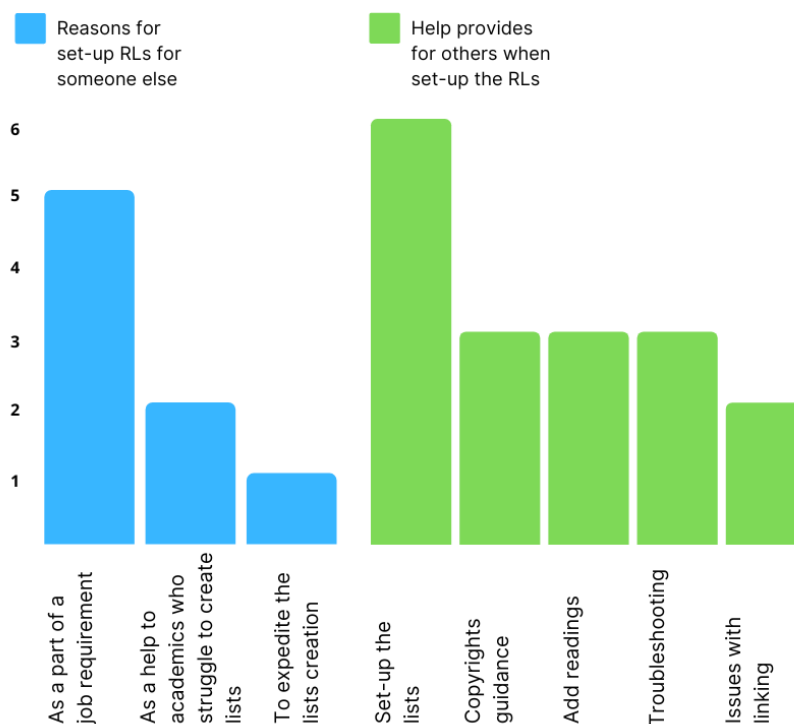
Figure 3.10. Reasons and help provided to set-up the WRL by the librarians (n = 6)

Academics were asked how many of their courses used rolled-over RLs (i.e., RLs that were used in multiple years), see Figure 3.11. The majority (63 of 68) had used rolled over RLs (on average 2.63 times) and only 5 had never rolled-over a RL. This continued use of RLs is higher in faculties such as FASS, WMS, and FEDU; we note that the same faculties also had higher numbers of overall RLs (see Figure 3.3). This may indicate that academics who created higher numbers of RLs tended to engage with them in the following years as well.
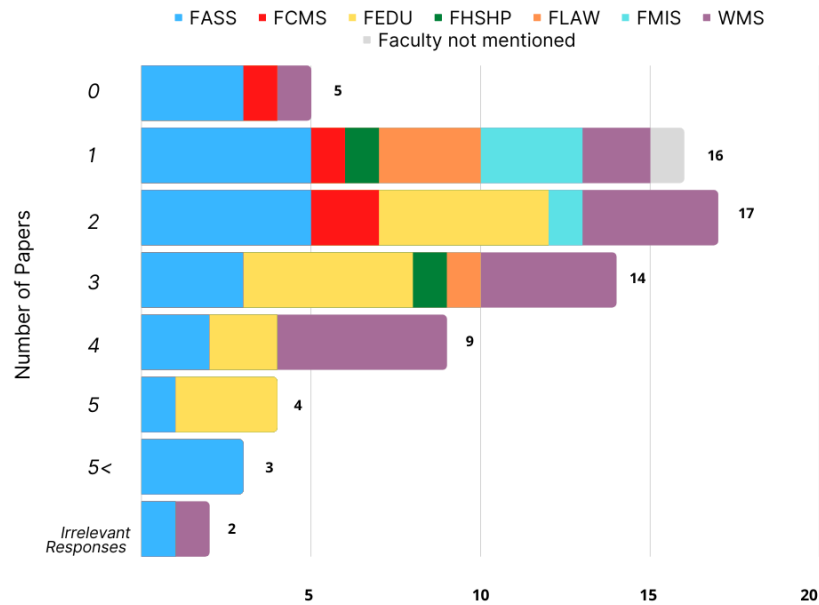
Figure 3.11. Number of courses taught by the academics which had RLs more than once (n = 70)

We enquired about the types of materials that academics included in RLs (see Figure 3.12). The majority of the respondents (62 of 73) indicated academic journals/articles as the most commonly included teaching material in the WRL, followed by books/eBooks (56), and web pages (28). We found that the top three resources were common across all seven analyzed faculties.

However, the most-often mentioned RLs materials were different across faculties, with academic journals/articles being dominant for academics from FASS, WMS, FEDU, and FMIS, and scans books/eBooks being prominent for academics for FLAW and FCMS. Surprisingly, web pages were the most often mentioned resource for FHSHP, but the respondent number was very low. The inclusion of such materials as web pages shows that WRL contains material in addition to the legally required copyrighted publications.
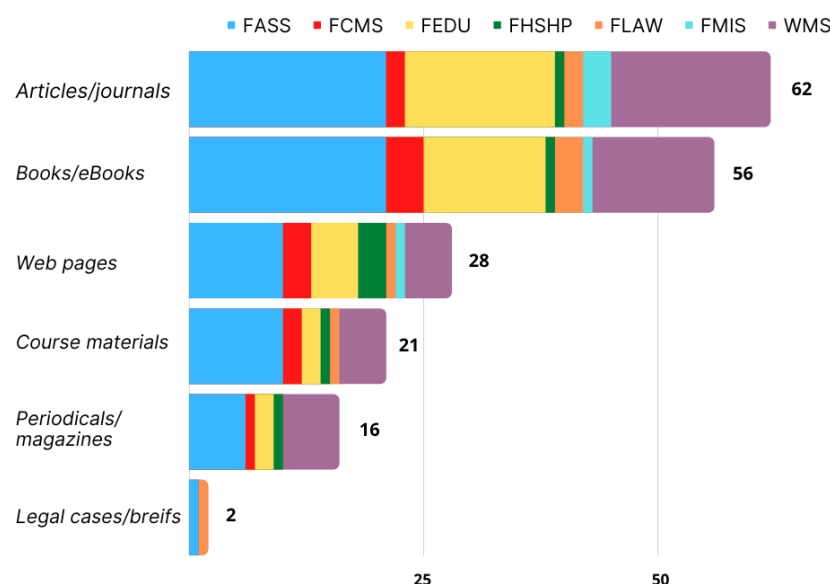
Figure 3.12. Teaching materials included in the RLs by the academics (n = 73)

Ease of Interaction with Reading List Set-up

We sought feedback on the academics' experience of setting up WRLs and received a mixed response (see Figure 3.13). 28 of 72 participants agreed with the statement that WRLs are clear and easy to set up, 22 were neutral, and 22 disagreed. We did not identify any particular patterns across the faculties. 55 participants provided further reasons for their feedback 12 of 55 participants commented that they found the interface intuitive and easy to follow (as reasons for their positive rating). 43 of 55 respondents gave a variety of negative feedback such as *hard to understand, complicated and not intuitive/user-friendly* (27), *wanting more guidance on the process* (15), *difficult to link materials* (7), *time-consuming* (6), and *increasing the workload* (1).

Answering the same question, 3 of 6 librarians were neutral, 1 disagreed, and 2 (strongly) agreed. Even though librarians have more experience and training on the setting up of the WRLs, their overall feedback was not very positive and in line with the academics' views: *not intuitive* (2), *okay after some use/training* (2), *minimal integration into other university systems* (1).
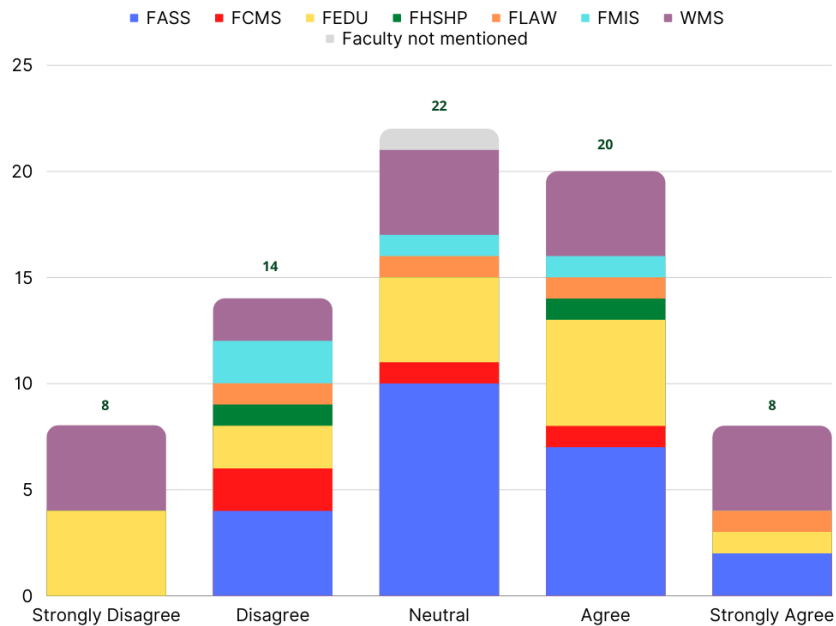
Figure 3.13. Set-up of the RL is clear and easy to interact with - academics rating (n = 72)

Final feedback on the set-up of RLs was given by 38 participants, including the following points: needing further guidance/struggling with the interface (12), appreciating the library support (9), not worth spending time / unnecessary burden (5), needs better interaction with Moodle and course outlines (2), easy to use and helpful (2). In summary, we identify a need to improve the system's usability.

3.5.2 Academics' & Librarians' Experience with digital material in the WRL

43 of 72 participants stated that they had successfully linked digital materials with their RLs. For the 29 participants who had not successfully linked digital material, we received the following further responses:

- *Participants had issues with using the RL system:* Nine participants did not know *how to link digital resources with the RLs* though they were aware that the functionality was available. Other reasons provided further indicate the *need for improving the linking process*, such as *confusion about the linking process* (9), *preference for other methods [of providing material]* (8), and *difficulty of the linking process* (4). Six academics expressed a *lack of awareness of the functionality of linking eBooks* (6).

- *Participants chose not to link digital material for students in their RLs:* Reasons given included: *not using digital material in the course* (5), *preference for print material instead*

(2). Some *access issues* were mentioned (e.g., material not provided by the library). One participant said they circumvented the RL system, by a link[ing] directly to an eBook itself, not [via] the RL software (1). Another participant reported that a librarian had linked eBooks and other teaching materials for them. Reasons unrelated to the RL system were also cited (e.g., do not remember).

These findings highlight the need for additional training and support by the academic library, as well as the need for an easier interface for linking digital materials. The six librarian respondents were all able to successfully link digital teaching materials with the WRL.

When asked about the ease of linking digital material with the WRL, a large group of academic respondents (18 of 65) remained neutral (see Figure 3.14); 24 were (strongly) positive, and 23 gave (strongly) negative responses. In addition, four of 6 librarians were neutral, and one agreed, and one strongly agreed to the ease of use of RLs. 32 of the 65 respondents made additional comments regarding the ease of linking material. While 5 respondents found it easy to link material, 27 of 32 respondents gave a variety of negative feedback such as *difficulty to understand* (10), *functions not memorable* (5), and specifics such as that it was *hard to decide which links to use* (3). 4 of the 6 librarians provided further feedback about challenges, such as *inconsistencies with linking to resources at online publishers* (3), and *the difficulty of explaining the process* (1).
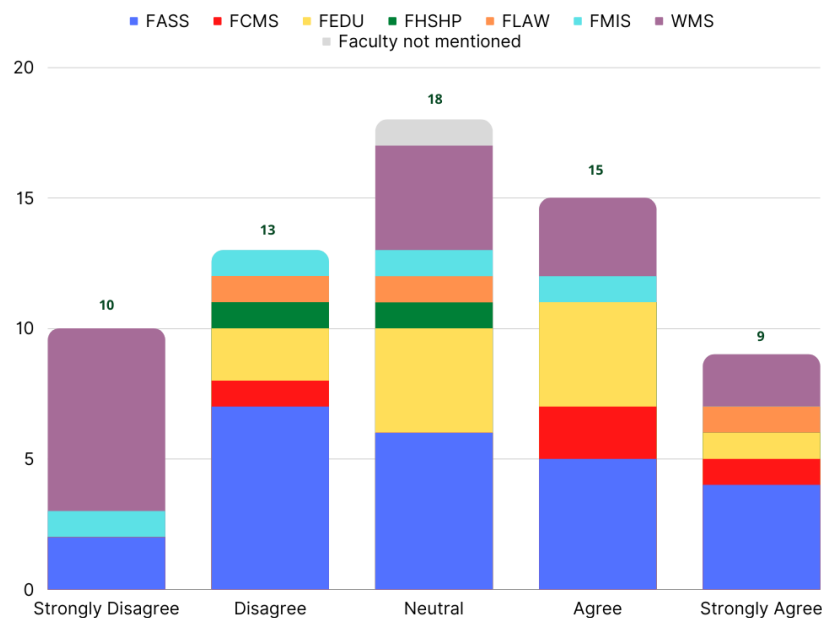
Figure 3.14. Linking an eBook with WRL is simple & clear - academics rating (n = 65)

The feedback from academics and librarians indicates that there are intricacies in linking digital material (particularly eBooks) due to the heterogeneity of the data structure in provider websites.

3.5.3 Academics' & Librarians' Experience with using WRL

27 of 71 respondents gave positive affirmation to the sentence 'The WRL made my job of teaching easier', 20 gave a negative response and 24 remained neutral (see Figure 3.15). From the detailed feedback of 52 participants, we see that 14 felt that WRL added to their workload without any perceived benefits for their teaching. Additional critical comments were the *lack of integration with other university systems such as Moodle or Course Outlines* (7), *doubts about actual usage by the students* (5), *difficulties in set-up and use* (4) *time consuming* (2). Positive feedback included the advantage of *having everything in one place* (7) and *reduced workload* (3).
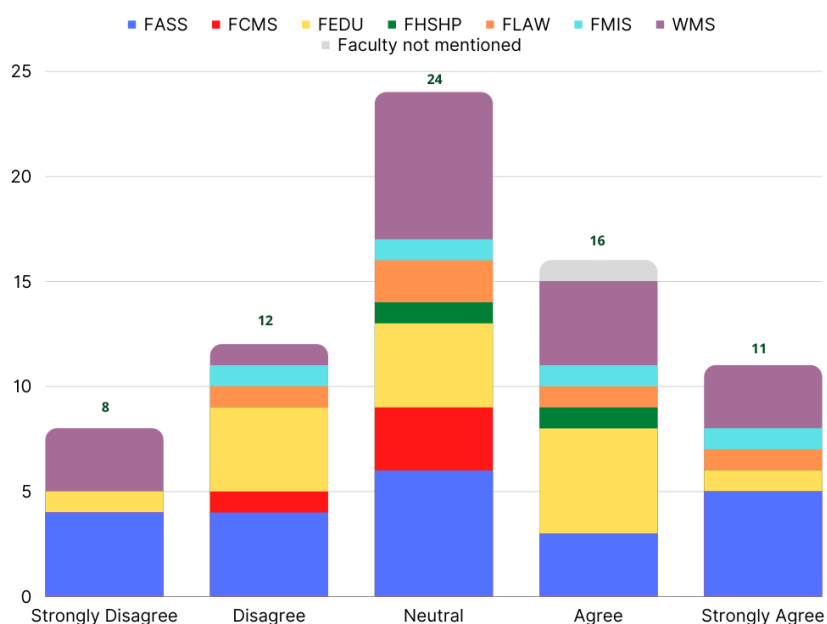
Figure 3.15. The WRL made my job of teaching easier - academics rating (n = 71)

The advantage of having everything in one place of course requires the academics to include not only the required copyrighted material but also all other reading material in the RLs (or to omit using non-copyrighted material).

When further examining the usefulness of WRL to academics beyond the support of teaching, 22 out of 71 respondents were neutral, and 39 were positive and only 10 negatives (see

Figure 3.16). 36 of the 71 provided further feedback, many of whom repeated points they made in earlier comments. For example, 7 of 36 found the *system unnecessary*, 5 doubted the *students would use the system*, 3 *wanted better integration into university systems,* 3 did not find it *easy to use*. On the other hand, 5 liked to have *all their reading material in one place*, 3 felt it *benefited the students*, 3 liked that it *helped to adhere to copyright rules*, and 2 felt it was *easy to roll over existing RLs*.
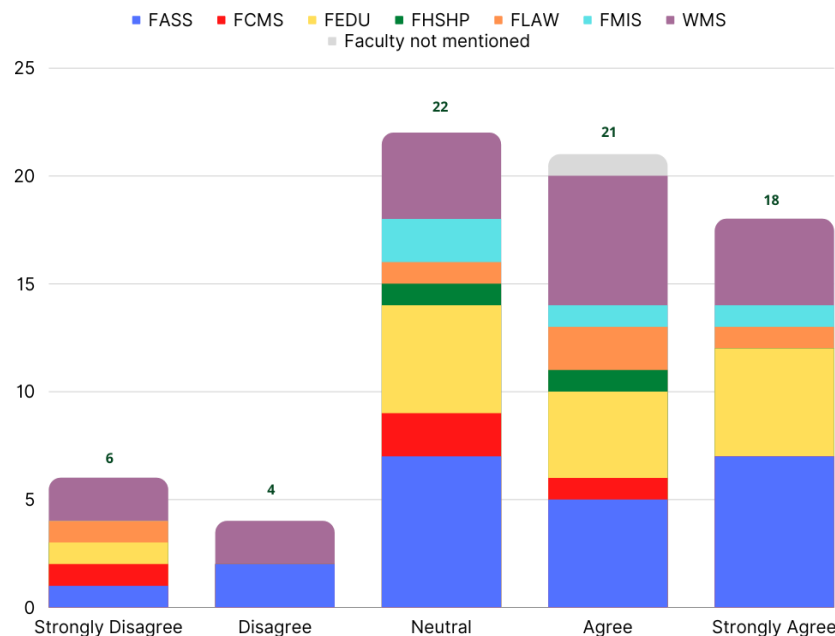
Figure 3.16. Having the WRL is useful - academics' rating (n = 71)

When asked about the satisfaction with the existing integration with Moodle (see Figure 3.17), 24 of 68 academics were neutral, 32 were positive and only 12 expressed a negative opinion. In contrast to the academics' impressions, the academic liaison librarians' responses on the same question were more negative: 3 gave negative feedback, 1 was neutral, and 2 were positive. In their detailed feedback 12 respondents (9 academics, 3 librarians) stressed that the *system needs better integration*, 5 asked for the RLs to be *more visible within Moodle* (to encourage students to use RLs), 4 suggested *auto-populate RLs information*. They suggested that the streamlining of integration might include, for instance, the inclusion of the readings with the relevant week/module/an individual item or topic.
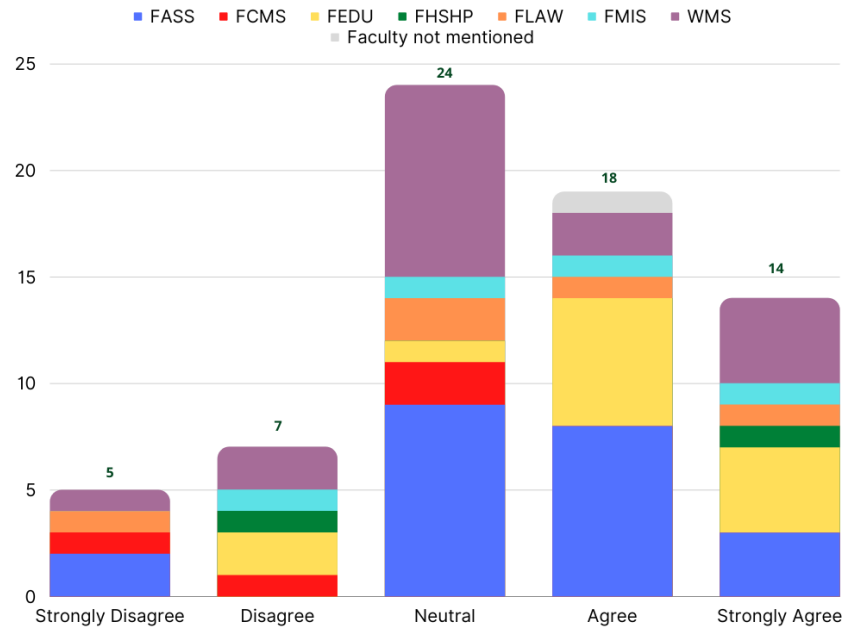
Figure 3.17. Satisfaction of integration of WRL with Moodle - academics rating (n = 68)

Finally, respondents volunteered some suggestions to improve the WRL, which we grouped as follows: *better integration of the RLs with other teaching systems* (11), *easy steps to complete the functions* (9), *help and user guidelines on how to use the RLs* (6), *better UX features and user-friendliness* (6), see Figure 3.18. In addition, the librarians made the following suggestions on system functionality: *adding a dashboard that measures students' engagement* (1), *adding a function that facilitates hiding sections in the lists* (1). Two further librarian comments suggested *enforcing the use of RLs by academics* (1) and *abolishing the system in exchange for a system that is based on Moodle* (1).
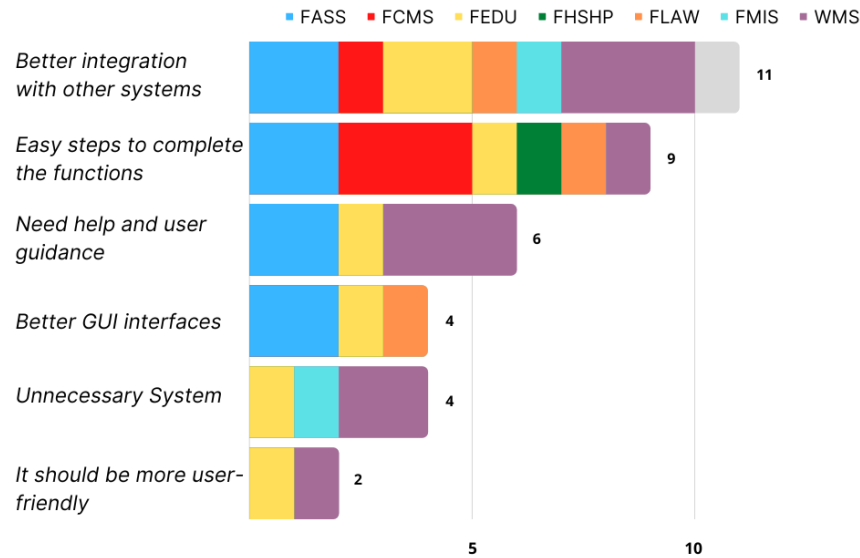
Figure 3.18. Suggestion on how to improve the WRL (academics, n = 35)

In summary, respondents' overall feedback on the ongoing use of the WRL reveals that the majority acknowledged the usefulness of the WRL. However, their detailed responses strongly suggested that improvements are necessary, including a streamlined workflow for the WRL functionalities and better integration of the WRL with other university systems used in teaching. When comparing the feedback from academics from different faculties, we do not find any discipline-specific feedback about the ease of use of the WRL.

3.6   Discussion

We discuss insights from our studies reported in this article, particularly in relation to related literature.

3.6.1   RL Numbers over Time

We observed that similar to other studies (Beasley, 2016; Krol, 2019; Walsby, 2020), the initial years of WRLs saw low numbers of RLs, with only a few academics being involved. In later years, the number of RLs grew at UOW, similar to other studies. In the engagement of academics with RLs creation, we identify two trends at UOW: RLs creation were at very high levels in four faculties (FEDU, FASS, FSEN, and WMS), and at low levels in the other four faculties (FMIS, FCMS, FHSHP and FLAW). While some of these differences may be explained by differing faculty sizes, there also seem to be disciplinary differences. Other studies confirm similar

variations between faculties (Beasley, 2016; Neill & Musto, 2017) but the specific pattern observed in our study had not been observed.

Related work reported on a number of interventions that helped with increasing RLs numbers, e.g., library staff creating the lists, a dedicated team to create the lists, improving communication between library and academics, continuous training (Krol, 2019; Walsby, 2020). At the UOW, the situation was found to be somewhat different: while more RLs were created over time, their overall increase was lower compared to that found in other studies. Even though similar interventions were in place at Waikato (e.g., a team of librarians creating RLs), the overall academic engagement remained low.

3.6.2   RL Content Types

From the questionnaire, we found that 85% of academics reported the inclusion of journals/articles, and 77% reported using books/eBooks in WRL. In addition, 38% of academics reported including other materials, such as web pages etc. Krol (2019) survey at the University of West London revealed books /eBooks being the most popular format for RLs inclusion (96%), with chapters/articles or audio-visual material being less often included (60%). We observe that overall, very little data is available, and is difficult to compare due to conceptual differences.

From the log data, we found that 43% of all materials included in WRL in 2020 were journals/articles, 40% were books/chapters, and 17.5% were other materials. This seems to mirror the preferences stated by academics during the survey.

When analyzing the difference between faculties, we found that most linked journals/articles and books/chapters were included in the close-to-equal measure. The only exceptions were Science/Engineering with a clear preference for books/chapters (86%), and Computing with a preference for other items (55%). Even though the WRL content was driven by the need to acknowledge copyrighted material, these differences between faculties may highlight area-specific preferences. While Brewerton (2014) and Krol (2019) similarly commented on the differences between disciplines, their observations were merely anecdotal. Our study is the first to observe these differences in a log study.

3.6.3   Satisfaction with RL System

We found that at the UOW, very few academics set up RLs independently, with 47% seeking help and 33% fully depending on someone else to set-up the RLs (see Figure 3.8). The main reasons

given were the complexity in setting up RLs, and time constraints, which reflect the observations in other studies (Cameron & Siddall, 2017; Zhu, 2018; Krol, 2019). Many academics felt that the RL system was unnecessary, doubted the actual usage by the students, and disliked the lack of integration with other university systems. One of the challenges identified by the academics and librarians' points to the inconsistencies between the online systems offered by publishers in terms of linking to eBooks, and to chapters/parts of eBooks. A standardization at the publisher or RL system level would greatly ease the burden to the creators of RLs.

14% of respondents did not find the WRL useful and the feedback of the 31% of the respondents who remained neutral revealed that many were not satisfied with the RLs functionality. This is only a slightly better result than that reported by Zhu (2018) where the majority of academics were dissatisfied with their RL system, as they did not find it stable and easy to use. Krol (2019) similarly reported that only 50% of their respondents felt comfortable using the RL system, due to time pressure, lack of training, and lack of confidence. Our study results thus agree with earlier studies (Cameron & Siddall, 2017; Krol, 2019) in observing that time constraints were a limiting factor in RL engagement by academics. We conclude that similar to many other RL systems, the WRL system did not offer academics sufficient incentives (i.e. teaching-related benefits) to want to invest their already-limited time.

From these reasons, we hypothesize that a lack of relevance of the RL system to the academics' work as teachers may have been a barrier. It remains unclear from our study data if this lack of relevance was caused by an "asymmetrical disconnection" (Rezaei, 2006) between librarians (who set-up and maintain the RL system) and academics (who use RLs in their courses). This may have led to a potential misalignment in the system's purpose and academic needs.

Krol (2019) found that 84% of their respondents agreed that RLs could be useful as a pedagogical tool. The original concept of academic RLs was to provide pedagogical 'scaffolding' by academics to students via signposting and annotations (Stuyf, 2002). However, the WRL system does not currently offer comprehensive pedagogical support. We note that the opportunity of establishing a RL system as a pedagogical tool has so far been missed. We believe the reason is that the system was acquired predominantly to address the legal requirement of copyright reporting, and any potential pedagogical benefits to teachers or students were not considered.

3.6.4 Implication for Digital Libraries

Requirements of tracking the reading materials (Al-Anazi et al., 2014; Akbar et al., 2011; Agosti et al., 2008) and the integration of digital libraries in academic learning environments (Margaret, 2003; Rezaei, 2006; McMartin et al., 2008; Virkus et al., 2009) were highlighted in previous studies. From the results of our study, we conclude that for a digital library to provide reading list functionality, linkage to both internal documents and documents provided by external publishers is required. In addition, linking to external sources, such as web pages, needs to be supported. Seamless access to the different content types would be of importance. Features that could support pedagogical commentary would need to be provided by the digital library system to go beyond lists of content for each course.

3.7   Summary and Conclusion

This article provides insights into the introduction of a RL system at the UOW over five years, and the experiences of academics and librarians with the University's RL system. From our log analysis and questionnaire responses, we draw the following five conclusions:

First, the faculties showed great variation in RLs uptake ranging from 3% to 63%, with a mean of 41%, which we believe may be due to differing disciplinary requirements. In order to better support the various faculty-teaching strategies, we recommend that the library take a flexible approach and develop discipline-specific initiatives to increase the number of RLs.

Second, the results from our log analysis study confirmed the differences in RLs content across disciplines, which was previously only reported through anecdotal evidence.

Third, we found the RLs set-up process to be complex and time-consuming and only a few academics managed to set up the RLs independently. We recommend streamlining the RLs creation process.

Fourth, we observed that many academics struggle to link eBook and other teaching materials with the RLs, and do not perceive the linking process to be user-friendly. We identified a need to improve the usability of the resource-linking process.

Finally, while acknowledging the University's requirement to implement RLs for recording copyrighted materials, we see a significant need for pedagogical support in WRL to better integrate into academic teaching. We believe that the uptake and perceived usefulness of WRL could be

improved through enhancing the pedagogical benefits and integration of RLs into teaching activities and support systems.

This study focused on exploring the experiences of those academics who were involved with creating RLs. As an extension of our work, it may be interesting to explore the feedback from those academics that did not engage with RLs. We are currently carrying out a companion study that explores the students' perceptions and experience of RLs. Insights from this second study will help guide our future research into pedagogical features needed for RL systems.

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Appendix A: Particularities of the each of Faculty

Faculty	Available support staff	Adopted teaching support systems
Faculty of Art and Social Sciences (FASS): Offers programmes in areas such as languages and linguistics, music, dance, theater, screen and media, anthropology, geography, environmental planning, history, philosophy, political science, social and public policy, sociology and social work.	Each faculty is assigned two academic liaison librarians.	Moodle as the Learning Management System.
Faculty of FCMS: Offers a stimulating and leading-edge environment of quality relevant teaching programmes in design, computer science, software engineering, mathematics, and data analytics.	Academic Liaison Librarians work with academic staff and postgraduate students to provide specialist tutorials and individual assistance for study and research.	The Paper Outlines System is to provide a centralized repository where subject outlines can be created, maintained, reviewed, presented and stored.
Faculty of Education (FEDU): Offers programmes in areas such as teacher education, counseling, human development, education, educational leadership and education studies.		Panopto enables University staff and students to capture and deliver audio and video content.
Faculty of Health, Sport and Human Performance (FHSHP): Offers qualifications that offer students who are passionate about health, hauora and wellbeing the opportunity to develop knowledge and skills to enhance the lives of individuals and communities.	Specialist staff also provide reference services, copyrights, tutorials and individual assistance to help staff and students to access and use Mātangireia and Map resources.	The library's information systems and technology includes Library Services Platform (Alma), Discovery Layer (Primo) and subscribed databases.
Faculty of Law (FLAW): Offers an innovative, student-focused Bachelor of Laws (LLB) degree in a stimulating academic environment.		Waikato Reading Lists for tracking copyrights and course reading management.
Faculty of Maori and Indigenous Studies (FMIS): Offers programmes in Māori language and linguistics, culture, customs, creative and performing arts, media and communication, Treaty of Waitangi, and development studies		Research Commons - institutional research repository
Waikato Management School (WMS): Offers a wide range of business education at all levels of study		O Neherā includes Digital Collections such as photographs, postcards, maps and posters.
Faculty of Science and Engineering (FSEN): Offers a range of innovative programmes for the undergraduate degrees of Bachelor of Science and Bachelor of Engineering.		

Appendix B: Questionnaire for Academics

No	Question	Type	Options
1	I am	Multiple Choice	I. Academic Staff II. Academic Support Staff
2	I am a staff member of the faculty	Multiple Choice	I. Waikato Management School (WMS) II. Faculty of Computing and Mathematical Sciences (FCMS) III. Faculty of Art and Social Sciences (FASS) IV. Faculty of Maori and Indigenous Studies (FMIS) V. Faculty of Science and Engineering (FSEN) VI. Faculty of Health, Sport and Human Performance (FHSHP) VII. Faculty of Education (FEDU) VIII. Faculty of Law (FLAW)
The following questions are about your engagement with the Waikato Reading List.			
3	Which of the following statements explain your Waikato Reading List set-up?	Checkbox	I. I have set up Waikato Reading Lists by my-self II. Someone else set up Waikato Reading Lists for me III. With the help of others, I have set up Waikato Reading Lists IV. Other
	If you sought help from others to set up Waikato Reading Lists, please specify what kind of help you sought?	Open-ended	-
4	For how many papers have you created a Waikato Reading List?	Multiple Choice	1 2 3 4 5 Other
5	For papers that you have taught multiple times, how many of those papers have had a Waikato Reading List more than once?	Multiple Choice	1 2 3 4 5 Other
6	What materials have you included in Waikato Reading Lists?	Checkbox	I. Course materials (presentations, documents, audios, videos, images

			etc)
			II. eBooks
			III. Scans from printed books
			IV. Web Page (blog, articles, but NOT academic journal/conference articles)
			V. Academic journals/conference articles
			VI. Periodicals/magazines
			VII. Other
The following Questions (7-8) are about your experience with setting up a Waikato Reading List.			
7	I found the set-up of Waikato Reading List to be clear and easy to interact with	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
8	Any other feedback about the set-up process?	Open-ended	-
The following Questions (9-12) are about your experience with linking an eBook or other teaching materials in Waikato Reading Lists.			
9	I have successfully linked eBooks or other teaching materials with my Waikato Reading Lists?	Multiple Choice	I. YES II. NO
10	If your answer is NO for the above, what are the reason/s?	Checkbox	I. I wasn't aware that I can link eBooks II. I was aware that I can link eBooks but I didn't know how to link eBooks via Waikato Reading List III. Linking eBooks via WRL is difficult IV. The process of linking eBooks via Waikato Reading List is confusing V. I choose other methods to make eBooks available to students VI. For my papers I recommend students to use print books VII. For my papers, the Library doesn't have the eBooks VIII. I'm not using eBooks in my papers or course readings IX. Other

11	I found linking an eBook to the Waikato Reading List to be simple and clear	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
12	Any other feedback about linking an eBook or other teaching materials with the Waikato Reading List?	Open-ended	-

Questions 13-16 are about your experience of ongoing use of the Waikato Reading List.

13	I used the Waikato Reading List to teach students in the following mode. You may select more than one	Checkbox	I. On-campus students (courses labeled HAM, TGA, or ZUC) II. Off-campus students (courses labeled NET)
14	The Waikato Reading List made my job of teaching easier	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
15	I found having the Waikato Reading List to be useful	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
16	Overall, I'm satisfied with how the Waikato Reading List is integrated with Moodle	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
17	Please provide your suggestions to improve the Waikato Reading List to make your teaching easier.	Open-ended	-

Appendix C: Questionnaire for Academic Liaison Librarians

No	Question	Type	Options
	The following questions are about your engagement with Waikato Reading Lists.		
1	Which of the following statements explain your Waikato Reading List set-up?	Checkbox	I. I have set up Waikato Reading Lists by myself II. I have sought the help of others to set up Waikato Reading Lists III. I have set up Waikato Reading Lists for someone else
2	If you have set-up a Waikato Reading List for someone else, please explain the reason(s) for this	Open-ended	-
3	If you set-up Waikato Reading Lists for someone else, please specify what kind of help that you provided?	Open-ended	-
4	How many Reading Lists have you created?	Multiple Choice	0 - 5 6 - 25 26<
5	How many times have you been asked to edit a rolled over list?	Multiple Choice	0 - 5 6 - 25 26<
6	What materials have you included in Waikato Reading Lists?	Checkbox	I. Course materials (presentations, documents, audios, videos, images etc.) II. eBooks III. Scans from printed books IV. Web Page (blog, articles, but NOT academic journal/conference articles) V. Academic journals/conference articles VI. Periodicals/magazines VII. Other
	The following Questions (7-8) are about your experience with setting up a Waikato Reading List.		
7	I found the set-up of Waikato Reading List to be clear and easy to interact with	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your	Open-ended	-

	rating on the above question.		
8	Any other feedback about the set-up process?	Open-ended	-

The following Questions (9-11) are about your experience with linking an eBook or other materials in Waikato Reading Lists.

9	I have successfully linked eBooks or other materials with the Waikato Reading Lists	Multiple Choice	I. YES II. NO
10	Any other feedback about the set-up process?	Open-ended	-

The following Questions (9-12) are about your experience with linking an eBook or other teaching materials in Waikato Reading Lists.

9	I have successfully linked eBooks or other teaching materials with my Waikato Reading Lists?	Multiple Choice	I. YES II. NO
10	If your answer is NO for the above, what are the reason/s?	Checkbox	I. I wasn't aware that I can link eBooks II. I was aware that I can link eBooks but I didn't know how to link eBooks via Waikato Reading List III. Linking eBooks via WRL is difficult IV. The process of linking eBooks via Waikato Reading List is confusing V. Other
11	I found linking an eBook to the Waikato Reading List to be simple and clear	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
12	Any other feedback about linking an eBook or other teaching materials with the Waikato Reading List?	Open-ended	-

Questions 13-15 are about your experience of ongoing use of the Waikato Reading List.

13	I have set up the Waikato Reading List for students who study in the following mode. You may select more than one	Checkbox	I. On-campus students (courses labeled HAM, TGA, or ZUC) II. Off-campus students (courses labeled NET)

14	Overall, I'm satisfied with how the Waikato Reading List is integrated with Moodle	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
15	Please provide your suggestions to improve the Waikato Reading List to support teaching better	Open-ended	-

Chapter 4

How Students use Reading Lists

In the previous chapter, we discussed the makeup of RLs and the experience of academics and librarians when creating RLs. We also wish to explore the students' experience with the RLs. This chapter therefore explores Thesis Question 2, the students' experience with the RLs, in particular when accessing electronic materials such as eBooks via RLs.

We used a questionnaire to survey the students' experience with RLs at the UOW. The results of this study are presented in this chapter under three themes: 1. Experience with the Resource Lists Interface 2. Experience of the use of eBooks in the WRL and 3. Satisfaction with the WRL. This chapter discusses multifaceted issues highlighted by the students and recommends improving the RLs system's usability.

The material presented in this chapter has been submitted to the International Journal of Digital Libraries (see J2 in Figure 1.3).

Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2023b). Online Reading Lists: Evaluating Students Experience, International Journal on Digital Libraries (Under review).

Online Reading Lists: Evaluating Students Experience

"You can't teach people everything they need to know. The best you can do is position them where they can find what they need to know when they need to know it."

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Abstract

Reading Lists have begun to play an important role in student-centric education. However, there is currently too little information about the students' experience in the use of the Reading Lists. This paper explores the students' experience with the Reading Lists, in particular, when accessing electronic materials such as eBooks via a Reading Lists system. We conducted a survey using an online questionnaire that comprised multiple choice and open-ended questions for the students who engaged with the Waikato Reading Lists. Thematic analysis was used for the qualitative data obtained from open-ended questions. Students were found to appreciate the way that Reading Lists help in their learning and perceived the Reading Lists to be a useful tool for their learning process. However, their use of Reading List systems features varied due to the lack of awareness, visibility, and interaction difficulties. We explore implications for Reading Lists implemented through Digital Libraries and recommend enhancing the usability and the pedagicial features of Reading List systems to increase students' engagement.

Keywords: Online Reading Lists, Digital Library, Tertiary Education, Student Engagement, eBooks

4.1 Introduction

Reading lists have long been a tool of study in tertiary teaching (Brewerton, 2014; Stokes & Martin, 2008), traditionally in paper-based form. They are a convenient information resource, which in recent years has been complemented by supplementary electronic information sources. Educators have noted the opportunity for managing and tracking reading materials in digital libraries (Agosti et al., 2010; Akbar et al.,2011; Al-Anazi et al., 2014) and for integrating digital libraries in academic learning environments (Agosti et al., 2010; Akbar et al., 2011; Al-Anazi et al., 2014; Margaret, 2003; Kumara et al., 2023a; Virkus et al., 2009).

Academics create reading lists for a number of purposes, chiefly the directing of student reading through given literature (Stokes & Martin, 2008). Typically, these lists are handed out or made available online to students at the start of their course. Also, academics usually provide these reading lists to the institution's library to support their collection development. Therefore, these lists represent an important channel of communication between academics, students and librarians. Current Reading Lists Management Systems (RLs) are often integrated into an academic library's offerings (Chad, 2018; Krol, 2019). Copyright Licensing New Zealand (CLNZ) requires all universities in New Zealand to provide software solutions to enable electronic reporting on copyrighted material (CLNZ, 2014). All eight New Zealand universities have started adopting RL systems since 2015 to meet these reporting obligations with CLNZ. The University of Waikato library has been offering Waikato Reading Lists (WRL) since 2016.

Previous studies identified the need for more detailed examinations of RLs, particularly with regards to enhancing student engagement (Cameron & Siddall, 2014; Krol, 2019; Marks, 2020). In this paper, we explore how students engaged with RLs while enrolled in courses at the University of Waikato. In particular, we seek answers to the following research questions:

RQ 1: What are students' experiences with RLs in general?

RQ 2: What is the student experience in using the list of reading material in WRL?

RQ 3: What are students' experiences in accessing external resources, such as eBooks via WRL?

The remainder of the article is structured as follows: The following section provides an overview of related RL studies and students' perceptions of RL systems and identifies research

gaps. Next, we explain our study method and then present the study results and data analysis. In the discussion, we compare our study insights with the results of recent studies. The final section presents the drawn conclusions.

4.2   Study Background

4.2.1   Institutional Context

The University of Waikato (UOW) has 13,076 students and 649 academic staff (UOW, 2020). Our study was conducted across all eight faculties: Art and Social Sciences (FASS), Education (FEDU), Science and Engineering (FSEN), Waikato Management School (WMS), Māori and Indigenous Studies (FMIS), Computing and Mathematical Sciences (FCMS), Health, Sport and Human Performance (FHSHP) and Law (FLAW). (See Appendix A for faculty details). RLs are typically created for each course instance, being assigned to different semesters and years, such as Summer Schools S and T, Semesters A and B, whole year Y courses, and Semester C (all other periods). Most students attend Semesters A and B, with fewer in summer schools S, T. Y, and C are rarely used, mostly for postgraduate studies.

4.2.2   Waikato Reading Lists System

WRL is a reading lists management system which the University introduced in 2016 to streamline the creation and management of course reading lists and make copyright compliance easier (UOW, 2022). At the UOW, reading lists are created by academics with the help of library staff to provide learning materials to students. This includes copyrighted materials such as scanned or photocopied print book chapters, book sections, or journal articles. In addition to that, it allows academics to add eBooks, eBook chapters, online articles, web pages/blogs, audiovisual materials, images etc.

The benefit of having a reading list is that the lecturer can create context and guidance around the learning material intended for student engagement, which can be done within a weekly schedule. Academics post required learning materials into the reading list for a course and students can access those learning materials by directly logging in to the WRL account or via Moodle account. Once they are logged, the published list of materials are accessible via the Resource Lists Interface which is the main interactive interface that displays all the linked materials that the students are required to engage with (see Appendix B for student view of the Resource Lists Interface of the WRL).

4.3 Related Work

Our analysis of related work on RL systems in tertiary education focused on two aspects: (1) students' experience and perception of the RLs (Brewerton, 2014; Cross, 2015; Krol, 2019; Marks, 2020; McGuinn et al., 2017; Siddall & Rose, 2014; Stokes & Martin, 2008), and (2) contents of the RLs (Casselden & Pears, 2019; Johnston & Salaz, 2019; Krol, 2019; Marks, 2020; Siddall & Rose, 2014)

Student Experience

Literature on students' experiences in RLs is sparse. Only two studies explored the general use of RLs in universities (Brewerton, 2014; McGuinn et al., 2017). Other studies examined RLs use within portions of a university (Cameron & Siddall, 2014; Krol, 2019; Marks, 2020; Stokes & Martin, 2008). One theme that consistently emerged from the studies is that the academics and librarians believed RLs 'spoon-feed' students as they hinder the students' development of learning skills (Cameron & Siddall, 2017; Krol, 2019; Stokes & Martin, 2008). Stokes & Martin (2008) indicated that some students saw RLs as a resource that only helped them with their assessments rather than seeing it as a part of their independent learning journey. The literature detailed numerous reasons for students' satisfaction or dissatisfaction with RLs. On the positive side, students appreciated RLs as a pedagogical tool, with scaffolding that encouraged them to read and explore their subjects (Cameron & Siddall, 2017; Krol, 2019; Marks, 2020; Stokes & Martin, 2008). A study conducted by Siddall and Rose (2014) at the University of Northampton found that students felt that RLs provided assurance that they were reading the right content, as well as giving easy access to that content. Furthermore, according to the authors, well-structured and annotated RLs with plenty of explanation and signposting were valued by students as they helped to build their confidence to become independent learners.

McGuinn et al. (2017) also noted that the majority of students at the University of Huddersfield found RLs to be a valuable resource that enhanced their learning. Cross (2015) observed that the students found the experience of RLs rewarding, when the content was easy to access, and allowed integration of RLs with their VLE and resource delivery systems. In line with the above findings, Brewerton (2014) also mentioned that the students tended to consider their RLs to be more important than many lecturers did.

Several factors preventing students from using their RLs were identified. According to McGuinn et al. (2017), students are dissatisfied if the lecturers do not regularly update the lists contents, organize poorly or are too lengthy. Brewerton (2014) also highlighted some barriers which include visibility (how well the features of the RL systems are conveyed to students), content (type of materials included), length of the RLs and the availability of included items. Furthermore, Brewerton (2014) noted that some students were confused as to the purpose of their RLs, and the expectations lecturers had of them regarding the listed materials.

RL Content

The literature also discusses the types of content found in RLs. Krol (2019) reported that books /eBooks were found to be the most popular material format in RLs with lower usage of digitized chapters/articles or audio-visual material. Marks (2020) identified that though the students at the London School of Economics preferred reading in print format, the deciding factor for them was always based on the convenience of reading. Therefore, he noted that students chose e-resources and appreciated signposted RLs. However, his findings showed that students remained dissatisfied with eBooks and had a strong preference for e-journal articles as a result of their structure and functionality. Casselden & Pears (2019) and Johnston & Salaz (2019) also reported that the students' satisfaction with accessing eBooks depended on availability, ease of both access and format.

Another theme that emerges from the literature is the role of the RL system as a pedagogical tool. Siddall & Rose (2014) mentioned that the RLs are under-used in their role as a pedagogical tool to develop students' information literacy skills. They mentioned that well-structured and annotated content could help to enhance the RLs as a pedagogical tool. Krol (2019) also highlighted the importance of enhancing the RL systems as a pedagogical tool with the help of academics and the library staff.

Importantly, none of the literature focused on evaluating the students' experience on the usability of the RLs tasks and its interfaces. However, according to the prior studies, it seems that students understood the importance of RLs as a piece of scaffolding which helped them to further information seeking. However, their engagement mainly depended on the quality and the ease of access to the RLs.

Identified Research Gaps

Table 4.1 compares the discussed studies. While six out of the seven studies focused on students' experience of the use of RL systems, only one study (Cross, 2015) explored the challenges of the implementation of RL systems. None of the studies focused on evaluating the students' experience with the usability aspects of the RL systems, such as user interfaces or specific features. The studies of Brewerton (2014), Cross (2015), and McGuinn et al. (2017) have focused on all faculties in a particular university. However, they did not analyze their data according to the faculty.

Table 4.1. Summary of the student experience on RL systems studies

Author	Instituion	Aim of the Study	Specific Focus			Method			Study Population		Participants		
			General exprience	Specific functions	Implementation challenges	Log Analysis	Questionnaire	Interviews/ Focus Groups	All Faculties	Selected Faculties	Academic Staff	Library Staff	Students
Stokes & Martin (2008)		tutor and student experience/expectations	✓	-	-	-	✓	-	-	Arts & Sciences; Health; Education	✓	-	✓
Brewerton (2014)	Loughborough, UK	student and lecturer experience	✓	-	-	-	-	✓	✓	-	✓	-	✓
Cameron & Siddall (2014)	Northampton, UK	explore the potential of RLs as a pedagogical tool	✓	-	-	-	-	✓	-	Education; Health	✓	-	✓
Cross (2015)	Nottingham Trent, UK	key components of new RL management system	-	-	✓	-	-	✓	✓	-	✓	✓	✓
McGuinn et al (2017)	Huddersfield, UK	student experience	✓	-	-	-	✓	-	✓	-	-	-	✓
Krol (2019)	West London, UK	students & academics engagement with RLs	✓	-	-	2016-2019	✓	✓	-	Computing and Engineering	✓	-	✓
Marks (2020)	London School of Economics Library	student experience/expectations	✓	-	-	-	-	✓	-	Social Science	-	-	✓
Our Study		student experience with RLs, use of eBooks through RLs.	✓	✓	-	-	✓	-	✓	-	-	-	✓

4.4 Method

This section presents the study method and the method deployed for data analysis.

4.4.1 Study Method

A survey was conducted using an online questionnaire that comprised multiple choice and open-ended questions for students who engaged with WRL (see Table 4.2 for summary of questions cut down version and Appendix C for a detailed version). Following ethics approval, the online questionnaire was distributed to all students enrolled in courses with reading lists in Semester B (Trimester) 2020. The study population for the survey consisted of the UOW students who had registered for papers in Semester B 2020 with at least one of those papers having a WRL. Students were not contacted directly; instead, assistance was requested from academics in the distribution of the questionnaire via Moodle to students in their papers. The assistance request was emailed to 307 academics in October 2020; the survey ran for two weeks, with a total of 68 student participants.

4.4.2 Method of Data Analysis

Since the questionnaire consisted of a mix of multiple choice and open-ended questions, several manual steps were taken to prepare the responses for analysis. Data gathered through multiple choice questions were first grouped according to the ratings, frequent comments and the faculties they were attached to. Then they were analyzed and presented in a structured form using a range of representational tools such as charts, graphs, and tables. To analyze the feedback to the open-ended questions, thematic analysis based on word/theme occurrence was deployed. The theme is a pattern found in the information that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon (Boyatzis, 1998).

Table 4.2. Summary of the questionnaire

Section	Question Number and Question
Demographic	1. I am [*An undergraduate student /A postgraduate student*] 2. I study [*On campus/ Online*] 3. I am a student at [*Faculty of*]
Experience with the Waikato	4. I am accessing WRL via the following mode/s [*Moodle/ Student portal/ Library search/ Reading Lists home page/ Other*] 5. Waikato Reading List displays reading resources in an organized manner

Reading Lists	(Please provide more details about your rating on the above question)
	6. The interface of the resources list in the WRL is clear and easy to use
	   (Please provide more details about your rating on the above question)
	7. Which of the following features have you used in the resources list interface of the WRL?
	8. The features in the resources list interface of the WRL are easy to understand and use (Please provide more details about your rating on the above question)
	   9. Overall, I found the Waikato Reading List to be clear and easy to interact with
	   (Please provide more details about your rating on the above question)
	10. Any other feedback about your experience with the Waikato Reading List?

Experience of accessing eBooks via the Waikato Reading Lists	11. I found accessing an eBook in the Waikato Reading List simple and clear
	   (Please provide more details about your rating on the above question)
	12. When accessing/reading eBooks via the Waikato Reading List have you encountered [*ebook as a single PDF to download/ ebook as a PDF that separated into the sections/chapters to download/ ebook as an online viewing document loaded in the vendor supported platforms/ other*]
	13. From each of these, which option do you prefer most?
	   (Please provide more details about your rating on the above question)
	14. Any other feedback about accessing an eBook in the Waikato Reading List?

Satisfaction with the Waikato Reading Lists	15. The Waikato Reading List satisfies my needs for finding reading resources my lecturer requires me to read
	   (Please provide more details about your rating on the above question)
	16. The Waikato Reading List has made my learning more effective
	   (Please provide more details about your rating on the above question.)
	17. I found having the Waikato Reading List to be useful
	   (Please provide more details about your rating on the above question.)
	18. Overall, I'm satisfied with using the Waikato Reading List for my learning
	   (Please provide more details about your rating on the above question)
	19. Any other feedback about your experience with the Waikato Reading List?

4.5   Results and Analysis

We received responses from 68 participants, representing all 8 faculties: FEDU (22), FASS (17), WMS (16), FSEN (7), FLAW (2), FCMS (1), FMIS (1) and FHSHP (1). One participant did not indicate their faculty. In addition, out of all participants, 67% were undergraduates and 34% were postgraduate students. 61% of them study on campus whereas 60% study online (some participants study on both the modes). We now present the results grouped thematically.

4.5.1   Experience with the Resource Lists Interface

The students' experiences of engagement with the Resource Lists Interface were explored via Section 1 of our questionnaire (see Table 4.2 question number 4-10).

Figure 4.1 depicts the typical WRL access pathways as self-reported by the students. The results show that the majority (62 of 67, 93%) of the student participants reported accessing the WRL via Moodle. No faculty-specific differences can be seen. With academics directing students to the WRL reading resources by posting a link in their Moodle papers, it is not surprising that Moodle becomes the students' main mode of access to the WRL.
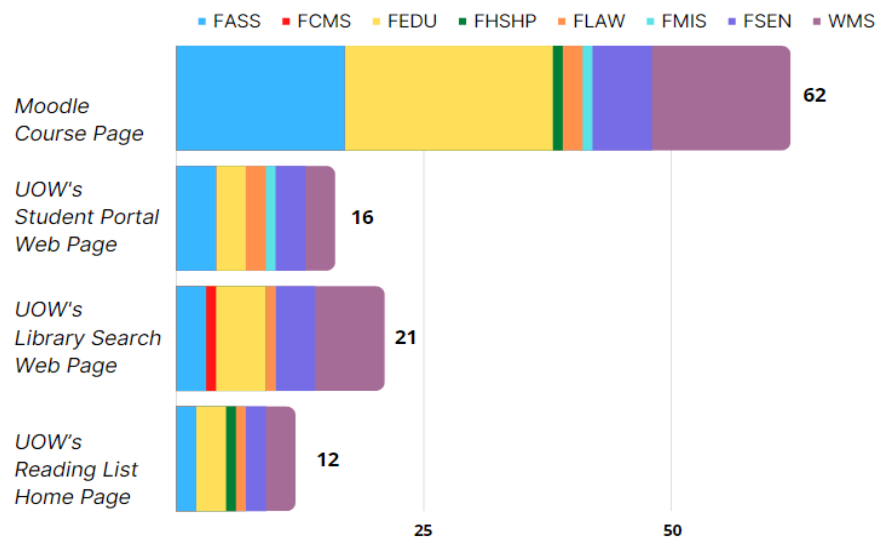
Figure 4.1. Accessing modes of the WRL (Q 4, n = 67) [more than one answer permissible]

Figure 4.2 shows the rating participants gave to the quality of organization in the reading list (using a Likert Scale "WRL displays reading resources in an organized manner").
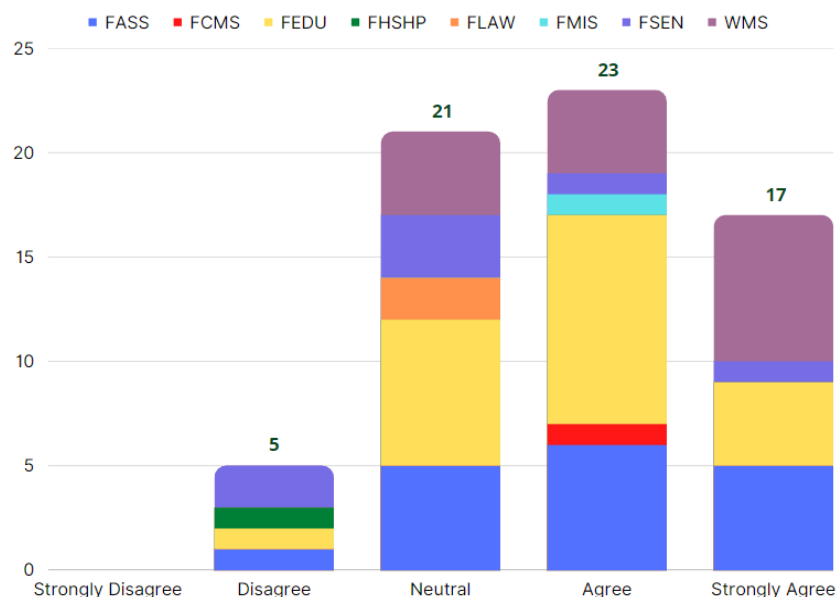
Figure 4.2. WRL displays reading resources in an organized manner (Q 5, n = 66)

We see that 40 of 66 (60%) respondents had a positive impression of the organization of the reading resources in the WRL (agree and strongly agree). Only 8% of the respondents had a negative impression. 46 participants additionally gave detailed feedback on the WRL interface. In Table 4.3, we summarize the respondents' detailed feedback and their rating for Question 5. Light gray color indicates positive feedback, and the dark gray color indicates negative feedback. The positive comments by the participants included "I feel good as the WRLs in my papers are divided into sections in accordance with papers' themes", "easy to follow. It is on the lecturer's side to refer to which sub-category to click into. I can follow it easily enough" and "Readings were organized by week, so I knew which ones to read when". Negative comments included "Don't always have the best options first", "The title and author are clear, but not to which topic or week the reading belongs to", "It gives topics which are not needed and is not very specific" and "too much information at once".

Table 4.3. WRL displays reading resources in an organized manner - detailed feedback. (Q 5, n = 46) [more than one answer permissible]

Feedback	Rating					Total
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Well organized and easy to follow	-	-	-	9	9	18
Readings need to be properly structured to week/topic/author	-	2	7	5	-	14
Content information needs to be more specific	-	-	6	-	-	6
The interface isn't ideal	-	-	1	-	-	1

Although 60% of respondents felt the WRL was well organized, many still suggested that the reading resources needed to be displayed in a more structured manner. We then explored the students' impressions regarding the clarity and ease of use of the Resource Lists Interface (see Figure 4.3). While nearly 59% were positive (39 of 66), the number of negative answers doubled (10 of 66, 15%) in comparison to the previous question.
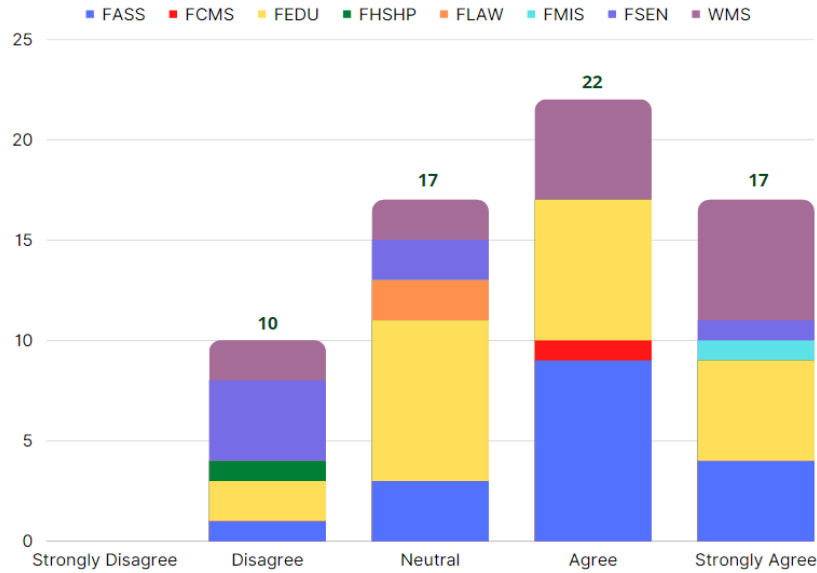
Figure 4.3. The interface of the resources list in the WRL is clear and easy to use (Q 6, n = 66)

When exploring the detailed feedback on ease of interaction with the Resource Lists Interface (see Table 4.4), five of the 39 respondents who were overall positive, believed that the contents of the Resource Lists Interface were inconsistent and busy with misleading information. Their comments included "sometimes struggle to find resources and not consistent", "Once I figured out where I was going, as above there are a lot of clicks", "too much information at once", and "the little dot for checking if you have read the given article is not always that easy to use. It's fine on computers, but not so much on tablets".

Table 4.4. The interface of the resources list in the WRL is clear and easy to use - detailed feedback (Q 6, n = 38) [more than one answer permissible]

Feedback	Rating					Total
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Clear and easy to use	-	-	1	7	11	19
Many information and misleading	-	1	5	2	-	8
Not consistent	-	-	1	3	-	4
Not used most of them	-	2	1	1	-	4
Old fashioned	-	-	3	-	-	3

Even though 59% of participants gave a positive rating, detailed feedback suggests that the Resource Lists Interface could be designed to be easier or clearer.

Next, we explored the RL features that respondents reported to have used (out of a list of 13 features). Figure 4.4 shows the summary of feature usage in the Resource Lists Interface: we note that the most used feature was 'View Online' (77%) which links to the resources. We note, however, that of the 66 participants only 51 seem to have used the option to view resources. More so, all other features were used by fewer than half the participants.
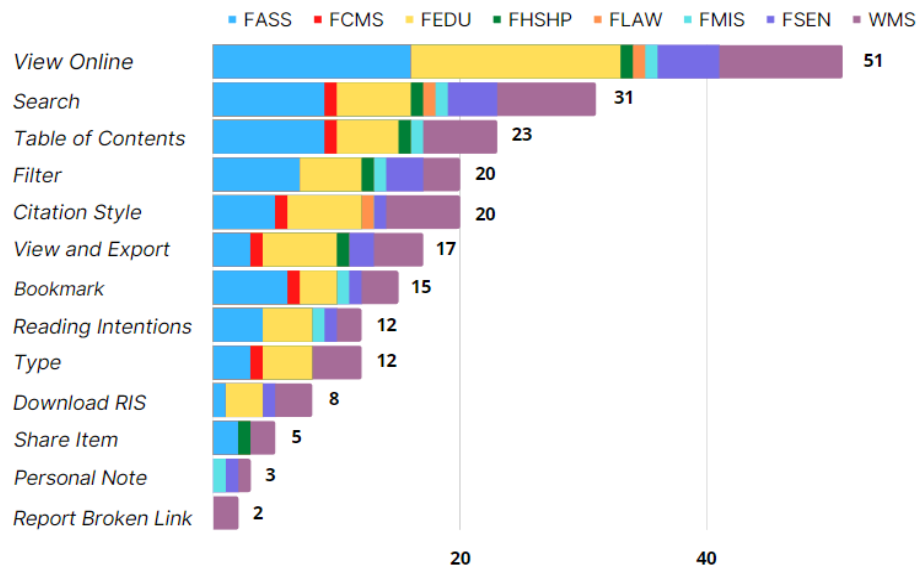
Figure 4.4. Features used in the Resource Lists Interface of the WRL (Q 7, n = 66)

Question 8 asked how easy it was to understand the participants found the resource list features. Only 50% of the respondents (33 of 66) found the Resource Lists features easy to understand and use (Figure 4.5). Half of the respondents expressed negative impressions (24%) or were neutral (26%). This may give an indication why the vast majority of features have not been used.
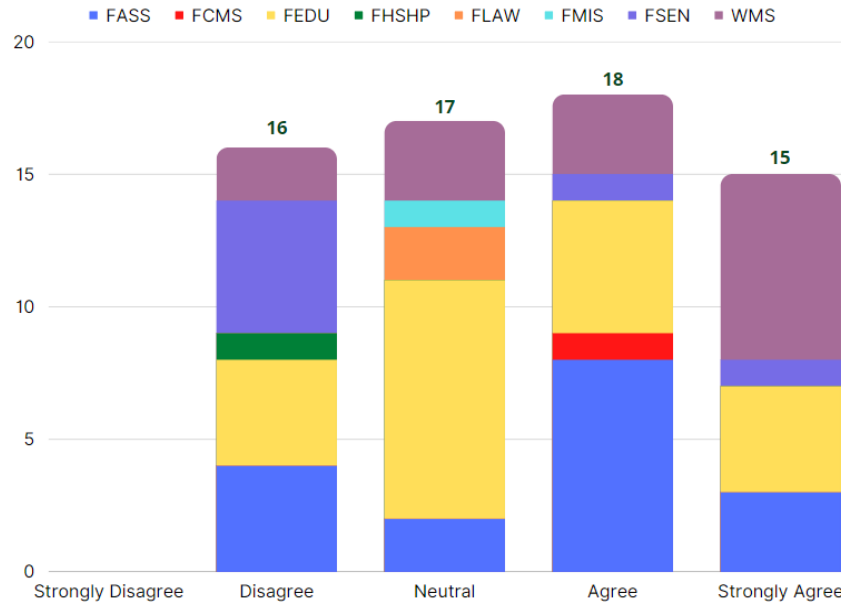
Figure 4.5. Resource lists features are easy to understand and use (Q 8, n = 66)

The comments by the participants (see Table 4.5) included 'awareness of the existence of such features (10) and difficulties in finding the features (4). Again, this provides an indication of why so few features are used – many participants were not aware that the features existed. One conclusion may be that the features of the Resource Lists Interface should be more visible, and the purpose of the features should be clear enough to understand and use.

Table 4.5. Resources Lists features are easy to understand and use - detailed feedback. (Q 8, n = 39) [more than one answer permissible]

Feedback	Rating					Total
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	
Easy to understand and use	-	-	1	5	9	15
Didn't know they existed	-	7	3	-	-	10
Difficult to understand	-	5	1	-	-	6
Difficult to find	-	4	-	-	-	4
Used only a couple of features	-	3	-	-	-	3

The students were also asked for their overall experience with WRL, and specifically on the clarity and ease of interaction (Question 9).
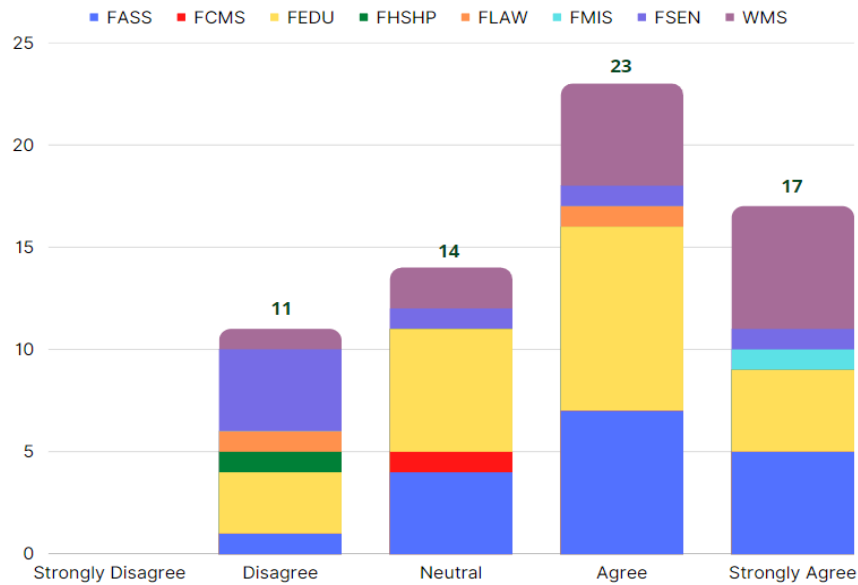
Figure 4.6. WRL is clear and easy to interact with (Q 9, n = 65)

As Figure 4.6 shows, 40 of 65 (60%) respondents expressed positive impressions, with 40% identifying as either neutral (22%) or disagree (18%). Difficulties in interacting with (4), understanding of, and visibility of (5) the features are the main reasons given for dissatisfaction with the WRL (see Table 4.6)

Table 4.6. WRL is clear and easy to interact with - summary of the detailed feedback.
(Q 9, n = 28) [more than one answer permissible]

Feedback	Rating					Total
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Easy to use	-	-	1	8	4	13
Should be simple to understand	-	2	3	-	-	5
Takes time to find the features	-	2	1	2	-	5
Difficult to interact	-	2	2	-	-	4
Concise layout	-	-	-	1	2	3

In summary, we note that the usability of the Resource Lists Interface and its features is currently lacking.

4.5.2 Students' Experience of the Use of eBooks in the WRL

In this section we explore the students' experiences of the use of eBooks in the WRL (see Section 2 of the questionnaire in Appendix C for questions).

39 of 64 respondents (61%) considered access to an eBook in the WRL to be simple and clear, whereas 39% did not (see Figure 4.7).
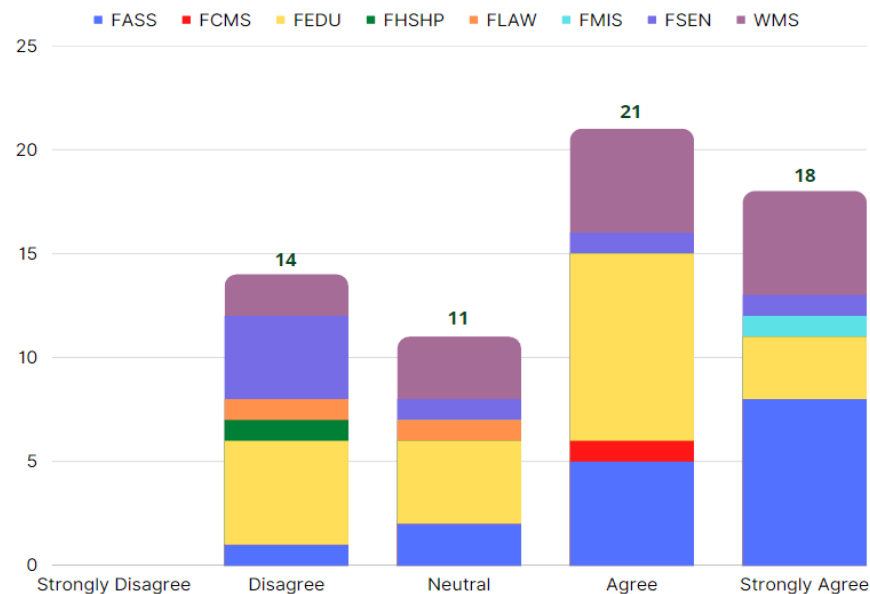
Figure 4.7. Accessing an eBook in the WRL is simple & clear (Q 11, n = 64)

Reasons given (see Table 4.7) for participants' dissatisfaction were access difficulties (7) (their comments included "some ebooks are not loaded in my browser", "could be difficult to access some ebooks", "hard to get access, access was denied", "sometimes I have clicked where I think I am meant to go and then had to follow random pathways"), many clicks to reach the contents (4), ebook loading issues (3), lack of free access to the contents (2) and issues in the required format (2). In addition to observing that the WRL requires a number of steps to get to the actual resource, all other feedback refers to the quality of the eBook access (which sits outside of WRL).

Finally, the student not having access to an eBook ("not free" comment) is most likely due to their not being logged into the university system. Here we see a potential mismatch in access rights between RL systems and other learning support systems.

Table 4.7. Accessing an eBook in the WRL is simple and clear - summary of the detailed feedback (Q 11, n = 64) [more than one answer permissible]

Feedback	Rating					Total
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Simple and straightforward	-	-	-	6	8	14
Difficult to access	-	6	1	-	-	7
Many clicks to reach	-	1	2	1	-	4
Not loading properly	-	1	2	-	-	3
Most of them were not free	-	-	2	-	-	2
Not in the required format	-	-	1	1	-	2

We then enquired in Question 12 about the modes of accessing eBooks that students encountered in the WRL (see Figure 4.8). We note here the minor discrepancy between participants having used the *View Online* feature (see Figure 4.4) and participants having accessed eBooks via the WRL.
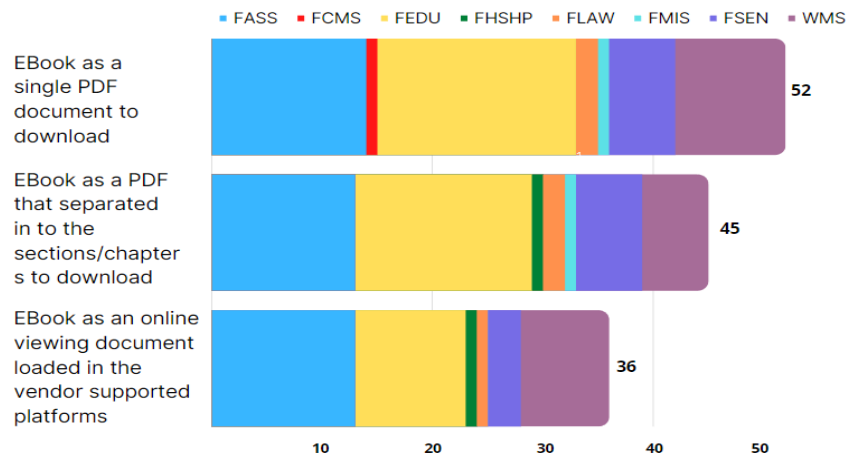
Figure 4.8. Encountered modes of accessing an eBook in the WRL (Q 12, n = 64) [more than one answer permissible]

We then asked participants (Question 13) for their preferred mode of accessing eBooks; see overview of answers in Figure 4.9.

We observe that the vendor-supported platforms are by far the least preferred option, even though more than half the participants encountered this mode of accessing eBooks.
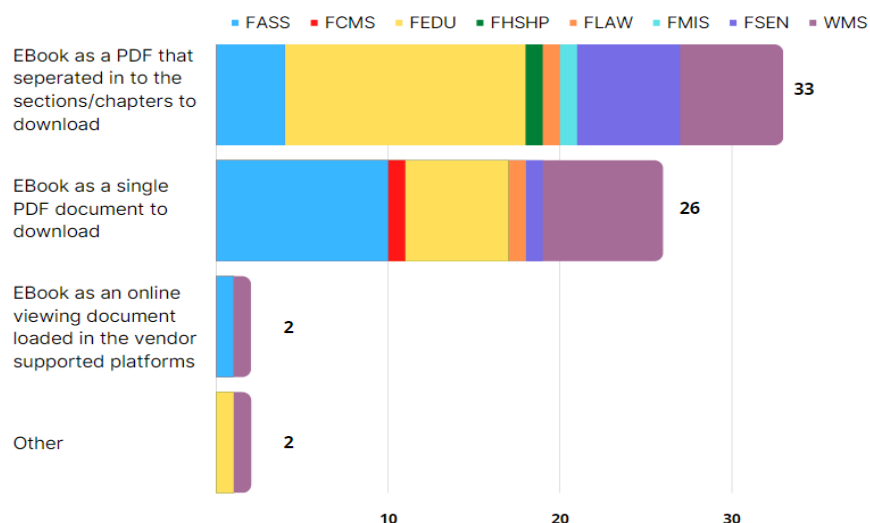
Figure 4.9. Preferred mode of accessing an eBook in the WRL (Q 13, n = 63)

The next question (Question 14) explores the driving factors behind their preference. These include the ease of download, print and search in the selected section rather than going through the whole document, faster access, and less confusion (see Table 4.8).

In contrast, students who preferred to access 'eBook as a single PDF document to download' mentioned that it saves their time and can access even without the internet connection once it is downloaded. Often students are only required to read a chapter or section for their class. In these cases, an eBook that is separated into sections/chapters to download makes it easier to pinpoint relevant information. While it may be recommended.

Therefore, we strongly suggest having an option where students can change whether they want to download the whole book pdf or just singular/multiple chapters when accessing an eBook via WRL; these are largely vendor-dependent and not managed by the RLs system.

Table 4.8. Accessing an eBook in the WRL is simple and clear - summary of the detailed feedback (Q 14, n = 64) [more than one answer permissible]

Option	Summarized response
eBook as a pdf document that separated into the sections/chapters to download	*"...download and print **just the section** I was **required** to read..."* *"...**don't** get **confused** with other chapters.."* *"...it's **easy** to download and use.."* *"...**small chunks** make it **easier** to flick through..."* *"... **don't need** the **whole book**..."* *"... **aren't reading entire books**, only **selected chapters ... easier**..."* *"...finding what you need **quicker**..."* *"...**choose what I want to download or read** ...have **little time** ..."* *"...**easy** when **searching** for one **particular thing**..."* *"... **easy** to read the **selected section later**..."* *"...**directing to required page** or **paragraph** is **better**..."* *"**Single chapters** are **more approachable** than whole books..."* *"...**easier**...a single document **difficult** to **pinpoint** the **information**..."*
eBook as a single pdf document to download	*"...**easiest** to **copy** text...**easy** to use **search** function formats..."* *"...**easier** to **skim** through a whole document..."* *"**Easier** to **collect** and **compile**..."* *"**Easier** to use **Ctrl F** and find what you had previously read..."* *"**Easier** to find **keywords**..."* *"...**don't** have to **stay logged in**..."* *"Downloading **multiple files** is an **inconvenient** act..."* *"...**can access** as needed when **don't** have **internet connection**.. **saves time**..."*
eBook as an online viewing document loaded in the vendor-supported platforms	*"...Reading online is the **easiest**..."*

4.5.3 Satisfaction with the WRL

Here we present the analysis results for the students' satisfaction with the WRL (Question 15).

When the students were asked about how satisfied they were regarding finding the reading resources that the lecturer directed them to read, the majority (45 of 66, 68%) were positive, 23 (35%) strongly so. Meanwhile, 18 students (27%) remained neutral, and 3 students (5%) expressed disagreement with the statement (see Figure 4.10). This is the most positive feedback received in this questionnaire.
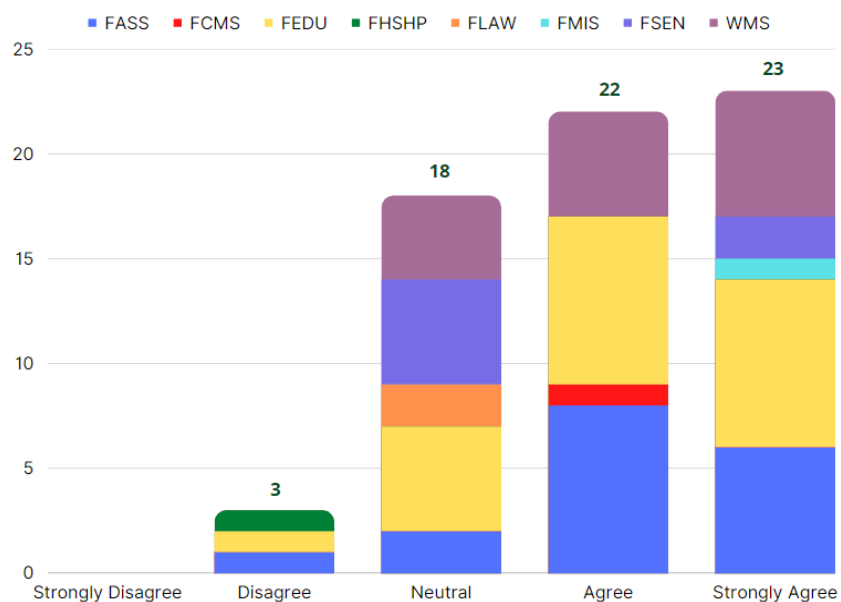
Figure 4.10. WRL satisfies my needs for finding reading resources (Q 15, n = 66)

Most of the students' feedback on their rating was positive, appreciating how it helped them to find required resources (see Table 4.9). They described it as "clean and easy", "helpful", "all reading in one place".

On the other hand, some students, including two students who rated as "Agree", commented that it was not easy to use, time wasting and not of good quality.

Table 4.9. WRL satisfies my needs for finding reading resources my lecturer requires me to read - detailed feedback (Q 15, n = 25) [more than one answer permissible]

Rating	Summarized responses
Strongly Disagree	*No responses*
Disagree	*"**Not easy** to find and **not good quality**"*
Neutral	*"...Still **needing development** around using the WRL..."* *"...**Not really**. Some books are **not available online**..."* *"It is **satisfactory**"*
Agree	*"...Majority of what is there is **useful for assessments**..."* *"...nice to know **which texts belong to which weeks/topics**..."* *"...relatively **easy to understand**...and is often **well organized**..."* *"Good **range of readings**..."* *"...**not all readings are in the reading list**. It's **annoying**...**Time wasting**..."* *"Sometimes the **links don't work**"*

Strongly Agree	*"It has been **fine**"* *"I like the **clean and easy to use UI. Moodle** is more **convenient** for me"* *"...say **essential** and it's directly links me to what my lecturer want me to read..."* *"...**easier** than having to get to the library..."* *"...readings are listed there online **in one place**..."* *"...the reading list is **helpful**..."* *"**Haven't** had any **problems**..."* *"... **gives support and further information**..."* *"Yes, it is **usually the first place**..."*

We asked students if the WRL made their learning more effective. 40 of 66 (60%) of the respondents gave a positive answer (see Figure 4.11). Their reasons included ease of access, helpful readings and having all readings in one place (see Table 4.10). In contrast, two students who rated as "Agree" mentioned that this mode of learning made them more effective than with the printed reading. However, among the 21 respondents (27%), who remained neutral, some comments indicated preferences for paper versions of readings or access via Moodle.
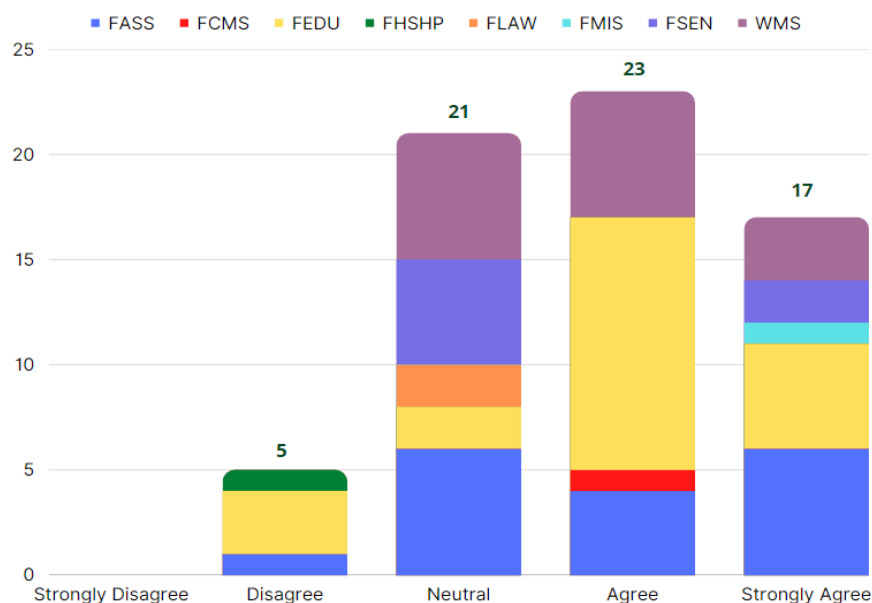
Figure 4.11. WRL made my learning more effective (Q 16, n = 66)

Table 4.10. WRL has made my learning more effective - detailed feedback (Q 16, n = 29) [more than one answer permissible]

Rating	Summarized responses
Strongly Disagree	*No responses*
Disagree	*"...**Not easy** to find and **not good quality**..."* *"...Can enhance my learning if I could **understand** ...**accessing** some documents..."*
Neutral	*"...Unless the **lecture requires** me to read... **I won't read** them..."* *"...I **don't always** use it..."* *"... My **preference** is **for paper versions**..."* *"Hard to know without ever having it"* *"...Compared **to linking the items in Moodle**? No"* *"... readings for a paper in one place for **ease of access**..."*
Agree	*"... **easy access** to important course-related information..."* *"... everything is there and **easy to find**..."* *"...I can **access relevant information**..."* *"...great jumping-off point for **further reading**..."* *"...I know **where I can access** ...when I don't have my book ..."* *"... **prefer** the **books of readings printed** ..."* *"... **helpful** readings in an **easy to access way**..."* *"I like the **clean and easy to use UI**. **Moodle** is more **convenient** for me..."* *"... actually, have to **do the readings** in order to make **my readings effective**..."*
Strongly Agree	*"...**access to many resources** through reference lists..."* *"...the reading list is **helpful** ..."* *"**Easier** to **consolidate** lecture content"* *"**Easy to use** and provides **more information**..."* *"... it is **easy to access** online 24/7..."*

Next, we explored the students' views on the usefulness of having the WRL (Question 17). The majority of participants (43 of 65, 66%) reacted positively, out of which 20 (31%) strongly agreed. 17 (26%) remained neutral while only 5 (8%) were negative (see Figure 4.12).

This indicates to us that the students understood the usefulness of having the WRL, though some expressed negative impressions of functionalities and the processes.
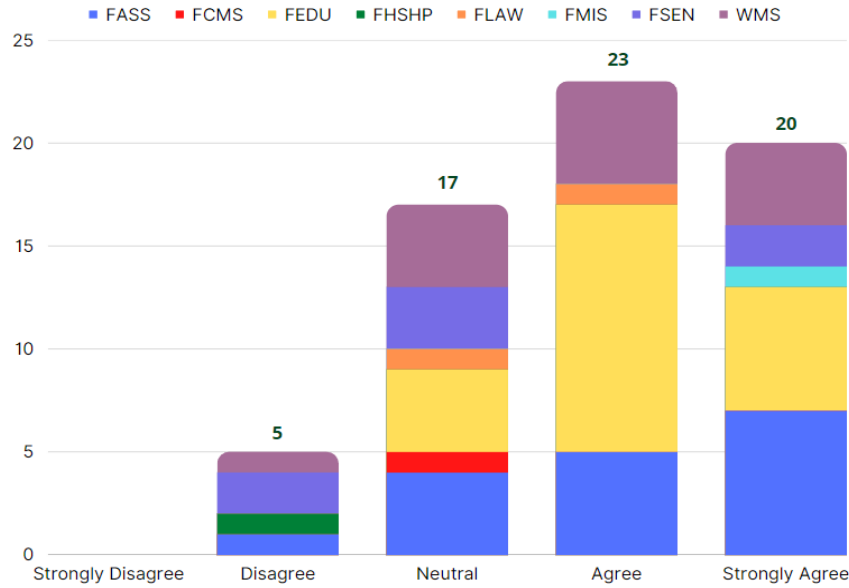
Figure 4.12. Having the WRL is useful (Q 17, n = 65)

Similarly, many students (47 of 66, 70%) were satisfied with using the WRL for their learning (see Figure 4.13) as it helped them to find good resources for their further learning. Those dissatisfied with the WRL found the interaction to be time-consuming or lacking in user guidance (see Table 4.11).
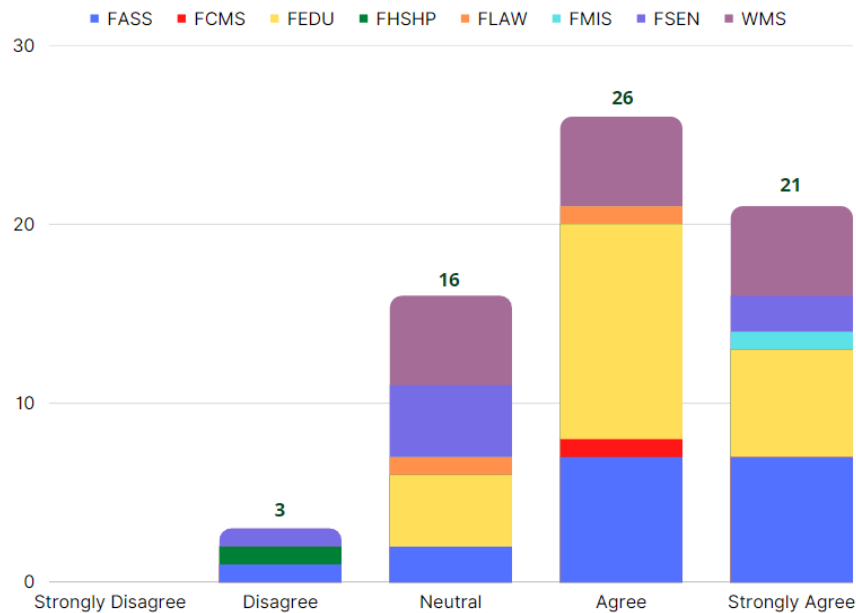
Figure 4.13. Satisfied with using the WRL for my learning (Q 18, n = 66)

Similarly, many students (47 of 66, 70%) were satisfied with using the WRL for their learning (see Figure 4.14). Areas of dissatisfaction with the WRL were when they were *time-consuming* or *poorly guided* (see Table 4.11). Positively, students were satisfied with WRL as *it helped them to find good resources for their further learning*.

Table 4.11. Satisfied with using the WRL for my learning - detailed feedback (Q 16, n = 29) [more than one answer permissible]

Rating	Summarized response
Strongly Disagree	*No responses*
Disagree	*"...Need to be **easier** found, not sending you out of the Waikato library to open a book that still not PDF form..."* *"... **Moodle** is **enough** no need **more** to **browse**..."*
Neutral	*"...I **don't feel** this..."* *"...While I can access relevant information, it can be **overly time-consuming,** and the interface **leaves a bit to be desired**..."* *"Proper **user guidance** is **needed**"* *"...Nothing to criticize with the reading list to begin with, **not even a major part of my learning** to be honest..."*
Agree	*"It served its purpose"* *"When needed, it's a **great resource**"* *"...Works well, **would be nice to not have to go through a hundred clicks to get there,** often to be told you can only read sections online too which I didn't benefit from..."* *"...Improving **search words within documents** would be much **more useful!**..."* *"...Provides another avenue to access class readings..."* *"...required and all I've known..."* *"...I **wish it loaded faster**, but that's a minor quibble..."* *"...It's **essential** to my learning..."* *"...It's **great**..."*
Strongly Agree	*"...It **builds the strong base** for your paper you are studying..."* *"...the reading list is **helpful** in writing my essays..."* *"...I use Waikato Reading list most weeks to further my learning..."* *"...Yes, **good resource for information** and readings as required..."*

In summary, the participants in the study acknowledged the valuable utility of the WRL, noting its positive impact on enhancing their learning experience. However, their in-depth feedback consistently reflects a keen interest in usability enhancements, particularly expressing a strong desire for a more streamlined workflow and seamless integration with Moodle, the university's learning management system. This resonating call for improvements underscores the

significance of optimizing the platform's usability and integrating it with existing educational tools, ultimately contributing to a more effective and satisfying learning environment for both academics and students alike.

4.6 Discussion

We here discuss insights from our study, particularly in relation to results of previous work and to our research questions from Section 4.1.

4.6.1 Experiences with RLs (RQ1)

Usefulness and Satisfaction

We found that the UOW student participants predominantly found the WRL useful. Negative comments referred to interface functionality and processes (see Figure 4.12). In previous studies from related work, students preferred RLs used as a pedagogical tool, with scaffolding that encouraged them to read purposefully and critically (Cross, 2015; Marks, 2020; McGuinn et al., 2017). Siddall & Rose (2014) and McGuinn et al. (2017) noted that students valued well-structured and annotated reading lists with features such as download, e-mail and personalization. Previous studies have also indicated that academics do not view RLs as exhaustive and that they want students to become independent researchers over time (Brewerton, 2014; Cameron & Siddall, 2017; Krol, 2019, Marks, 2020; Stokes & Martin, 2008). In agreement with this, in our prior study on academics' engagement with the WRL, we identified that most academics had a negative impression of the WRL functionalities (Kumara et al., 2023a). In contrast, this study found that the UOW students were satisfied with using the WRL for their learning (see Figure 4.13). A considerable number of students were dissatisfied with the clarity and ease of interaction with the WRL. The main areas of their dissatisfaction were that the lists were difficult to understand and interact with, poor visibility of the features and when they were poorly structured (see Section 4.5.1). Difference to our findings, related work found that students disliked it when the RLs were infrequently updated and unhelpfully lengthy Brewerton (2014), Marks (2020) and McGuinn et al. (2017).

Impact on Learning

The literature on print versus e-resources finds that reading on screen may have a negative impact on reading comprehension for 'cognitively challenging' tasks (Johnston & Salaz, 2019). At the

UOW, students appreciated the way that WRL helped them to find required resources that the lecturer directed them to read (see Figure 4.10). However, the main reasons for students' disappointment were when the RLs were hard to use due to the broken links, poor structuring, and quality, and when they were not updated with all the required readings (see Table 4.9). This echoes the findings of Brewerton (2014), Marks (2020) and McGuinn et al. (2017). Nevertheless, students believed that the WRL made their learning more effective because of ease of access, helpful readings and having all readings in one place (see Figure 4.11 & Table 4.10). Similarly, McGuinn et al. (2017) noted that the students at the University of Huddersfield found RLs to be a valuable resource, which enhanced their learning. However, at the UOW, some had stated, if they had a choice, they would always prefer printed RLs as their learning makes it more effective with the printed reading (see Table 4.10). Similarly, students at the London School of Economics have expressed a clear preference for resources linked directly from their RLs, not due to a preference for reading on screen, but due to convenience (Marks, 2020).

4.6.2 UX Features: Resource Lists Interface (RQ2)

While the majority of participants believed that reading resources are presented in an organized manner within the Resource Lists Interface (see Figure 4.2), almost 40% indicated in their detailed feedback that there is a need for a more user-friendly display of reading resources (see Table 4.3). This response may result from how well the Resource Lists Interface was perceived as structuring the reading resources (i.e., week/topic/author) and the specificity of the content information (see Table 4.3). Furthermore, we found that factors such as inconsistencies in the contents of the Resource Lists Interface and misguidance due to an excessive amount of information significantly impact students' impressions of the clarity and ease of interaction with the Resource Lists Interface (see Figure 4.3 & Table 4.4). Though there are many features available in the Resource Lists Interface, we note that students' preference is almost entirely limited to a single feature (see Figure 4.4). The most commonly used feature was View Online (77%). The difficulty of understanding and use of the Resource Lists Interface was the main limiting factor. Other reasons included students' lack of awareness of the existence of such features and difficulties in finding the available features (see Table 4.5). Another open question is the role of reading lists in students' learning activities. If students are predominantly using the RL to access the resources recommended by their lecturer, the additional features may not be of interest to students.

4.6.3 Reading Format and Appearance (RQ3)

We observed that a substantial number of Waikato students found access to an eBook in the WRL to be straightforward and clear, as shown in Figure 4.7. Nevertheless, a significant portion of students' feedback (39%) indicated that they did not perceive it as organized, as depicted in Figure 4.7 and Table 4.7. There are several reasons for this dissatisfaction, mostly linked to vendor options outside of the WRL (see Table 4.7). Similarly, prior studies found that students' satisfaction with accessing eBooks depends on their availability, ease of access and ease of format (Casselden & Pears, 2019; Johnston & Salaz, 2019; Marks 2020). Though these were the main issues, we found that some students faced difficulties due to the limitation of licensed access to eBooks (see Table 4.7). The same issue was identified by Marks (2020), indicating, "Some had come up against concurrent license limits". This author found that though students preferred e-resources, which linked to their RLs, they disliked eBooks mainly due to the interface usability. For example, his findings showed that students disliked it when the reading pane did not take up the whole screen, as the text was too small and the surrounding menus distracting.

At the UOW, though many students encountered 'eBook as a single PDF document to download' in the WRL, we note their preference is to access 'eBook as a PDF document that is separated into the sections/chapters to download' (see Figure 4.8 & Figure 4.9). Identified reasons include ease of download, print and search in the selected section rather than going through the whole document and faster access (see Table 4.8). Similarly, Marks (2020) found that students deemed eBooks only acceptable when reading a single chapter that could be downloaded to PDF. Ideally, participants wanted eBooks to be the same format as journal articles.

4.6.4 Limitations

The primary limitation of our study is the number of respondents. The study population for the survey consisted of all students who had registered for papers in Semester B 2020 and at least one of those papers having a WRL (estimated 800 students). Similarly, Siddall & Rose (2014) recognized the sample as a potential limitation on their study at University of Northampton. Limited response rates to online questionnaires are a recurring issue in the study of reading lists and have been observed across academic research (Wu et al., 2022).

4.6.5   Implication for Digital Libraries

Requirements of tracking the reading materials (Agosti et al., 2010; Akbar et al.,2011; Al-Anazi et al., 2014) and the integration of digital libraries in academic learning environments (Agosti *et al.,* 2010; Akbar et al.,2011; Al-Anazi et al., 2014; Margaret, 2003; Kumara et al., 2023a; Virkus et al., 2009) were highlighted in previous studies. With regards to the format and appearance of the materials linked to the RLs, we found that the students' preference is always to work with materials, which are separated into the sections/chapters and can be downloaded such as PDF documents (see Section 4.6.3). In addition, our findings offer a better view on students' learning practices and their perceptions on a virtual learning environment (see Section 4.6.1). Therefore, these findings undoubtedly help to understand the best way to integrate digital libraries into the academic learning environment.

4.7   Summary and Conclusion

This article provides insights into the experiences of students with a university's RL system. From our study, we draw the following conclusions:

Students appreciate the way that RLs help in their learning, and they perceive the RLs as a useful tool for their learning process. However, the main reasons that prevent students from using the RLs were when they were difficult to interact with or to understand, a lack of visibility of the features (i.e., how well the features of the system are conveyed to students) and when they were not updated with all the required readings. We note these factors act as barriers in the full use of the RL systems' role as a pedagogical tool to develop students' independent learning skills. Hence, we believe that the students' experience with RLs could be improved further by enhancing the above-discussed usability (see Section 4.6.1 & Section 4.6.3) and the pedagogical features (see Section 4.6.2) of RLs.

Students appreciated well-structured and organized reading resources in the Resource Lists Interface. They remained dissatisfied when the reading resources were poorly organized, inconsistent and when the contents were not specific. In terms of the use of features in the Resource Lists Interface, we saw a clear usage gap due to the students' lack of awareness of the availability of existing features. This lack of awareness resulted because of poor visibility of the system's features. Therefore, we believe that the usability of the Resource Lists Interface needs to be improved.

Students commonly encountered eBook as a single PDF document to download in WRL. However, many students prefer an eBook that is separated into sections/chapters that could be downloaded to PDF. Students' deciding factor for this at the UOW is convenience in terms of accessing, downloading, printing, and searching. Therefore, it is essential, if students are to get full value from their RLs, to improve eBook accessibility and appearance in RLs with a user-friendly reading platform.

Overall, these multifaceted issues give us a clear recommendation to improve resource accessibility, feature clarity, and user-friendliness of the Reading Lists system. Furthermore, repeating this study at the other New Zealand Universities (who are using the same system) would be useful.

4.8   References

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Appendix A: Particularities of the each of Faculty

Faculty	Available support staff	Adopted teaching support systems
Faculty of Art and Social Sciences (FASS): Offers programmes in areas such as languages and linguistics, music, dance, theater, screen and media, anthropology, geography, environmental planning, history, philosophy, political science, social and public policy, sociology and social work.	Each faculty is assigned two academic liaison librarians. Academic Liaison Librarians work with academic staff and postgraduate students to provide specialist tutorials and individual assistance for study and research. Specialist staff also provide reference services, copyrights, tutorials and individual assistance to help staff and students to access and use Mātangireia and Map resources.	Moodle as the Learning Management System. The Paper Outlines System is to provide a centralized repository where subject outlines can be created, maintained, reviewed, presented and stored.
Faculty of FCMS: Offers a stimulating and leading-edge environment of quality relevant teaching programmes in design, computer science, software engineering, mathematics, and data analytics.		Panopto enables University staff and students to capture and deliver audio and video content.
Faculty of Education (FEDU): Offers programmes in areas such as teacher education, counseling, human development, education, educational leadership and education studies.		
Faculty of Health, Sport and Human Performance (FHSHP): Offers qualifications that offer students who are passionate about health, hauora and wellbeing the opportunity to develop knowledge and skills to enhance the lives of individuals and communities.		Library's information systems and technology includes Library Services Platform (Alma), Discovery Layer (Primo) and subscribed databases.
Faculty of Law (FLAW): Offers an innovative, student-focused Bachelor of Laws (LLB) degree in a stimulating academic environment.		Waikato Reading Lists for tracking copyrights and course reading management.
Faculty of Maori and Indigenous Studies (FMIS): Offers programmes in Māori language and linguistics, culture, customs, creative and performing arts, media and communication, Treaty of Waitangi, and development studies		Research Commons - institutional research repository
Waikato Management School (WMS): Offers a wide range of business education at all levels of study		O Neherā includes Digital Collections such as photographs, postcards, maps and posters.
Faculty of Science and Engineering (FSEN): Offers a range of innovative programmes for the undergraduate degrees of Bachelor of Science and Bachelor of Engineering.		

Appendix B: Student view of the Resource Lists Interface of the WRL

Note: Interactive features are highlighted in red color.

Appendix C: Questionnaire for Students

No	Question	Type	Options
1	I am	Multiple Choice	I. An undergraduate student II. A postgraduate student
2	I study	Checkbox	I. On campus II. Online
3	I am student at	Multiple Choice	I. Waikato Management School (WMS) II. Faculty of Computing and Mathematical Sciences (FCMS) III. Faculty of Art and Social Sciences (FASS) IV. Faculty of Māori and Indigenous Studies (FMIS) V. Faculty of Science and Engineering (FSEN) VI. Faculty of Health, Sport and Human Performance (FHSHP) VII. Faculty of Education (FEDU) VIII. Faculty of Law (FLAW)
The following questions are about your experience with the Waikato Reading List (WRL)			
4	I am accessing WRL via the following mode/s	Checkbox	I. Moodle II. UOW's Student Portal Web Page III. UOW's Library Search Web Page IV. UOW's Reading List Home Page V. Other
5	Waikato Reading List displays reading resources in an organized manner	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	
6	The interface of the resources list in the WRL is clear and easy to use	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	
7	Which of the following features have you used in the resources	Checkbox	I. Table of Contents II. Type (Sort based on resource type)

	list interface of the WRL?		III. Filter IV. Citation Style V. View and Export VI. Search VII. View Online VIII. Bookmark IX. Personal Note X. Download RIS XI. Report Broken Link XII. Share Item XIII. Reading Intentions
8	The features in the resources list interface of the WRL are easy to understand and use	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	
9	Overall, I found the Waikato Reading List to be clear and easy to interact with	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	
10	Any other feedback about your experience with the Waikato Reading List?	Open-ended	
The following Questions are about your experience of accessing eBooks via the Waikato Reading List			
11	I found accessing an eBook in the Waikato Reading List simple and clear	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
12	When accessing/reading eBooks via the Waikato Reading List have you encountered	Checkbox	I. EBook as a single PDF document to download II. EBook as a PDF that separated in to the sections/chapters to download III. EBook as an online viewing document loaded in the vendor supported platforms

			IV. Other
13	From each of these which options do you prefer most?	Multiple Choice	I. EBook as a single PDF document to download II. EBook as a PDF that separated in to sections/chapters to download III. EBook as an online viewing document loaded in the vendor supported platforms IV. Other
	Please provide more details about your rating on the above question.	Open-ended	
14	Any other feedback about accessing an eBook in the Waikato Reading List?	Open-ended	

The following Questions are about your experience of usability and satisfaction with the Waikato Reading List.

15	The Waikato Reading List satisfies my needs for finding reading resources my lecturer requires me to read	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	
16	The Waikato Reading List has made my learning more effective	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	
17	I found having the Waikato Reading List to be useful	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
	Overall, I'm satisfied with using the Waikato Reading List for my learning	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral

18			4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	
19	Any other feedback about your experience with the Waikato Reading List?	Open-ended	

Chapter 5

Reading Lists Systems Designed for Tertiary Education

Throughout Chapters 2, 3 and 4 we examined the make-up of RLs and explored the experience of both academics and students. In this chapter, we further explore the make-up of RL systems, in particular, how RL systems' features support the pedagogical needs of the academics and students. We discuss the insights gained from our study, which contribute to answering the first and the second Thesis Questions.

A comparative analysis approach was employed in this study. We conducted a detailed comparison of tertiary RL systems with particular focus on their core features required for course list management. This chapter recommends the need for interactive features that should be better integrated into academic teaching.

The paper presented in this chapter was published and presented at the ACM/IEEE Joint Conference on Digital Libraries, 2023 (see C2 in Figure 1.3).

Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2023c). Reading Lists Systems' Pedagogical Features: A Comparative Analysis, 2023 ACM/IEEE Joint Conference on Digital Libraries (JCDL), Santa Fe, NM, USA, 2023, pp. 169-178, doi: 10.1109/JCDL57899.2023.00032.

Reading Lists Systems' Pedagogical Features: A Comparative Analysis

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Abstract

Reading Lists Systems are a pedagogical tool used in tertiary education to streamline the creation and management of course reading lists and make copyright compliance easier. This paper explores the design of current Reading List systems and how their features support the pedagogical needs of academics and students in tertiary education. A feature review combined with a comparative analysis approach was employed in our study. We analyzed and compared Reading Lists systems and their features, implemented through Digital Libraries, that provide pedagogical support for academic teaching. As one of our outcomes, we identify the need to assist teachers to effectively use these tools in their daily practice.

5.1   Introduction

Recent years have seen an increased focus on learner-centric rather than teacher-centric education (Mascolo, 2009; Boyadzhieva, 2016). This change in teaching practice requires support from next generation learning management solutions (Cross, 2015; Hinze et al., 2017; Martin & Stokes, 2008). Reading Lists (RLs) are a learning management solution used in tertiary education as a pedagogical tool and for tracking the use of copyrighted materials. RLs consist of collections of materials and resources selected by academics and provide students with links, scans, and references to required readings and other materials for their course work (Brewerton, 2014; Siddall, 2016). Supported by technological and pedagogical developments, these lists have become an important channel of communication between teachers and students.

Educators have noted the opportunity for managing and tracking reading materials in digital libraries (Al-Anzai et al., 2014; Akbar et al., 2011; Agosti et al., 2010) and for integrating digital libraries in academic learning environments (Al-Anzai et al., 2014; Akbar et al., 2011; Agosti et al., 2010; Kumara et al., 2023a; Margaret, 2003; Virkus et al., 2009). As a result, Reading List Management Systems have gained wider acceptance in tertiary education and are often integrated into the academic library's offerings (Krol, 2019; Chad, 2018). RLs have begun to play a significant role in this learner-centric education within the tertiary education sector (Cross, 2015; Chad, 2018). We conducted a comparative study to explore the design and implementation of RL systems in order to identify the features that provide pedagogical support for academic teaching in tertiary education. In this paper, we explore how current RL solutions support the pedagogical needs of academics, and seek answers to following two research questions:

RQ1: What RL system features are valued by academics for their pedagogical benefits?

RQ2: What pedagogical features are offered by current Reading List Management Systems?

The remainder of the paper is organized as follows: we begin with an overview of related work in the RLs and digital libraries. In Section 5.3, we present an overview of RL systems and a review of the research exploring these systems. We then present our study method, and the results of our study and the comparative analysis of RL systems features. In the discussion section, we compare our data and insights with those of the related work. The final section summarizes our insights and presents conclusions and recommendations drawn from our study.

5.2   Background: Related Work

The selection of eBooks from libraries or course reserves has been studied previously (McKay et al., 2012a; McKay et al., 2012b; Vanderschantz, Timpany & Hinze, 2015; Zhang et al., 2020; Potnis et al., 2018), however, not in the context of dedicated Reading Lists. The use of Reading Lists in tertiary teaching across individual universities (Brewerton, 2014; Zhu, 2018; Walsby, 2020) as well as within parts of a university (Baesley, 2016; Cameron & Siddal, 2017; Krol, 2019; Neil & Musto, 2017; Taylor, 2019) has been well reported. A number of studies focus on academics' experiences of RLs (Baesley, 2016; Brewerton, 2014; Cameron & Siddal, 2017) and others on students' experiences when using RLs (Brewerton, 2014; Martin & Stokes, 2008; Marks, 2020; Siddal & Rose, 2014). A common focus across literature is the identification of significant hurdles for academics and students to usefully engage with RLs.

5.2.1   Academics Experience

The academics' willingness to engage with RLs varied across studies. Staff time constraints were cited by Cross (2015) as a significant barrier to the adoption of RLs at Nottingham Trent University. Similarly, according to Neill and Musto (2017), the primary obstacle preventing academics from using RLs is a lack of time. In addition to the staff time constraints, Beasley (2016) found that the academics' working knowledge and the perceived usefulness of the system were further hindrances at the University of Auckland. Academics' resistance to engaging with a RL system was reported by Krol (2019). The academics' engagement in the setting-up of RLs remained low despite the library staff's assistance in creating RLs for all courses.

The majority of research identified significant obstacles that academics must overcome in order to effectively interact with RLs. While Zhu (2018) found that the academics at Auckland University of Technology appreciated the capacity to share copyright content via RLs, 40% of participants were unsatisfied with the general function, stability, and convenience of use of the RL system. In Walsby's (2020) study at the University of Manchester, the following requirements were identified by academics: increased system functionality, integration with university's learning management software, greater user support, and education about the system's potentials and capabilities. Similarly, Neill and Musto (2017) identified the need for better integration of RLs with learning management systems. However, the way in which RLs and a learning management system should integrate has not been addressed. Other factors highlighted as hindrances to RLs

uptake were the discipline and lecturing experience of academics. According to Brewerton's (2014) study at Loughborough University, academics were not confident that their efforts to maintain the RLs led to adequate perceived value for the students. One theme that consistently emerged from the student-focused studies is that the academics and librarians believed RLs 'spoon-feed' students as they hinder the students' development of learning skills (Cameron & Siddal, 2017; Krol, 2019; Martin & Stokes, 2008). Finally, both Taylor (2019) and Devine (2017) argue that the RLs need to go beyond being a repository of teaching materials but should become teaching tools in their own right.

5.2.2   Students Experience

The literature detailed numerous reasons for students' satisfaction or dissatisfaction with RLs. Krol's (2019) study found that some student participants saw RLs as a resource that only helped them with their assessments rather than seeing it as a part of their independent learning journey. On the positive side, students appreciated RLs as a pedagogical tool, with scaffolding that encouraged them to read and explore their subjects (Cameron & Siddal, 2017; Krol, 2019; Martin & Stokes, 2008; Marks, 2020). A study conducted by Siddall & Rose (2014) at the University of Northampton found that students felt that RLs provided assurance that they were reading the right content, as well as giving easy access to that content. Furthermore, well-structured, and annotated RLs with additional explanation and signposting were valued by students as they helped to build their confidence to become independent learners.

McGuinn et al. (2017) noted that the majority of students at the University of Huddersfield found RLs to be a valuable resource that enhanced their learning. Cross (2015) observed that the students found the experience of RLs rewarding, when the content was easy to access, and allowed integration of RLs with their VLE and resource delivery systems. In line with the above findings, Brewerton (2014) mentioned that the students tended to consider their RLs to be more important than many lecturers did. Several factors preventing students from using their RLs were identified. According to McGuinn et al. (2017), students expressed dissatisfaction if RLs contents were not regularly updated, organized poorly or were too lengthy. Brewerton (2014) highlighted as barriers: poor visibility (how well the features of the RL systems are conveyed to students), content (type of materials included), length of the RLs and the availability of included items. Furthermore, he noted that some students were confused as to the purpose of their RLs, and the expectations lecturers had of them regarding the listed materials.

5.3 Overview of RL Systems

The concept of reading lists promises to provide a better learning experience for students and the prospect of time savings for academics and libraries (Siddall & Rose, 2014). To make this into reality several commercial and open-source RL solutions have been developed. In this section, we discuss the RL system landscape in tertiary education from three perspectives: the nature of the RL systems (commercial or open source), the RL system currently in use in tertiary education and the available features in those systems. To do this we conducted a review of the literature on the RL systems. This discussion provides a picture of the RL solutions' landscape and their use in tertiary education.

The RL system landscape consists of commercially developed solutions as well as open-source solutions (see Table 5.1). Commercial RL solutions were first introduced in 2010 by several Virtual Learning Environment (VLE) providers. Parallel to the development of commercial solutions, some universities and independent organizations developed their own RL solutions, often as open-source products (Cross, 2015). Many of these systems aim for integration with VLE and Library Resource Discovery Tools (RDTs). However, existing solutions support student learning only in a partial and often fractured way (Chad, 2018; Krol, 2019; Siddall & Rose, 2014; Taylor, 2019). Some systems even fail to meet basic pedagogical needs of academics, students, and librarians (Brewerton, 2014; Kumara et al., 2023a; Kumara et al., 2023b; Siddall & Rose, 2014; Taylor, 2019, Zhu, 2018).

At many universities, traditional 'course reserve' services (which is a library service that allows academics to set up lists of course materials for students to engaged) have been entirely replaced by more comprehensive RL solutions such as Talis Aspire, Ex Libris Leganto and Kortext Keylinks (Higher Education Library Technology, 2020). Commercial solutions were first introduced between 2010 and 2012 by several commercial VLE providers (Cross, 2015). Talis Aspire was one of the first market entries and has been adopted by more than 90 universities globally, becoming the most widely used solution (see Table 5.2). Another popular solution is Ex Libris Leganto, which has been adopted by more than 30 UK universities. In 2012, PTFS Europe launched the Rebus: list Reading Lists solution, which was in 2017 relaunched as Kortext Keylinks (Higher Education Library Technology, 2020). It has now been adopted by several UK-based universities. Parallel to the commercial solutions, universities and independent organizations

developed open-source RL solutions (Cross, 2015). Of these, only a few are still active, and many appear to no longer be developed (see Table 5.1). Open-source solutions that are still active and in-service at several universities include the Loughborough Online Reading List System (LORS), developed at the University of Loughborough and the MyReading Reading List system developed at the University of Huddersfield (Brewerton, 2014; McGuinn et al., 2017; Higher Education Library Technology, 2020). An early open-source development was undertaken in 2008 by the Open University of UK in collaboration with RefWorks-COS. They developed the toolkit ReMIT for integrating reference management tools into a virtual learning environment (Telstar, 2018). This system was adopted by several universities, among others the Southampton Solent University. However, this project no longer appears to be actively maintained. In 2009, the University of Kent started the development of their RL system called List8D. After the initial prototype was released in 2010, they discontinued the further development of the project and adopted Talis Aspire. In addition, the University of York started an in-house development of the RL system (called EARL) in 2013. This was replaced with Ex Libris Leganto in 2017.

Table 5.1. RL systems overview

Code	System and Background	Open Source	Commercial	Originated at university	Active up-to-date
S1	MyReading (2011)	✓	-	✓	✓
S2	LORLS (2002)	✓	-	✓	✓
S3	List 8D (2009/10)	✓	-	✓	-
S4	EARL (2013)	✓	-	✓	-
S5	UNILIBRI (2012/13)	✓	-	-	-
S6	Talis *Aspire* (2009/10)	-	✓	-	✓
S7	Talis *Elevate* (2019/20)	-	✓	-	✓
S8	Ex Libris *Leganto* (2014/15)	-	✓	-	✓
S9	Kortext *KeyLinks* (2012)	-	✓	-	✓
S10	SirsiDynix BLUEcloud *Course Lists* (2015/16)	-	✓	-	✓

For better understanding, we tabulated the list of most common active solutions and some universities that adopted them (see Table 5.2). Commercial products now seem to dominate course reading list management at universities. Based on our available data, Talis Aspire has effectively become the global market leader.

Table 5.2. The RL systems currently in use in tertiary education

	Solution	Number of universities (approx.)	Name of some universities
Commercial	Talis *Aspire* /Elevate (S6/S7)	90<	University of Oxford University of Alberta University of Waikato Leeds Trinity University Bristol, University University of Auckland Griffith University Leeds Beckett University Brunel University University of Tasmania Capilano University etc...
	Ex Libris *Leganto (S8)*	30<	Cambridge, University Aberdeen, University University of Sydney Bath, University etc...
	Kortext *Keylinks (S9)*	5<	Birmingham City University Bournemouth, Arts University Buckinghamshire New University etc...
Originated at university	MyReading (S1)	1	University of Huddersfield
	LORLS (S2)	1	University of Loughborough

To gain a better understanding of the RL systems, we analyzed the features offered by those systems. In Table 5.3, we categorize and list the commonly available features of the existing RL systems (systems we listed in Table 5.1) under three main categories; (A) core features of the RL systems, (B) pedagogical supportive features for academics and (C) pedagogical supportive features for students. The core features of the RL systems were further categorized into three main perspectives; (a) general features, (b) features that facilitate integrating library work and (c) automatic updating.

In this categorization, general features mean the availability of the basic functionalities in these RL systems. Library work integration refers to how well these RL systems provide an avenue

for integration with the other internal library systems. Automatic updating refers to the ability of the RL systems to automatically update the external links to the library's discovery systems. The pedagogical supportive features for academics and pedagogical supportive features for students refer to how well these solutions facilitate interactive engagement to them with respect to an individual item in the list.

Table 5.3. Available features in the RL systems

Core features (A)	Pedagogical supportive features for academics (B)	Pedagogical supportive features for students (C)
General (a)	Manage lists (create/edit/delete)	Ratings
Integration options (linking/ embedding) with existing library and teaching platforms		
Support for multimedia content in	Organize lists	Notes
Widgets	Drag and drop	Comments
Reminders	Tags/label	Threaded discussions
Import: work with various reference management software	Hide list/sections	Bookmark
Subheadings and Sub-lists	Digitize book chapters	Export
Copying items in the lists to another	Add notes to library/students	Contents annotation (text and non-text)
Rollover lists	Add web links	Suggestions
Library work integration (b)	Manage collaborators	Highlight
Adding materials from the library catalogs	Bookmark	Filter
Generating reading recommendations	Dashboard/usage stats	Reading Intentions
With library ordering processes	-	-
Automatic update and integration (c)	-	-
Updating of article links	-	-
Updating of links to the OPAC	-	-

While user interactions with RL systems had been studied previously, to the best of our knowledge, no in-depth work had been undertaken to explore the features of RL systems and how these features provide pedagogical support for academic teaching in tertiary education. It is worthwhile to study how the available course reading list management systems can support the pedagogical needs of the key stakeholders: academics, students, and librarians.

In Section 5.5 we review previous studies which identify features of RL systems and discuss how those pedagogically supportive features are used.

5.4 Method

This section describes our study method, data collection, data preparation and pre-processing of the data for analysis. Our study employs two research approaches including a review of system features and comparative analysis of RL systems.

5.4.1 Study Method

The first phase of our study consisted of a review on RL systems' features that are valued by academics. This review provides an opportunity for us to glean from the existing literature to answers to our first research question **(RQ1)**.

The second phase of our research was a comparative analysis of RL systems to assess the availability of pedagogical supportive features in identified Reading Lists systems (see Table 5.1). This study helped find the answer to our second research question **(RQ2)**.

We here describe the data collection process for the two phases of our study.

Phase 1: Feature Review

The goal of this review was to identify the significant pedagogical supportive features of the RL systems designed for tertiary education. For that, we examined the previous studies, which explored the use of RL systems in tertiary education across universities, in particular, the use of pedagogical supportive features. In addition, we discuss the RL systems' features that were valued by the academics and the students and identified through our own studies with them (Kumara et al., 2023a; Kumara et al., 2023b).

To ensure that all related research regarding this field of study was reviewed, we used Google Scholar and other databases (which can be accessed via the University's library) as sources. Search terms that were used in order to capture all relevant studies included: "Reading Lists Management Systems", "Online Reading Lists", "use of Reading Lists in Universities", "Reading Lists Systems adopted by universities", "user perceptions and experiences on Reading Lists", "Resource Lists Systems" and "Resource Lists Management in tertiary education". When identifying the studies to review and data extraction, we applied inclusion and exclusion criteria for the study. As inclusion criteria, we first selected the publications that discussed RL systems studies that focused on tertiary education (with availability of the full text), which included, case

studies, theoretical papers, empirical and log analysis surveys, articles/ reports available on the internet (including commercial and non-commercial website providers). We excluded the articles which are not relevant to our research questions and do not focus on the use of RL systems, in particular, the use of pedagogical features. We also excluded the published articles on websites that cannot be validated (author, date, sponsoring body).

Phase 2: Comparative Analysis of Systems

In this study, we employed a comparative analysis method. According to Given (2008), comparative analysis is the process of analyzing the entities of a study (such as individuals, interviews, statements, settings, themes, characteristics, groups, and cases) in order to isolate similarities and differences. In the context of our comparative analysis, the entities we considered were the characteristics of RLs. The goal of this analysis was to compare the RL systems designed for tertiary education on the basis of their pedagogical supportive features together with other core features required for course list management for university academics. For this analysis, we selected ten RL systems, which are designed for tertiary education. When selecting, we considered availability of the information, and access to the contents of those systems. Those systems are: MyReading, LORLS, List 8D, EARL, UNILIBRI, Talis Aspire, Talis Elevate, Ex Libris Leganto, Kortext Keylinks and SirsiDynix (see Table 5.1).

After selecting the RL systems, we defined a set of review criteria to compare these systems together, those are: development, status, availability, category, and applicability. Table 5.4 explains the review criteria that we used to evaluate the systems.

Table 5.4. Review criteria summary

Review criteria	Description
Development	Focuses that the system is commercially developed, inhouse developed (by a university) or open-source.
Status	Focuses that the system is active or defunct.
Availability	Focuses the presence of the systems features i.e. Core features, pedagogical features for academics and students
Category	Focuses on presence of core features of the software solutions i.e general features, features that facilitate integrating library work and automatic updating
Applicability	Focuses what type of pedagogical support features are available for academics and students

5.5   RL Systems Features

Over the last couple of decades, considerable research interest has focused on the use of RLs in tertiary education. Widespread attention in this field of research was aroused by several reasons such as significant changes in teaching practices and the changes in related technologies, especially the popularity of virtual learning environments and resource discovery tools (Cross, 2015; Chad, 2018; Krol, 2019). The research literature on the RL systems in tertiary education is presented in this section under two themes: (1) RL features identified though the user studies, and (2) summary of the significant pedagogical features. This section thus contributes to answering the first research question (RQ1).

5.5.1   RL Features Identified

We here discuss the RL systems' features that have been identified through research studies with academics and students. Most previous studies observed that RL systems' features are not easy to use and do not firmly address the requirements of the users. This has become a significant hurdle for academics to overcome in order to usefully engage with RL systems (Devine, 2017; Kumara et al., 2021; Kumara et al., 2023a; Kumara et al., 2023b; Neill & Musto, 2017; Taylor, 2019; Walsby, 2020; Zhu, 2018). We will use this section to outline these hurdles and highlight the remaining issues for academics and students that the literature has reported.

One of the major hurdles for academics was the successful set-up of a list. Adolphus (2012) and Kumara et al. (2023a) highlighted that the initial set-up of a reading list has become highly complex and takes a significant amount of time. A similar issue was identified by Cameron & Siddal (2017): all of their study participants agreed that setting up multiple lists was extremely time-consuming, taking "forever" to do, and each list involved a "tremendous amount of work," that was "off-putting and daunting". Importantly, they observed that the amount of set-up and maintenance requirements differed significantly depending on the individual academic's discipline. Kumara et al. (2023a) found that the academics at UOW wished for a more intuitive, simplistic, and user-friendly process for setting up a list (which facilitate academics to personalize their list appearance: includes features such as structuring, editing, formatting, and hiding a section or a list).

Providing 'Notes' is another feature available in the RL systems' that allows academics to guide the students' reading. Secker (2005) found that lists which are enriched with commentary,

notes and explanations are pedagogically valuable and constitute an important learning resource. Adolphus (2012) observed that the note feature could be used to include a variety of texts into the lists that address different student abilities. He further recommended that academics use the note feature to explain why a particular resource is valuable, what it covers, why it is included and what the student will gain from looking at it. Taylor (2019) highlighted the use of the note feature to personalize reading lists, to explain how the list works, their expectations of the students in terms of engagement with resources, the importance of texts, or quite simply, which chapter to read in an eBook. Kumara et al. 's (2023a) study confirmed that the note feature has been under-utilized by the academics. They note that lack of awareness of availability and the use as the main reasons for that. Further, from their log analysis study, they identified that the majority of the 'lecturer notes' have not provided any pedagogical supportive guidance to the students.

A third feature in RL systems is 'labelling'. This allows academics to prioritize their list items. Chelin et al. (2005) highlighted that the lists could be improved through an explanation of the labels used by academic staff "to clarify the distinction between 'essential' and 'further' reading". Adolphus (2012) also highlighted the importance of this prioritization of the list items (via labelling). He explains that this will help students manage their time, and their money if they need to purchase certain items. Similarly, Siddall (2016) noted that lists with labels would act as a communication device between staff and students and help to clarify expectations. However, Chelin et al. (2005), Siddall (2016) and Stokes & Martin (2008) found that a variety of 'annotations explaining terminologies' was in use across the institutions with respect to readings, e.g., 'indicative', 'core', 'essential', 'additional', 'further', 'recommended', 'useful', and 'suggested'. According to them, all these vocabularies added to the confusion and miscommunication of expectations to students. Interestingly, Siddall's (2016) study at the University of Northampton identified that the ranking and use of these terminologies varied according to the academics' disciplines.

The 'Bookmarks' feature allows academics to capture the available information from online resources and presents it in an easy to edit format, ready to save and add to the lists. Cross (2015) identified in his study at the Nottingham Trent University, for a large amount of online material not yet bookmark compatible, only basic information (URL, and page Title tag data) is extracted. He suggests that the bookmarklet feature needs a significant amount of sustained intervention to manually add the missing metadata and to create sustainable authentication-aware

links. Bookmarking full-text documents was also seen as an issue by McGuinn et al. (2017) and Kumara et al. (2023a) and they suggest that this feature needs to be further developed. Zhu (2018) also highlighted that academics dissatisfaction with features like Bookmarks largely affects their intention to use the RL system at the Auckland University of Technology. One RL system feature that prompted positive feedback from many academics was the 'content digitization' service, which allows academics to request copyright-cleared articles and chapters be made available online via the RL systems (Taylor, 2019). This has greatly expanded the range of material available to students electronically (including articles outside the library subscriptions). From an academic and library point of view, it is a triumph for both copyright law and online library subscription usage statistics.

Thompson et al. 's (2004) found in their study at the University of Wolverhampton that students preferred lists, which are structured into key reading/titles for specific weeks, specific topics/subject areas, and a single core text with background/supplementary readings. Brewerton (2014) and Siddall (2016) also found that students benefited from lists that are well structured, rather than an alphabetical list of references. Similarly, Siddall & Rose (2014) noted that well-structured and annotated lists that included course-relevant explanations and signposting were found to be helpful by students and helped build their study confidence. Kumara et al. 's (2023b) study with the UOW students found that the students appreciated well-structured and organized reading resources in their reading lists. They remained dissatisfied when the reading resources were poorly organized, inconsistent and when the contents were not specific. Further, they identified that the many students preferred an eBook that is separated into the sections/chapters that could be downloaded as PDF as it reduces confusion, saves their time, and can be accessed even without the internet connection once it is downloaded. Importantly, they noted the students' lack of awareness of the availability of existing features in their lists due to the poor visibility of the system's features.

Some studies suggest new features for the RL systems. For example, Zhu (2018) reported that academics want to have a feature in RLs that allows students to 'submit resources'. Kumara et al. (2023a) highlighted that the academics showed high interests to features that help them to encourage active engagement and transform their static list to capture the imagination of students and hold their attention includes features such as: automated guidance, widgets (allow users to drop the reading list sections/individual references into blog posts/VLEs), email, preview of linked

materials, pooling of materials, usage statistics and better synchronization into Moodle and other teaching support systems. McGuinn et al. (2017) and Kumara et al. (2023b) suggest a more user-friendly interface to the RLs (mobile-friendly), and features such as download, print, search, personal notes, e-mail, and personalization.

5.5.2 Summary: Significant Pedagogical Features

Based on the above discussion, we here prioritize the list of features that the RL systems may include or streamline. We were limited in our capacity to assess the importance of all available features, as we did not find sufficient information from other studies. We observe that all the available publications are reports reflecting on an institute's journey, and none of the studies focused on reviewing the RL systems' features. Table 5.3 presents an overview of the pedagogical supportive features found within the existing Reading List systems. Table 5.5 lists these features by priority. This prioritization is accomplished through an in-depth review of previous studies and literature, which have examined the impact and effectiveness of these features on educational outcomes. Our study is the first to review the available features of the RL systems. Therefore, we were able to assess and prioritize only some of those features, which enhance the pedagogical benefits (see Table 5.5). Together, Tables 5.3 & 5.5 offer insights into the current landscape of RL systems, their diverse pedagogical features, and the evidence-based prioritization of these features for more effective and impactful integration in educational settings.

As discussed in Section 5.5.1, we grouped the features into four main categories, in the following table, Category refers to those groups and lists the identified features of the RLs. We prioritized these features based on their significance to enhancing the pedagogical benefits (priority column). The Reference studies column indicates the studies, which highlighted and discussed the importance of the particular feature. The remarks column explains whether RL systems should bring in or streamline those features.

Table 5.5. Significant RL system features for enhancing the pedagogical benefits.

Category & Feature	Priority	Reference studies	Remarks
Lists management			
Setup a list	High	Adolphus [21]; Cameron & Siddal [22]; Kumara et al. [12]	Required to streamline the user workflow
Linking resources (bookmarks, content digitization)	High	Cross [3]; McGuinn et al. [15]; Zhu [11]; Kumara et al. [12]; Taylor [10]; Kumara et al. [13]	"
Lists organization			
Structuring, editing, formatting, hiding a section or a list	High	Brewerton [5]; Siddel [6]; Siddall & Rose [9]; Thompson et al.[25]; Kumara et al. [12]	"
Interactive engagements			
Notes	High	Adolphus [21]; Secker [23]; Taylor [10]; Kumara et al. [12]	"
Labels	High	Adolphus [21]; Chelin et al. [24]; Siddel [6]; Stokes & Martin [4]; Kumara et al. [12]	"
Automated guidance	High	Kumara et al. [12]	Features don't currently exist and need implementation
Widgets	Moderate	Kumara et al. [12]	"
Preview of linked materials	High	Kumara et al. [12]	"
Pooling of materials	High	Kumara et al. [12]	"
Email	Moderate	McGuinn et al. [15] Kumara et al. [12]	"
Submit resources	Moderate	Zhu [11]	"
Usage statistics	Moderate	Kumara et al. [12]	Required to streamline the user workflow
Search, Download and Print	Moderate	McGuinn et al. [15] Kumara et al. [12]	"
Integrations			
Synchronization with teaching and library support systems	Moderate	Kumara et al. [12]	"

5.6 Comparative Analysis

This section presents the comparative analysis of RL systems' features, in particular, availability of pedagogical supportive features.

5.6.1 Systems vs Features

This subsection presents the results of the comparative analysis of the RL systems' features under three main themes: core features of the Reading List systems, pedagogical supportive features for academics, and pedagogical supportive features for students.

In this analysis, we used a code to uniquely identify each system and those are: S1 (MyReading), S2 (LORLS), S3 (List 8D), S4 (EARL), S5 (UNILIBRI), S6 (Talis Aspire), S7 (Talis Elevate), S8 (Ex Libris Leganto), S9 (Kortex KeyLinks) and S10 (SirsiDynix BLUEcloud Course Lists). These system identifiers will be used in Table 5.6.

5.6.1.1 Core Features of the RL Systems

The core features of the RL systems have been reviewed here according to the categorization presented in Table 5.3.

Table 5.6. Core features of the RL systems

Category	Features	Open Source / Originated at University					Commercial				
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
General	Integration options (linking/ embedding) with existing library and teaching platforms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Support for multimedia contents in lists	✓	-	-	-	-	✓	✓	✓	✓	✓
	Widgets	✓	-	-	-	-	-	-	-	-	-
	Reminders	-	-	-	-	✓	-	-	-	-	-
	Import: works with various reference management softwares	-	✓	✓	-	✓	-	-	✓	-	✓
	Sub-headings and sub-lists	✓	✓	-	✓	-	✓	✓	✓	✓	✓
	Copying items in the lists to another	✓	✓	-	✓	-	✓	✓	✓	✓	✓
	Rollover lists	✓	✓	-	-	-	✓	✓	✓	✓	✓
Library work integration	Adding materials from the library catalogue	✓	✓	-	✓	-	✓	✓	✓	✓	✓
	Generating reading recommendations	✓	✓	-	-	-	-	-	✓	-	-
	Integration with library ordering processes	✓	✓	✓	-	-	-	-	✓	-	-
Automatic update and integration	Updating article links	✓	-	-	-	-	-	-	-	-	-
	Updating of the links to the OPAC	✓	-	-	-	-	-	-	-	-	-

As detailed in Table 5.6, when we closely look at the general feature category, only one functionality is commonly available in all the solutions, i.e., 'integration option of the RL systems with the university LMSs and the library platforms'. Functions such as 'Sub-heading', 'Sub-lists' and 'Copying items' are also implemented in eight solutions except for S3 and S5. There are two unique functionalities i.e., 'Widgets' (S1) and 'Reminders' (only in S5). Widgets allow users to drop the list sections (or individual references) into blog posts or VLEs. Reminders facilitate users to receive notifications via emails, VLEs and 1-to-1 conversations. In the library work integration category, function, 'adding resources from the library catalogues' is implemented in eight solutions except for S3 and S5. 'Generating reading recommendations and suggestions' (based on the academics' usage and the usage of similar lists in other domains) is available only with S1, S2 and S8. This is a very helpful function to academics in terms of saving their time and knowing what kind of resources are linked in similar lists/fields of study (see interactive engagements in Table 5.5). The automatic update and integration category itself is unique to the S1 solution which was developed by the University of Huddersfield. The function of 'automatic update of article links' is important for academics and the library. Because, in some instances, the library must change the subscription. If that happens, some links in existing lists will not work. However, with this functionality, even though subscriptions have changed, links will not break. It will automatically update accordingly. Another function in this category is 'automatic update of links to the library catalogue' (OPAC, Summon etc.). In this instance, when the library purchases/subscribes to an eBook, any lists which use the print version of that eBook will automatically update with the new eBook link.

In summary, the existing RL systems provide a range of core features. The open-source system S1 provides the greatest variety of features. The reason may be its origin at a university (Huddersfield), where the system was developed according to requirements provided by university academics. Commercial systems S6, S7 and S9 provide a smaller number of similar features.

5.6.1.2 Pedagogical Support Features for Academics

In this subsection, we compare all ten RL solutions in order to identify what type of pedagogical support features are available for academics. Table 5.7 details the comparison results.

Table 5.7. Pedagogical support features for academics

Interactive engagement for academics	Open Source / Originated at University					Commercial				
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Manage lists (create/edit/delete)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Organize lists	✓	✓	-	✓	-	✓	✓	✓	✓	-
Drag and drop	-	✓	-	✓	-	✓	✓	✓	✓	-
Tags/labels	✓	✓	-	-	-	✓	✓	✓	✓	-
Hide list/section	✓	✓	-	✓	-	-	-	-	-	-
Digitize book chapters	✓	-	✓	✓	-	✓	✓	✓	✓	-
Add notes to library/students	✓	✓	-	✓	-	✓	✓	✓	✓	✓
Add web links	✓	✓	-	✓	-	✓	✓	✓	✓	✓
Manage collaborators	-	-	-	-	-	-	-	✓	✓	-
Bookmarks	✓	✓	-	-	-	✓	✓	✓	✓	✓
Dashboard/usage stats	-	✓	-	✓	✓	-	✓	✓	✓	-

As shown in Table 5.7, out of the active systems, S8 & S9 support most features for academics. The reason for this lesser number of features may be that both S3 and S5 are open-source developments and no longer appear to be being developed. S10 is a commercial product that caters only to a niche market segment (available to libraries in North America). Some features are common with all the active solutions such as 'managing lists', 'organizing lists', 'tags/labels', 'adding notes', 'adding web links' and 'bookmarking' (S5 system i.e., ERAL is also defunct and no longer being developed).

Among all the features, some are unique for open-source solutions and some we can see only in commercial solutions (see Table 5.7). For example, 'hiding a list, item or a section' is possible with the open-source solutions (S1, S2 & S4). This feature allows academics to hide both individual items and entire sections on a reading list. This feature could be useful if academics wish to start preparing a reading list for students but do not want it to be accessible yet (see lists organization in Table 5.5). On the other hand, 'managing reading list owners and collaborators' can be seen only in commercial solutions (S8 & S9). This feature facilitates academics (as a reading list owner) to add or remove other users as additional owners or as collaborators (co-lecturers, instructors, demos, coordinators, admins etc.). This helps academics to manage their list and the contributions made by others more effectively (see lists management in Table 5.5).

In summary, each of the RL systems analyzed here includes a variety of features that provide pedagogical benefits for academics and support teaching activities.

5.6.1.3 Pedagogical Support Features for Students

In this subsection, similar to the above, we compared available features from the student point of view (see Table 5.8).

Table 5.8. Pedagogical support features for students

Interactive engagement for students with an individual item / resource in the list	Open Source / Originated by a University					Commercial				
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Ratings	✓	✓	-	-	-	-	-	✓	-	✓
Notes	✓	✓	-	-	-	✓	✓	✓	-	-
Comments	✓	-	-	-	-	-	✓	-	-	-
Threaded discussions	✓	-	-	-	-	-	✓	-	-	-
Bookmarks	✓	-	-	-	-	✓	✓	-	-	-
Export	✓	✓	-	-	-	✓	✓	-	✓	✓
Contents annotations (text and non-texts)	-	-	-	-	-	-	✓	✓	-	-
Suggestions	✓	-	-	-	-	-	-	-	-	-
Highlights	-	✓	-	-	-	-	✓	-	-	-
Filter	-	✓	-	-	-	✓	✓	✓	✓	-
Reading intentions	-	-	-	-	-	✓	✓	-	-	-

As detailed in Table 5.8, we see all solutions have attempted to facilitate student learning with different types of interactive features. The 'Rating' feature allows students to rate the items on their reading list. This feature is implemented in all the active solutions except S6 and S7. 'Notes' is another important feature where students can add personal notes to reading list items. Once a note is present on the list, the filter allows you to display those matching your criteria (the presence or lack of a personal note). Going one step further, S1 and S7 solutions allow students to 'annotate' or 'comment' on all resource types within their reading list. This is a great way for them to engage in discussion with their peers on important elements of the content on their course. Further, these two solutions facilitate 'threaded discussion' with class (available to everyone in particular courses). Here, students are also able to make personal/private notes, which are visible only to them.

Another important feature introduced by S7 and S8 is 'annotating non-text contents'. This feature allows commenting and annotation of images. This can be a useful way for students to engage in discussion on important elements of the content they are learning. The 'Filtering' option allows students to refine their list using a number of different factors. This feature is enabled in all the active solutions except S1 and S10. In some systems, academics may define the importance of, such as 'Essential', 'Recommended' or 'Optional'. 'Reading intentions' has been implemented

only in commercial solutions (S6 & S7): students can assign classification such as 'Undecided', 'Will read', 'Reading now', 'Have read', 'Won't read'.

In summary, out of all systems, S1 and S7 provide more interactive features to students compared to other RL systems. S2, S6 and S8 have fewer features; the remaining solutions offer very few student- supportive features. S2, S6 and S8 have fewer features, the remaining solutions offer very few students supportive features.

5.7   Discussion

We here discuss the insights from our study results reported in this paper with regards to our research questions. Where appropriate, our findings are compared with those from related literature.

5.7.1   RQ1: RL Systems' Features Valued by Academics

As Lists management and organization: naturally, the 'set-up' feature is available in all the solutions we compared. Adolphus (2012) and Cameron & Siddall (2017) identified that successfully setting up a list is one of the major hurdles for academics. They noted, even though the RL systems provided various setting up options, academics experienced this step as a highly complex and time-consuming task. This echoes our own findings (Kumara et al., 2023a) in which academics reported a lack of intuitiveness/user friendliness of the process, lack of guidance to the academics on the process and difficulties in linking materials.

We identified that 'structuring' the reading list contents was a feature found in most systems. Many previous studies identified the importance of this feature to students (Brewerton, 2004; Siddall, 2016; Siddall & Rose, 2014; Thompson et al., 2004). In our previous study with academics (Kumara et al., 2023a), we noticed that academic participants wished for more flexibility in structuring and formatting their lists and list items. They preferred lists, which can break down into weeks, topics, and subsections. They wanted to format the texts they entered with respect to the linked items (ex. changing the font, font size, style, and the referencing style).

Pedagogical guidance: another feature that we observed in all the active systems is 'notes'. According to Adolphus (2012), Secker (2005) and Taylor (2019), this feature helps to make RL systems an important learning resource by adding pedagogical value to the lists. 'Labelling' feature is also available in all the active systems except S10 (see Table 5.7). Previous studies highlighted the significance of having this feature to bridge the gap between academics and the students and

helps to clarify expectations (Adolphus, 2012; Chelin et al., 2005; Siddall, 2016; Stokes & Martin, 2008). This feature further helps students to manage their time, and their money if they need to purchase certain items (Adolphus, 2012).

Linking resources: we noted that the 'Bookmark' feature is also implemented in all the active systems (see Table 5.7). However, previous studies reported that the academics were not fully satisfied with use of this feature (Cross, 2015; McGuinn et al., 2016; Zhu, 2018). The main reason they identified this was compatibility issues. A large number of online materials and full-text documents are not bookmark compatible. Apart from that 'content digitization' is another resource linking feature that many academics prompted positive feedback as it adhered to the copyright law (Taylor, 2019). However, we identified two active systems, S2 & S10 (S5 defunct), which still have not implemented this feature (see Table 5.7).

5.7.2   RQ2: Pedagogical Features Offered

Several solutions for managing course reading material have been introduced over time. Some were in-house developments and others were commercial products (see Table 5.1). We note that out of ten solutions reviewed, currently seven solutions have been active in the market and used by the universities. The remaining three solutions were defunct and no longer appear to be being developed (i.e., S3, S4, & S5). Out of these three, two were in-house developments by the University of Kent (S3) and the University of York (S4). We observed that both universities stopped their in-house system development and replaced it with S6 (Talis Aspire) and S8 (Ex Libris Leganto) respectively. We found that traditional course reading lists have been replaced with online Reading List systems by most of the universities with varying degrees of success.

We note that the success of a particular system seemed highly influenced by the pedagogical features provided by those systems to the academics and students. For example, systems such as S8, S9 (10 features) and S2, S6, S7 (9 features) provide many pedagogical features compared to others (see Table 5.7) and those systems are currently used in many tertiary institutes except S2 and S9 (see Table 5.2). Some of such features offered by them are 'setting up a list', 'structure/organize lists', 'rollover lists', 'add/linking resources and web links', 'drag and drop', 'notes', 'labels', 'bookmarks', 'content digitization', 'dashboard', 'comment and annotation', 'export contents & references'. The significance of having some of these features was also highlighted in the previous studies (see Table 5.5 in Section 5.5.1). Though the system S9 (Kortext

Keylinks) provides the above features (with an additional feature 'manage collaborators'), it is not used as much as the S6, S7 and S8. We could not find the exact reason for that, but its relaunch in 2017 may have affected this.

5.7.3 Suggestions for Digital Libraries

There has been a growing body of research that emphasizes the importance of tracking course reading materials (Al-Anzai et al., 2014; Akbar et al., 2011; Agosti et al., 2010) and integrating digital libraries into academic learning environments (Margaret, 2003; McMartin, 2008; Rezaei, 2006; Virkus et al., 2009). From the results of our comparative analysis, we conclude that for a digital library to provide reading lists functionality, linkage to both library catalogues (OPAC, summon etc.) and other university's teaching support systems are required. Additionally, when the library changes resource subscriptions, existing links in RLs should not be broken and should be updated automatically. Seamless access to the different content types would be of importance. Features that could support pedagogical guidance with signposting and annotation (such as notes, commentaries, threads) would need to be provided by the digital library systems to go beyond lists of content for each course.

5.8 Conclusion and Recommendations

The main objective of this research was to provide an insight into how RL systems support the pedagogical needs of academics and students in tertiary education. To achieve this objective, a feature review and comparative analysis was performed and from which we draw the following conclusions:

Existing RL systems offer a variety of interactive pedagogical features. Our research found that academics are expecting more intuitive, simple, and user-friendly RL features. They wish for features that support active student engagement and transform their static reading lists. Existing RL systems do not fully meet their expectations.

We recommend that RL systems should address the following requirements:

- RL set-up processes should be simple, easy to understand and as time efficient as possible (see lists management in Table 5.5).

- RLs should address a broad variety of discipline specific requirements (see Section 5.5.1).

- RL resources should be broken down into sections to help students to navigate easily (see Section 5.5.1, lists organization in Table 5.5 and Table 5.7).

- RLs should be structured, e.g., by themes or by session (see interactive engagements in Table 5.5 and Table 5.7).

- RL labels, notes and comments should not cause confusion about academics' expectations of students (lists organization in Table 5.5, Table 5.7, and Table 5.8).

- RLs should highlight the importance of the list items (see Table 5.8).

- RLs should synchronize with university's teaching support and library support systems (see integration in Table 5.5 and Table 5.6).

Finally, we identify the need for interactive features that better integrate into academic teaching. For example, features such as 'automated guidance', 'preview of linked materials', and 'pooling of materials' (see Section 5.5.1 and Table 5.5) could improve the pedagogical benefits and usefulness of the RL systems for teaching activities (beyond a listing of resources).

We are currently carrying out two companion studies to understand if and how academics use these features to guide the students in their teaching. The first study explores the perceptions and experiences of academics regarding the features of the RL system, followed by a log analysis that examines the use of the 'note' feature by academics in their reading lists. Insights from these studies will help guide our future research into pedagogical features needed for RL systems.

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Chapter 6

Academics' Use of Reading List Features

In the previous chapter, we explored pedagogical support features provided in RLs systems and observed that the 'notes' feature was often used for pedagogical support for students. This chapter, therefore, explores in greater detail the academic engagement with specific reading lists features. This chapter also contributes to answering the second Thesis Question (RLs aspects that hinder uptake and use of academics).

In an interview, we surveyed the academics' experience with RLs features. In our log analysis, we then explored in detail the academics' use of 'notes for students' feature for one academic year. The analysis results of the interviews are presented in this chapter under three themes: 1. Academics' Experience with the WRL Set-Up and Linking Resources 2. Academics' Experience with the Use of Notes Feature and 3. Academics' Perceptions and Suggestions to improve the WRL. The log analysis results are also presented under three topics: 1. Notes Analysis of Books/Chapters 2. Notes Analysis of Articles/Journals and 3. Notes Analysis of Other Items. This chapter recommends improving the RL systems' usability and to better integrate note features into academic teaching.

The material presented in this chapter has been accepted for publication in the International Journal of Digital Libraries (see J3 in Figure 1.3).

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Academics' Experience of Online Reading Lists and the use of Reading List Notes

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Abstract

Reading List Systems are widely used in tertiary education as a pedagogical tool and for tracking copyrighted material. This paper explores academics' experiences with Reading Lists created in the official Reading Lists System and in particular, the use of reading list *notes* feature across a whole university. A mixed-methods approach was employed in which we first conducted interviews with academics about their experience with reading lists. We identified the need for streamlining the workflow of the reading lists set-up, improved usability of the interfaces, and better synchronization with other teaching support systems. Next, we performed a log analysis of the use of the notes feature throughout one academic year. The results of our log analysis were that the *note* feature is under-utilized by academics. We recommend improving the systems' usability by re-engineering the user workflows and to better integrate notes feature into academic teaching.

Keywords: Reading List Systems, Online Reading Lists, Tertiary Education, Academics Experience, Reading List Notes

6.1 Introduction

Typically, in tertiary teaching, reading lists provide students with references to required readings and other materials for their course work (Brewerton, 2014; Siddall 2016). They have long been a part of tertiary education as a pedagogical tool and for tracking the use of copyrighted materials (Brewerton, 2014; Siddall & Rose, 2014; Stokes & Martin, 2008). Traditionally reading lists used to contain references to print-based materials such as books, chapters, journals, articles, proceedings, websites, blogs and magazines. The online version of RLs now contains additionally a significant amount of non-textual information such as videos, audio recordings and other resources. They are therefore often referred to as Resource Lists or Online Reading Lists – RLs - (Cross, 2015). Educators have noted the opportunity for managing and tracking reading materials in digital libraries (Al-Anazi et al., 2014; Akbar et al., 2011; Agosti et al., 2010) and for integrating digital libraries in academic learning environments (Margaret, 2003; Virkus et al., 2009; Rezaei, 2006; McMartin et al., 2008). RLs are often integrated into an academic library's offerings (Krol, 2019; Chad, 2018), and academics are supported by academic liaison librarians in managing lists. Therefore, these lists represent an important channel of communication between academics, students and librarians and they have a critical role to play in transforming students into autonomous learners (Rowley, Hartley, and Larkin, 2008). Copyright Licensing New Zealand (CLNZ, 2014) requires all universities in New Zealand to provide software solutions to enable electronic reporting on copyrighted material. To meet these reporting obligations with CLNZ, all eight New Zealand universities adopted RLs systems in 2015.

Previous studies found that the RLs are under-used in their role as a pedagogical tool (Brewerton, 2014; Siddall & Rose, 2014; Zhu, 2018; Taylor, 2019). All of these studies were user focused (academics or students) and not based on log analyses (see Table 6.1). Therefore, we investigate this further, beyond the user study, by a log analysis. We previously explored pedagogical support features provided in RLs systems (Kumara et al., 2023c). We observed that the 'notes' feature was often used for pedagogical support for students. Academics left notes to students to guide their reading. Importantly, it gives an opportunity to academics to increase their own voice in the list (Taylor, 2019). As examples by explaining *why a particular resource is valuable, what it covers, why it is included and what the student will gain from looking at it*, *how the list works, their expectations of the students in terms of engagement with resources, or quite*

simply, which chapter to read in an ebook (Adolphus; 2012; Taylor, 2019). In the research reported here, we are interested in understanding if and how academics used this 'note' feature to guide the students in their teaching. We believe this understanding will help to improve the utilization of the RLs as a pedagogical supportive tool.

In this article, we explore academics' experiences with the RLs and the use of RLs*'* notes. We seek answers to three specific research questions:

> **RQ1:** What are academics' experiences with creating RLs*?*
>
> **RQ2:** What are academics' experiences of linking resources in RLs*?*
>
> **RQ3:** How were academics using notes in RLs?

The remainder of the article is organized as follows: The following Section 6.2 gives an overview of related work on academics' perception and experience with RLs. We then explain our study method (Section 6.3) and present the results of our study and data analysis (Sections 6.4 and 6.5). In the discussion in Section 6.6, we compare our study insights with those of related work. The final section presents conclusions and recommendations from our study.

6.2   Literature Review

The use of RLs in tertiary teaching across individual universities (Brewerton, 2014; Zhu, 2018; Walsby, 2020) as well as within parts of a university (Beasley, 2016; Neill & Musto, 2017; Cameron & Siddall, 2017; Taylor, 2019; Krol, 2019) has been well reported. A number of studies include academics' perceptions of the RLs (Beasley, 2016; Brewerton, 2014; Cameron & Siddall, 2017). Fewer studies have reported on academics' experiences on use of RLs features (Cameron & Siddall, 2017; Siddall, 2016; Cross, 2015). A common focus across literature is the identification of significant hurdles for academics to usefully engage with RLs.

Academics' Experiences of RLs

The willingness of academics to engage in RLs creation seemed to vary across the different studies. Cross (2015) at Nottingham Trent University highlighted that staff time constraints were a key barrier to the uptake of the RLs at their institute. Beasley (2016) found that familiarity with the system, staff time constraints, and perceived usefulness of the system were also hindrances at the University of Auckland. Krol (2019) discussed resistance and lack of interest by academics.

Despite RLs being created for all courses with the help of library staff, the academics' engagement with the RLs creation remained low due to a cited lack of time (Krol, 2019).

Most studies identified significant hurdles for academics to overcome in order to usefully engage with RLs. While Zhu (2018) found that the academics valued the facility of the sharing of copyright material via the RLs, 40% were dissatisfied with the overall RLs' functionality, stability and ease of use. Consultations with staff at the University of Manchester identified the need for improved functionality of the system as well as integration into the learning management software, better support for users, and marketing to their users of the potentials and capabilities of the system (Walsby, 2020). Neill and Musto (2017) found that academics at the Dublin Business School wished for better integration of RLs with their learning management system, and also identified time constraints as the main barrier for academics to use the RLs. Other factors highlighted as hindrances to RLs uptake were the discipline and lecturing experience of the academics. Taylor (2019) agreed with her colleague Devine (2017) in arguing that the RLs needs to go beyond being a repository of teaching materials but should become a teaching tool in its own right. However, in what way RLs and a learning management system would integrate has not been addressed.

Academics also reported concerns that the RLs may not provide enough cost benefits for them and their students. Brewerton's (2014) study at Loughborough University found that some academics were not convinced that their efforts in maintaining the RLs were appropriate in comparison to the perceived benefit to the students. Cameron and Siddall (2017) even noted concerns voiced by academics about RLs effectively "spoon-feeding" students and observed a lack of effective communication between librarians and academics.

Academics' Experiences of the RLs Features

Adolphus (2012) highlighted that the initial set-up of a RLs has become highly complex and takes a significant amount of time. A similar issue was identified by Cameron & Siddall (2017): all of their study participants agreed that setting up multiple lists was extremely time-consuming, taking "forever" to do, and each list involved a "tremendous amount of work," that was "off-putting and daunting". Importantly, they observed that the amount of set-up and maintenance requirements differed significantly depending on the individual academic's discipline.

Thompson et al.'s (2004) found in their study at the University of Wolverhampton that students preferred lists, which are structured into *key reading/titles for specific weeks, specific*

topics/subject areas and *a single core text with background/supplementary readings*. Brewerton (2004) and Siddall (2016) also found that students benefited from lists that are well structured, rather than an alphabetical list of references. Similarly, Siddall & Rose (2014) noted that well-structured and annotated lists that included course-relevant explanations and signposting were found to be helpful by students and helped build their study confidence.

Secker (2005) found that lists which are enriched with commentary, notes and explanations are pedagogically valuable and constitute an important learning resource. Adolphus (2012) observed that the note feature could be used to include a variety of texts into the reading lists that address different student abilities. He further recommended that academics use the note feature to explain *why a particular resource is valuable, what it covers, why it is included and what the student will gain from looking at it*. Taylor (2019) highlighted the use of the note feature to *personalize reading lists, to explain how the list works, their expectations of the students in terms of engagement with resources, the importance of texts, or quite simply, which chapter to read in an ebook*.

The literature also touches on the resource-linking features found in RLs. The '*Bookmarks*' feature allows academics to capture the available information from online resources and presents it in an easy to edit format, ready to save and add to the lists. Cross (2015) identified in his study at the Nottingham Trent University, for a large amount of online material not yet bookmark compatible, only basic information (URL, and page Title tag data) is extracted. He suggests that the bookmarklet feature needs a significant amount of sustained intervention to manually add the missing metadata and to create sustainable authentication-aware links. Bookmarking full-text documents was also seen as an issue by McGuinn et al. (2016) in their study at the University of Huddersfield, and they suggest that this feature needs to be further developed. Zhu (2018) also highlighted that academics dissatisfaction with the features like Bookmarks largely affects their intention to use the RLs at the Auckland University of Technology. One resource-linking feature that prompted positive feedback from many academics was the '*content digitization*' service, which allows academics to request copyright-cleared articles and chapters, be made available online via the RLs (Taylor 2019). This has greatly expanded the range of material available to students electronically (including articles outside the library subscriptions). From an academic and library point of view, it is a triumph for both copyright law and online library subscription usage statistics.

Some studies suggest new features for the RLs. For example, Zhu (2018) reported that academics want to have a feature in RLs that allows students to '*submit resources*'. McGuinn et al. (2016) suggests a more user-friendly interface to the RLs (mobile-friendly), and features such as download, e-mail and personalization.

Identified Research Gap

We observe that many of the available publications are reports reflecting on an institute's journey. Table 6.1 provides an overview of the discussed studies on academics' perceptions of use of the RLs. Out of the ten studies, only two studies included academics' perception of a specific feature. Of these two Siddall (2016) focused on the *book ordering* feature whereas Cameron & Siddall (2017) focused on *labels* feature. In addition, only two studies used a detailed log analysis. Of these two, Beasley (2016) focused predominantly on a single semester. Krol (2019) covered a four-year period (2016-2019) but limited the study to a single faculty (Computing and Engineering). Both of these studies explored the uptake of the RLs at particular universities. None of the studies focused on analyzing the log data of the use of a specific feature.

Table 6.1. Academics' experiences of use of the RLs: summary of the studies

Author	Instituion	Aim of the Study	Specific Focus			Method			Study Population		Participants		
			General exprience	Specific functions	Implementation challenges	Log Analysis	Questionnaire	Interviews/ Focus Groups	All Faculties	Selected Faculties	Academic Staff	Library Staff	Students
Brewerton (2014)	Loughborough, UK	student and lecturer experience	✓	-	-	-	-	✓	✓	-	✓	-	✓
Cameron & Siddall (2014)	Northampton, UK	explore the potential of RLs as a pedagogical tool	✓	-		-	-	✓	-	Education; Health	✓	-	✓
Cross (2015)	Nottingham Trent, UK	key components of new RL management system	-	-	✓	-	-	✓	✓	-	✓	✓	✓
Beasley (2016)	The University of Auckland, NZ	academic engagement with the implementation of the Reading List systems	✓	-	-	✓	-	✓	-	Faculty of Education and Social Work Faculty of Engineering	✓	-	-
Siddall (2016)	Northampton, UK	academics' perceptions of reading list labels	-	✓	-	-	-	✓	✓	-	✓	-	-
Neill & Musto, (2017)	Dublin Business School, Ireland	explores faculty perceptions of the Reading List Systems	✓	-	-	-	✓	✓	-	Business, Art and Law	✓	-	-
Cameron & Siddall (2017)	Northampton, UK	academics' experience of the Reading Lists and Ordering Process	✓	✓	-	-	✓	✓	-	Health, Education, Business, Social Sciences and Arts	✓	-	-
Zhu (2018)	Auckland University of Technology, NZ	explore factors Influencing Lecturers' Intention to Use Reading Lists	✓	-	-	-	✓	-	✓	-	✓	-	-
Taylor (2019)	The University of Worcester, UK	concerns of academics about Reading List systems	✓	-	-	-	✓	-	-	Postgraduate	✓	-	-
Krol (2019)	West London, UK	students & academics engagement with RLs	✓	-	-	2016-2019	✓	✓	-	Computing and Engineering	✓	-	✓
Walsby (2020)	The University of Manchester, UK	implementing a Reading List strategy	✓	-	-	-	✓	✓	✓	-	✓	-	-
Our Study		academics experience with RLs, use of notes.	✓	✓	-	✓	-	✓	✓	-	✓	-	-

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6.3   Study Method

This section describes the study context, method, data collection, data preparation and pre-processing for analysis. Our study employs a mixed-methods approach (Venkatesh et al., 2013) including interviews with academics and a transaction log analysis.

6.3.1   Institutional Context

The University of Waikato had eight faculties at the time of the study: Arts and Social Sciences (FASS), Education (FEDU), Science and Engineering (FSEN), Waikato Management School (WMS), Māori and Indigenous Studies (FMIS), Computing and Mathematical Sciences (FCMS), Health, Sport, and Human Performance (FHSHP) and Law (FLAW). RLs are typically created for each course instance, being assigned to different semesters and years, such as Summer Schools S, and G, Semesters (Trimester) A and B, whole year D courses, and Semester C (all other periods). Most students attend Semesters A and B, with fewer in Summer Schools S, G. D, and C are rarely used, mostly for postgraduate studies. Courses are taught at different levels. There are six such levels available. Level 0 for foundation or bridging students, Level 1/100, Level 2/200, Level 3/300, Level 4/400, and Level 5/500/5+ for postgraduate courses.

6.3.2   Study Method

Our study consists of two phases. The first phase of our mixed-methods study consisted of interviews with academics. The second phase of the study used a log analysis of the "lecturer notes" (notes given by the lecturer to the students for each linked item) of Waikato Reading Lists (WRL) for the year 2020. The purpose of the "*notes*" log analysis was to gain an in-depth understanding of how academics engage with a pedagogical support feature of the WRL. We here describe the data collection process for the two phases of our study.

Phase 1: Interviews

The study population for the interviews consisted of the UOW academics who were involved with WRL as list creators in at least one case. The survey invitation request was emailed to them in October 2021. We received 19 positive responses from the academics representing 6 faculties. A total of 19 interview sessions were conducted via Zoom within the stipulated time period. The interview questions comprised closed and open-ended questions and were constructed under three main themes (see Appendix A):

- Experience of the WRL set-up and linking materials
- Experience of the use of notes feature
- Perceptions and suggestions to improve WRL

Phase II: Log Analysis

The raw data from the WRL transaction logs were automatically processed and collated into tables of summary data. In this study, a selection of these data received from the UOW library covering 1 January 2016 to 31 December 2020 is discussed. The collected data represent all RLs items (book, chapter, article, journal or other) which were linked by, or for, all the faculties concerning the teaching and assessment periods. In addition, data were collected for the following:

- Courses for which a list was created
- Lists for which an item was linked
- Bibliographic details of the item
- The year and the semester for which the item was linked
- The creator (academic staff or academic liaison librarian)
- Mode of the item (online or physical)
- Type of the item (book, chapter, article, journal or other)
- Specific notes indicated with the item (to students or the library)

Any lists that were deleted at some point from the WRL do not appear in the logs. This is a rare occurrence. The lists are deleted, usually, only if they are duplicates and the regular practice is for all lists to be archived annually. Hence, the statistics for RLs can be assumed to be complete. Table 6.2 describes the preparation of the transaction log data for analysis.

Table 6.2. Preprocessing steps for log data analysis

Step	Description
STEP 1	Removed all RLs created in 2015 because Summer School 2015 lists were created as part of the pilot phase and RLs were fully published for teaching in 2016 Semester A onwards.
STEP 2	Removed all RLs created in 2021 as, before the end of the year, it is impossible to determine the exact count of RLs created by each faculty.
STEP 3	Introduced a column labeled "Faculty" to identify the RLs *items* created by each faculty.

STEP 4	Introduced a column labeled "Paper Level" to identify the RLs *items* linked with which level of the paper.
STEP 5	Introduced a column labeled "Code" to categorize each note specifically.

## 6.4   Results and Analysis of Interviews

The interviews investigated the experiences and perceptions of academics with the use of WRL under three sections; reading list setup and linking process, use of notes feature, and perception and suggestions to improve the WRL. We interviewed 19 participants, representing 6 of 8 faculties. We did not receive an equal number of participants from each faculty. The faculties were represented as follows: FASS (7), WMS (4), FEDU (3), FLAW (2), FCMS (1), FSEN (1), FMIS (0) and FHSHP (0).

6.4.1   Academics' Experiences with the WRL Set-Up and Linking Resources

We here discuss the academics' experiences of creating reading lists and linking digital resources in their lists.

Set-up of the RLs

First, we asked academics *'how easy was it to create a reading list?'* and received mixed feedback (see Figure 6.1). 3 participants did not answer the question as they were not directly engaged with reading list creation, they sought help from the liaison librarians for the initial set-up of their reading lists. 6 of 16 respondents (with 2 strongly) said it was easy to set up, 4 were neutral, and 6 experienced it as difficult. We did not identify any patterns across the faculties. All respondents provided further reasons for their ratings (respondents were permitted to give more than one reason). 5 of 16 respondents commented that they found *'it was self-explanatory, easy to navigate and straightforward to use'*. 13 of 16 respondents gave negative feedback such as *it's complicated and easily forgetting how to do it* (6) *not intuitive* (4), *not user-friendly* (3) and *time-consuming* (3).
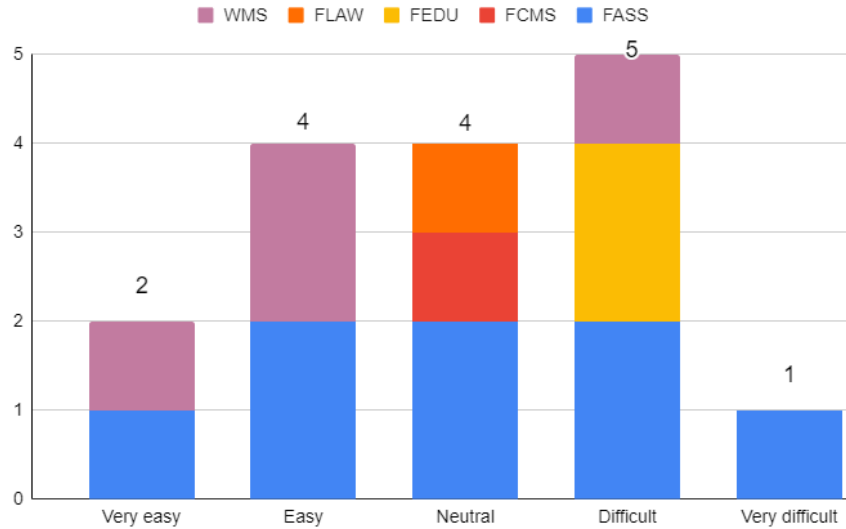
Figure 6.1. Ease of creating a reading list, feedback sorted by faculty (n=16)

Next, we questioned, '*how easy is it to remember the process of creating reading lists?*'. 8 of 16 respondents gave negative affirmation to the question, 5 gave a positive response and 3 remained neutral (see Figure 6.2). From the detailed feedback of 16 respondents (they were permitted to give more than one reason), we see that 10 felt *'if WRL is not used all the time, it's not that easy to keep remembering the process'*. Additional critical comments were the *complicated processes* (3), *not intuitive* (1) and *time-consuming* (1). Positive feedback included that *'if you're using it all the time, it's easy' (3)*.
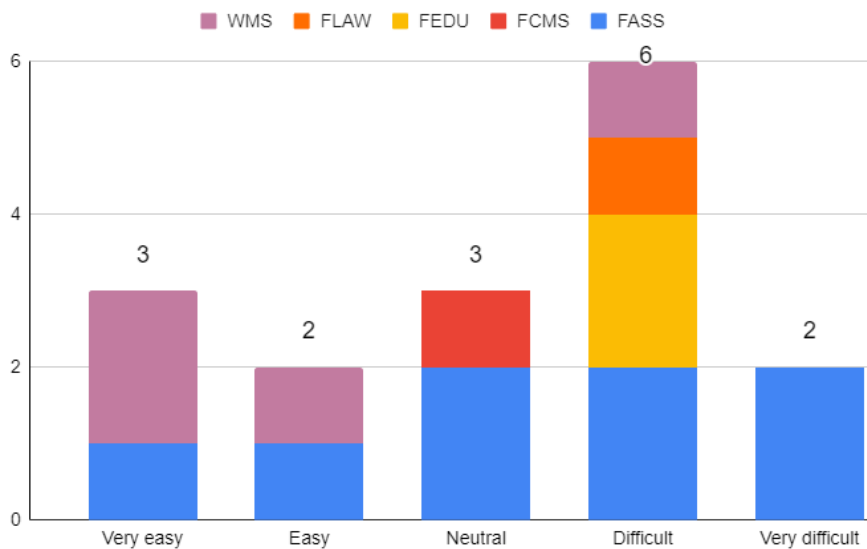

Figure 6.2. How easy is it to remember the process of creating reading lists?, feedback sorted by faculty (n=16)

Linking Resources in RLs

As WRL provides a variety of options to add reading materials to the lists, we asked academics *how they add materials to the reading lists* (see Figure 6.3). More than half of the respondents (10 of 19) indicated that they commonly used the *bookmark browser extension* feature to include teaching materials in their lists. 6 of 19 respondents used the *add resource* feature in the WRL, whereas 8 respondents *sent their resources to the library* to add into their lists on behalf of them. 2 of 19 respondents used the *digitization request* feature in the WRL. We found that the *bookmarking* feature were common across four faculties except FLAW and FSEN. Respondents from FLAW and FSEN expressed that they *send their resources to the library* to add to their lists. The main reason was that this option is easier for them as the library team is doing better. For example, one respondent mentioned that "*...I just gave them the citation...and of course they were all accessible in the library, so they would do it on their own... they've been really, really great...'.* However, only respondents from the FCMS said that she used all the options to add materials to the lists. According to her, options such as *add resource* and *bookmark extension* are intuitive and fairly easy to use. Further she mentioned that the "*digitization feature is easy to use if you know exactly what part of the book you want to digitize, else it's difficult"*.
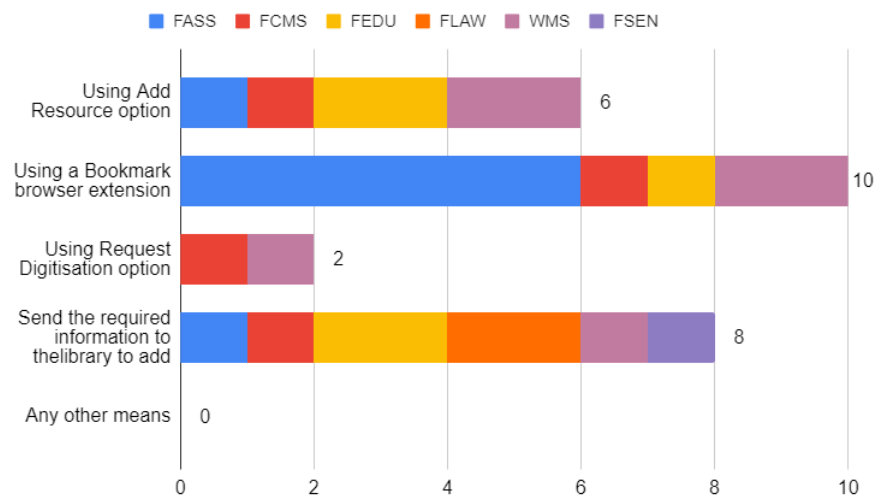

Figure 6.3. How academics add material to the reading lists, feedback sorted by faculty (n=19, more than one option allowed)

Next, with respect to academics' responses on how they add materials (as in Figure 6.3), we requested them to express their views of the interfaces that they engaged with when adding materials. We received the following further responses (see Table 6.3).

Table 6.3. Academics responses on the interfaces used for adding materials.

Academics responses	Questions					
	(i) How easy was it to use add resources? (1= Very easy and 5= Very difficult)					(ii) What features of the interface were easy or hard for you to use?
	1	**2**	**3**	**4**	**5**	
Academics who used *add resource* feature (6 responses for i, ii)	1	2	2		1	"...More appropriate method for me to use as I'm not using other options. But it's just **not simplified** and seems **too complex**..." "...the search... the **search by title**. I could type the title in this, it's really good and come…" "...none of it was easy. I mean, it's **hard to even find how to add stuff**…" "...the **drag and drop was easy**. It's more **complicated if you need to scan material** or if you...have **an external resource** like if you have a website…" "...there is **so many requirements**, it's just clicking here clicking there…" "...i **need to revise sometimes** or **edit** all the **components** in the lists..."
Academics who used ***Bookmarking*** feature (10 responses for i) (8 responses for ii)	3	3	3	-	1	"...I think just the fact that it's essentially and it's automatically in your list and then you just need to drag and drop it to where it needs. So it **doesn't require too many steps**. Sometimes it **doesn't pick up the correct metadata**…" "...When you click on the particular link in the interface, **it will appear and direct it**...only confusing bit...if I'm doing a journal article where it ends up on the list and there's only two options near the start of the list or near the end of the list...You **have to scroll it up and put it to a place where you want it to be**…" "...the hardest feature was working out **how to link to an ebook properly**…" "...it's not particularly difficult, but it could be **clearer about which fields are relevant** and it would be helpful of **translated that into an APA citation and the reference list**. Because the students often get quite confused about who the author is and so... Depending on how that feels being filled out…" "...I **find something that I like**... I can choose really less than I want it to go, and I can choose the part like I've got my reading list…" "...because **it's dumb**, you do have to **go into the record just to check that everything's right**...they've got the right author and it's all looking how you want it to look…"

						"...When you have to enter it yourself it **can be very confusing**, especially between chapter titles...sometimes **it's really tricky** and there's always a chance of **not doing it really properly**…" "... I could **never work out** whether the process I followed was **going to produce the attachment or not** or add the resource or not..."
Academics who used *Request Digitization* feature (1 response for i, ii)	-	1	-	-	-	"...The difficult part about this is that **not all of the books have the same structure.**..You have different pages within different chapters that you want to show so...So in that case it was more difficult to explain through the system than to take the book to the library with stickies…"
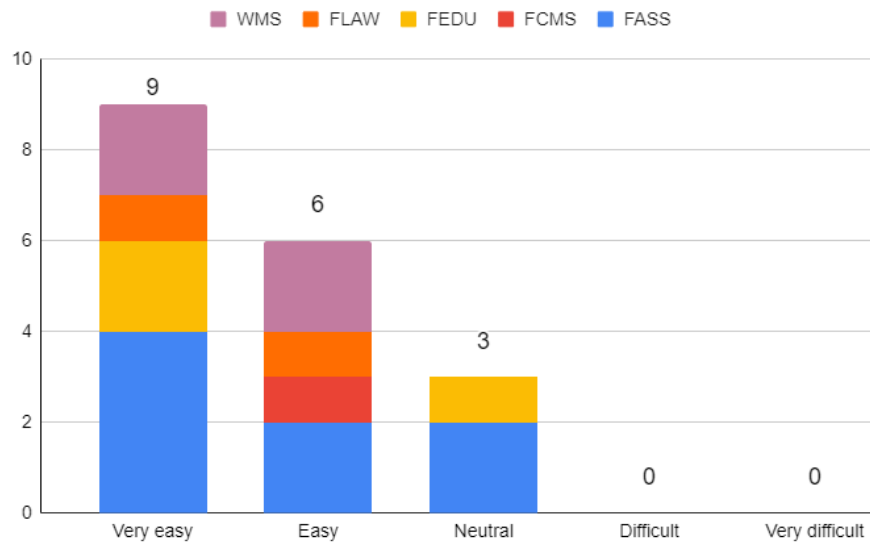
Figure 6.4. How easy or difficult to browse the contents in the interface, feedback sorted by faculty (n=18)

When asked about the ease of browsing the contents in the interface when viewing the linked materials, many respondents (15 of 18) were positive (see Figure 6.4) and 3 remained neutral. None of the academics gave negative responses. All participants provided further feedback on their rating. Participants whose rating was positive said *browsing the contents in the interface is fairly easy and they haven't found any difficulties.* However, out of them, 4 participants who rated it as easy experienced some issues. 2 of them mentioned that *sometimes different types of interfaces appear, sometimes directly going to the particular chapter or the content and they have to find it and fix it for students.* One participant said *it's time consuming* and the other participant identified students facing some issues *depending on what browser they were using.* Importantly,

from the detailed feedback of 3 participants who rated as neutral, there are intricacies in browsing the contents in the linked materials (particularly eBooks) due to the heterogeneity of the data structure in provider websites.

In summary, we identify a need to improve the system's usability, particularly with regards to the reading lists set-up and linking process.

6.4.2 Academics' Experiences with the use of Notes Feature

Notes are an important pedagogical feature available in the RLs systems, which allows academics to guide the students' reading. This feature undoubtedly helps to make RLs systems an important learning resource by adding pedagogical value to the lists. Here, we investigated the academics' experiences and perceptions of the use of notes feature in the WRL.

First, we enquired about their awareness. We asked academics '*were you aware of the feature that supports leaving notes for students in reference to a linked item?*' and received responses that 11 of 19 were aware about it (see Figure 6.5). Out of 11 participants who were aware, only 9 of them actually engaged with this feature. Because 2 participants had not used this feature though they were aware that the feature was available. The reasons given by them include; '*I haven't used it at the level of the individual resources. I use notes in the topic section*', '*I don't know how it would work. I'm not sure if I add a note my student will receive*'. Overall, it seems that the majority of participants (10 of 19) were not engaged with this feature due to the lack of awareness of the availability and the use of the feature.
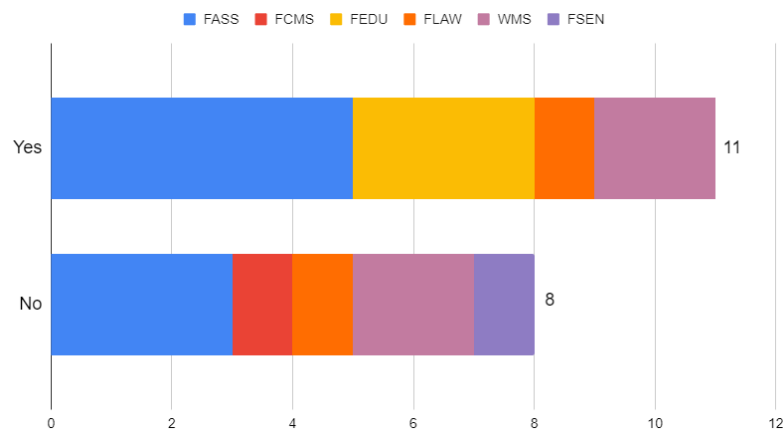
**Figure 6.5.** Academics awareness of the notes feature, feedback sorted by faculty (n=19)

For the 9 participants who had experiences of the use of notes feature, we received the following further responses:

- *Ease of interaction:* when asked about the ease of use of the notes feature, all academic respondents were positive (with 6 strongly).

- *How participants used the notes feature:* Responses given included: to direct students to a particular chapter or the page (s) to read (7), to explain what covering in class (4), to explain the students a bit about the particular reading in terms of why it is important and how the reading applies (3), to put a few little reminders and messages (2), to explain about the assignments (2), classified list items (1).

- *Type of notes they used and why they used in that way:* Responses given grouped as follows;

    (i) Signposting (5) - to direct students to read a particular part of a chapter or book or whatever it is.

    (ii) Guidance and for rationale (3) - to provide students with the reason for the reading, how the student can use the reading, how it will help their learning, and how it applies to what they're learning in class.

    (iii) Explanatory (3) - to explain about the particular reading.

    (iv) Miscellaneous (3) - to encourage, send messages and reminders to students.

- *Participants overall experience of using notes:* Responses given included: it's nice, helpful and supports the teaching (5), not sure if the given notes are helpful to students or not (4), gives an opportunity to annotate the resource list (1).

6.4.3 Academics' Perceptions and Suggestions to improve the WRL

In this section, we examine the varying perceptions, expectations, and suggestions of the academics in relation to the WRL.

16 of 19 respondents gave positive affirmation to the question *'Do you think a reading list system is well-suited to your subject area/ discipline?'*, only 1 gave a negative response and 2 remained neutral (see Figure 6.6).
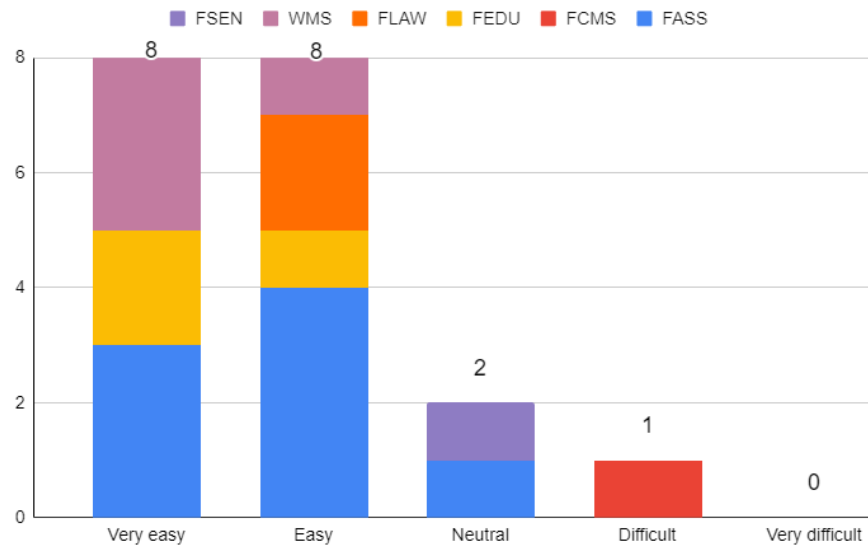
Figure 6.6. RLs system is well-suited for my discipline, feedback sorted by faculty (n=19)

When we asked them to provide more details about their rating on the above question, we saw that irrespective of their positive feelings many shared some interesting views and suggestions as in Table 6.4.

Table 6.4. RLs system is well suited for my subject area/ discipline, detailed feedback.

Participants Ratings	Summarized responses
1 (very easy)	"...making sure all the readings are **in a proper section**.... because I **think students get overwhelmed**, looking at a full reading list and they probably just kind of scroll it and don't find the one that they need to be reading, So I like the way in **which the reading lists can be really tailored into each week** of learning…"
	"…I think **it's very straightforward** and **really well organized**, but if you **don't** have it **set up that way**...I could see it being a little bit **more confusing**…"
	"... It helps me to **put all my readings together in one space** for the students and to **combine a variety of media** I teach online... it helps me **to group those together and annotate them** and make them **easily available** at the click of a button…"
	"...I like the reading list system that can **match week by week**... I think the idea of **breaking down the reading** for students...Otherwise, if you just put all the readings and one great big list... it would just be **overwhelming for students**…"
	"...I think you know students need to have a reading list that would tell those **more to be reading for appropriate contents** that we're going through, but I'm not just sure that the current system that we have could be **simplified** and could be **made easier** to use…"

	".. It's easy to have **everything in one place**, it's **easy to update** it and...I can **roll it over easily**…"
2 (easy)	"...I think it would be good to have had some **training on how to use it**. We weren't shown how to use it at all, so. We just had. To figure it out for ourselves…"
	"...I find this one kind of **confused**...'because there are **different ways** of doing things...**different ways of uploading stuff**. Sometimes **multiple steps involved**...it kind of gets really difficult…"
	"...It's extremely **well suited** and I need to have it. It's just that this particular system is **quite difficult to use**…"
	"...I feel that reading lease should be **needed to promote** more and show students **how to use it**…"
	"...it's **quite static** in the sense that a reading is presented, and you can read it and there's, you know you don't **really interact with the reading**…"
	"...I think the biggest hurdle is it's **not connected to Moodle** properly…"
	"...a huge amount of material has been shifted online, so it's now **really easy to link to the types of resources**…"
3 (Neutral)	"...**students don't even look at** them. You have to remind them all the time and a lot of them just don't go…"
	"...I don't think **they really use it** otherwise, unless they have a very specific assessment where they need to…"
4 (difficult)	"...one big problem is that you **cannot look at the material** that is **scanned in full page view**…"

Many academics appreciate the way that the WRL supports managing their teaching resources (see Table 6.4). However, they highlighted some important points with regards to the reading lists such as *reading lists should be tailored into each week of learning* (3), *quite difficult to use as different ways of doing things* (2), *better UI interaction for linked/scanned items* (2), *training on how to use it and promote it among students* (2), *doubt about students usage* (2) *properly integrate with Moodle* (1).

We then further examined the academics suggestions to improve the WRL beyond the support of teaching. We grouped their responses as follows:

- Simplified process to add resources (4): Responses given included: *'much more simple and straightforward system for **identifying and uploading the readings'**, 'having a **kind of space pool** for us to **save those resources** we might need in the future', 'it*

*requires us first to bookmark and then to go in and edit the link better to have **simpler way of achieving that'**, 'if I could have the **following or past years reading list available** then it would easy to update'.*

- Make it easier and more intuitive (4): Responses given included: *'it needs to be a **lot more intuitive'**, '**update** the system', 'make the **setup template clearer to use'**, '**simplify**, make it **easy to use** and make it **intuitive'.***

- Improved UI experience (4): *'**update** the interfaces, 'enhance **familiarity'**, 'I don't find that browser extension interface **quite as useful** as it might be', '**preview** of the first page of the document or an **expanded view'.***

- Proper structuring and formatting (3): Responses given included: *'sometimes it's difficult to see where your sections are so having those **sections in a more clearly differentiated way** is better', '**list the resources using a APA referencing style because it would be useful to model APA referencing style** to the students', 'it would be good also to have like an **option to collapse or to hide a part of a section** rather than have all of them expanded'.*

- Automated/self-guidance (3): *'**frequently asked questions** kind of pieces of information', 'quick five-minute video **reminding us of how to use'**, '**clearer prompts**, asking what kind of source you want to put in a book or journal or website, in which week?'.*

- Training and support (2): *'some scope for a bit of **extra education** there', 'it would be good to have a **contact person'.***

- Streamline the digitization process (2): Responses given included: *'I have to **request the digitization** for an item **every year** though if it's been digitized previously', 'I **cannot look** at the material that is **scanned in full page view'.***

Finally, respondents volunteered some views on the missing features within the WRL and some of them repeated points they made in earlier comments. We grouped their responses into seven main categories as follows:

- More simplistic process for setting up a list (6): Here the academics request a clearer, simplified, and straightforward template for reading lists set-up.

- Attractive and informative GUI (4): Some of the academics expressed that they don't feel like they engaged with the reading materials when reading on screen. They wanted more attractive interfaces with helpful browsing information. They prefer lists which can break down into subsections and icons, the thumbnails for the readings.

- Synchronization into Moodle (4): Since academics engaged with both Moodle and WRL, they requested better integration among these two systems.

- Formatting, editing and viewing list items (4): Here they wanted to format the texts they entered with respect to the linked items. For example, in a paragraph, changing the font, font size, style and the referencing style. Further, they indicate the requirement for a better view for scanned materials.

- Export bookmarks (1): One academic request the option of exporting all bookmarks at once rather than doing it one by one.

- Usage dashboard/widgets (1): Simple way for knowing which resources are being used and how much the students are engaged with it.

In summary, respondents' perception, and the experience on the use of the WRL reveals that the majority acknowledged the usefulness of the WRL for their teaching. However, their detailed responses strongly suggested that improvements are necessary, including a streamlined workflow for the WRL functionalities, attractive interfaces with clearer prompts and better synchronization into other teaching support systems.

6.5 Results and Analysis of the Lecturers' Notes in WRL

This section presents the results of our log analysis of lecturer notes. Here, we analyzed specific notes given by the academics to the students for each linked item in their RLs.
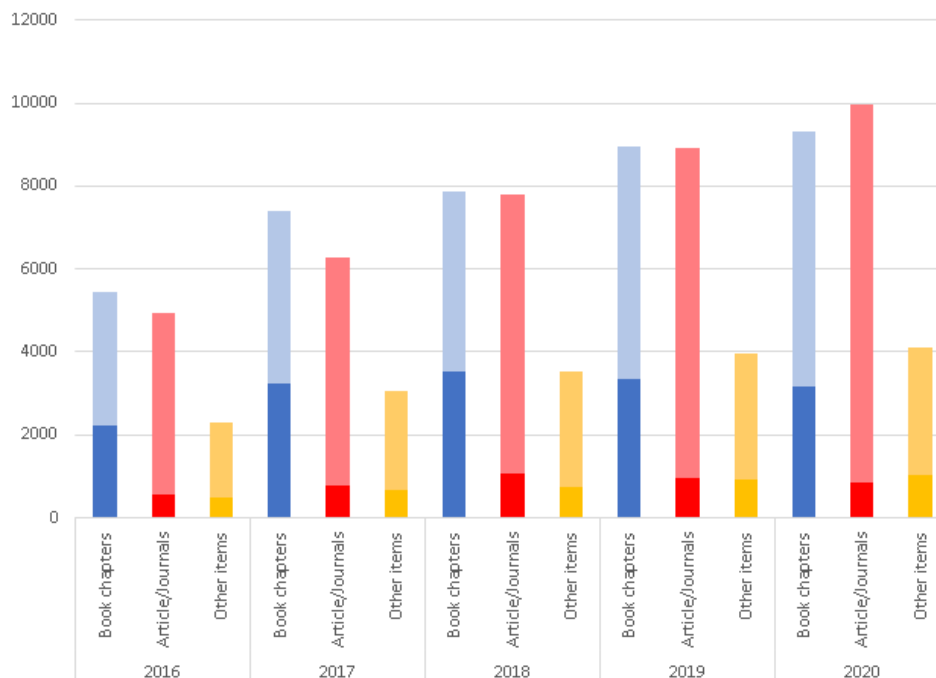
Figure 6.7. Lecturer notes to the students sorted by the type of items linked (2016-2020)
Note: Dark color indicates items with notes and light color indicates items without notes

Figure 6.7 shows that the total number of items in the WRL increased gradually each year. However, the *lecturer notes* to the linked items have not increased proportionality to the total number of items. We observe that across all years, academics include proportionally more notes with books/chapters than with the other two categories. Though book/chapters contributed largely, when we explored the *lecturer notes* to the book/book chapters as a proportion to all linked book/chapters items, it had fallen from 41% in 2016 (2227 items with notes out of 5452 items) to 34% by 2020 (3185 items with notes out of 9322 items). Taken together with the other two categories, articles/journals also fell from 12% in 2016 (573 items with notes out of 4947 items) to 8% by 2020 (842 items with notes out of 9979 items), while other items with notes increased from 22% (494 items with notes out of 2295 items) to 25% (1028 items with notes out of 4095 items).

In this section, we closely examined the *lecturer notes* in all categories using the content analysis method. As Holsti (1968) describes, content analysis is a strong research technique that we used to find specific words, recurring themes, or fundamental concepts in qualitative data, in this context, the *lecturer notes*. Using this method, we systematically measured and analyzed distinct textual elements within the *lecturer notes* that enhance pedagogical support, whether through wording, thematic representation, or conceptual delineation. This method enabled us to

identify prevailing trends and nuances within the notes. Table 6.5 presents a structured categorization of the lecturer notes in detail, along with examples that show the patterns and themes we identified.

Table 6.5. Content analysis of the notes for books/chapters, articles/journals & other items

	Categorization of texts	**Sample lecturer notes**
Signpost	Mentioned only the Chapter/s	A. *Chapter 1* B. *Chapter 1 - Assessment Overview;*
	Mentioned only the Chapter/s with page number/s	A. *Chapter 1, p1-14* B. *Chapter 10, pp. 224-234 + pp. 251-255* C. *Global Strategy Journal, May 2017, 7(2), pp.159-171.* D. *Chapter 18: Studying Creativity Across Different Domains:* E. *Helpful Please read for week 4's discussion - Digital Literacy*
Pedagogical supportive	Descriptive guidance	A. *Chapter 1 provides a particularly useful overview of the origins and meaning of the term 'dystopian'.* B. *Click on the title to check the availability of library copies - This guide will serve you well in developing your scholarly writing. In addition to details on APA style, there are sections that illustrate the difference between paraphrasing and plagiarism.* C. *Sometimes writers inter-change "shared reading" and the reading to/read-aloud method. This can be confusing because in our programme, we use these terms very purposefully to denote two different approaches. Please read carefully, and only use Shared Reading for that approach (which you will learn about next year). Read-Aloud or Reading To is not the same as Shared Reading.*
None Pedagogical supportive	No signposting	A. *E-book* B. *TX553.T7A72 2006*
	Descriptive but no pedagogical support	A. *Use the keyword 'guardianship' in the search box to find the file or highlight heading and right click for a google search* B. *This is a 3-user e-book, when finished reading a chapter please close the webpage so others can access.*

6.5.1   Notes Analysis of Books/Chapters

Here we present the analysis results for books/chapters. Figure 6.8 depicts the total number of linked book/chapters in 2020 and the inclusion of *lecturer notes*. Out of 9322 linked items, only 3185 (34%) items had *lecturer notes*.
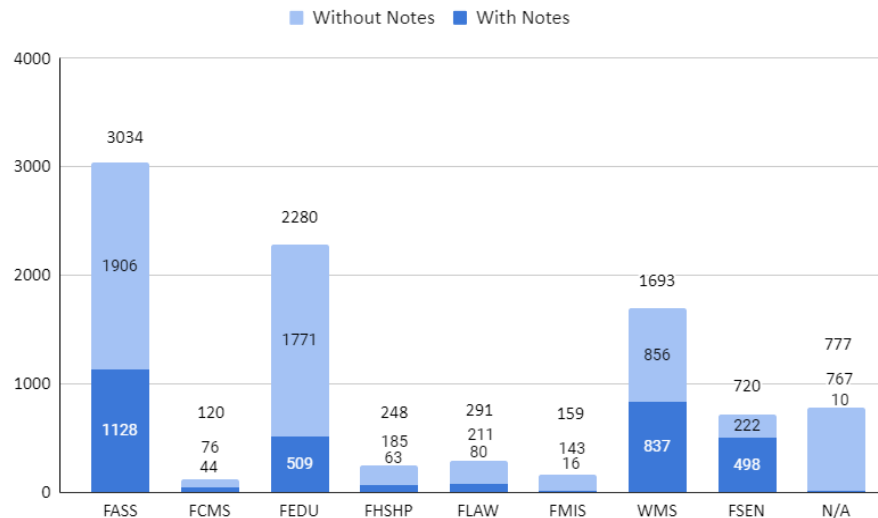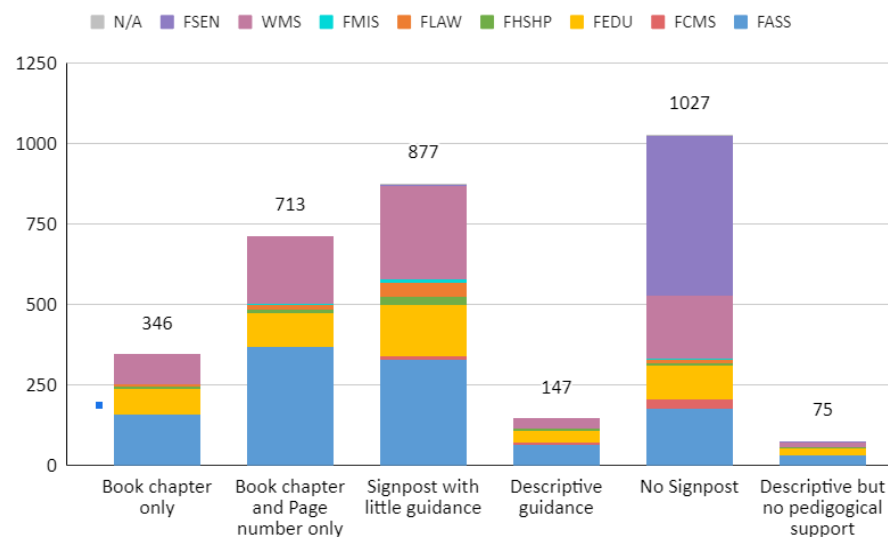
Figure 6.8. Lecturers' notes to the students with regards to books/chapters in 2020, group by faculty

We observed field-based differences in the inclusion of the *lecturer notes* (see Figure 6.8). One group of faculties (FASS; 1128 [37%], FEDU; 509 [22%], WMS; 837 [49%] and FSEN; 498 [69%]) contributed far more notes than the other group (FCMS; 44 [37%], FHSHP; 63 [25%], FLAW; 80 [27%] and FMIS; 16 [10%]). However, we note that this difference was mainly due to the variations in linked items in RLs by each faculty. Most prominent here is FSEN with 69% notes for the linked items. In contrast, FMIS is only with 10% notes for the linked items.
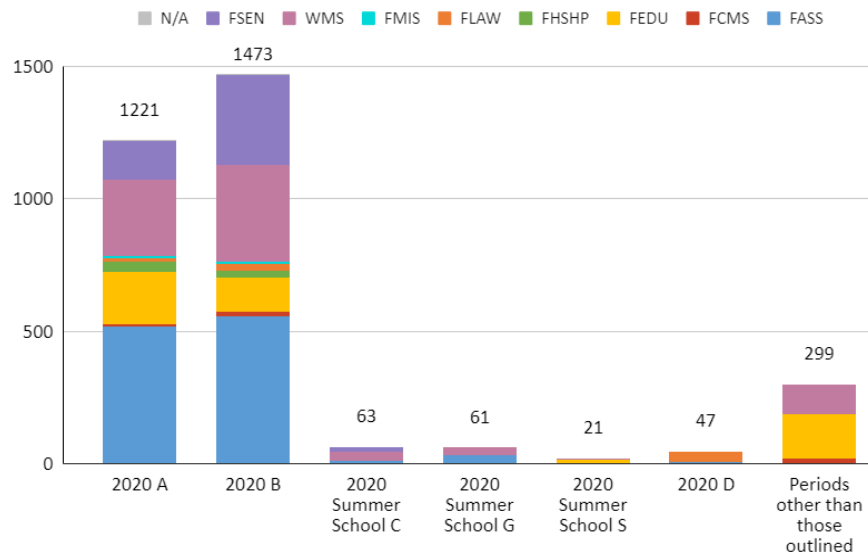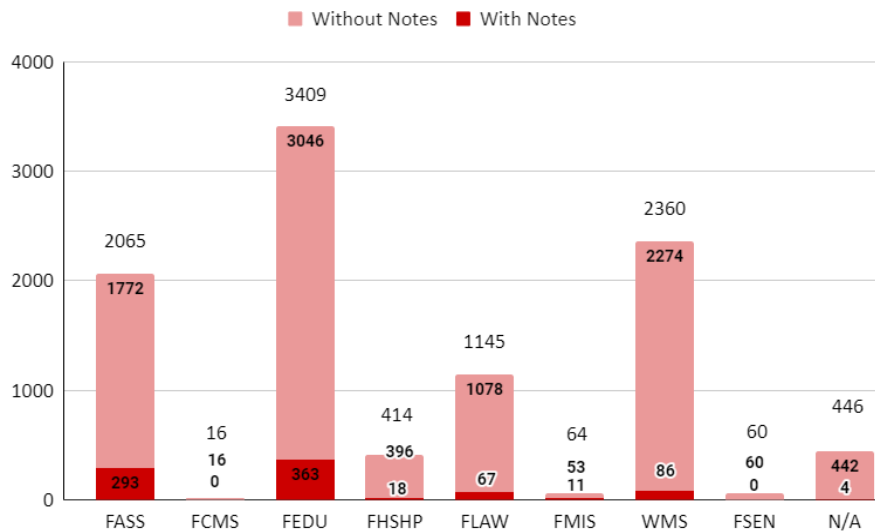

Figure 6.9. Lecturers' notes to the students with regards to books/chapters in 2020, sorted by faculty, group by semester

Then, we analyzed the total number of *lecturer notes* included across all eight faculties for each academic semester in 2020 (see Figure 6.9). While the overall number shows high in semesters A and B, for other semesters the numbers are low. This is because most students attend semesters A and B, with fewer in summer schools. Other semesters are rarely used, mostly for postgraduate studies. Like the pattern we identified in Figure 6.8, here for semesters, inclusion of *lecturer notes* was higher in the four faculties FEDU, FASS, FSEN, WMS (greater than 100 notes per semester, e.g., semester A, B 2020), compared to the other four faculties FMIS, FCMS, FHSHP and FLAW (less than 40 per semester).

Figure 6.10. Lecturer notes to the students with regards to books/chapters in 2020, sorted by faculty, group by note type

As shown in Figure 6.10, 35% (1102) of the *lecturer notes* did not provide any pedagogical supportive guidance to the students (i.e., '*no signpost' and 'descriptive but no pedagogical support'*). Only 5% (147) of the total *lecturer notes* contain pedagogically beneficial guidance to the students (i.e., *descriptive guidance*). Previously, in Figure 6.8, we noted that FSEN included higher *lecturer notes* (498 notes) but according to content analysis, all those notes did not bring any pedagogical benefits to the students (only 1 note provides descriptive guidance but that also without pedagogical support). Similarly, irrespective of the higher numbers in WMS (837 notes) and FASS (1128 notes), the content analysis revealed that only 32 in WMS and 63 in FASS contains pedagogically beneficial guidance to the students (*i.e*., *descriptive guidance*, see Figure 6.10). Four possible interpretations may be drawn from these observations. First, academics lack

awareness of the use of this feature. Second, academics may not believe that this was a good option for them to guide students. Third, lack of user-friendliness of the *Note* feature. Fourth, discipline-specific requirements (i.e., engineering, science, management etc.)
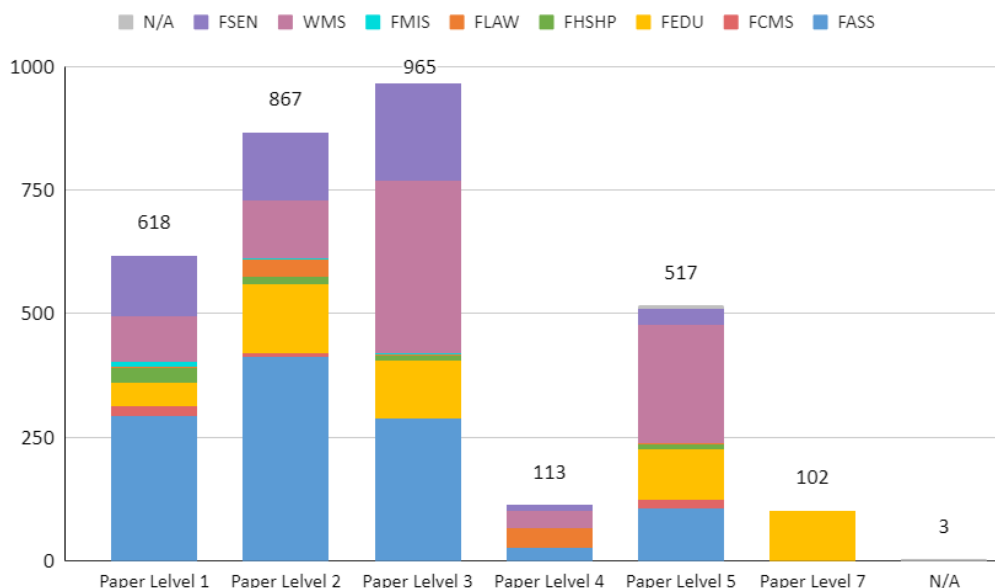
Figure 6.11. Lecturer notes to the students with regards to books/chapters in 2020, sorted by faculty, group by paper level

Next, we examined the *lecturer's notes* against the paper levels (see Figure 6.11). Paper levels refer to the different levels at which courses are taught and are usually associated with years of study (see Table 6.2). First-year (100 level or level 1) courses are more general while fourth year (400 level or level 4) courses are more advanced. 500 level or level 5 (+) courses are graduate and postgraduate level courses.

Among all levels, academics used to include more notes to the level 3 courses (see Figure 6.11). This may be since the level 3 courses rely less on formal teaching and assessment and require greater student participation both in timetabled classes and through seminars and workshops. On the other hand, level 4 courses show the lowest. This is because most courses are offered and students attend levels 1, 2 and 3, with fewer in level 4.

6.5.2 Notes Analysis of Articles/Journals

This section presents the analysis results for articles/journals. Out of 9979 linked items, only 842 (8%) items had *lecturer notes* in 2020 (see Figure 6.12).

Figure 6.12. Lecturers' notes to the students with regards to articles/journals in 2020, group by faculty

Overall, among all faculties, *lecturer notes* numbers are low. In FSEN and FCMS, there are a few linked items and none of them includes any notes. Though FASS, FEDU, WMS and FLAW showed a higher linked items compared to the other faculties, as a percentage, items with *lecturer notes* are low (FASS; 14%, FEDU; 11%, FLAW; 6% and WMS; 4%). From this log data, it is difficult to identify the exact reasons for having a low number of *lecturer notes*. However, one possible reason is that as the contents of the linked articles/journals are small and specific by nature (compared to books) and therefore, academics might not have seen any requirement for providing signposting or descriptive notes about the item.
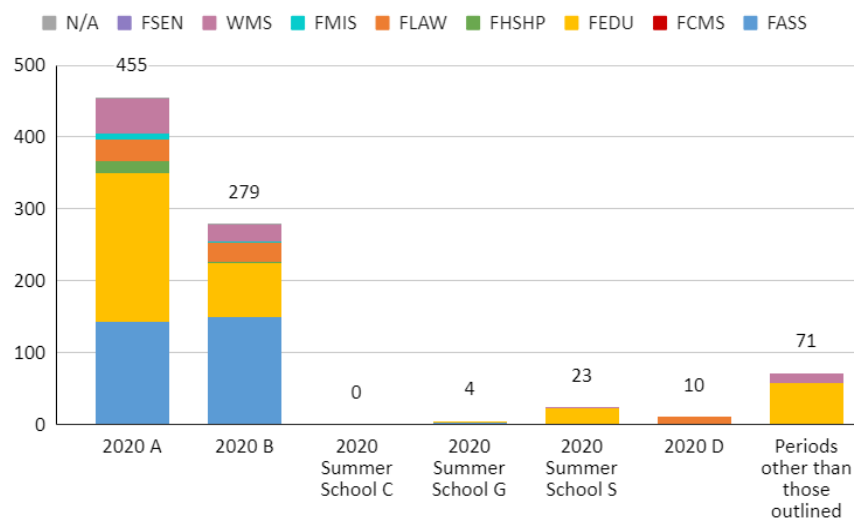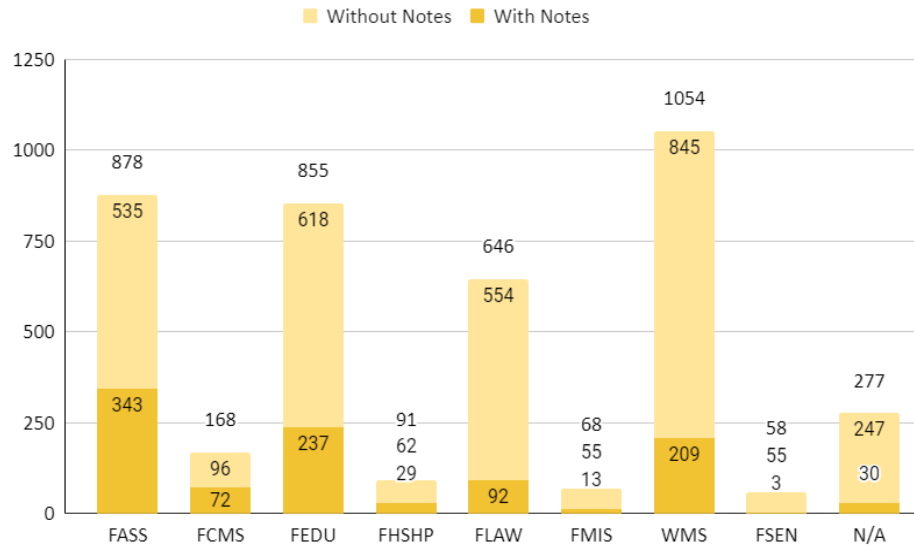

Figure 6.13. Lecturers' notes to the students with regards to articles/journals in 2020, sorted by faculty, group by semester

When we analyzed the total number of *lecturer notes* for each academic semester, the overall numbers were high in semesters A and B while for other semesters the numbers were low (see Figure 6.13). We saw a similar pattern with books/chapters as well (see Figure 6.9). The only difference is that semester B showed higher *lecturer notes* for books/chapters whereas semester A showed higher lecturer notes for articles/journals. In semester B, the higher number of *lecturer notes* for books/chapters suggests that the course content may have relied more heavily on textbooks or specific book chapters. By contrast, semester A had a higher number of notes for articles/journals, indicating that the course materials may have included more academic papers or journal articles.

However, these higher numbers in the first two semesters are not surprising as many students attend for these semesters (many courses offered), with fewer in other semesters (mostly for postgraduate studies). We observe that in semester A, FEDU contributed far more *lecturer notes* than the other faculties (208; 46%). However, by semester B had fallen to about half the proportion (75; 27%). The FASS continued with the same proportion (~140 per semester; 31%) whereas for FMIS, FCMS, FHSHP and FLAW it was less than 50 per semester.
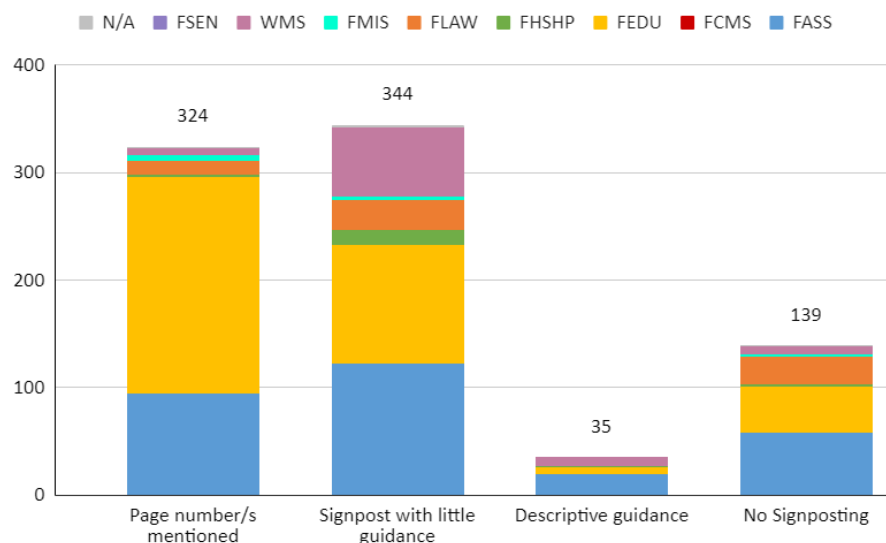
Figure 6.14. Lecturer notes to the students with regards to articles/journals in 2020, sorted by faculty, group by note type

As depicted in Figure 6.14, we see many *lecturer notes* for articles/journals contained signposts (668; 79%). However, only 4% (35) of the *lecturer notes* provide pedagogical supportive guidance to the students (i.e., *descriptive guidance*). 16% (139) did not provide any pedagogical

supportive guidance (i.e., *no signpost*). In Figure 6.12, we identified that the FEDU and the FASS included a higher number of *lecturer notes* (363 and 293 notes), but content analysis showed us that only 7 in FEDU and 19 in FASS contains pedagogically beneficial guidance (*i.e.*, *descriptive guidance*). Possible interpretation we may draw from this observation is that since the contents of the articles/journals are limited by nature, academics may have thought that a detailed explanation was not needed for this.
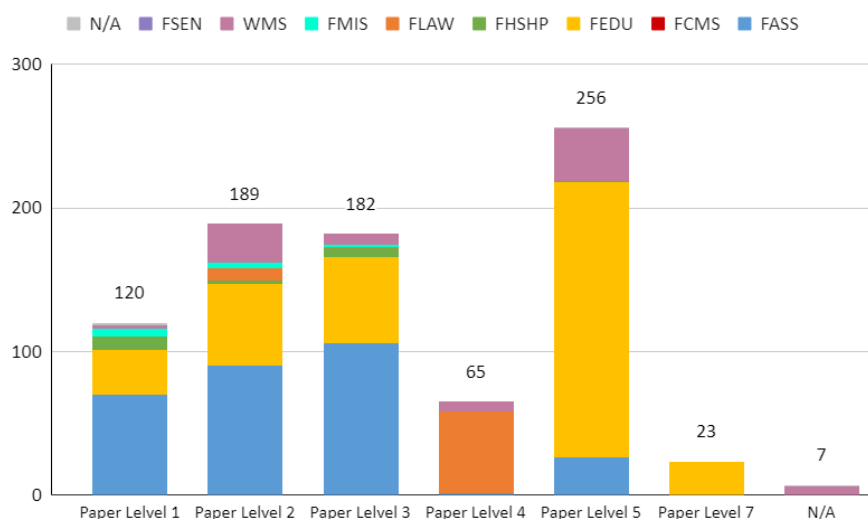
Figure 6.15. Lecturer notes to the students with regards to articles/journals in 2020, sorted by faculty, group by paper level

When examining the *lecturer's notes* against the paper levels (see Figure 6.15), we see academics used to include more notes in the level 5 courses (*i.e.,* graduate courses). For books/chapters, this was for level 3 courses (see Figure 6.11). This may be as the level 5 courses are more reliant on research work and require greater access to articles/journals. Like the books/chapters, low figures in level 4 courses are not surprising. Because most courses are offered and students attend the first three levels, with fewer in level 4.

6.5.3   Notes Analysis of Other Items

This section presents the analysis results for other items. Other items contained linked resources such as web URLs, audios, and videos etc.

Figure 6.16. Lecturers' notes to the students with regards to other items in 2020, group by faculty

Out of a total of 4095 linked items, one-quarter of items (1028) had *lecturer notes* in 2020 (see Figure 6.16). Similar to other two linked item categories (books and articles), for other items also we see one group of faculties (FASS; 343 [39%], FEDU; 237 [28%], WMS; 209 [20%] and FLAW; 92 [14%]) contributed far more notes than the other group (FCMS; 72 [75%], FHSHP; 29 [32%], FSEN; 3 [5%] and FMIS; 13 [19%]). This difference was mainly due to the variations in total linked items by each faculty (higher the linked numbers, higher the lecturer notes).

However, as a percentage of the total linked items, FCMS and FHSHP showed higher figures. Most prominent here is FCMS with 75% notes for the linked items, which we have not seen with FCMS in the other two categories (see Figure 6.8 & 6.12). In contrast, FSEN is only with 5% notes for the linked items. We observed a poor figure with FSEN in articles/journals as well (0%). However, FSEN showed their highest figures (69%) in the books/chapters category (see Figure 6.8).
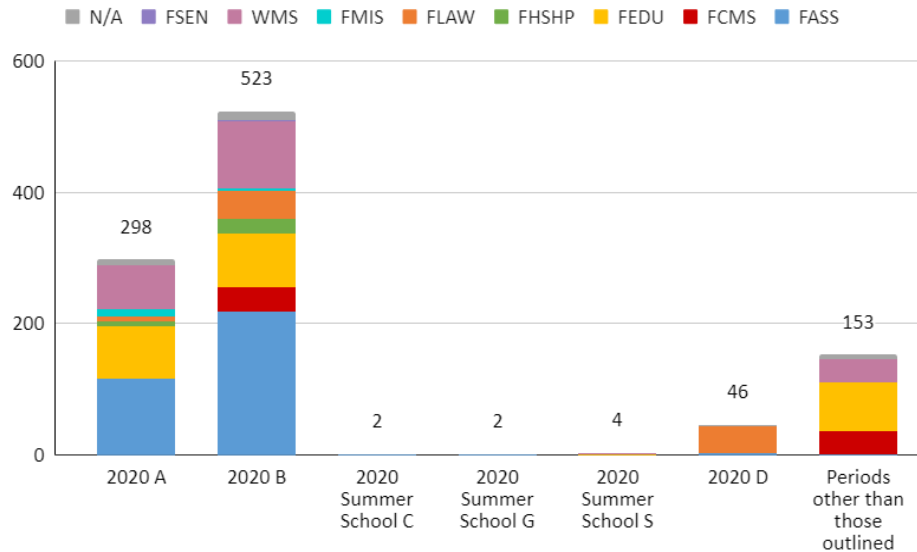
Figure 6.17. Lecturers' notes to the students with regards to other items in 2020, sorted by faculty, group by semester

In alignment with the previous two categories (see Figure 6.9 & 6.13), here also we observe a similar pattern in *lecturer notes* for items in each academic semester (see Figure 6.17). The same reason echoes here as well. The FASS contributed more *lecturer notes* than the other faculties in Semester A (117; 39%). However, by semester B had risen to about double the numbers (219; 41%) while FEDU and WMS continued with the same proportion (~100 per semester).
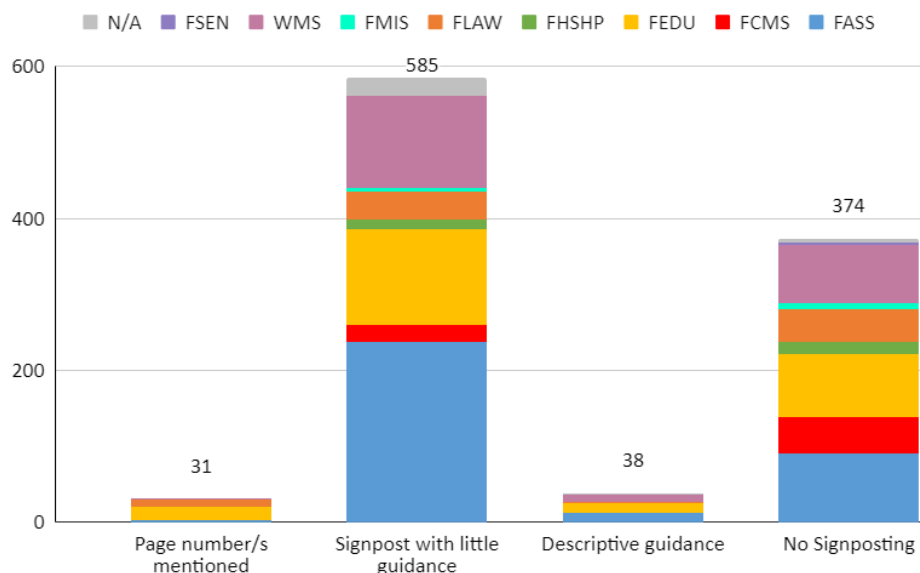
Figure 6.18. Lecturers' notes to the students with regards to other items in 2020, sorted by faculty, group by note type

Like the articles/journals, for other items also we see many *lecturer notes*, which included the signposts guidance (616; 60%). 4% (38) of the *lecturer notes* provide pedagogical supportive guidance to the students (*i.e., descriptive guidance*). 36% (374) of the notes have not contained any pedagogical supportive guidance, *i.e., no signpost* (see Figure 6.18). Though the FASS, FEDU and WMS contributed many *lecturer notes* (343, 237, 209) only very few contain pedagogically beneficial guidance (*i.e., descriptive guidance*). In previous discussions we also saw a similar pattern with regards to the other two categories (see Figure 6.10 & 6.14).
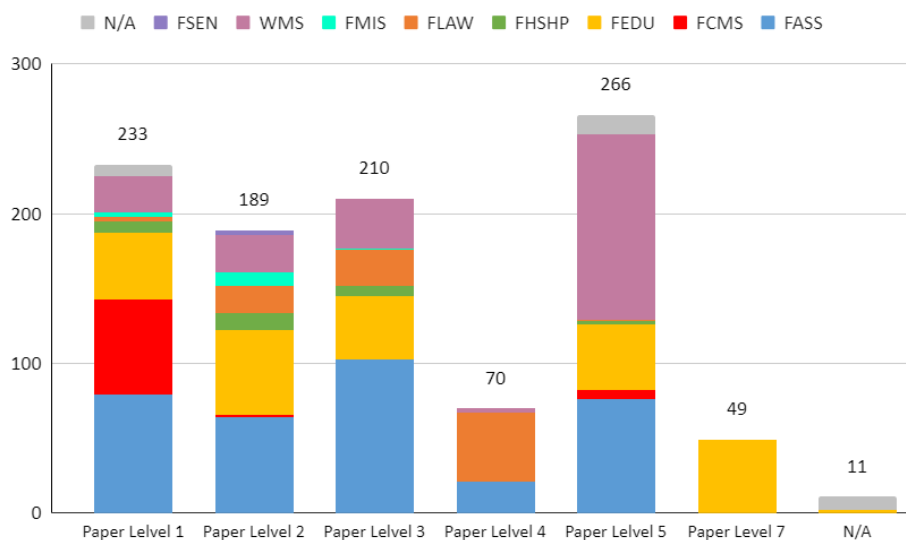
Figure 6.19. Lecturers' notes to the students with regards to other items in 2020, sorted by faculty, group by paper level

Finally, we examined the *lecturer notes* for other items against the paper levels (see Figure 6.19). Even though academics had included more notes in the level 5 courses (*i.e.,* graduate courses), overall, we cannot see any significant variation between paper levels except Level 4 and Level 7.

In summary, the difference in the types of materials used in each semester could be a contributing factor to the variation in the number of notes. It is possible that when students are studying materials from books or chapters, they may find the content more comprehensive and structured, leading to many instances where additional notes are needed by their lecturer. On the other hand, academic articles or journal papers may require less guidance due to their specific focus, deeper analysis, or detailed information. Therefore, it is essential to consider the context of

the papers and the nature of the materials provided to draw accurate conclusions about the reasons behind the discrepancy in the number of notes between semesters and paper levels. Additional factors, such as the teaching approach, assignment type, assessment method, and student preferences, may also influence the academics note-giving patterns observed. Further investigation and analysis of the paper content and academics feedback could provide more insights into the specific reasons for the observed differences.

6.6   Discussion

We discuss insights from our studies reported in this article, particularly in relation to related literature.

Lack of usability of RLs features

We found that 81% respondents negatively commented on the reading lists set-up feature (see Figure 6.1). The main reasons given by them were the complexity and lack of intuitiveness of the process. We therefore identified a need to improve the system's usability in the reading lists set-up process. Similar observations were reported by Cameron & Siddall (2017), Cross (2015), Zhu (2018) and Krol (2019) in their studies. In addition, our participants agree with those in earlier studies in observing that time constraints were a limiting factor in setting up a list (Adolphus, 2012; Beasley, 2016; Cameron & Siddall, 2017; Cross, 2015; Zhu, 2018; Krol, 2019). 62% of the participants noted that it is not that easy to keep remembering the process because they do not use the RLs system regularly (see Figure 6.2). Academics usually only engage with the list creation once or twice a year, sometimes after a couple of years, and the process of setting up a list may be easily forgotten.

Cameron & Siddall (2017) observed that in their study the work required to set-up and maintain a reading list differed significantly depending on the academic discipline. We did not observe such a variation, which may be due to the small number of participants from each discipline. Instead, 84% of our respondents confirmed that the RLs system is well suited to their discipline (see Figure 6.6).

Our participants wished for more flexibility in structuring and formatting their lists and list items. They preferred lists, which can break down into weeks, topics, and subsections. They wanted to format the texts they entered with respect to the linked items (ex. changing the font, font size, style and the referencing style). We did not see this aspect discussed in any other studies.

However, some studies (Brewerton, 2004; Siddall & Rose, 2014; Siddall, 2016; Thompson et al.'s, 2004) found that the students preferred well-structured and annotated lists.

We found that respondents used different means for linking resources: *bookmarking, adding resources* feature, or requesting support from the library for digitization and adding of information (see Figure 6.3). We noted that several respondents had not been aware of the bookmarking feature. When analyzing the difference between faculties, we found that the *bookmarking* and *add resource* feature were common across FASS, FSDU, WMS and FCMS. One of the challenges identified by academics was missing metadata when bookmarking eBooks. FSEN and FLAW showed a clear preference for *sending their resources to the library to add on their behalf.* Krol (2009) and Kumara et al. (2021) reported on the type of materials linked in the RLs but did not discuss the features used for linking resources. Further exploration of different feature preferences between faculties is recommended. We noted participants' concerns with clarity and the ease of use in both *bookmarking* and *adding resources* for resource linking.

Based on the above discussion, we note issues in initial setting up and linking resources as potential barriers for academics' uptake of the RLs. Therefore, we identify a need to improve the system's usability of those features.

In addition, we had previously identified inconsistencies when linking to part of eBooks via the online systems offered by publishers (Kumara et al., 2023a). Therefore, a standardization at the publisher or RLs system level would greatly ease the burden to the creators of RLs.

Underused Notes feature in RLs

Adolphus (2012), Secker (2005) and Taylor (2019) suggest that the *note* feature helps to make RLs systems an important learning resource by adding pedagogical value to the lists. However, none of the studies explored the log data of *lecturer notes* and did not examine the academics' experiences of use of this feature. Our study is the first to explore these contexts. We observed that while the total number of linked items (books/chapters, articles/journals etc) in the WRL increased gradually each year, the *lecturer notes* attached to linked items have not increased proportionality. We found that the *lecturer notes* (any type of a note, see Table 6.5 for note types) for linked book/chapter items had fallen from 41% in 2016 to 34% by 2020 and articles/journals fell from 12% to 8% by 2020 (see Figure 6.7). There might be several reasons for this. One possible reason might be that though over time reading lists numbers increased, academics did not engage with many

features offered by the system. The reading lists numbers increased over time due to the increment of the offered papers and the continued support given by the university library (Kumara et al., 2023a). As reading lists numbers increased, the number of linked items also increased. However, as we mentioned earlier, academics have not used many pedagogical supportive features offered by the system. The *note* is one of such features. In our interviews with academics, we identified that more than half of the participants (10 of 19, 53%) have not engaged with the *note* feature due to the lack of awareness. The academics who did use this feature also have doubts about whether the given notes are helpful to students or not. Therefore, though the linked items increased over time *lecturer notes* for the linked items have not increased.

Our content analysis of the *lecturer notes* (see Table 6.6 for categorizations of *lecturer notes*) found that most lecturers did not provide any pedagogical supportive guidance to the students (see Figures 6.10, 6.14 & 6.18). For books/chapters, only 5% of the total *lecturer notes* contains pedagogically beneficial guidance to the students whereas articles/journals and other items were included in the close-to-equal measure (4%). When looking at the reasons for this, in our interviews with academics, we found that they used *notes* in different ways. Mainly they used it to *direct students to a particular chapter or the page(s) to read*. Other purposes include: *to explain what is covered in class* and *to explain to the students a bit about the particular reading in terms of why it is important and how the reading applies.* We identified that many of them did not use this feature to provide any descriptive guidance to students. Hence, the opportunity of utilizing this feature as a pedagogical supportive tool has so far been missed.

Finally, from the findings of the log data and the interviews, we note that this feature has been under-utilized to bridge the gap between academics and the students and helps to clarify expectations. Therefore, it does not currently offer comprehensive pedagogical support. Apart from the pedagogical significance, we believed that the streamlining and better utilization of the note features would help students to manage their time, and their money as well.

6.7   Conclusion

This article provides insights into the academics' perceptions and experiences with the University's RLs system and the use of notes feature. From our interview responses and log analysis, we have drawn three conclusive points that shed light on the challenges and opportunities for improving the system's usability and pedagogical impact:

First, academics reported difficulties during the initial setting up of RLs, indicating a lack of user-friendliness in the set-up process. This finding emphasizes the importance of streamlining and simplifying the list creation process to enhance the overall user experience. By designing a more intuitive and straightforward workflow, we could empower academics to create reading lists more efficiently, allowing them to focus on the core aspects of their teaching.

Second, many academics heavily depend on library support for linking resources, revealing a lack of confidence and awareness in completing this task themselves. To address this issue, we recognize the need to improve the system's usability not only in list creation but also in resource linking. By providing clear guidance and support, we can instill confidence in academics to independently manage their resources within the RLs system, reducing their reliance on external assistance.

Third, our interviews and log analysis studies revealed that the notes feature has been under-utilized by academics. The lack of awareness of its availability and potential applications stands as a significant barrier to its adoption. Recognizing the untapped potential of the notes feature, we advocate for a more prominent and integrated presentation of this functionality within the system. By enhancing its visibility and highlighting its pedagogical benefits, we envision greater utilization and recognition of the notes feature as a valuable tool in supporting teaching activities.

This research provides actionable insights for enhancing the University's RLs system, focusing on user-friendliness and feature utilization. By addressing the identified challenges and incorporating valuable feedback from academics, we strive to create a more efficient and supportive platform for both educators and students. As we continue to refine and implement the improvements, we anticipate a more positive and transformative impact on teaching and learning activities at the University.

We are currently actively working on designing a more user-friendly workflow for RLs systems. Our goal is to develop an interface that is not only more accessible and intuitive but also empowers academics to harness the full potential of the system independently. We believe that this redesign will foster a more seamless and engaging experience, leading to increased adoption and utilization of the RLs system across the academic community.

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Appendix A: Particularities of the each of Faculty

Faculty	Available support staff	Adopted teaching support systems
Faculty of Art and Social Sciences (FASS): Offers programmes in areas such as languages and linguistics, music, dance, theater, screen and media, anthropology, geography, environmental planning, history, philosophy, political science, social and public policy, sociology and social work.	Each faculty is assigned two academic liaison librarians.	Moodle as the Learning Management System.
Faculty of FCMS: Offers a stimulating and leading-edge environment of quality relevant teaching programmes in design, computer science, software engineering, mathematics, and data analytics.	Academic Liaison Librarians work with academic staff and postgraduate students to provide specialist tutorials and individual assistance for study and research.	The Paper Outlines System is to provide a centralized repository where subject outlines can be created, maintained, reviewed, presented and stored.
Faculty of Education (FEDU): Offers programmes in areas such as teacher education, counseling, human development, education, educational leadership and education studies.		Panopto enables University staff and students to capture and deliver audio and video content.
Faculty of Health, Sport and Human Performance (FHSHP): Offers qualifications that offer students who are passionate about health, hauora and wellbeing the opportunity to develop knowledge and skills to enhance the lives of individuals and communities.	Specialist staff also provide reference services, copyrights, tutorials and individual assistance to help staff and students to access and use Mātangireia and Map resources.	Library's information systems and technology includes Library Services Platform (Alma), Discovery Layer (Primo) and subscribed databases.
Faculty of Law (FLAW): Offers an innovative, student-focused Bachelor of Laws (LLB) degree in a stimulating academic environment.		Waikato Reading Lists for tracking copyrights and course reading management.
Faculty of Maori and Indigenous Studies (FMIS): Offers programmes in Māori language and linguistics, culture, customs, creative and performing arts, media and communication, Treaty of Waitangi, and development studies		Research Commons - institutional research repository
Waikato Management School (WMS): Offers a wide range of business education at all levels of study		O Neherā includes Digital Collections such as photographs, postcards, maps and posters.
Faculty of Science and Engineering (FSEN): Offers a range of innovative programmes for the undergraduate degrees of Bachelor of Science and Bachelor of Engineering.		

Appendix B: Interview Questionnaire for Academics

No	Question	Type	Options
1	I am	Multiple Choice	I. Academic Staff II. Academic Support Staff
2	I am a staff member of the faculty	Multiple Choice	I. Waikato Management School (WMS) II. Faculty of Computing and Mathematical Sciences (FCMS) III. Faculty of Art and Social Sciences (FASS) IV. Faculty of Maori and Indigenous Studies (FMIS) V. Faculty of Science and Engineering (FSEN) VI. Faculty of Health, Sport and Human Performance (FHSHP) VII. Faculty of Education (FEDU) VIII. Faculty of Law (FLAW)
Section 1: Reading List Set-Up and Linking Process			
3	When creating reading lists, did you create them by yourself or with the help of others?	Multiple Choice	I. Created yourself II. Created help of others
	If created yourself (please answer i, ii, iii),		
	(i) How easy was it to create? Why?	Likert Scale	1 - Very Easy 2 - Easy 3 - Neutral 4 - Difficult 5 - Very Difficult
	(i) How easy is it to remember the process of creating reading lists? Why?	Likert Scale	1 - Very Easy 2 - Easy 3 - Neutral 4 - Difficult 5 - Very Difficult
	(iii) When creating a reading list - how did you add material to the list?	Checkbox	(iii-A) Using Add Resource option (iii-B) Using a Bookmark browser extension (iii-C) Using Request Digitization option (iii-D) Send the required information to the library to add (iii-E) Any other means
	If used Add Resource option (iii-A)	Likert Scale	1 - Very Easy 2 - Easy

	(iii-A-a) How easy was it to use add resources? Why?		3 - Neutral 4 - Difficult 5 - Very Difficult
	(iii-A-b) What features of the Add Resource interface were easy for you to use?	Open ended	
	(iii-A-c) What features of the Add Resource interface were hard for you to use?	Open ended	
	If used Bookmark browser extension option (iii-B) (iii-B-a) How easy was it to use add resources? Why?	Likert Scale	1 - Very Easy 2 - Easy 3 - Neutral 4 - Difficult 5 - Very Difficult
	(iii-B-b) What features of the Bookmarking interface were easy for you to use?	Open ended	
	(iii-B-c) What features of the Bookmarking interface were hard for you to use?	Open ended	
	If used Request Digitization option (iii-C) (iii-C-a) How easy was it to use add resources? Why?	Likert Scale	1 - Very Easy 2 - Easy 3 - Neutral 4 - Difficult 5 - Very Difficult
	(iii-C-b) What features of the Request Digitization interface were easy for you to use?	Open ended	
	(iii-C-c) What features of the Request Digitization interface were hard for you to use?	Open ended	
	If created with the help of others, What kind of help did you seek (and why)?		
4	When viewing linked materials, how easy or difficult is it for you to browse the contents in the interfaces? Why?	Likert Scale	1 - Very Easy 2 - Easy 3 - Neutral 4 - Difficult 5 - Very Difficult
Section 2: Use of Notes feature			

5	(i) Were you aware of the feature that supports leaving notes for students in reference to a linked item?	Multiple choice	1 - Yes 2 - No
	(ii) How easy was it to use?	Likert Scale	1 - Very Easy 2 - Easy 3 - Neutral 4 - Difficult 5 - Very Difficult
	(iii) How have you used the notes feature?	Open-ended	
	(iv) What type of note have you used? Why did you use notes in that way?		
	(v) What more can you tell me about your experience using notes?		

Section 3: Perception and suggestions to improve

6	(i) Do you think a reading list system is well-suited to your subject area/ discipline? Why?	Likert Scale	1 - Very Easy 2 - Easy 3 - Neutral 4 - Difficult 5 - Very Difficult
	(ii) Any other suggestions to improve the WRL?	Open-ended	
	(iii) What features did you miss within the WRL?	Open-ended	

Chapter 7

Improving the Usability of Waikato Reading List System

The outcome of the study presented in the previous chapter was to recommend improving the WRL systems' usability. We explored interface options for the Waikato Reading List System through a series of prototypes. This chapter explores the academics' feedback for this new prototype design in comparison to the existing interfaces of the Waikato Reading Lists. The outcome of our study contributes to answering the third Thesis Question of our research (type of intervention could address and rectify the issues identified). The interface design and results of our interviews with academics are presented in this chapter under four themes: 1. Creating a New List 2. Resource Lists Interface 3. Note Feature and 4. Moodle Integration.

This final paper presented in this chapter is ready to be submitted to the International Journal of Digital Libraries (see J4 in Figure 1.3).

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Improving User Experience of Online Reading List Systems: An Academic Perspective

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Abstract

Reading lists have long been a tool of study in tertiary teaching and play a critical role to support students as autonomous learners. It has been observed that the existing Online Reading Lists support student learning in a partial, fractured way and are under-used in their role as a pedagogical tool. This paper introduces a redesigned interface for an Online Reading Lists system with the aim to raise academic ease of use and, ultimately, buy-in. We investigated the academics' feedback for this prototype design in comparison to the existing interfaces of the Waikato Reading List system. The results of our analysis identified that our new prototype design is better than the existing interfaces and this design has been accepted by the majority of academics. Academics were found to appreciate the way our design integrates into their teaching activities to enhance the pedagogical support. We note that the reasons such as simplicity, intuitiveness and visually appealingness with the new prototype acted as academics' deciding factors for our new design.

Keywords: Online Reading Lists, Tertiary Teaching, Academics Experience, Pedagogical Features, Prototype Design

7.1   Introduction

Online Reading Lists (RLs) have long been a part of tertiary education (Brewerton, 2014; Stokes & Martin, 2008). They are predominantly used as a pedagogical tool for providing reading materials to students (Siddall & Rose, 2014). In New Zealand, Online Reading Lists also track the use of copyrighted materials at tertiary institutions. Copyright Licensing New Zealand (CLNZ) required all universities as of 2015 to provide electronic reporting on copyrighted material used under the CLNZ Education License (CLNZ, 2014). The University of Waikato library has been offering an Online Reading Lists system called Waikato Reading Lists (WRL) since 2016 (UOW, 2022).

Previous studies on the use of RLs identified a need for more detailed examination of uptake of the RLs in tertiary education, particularly with regards to enhancing the academics engagement (Cameron & Siddall, 2017; Cross, 2015; Baesley, 2016; Zhu, 2018). We conducted overall seven studies to identify any obstacles for academics and students to usefully engage with the RLs. Based on the findings of these studies, we designed a new interface for the WRL, with the aim of raising academic ease of use and, ultimately, buy-in. In this article, we present the new reading list interface and through a user study explore academics' feedback with regard to usability and perceived ease of use.

The remainder of the article is structured as follows: The following section provides an overview of related work on academics' experience on RLs and the evaluation of RL features. In Section 3, we present the review on RL interfaces including existing interfaces and the new prototype design. Next, in Section 4, we explain our study method and then present the study results and data analysis. In the discussion, we compare our study insights with the results of recent studies. The final section presents the drawn conclusions.

7.2   Related Work

The selection of eBooks from libraries or course reserves has been studied previously (McKay et al., 2012; Vanderschantz et al., 2015; Zhang et al., 2020; Potnis et al., 2018) however, not in the context of dedicated Reading Lists. Our analysis of related work on RL systems in tertiary education focuses on two aspects: (1) academics' experience of the RLs and (2) evaluation of RL's features.

7.2.1   Academics' Experiences

The academics' experience of the use of RLs in tertiary teaching across individual universities (Brewerton, 2014; Zhu, 2018; Walsby, 2020) as well as within parts of a university (Beasley, 2016; Neill & Musto, 2017; Cameron & Siddall, 2017; Taylor, 2019; Krol, 2019) has been well reported. Several studies include a longitudinal approach. Krol (2019) reported that the University of West London saw an increase in RLs from 4% in 2013/14 to 100% of courses by 2018/19. Few other studies have reported 100% saturation of RLs uptake by academics across a teaching division let alone an entire university. Taylor (2019) found that at the University of Worcester 95% of modules had RLs in 2018/19, after first introducing RLs in 2014/15. Kumara et al.'s (2023a) study at the UOW observed that similar to other studies, the initial years saw low numbers of RLs, with only a few academics being involved. In later years, the number of RLs grew at UOW, like other studies. More typically, Kumara et al.'s (2021 and 2023a) study found that RLs creation varied among faculties due to differing faculty size and the disciplinary needs. Beasley's (2016) and Neill & Musto's (2017) studies also confirm similar variations between faculties.

The observed willingness of academics to engage in RLs creation seemed to vary across the different studies, with many citing reasons for low engagement. Cross (2015) at Nottingham Trent University highlighted that staff time constraints were a key barrier to the uptake of the RLs at their institute. Beasley (2016) found that familiarity with the system, staff time constraints, and perceived usefulness of the system were also hindrances at the University of Auckland. Krol (2019) discussed resistance and lack of interest by academics. Despite RLs being created for all courses with the help of library staff, the academics' engagement with the RLs creation remained low due to a cited lack of time (Krol, 2019).

Most studies identified significant hurdles for academics to overcome in order to usefully engage with RL systems. While Zhu (2018) found that the academics valued the facility of the sharing of copyright material via the RLs, 40% were dissatisfied with the overall RLs' functionality, stability, and ease of use. Consultations with staff at the University of Manchester identified the need for improved functionality of the system as well as integration into the learning management software, better support for users, and marketing to their users of the potentials and capabilities of the system (Walsby, 2020). Neil & Masto (2017) found that academics at the Dublin Business School wished for better integration of RLs with their learning management system, and also identified time constraints as the main barrier for academics to use the RLs. Other factors

highlighted as hindrances to RLs uptake were the discipline and lecturing experience of the academics. Similarly, Kumara et al. (2023a) also identified that the academics at the UOW wanted for better synchronization of RLs into other university teaching support systems and especially, more visibility within Moodle. Further, they found that the Waikato academics wished for improved user-friendliness for RLs in terms of better UX features, attractive interfaces with clearer prompts and the streamlined user workflow. Taylor (2019) agreed with her colleague Devine (2017) in arguing that the RLs needs to go beyond being a repository of teaching materials but should become a teaching tool in its own right. However, in what way RLs system and a learning management system would integrate has not been addressed. Academics also reported concerns that the RLs may not provide enough cost benefits for them and their students. Brewerton's (2014) study at Loughborough University found that some academics were not convinced that their efforts in maintaining the RLs were appropriate in comparison to the perceived benefit to the students. Kumara et al. (2023a) noted that some academics of Waikato University doubted the students' actual use of the RLs. Cameron & Siddall (2017) even noted concerns voiced by academics about RLs effectively "spoon-feeding" students and observed a lack of effective communication between librarians and academics.

7.2.2   Evaluation of RLs Features

Most previous studies observed that RL systems' features are not easy to use and do not firmly address the requirements of the academics. This has become a significant hurdle for academics to overcome in order to usefully engage with RL systems (Devine, 2017; Neill & Musto, 2017; Taylor, 2019; Walsby, 2020; Zhu, 2018).

One of the major hurdles for academics was the successful set-up of a list. Adolphus (2012) and Kumara et al. (2023a) highlighted that the initial set-up of a list has become highly complex and takes a significant amount of time. A similar issue was identified by Cameron & Siddall (2017): all their study participants agreed that setting up multiple reading lists was extremely time-consuming, taking "forever" to do, and each list involved a "tremendous amount of work," that was "off-putting and daunting". Importantly, they observed that the amount of set-up and maintenance requirements differed significantly depending on the individual academics' disciplines. Kumara et al. (2023a) found that the academics at Waikato university wished for a more intuitive, simplistic, and user-friendly process for setting up a list.

Thompson et al.'s (2004) found in their study at the University of Wolverhampton that students preferred lists, which are structured into key reading/titles for specific weeks, specific topics/subject areas, and a single core text with background/supplementary readings. Brewerton (2004) and Siddall (2016) also found that students benefited from reading lists that are well structured, rather than an alphabetical list of references. Similarly, Siddall & Rose (2014) noted that well-structured and annotated reading lists that included course-relevant explanations and signposting were found to be helpful by students and helped build their study confidence. Kumara et al.'s (2023b) study with the UOW students found that the students appreciated well-structured and organized reading resources in their reading lists. They remained dissatisfied when the reading resources were poorly organized, inconsistent and when the contents were not specific. Further, they noted the students' lack of awareness of the availability of existing features in their lists due to the poor visibility of the system's features.

Most RL systems provide 'Notes' feature to allow academics to guide the students' reading. Secker (2005) found that reading lists which are enriched with commentary, notes and explanations are pedagogically valuable and constitute an important learning resource. Adolphus (2012) observed that the note feature could be used to include a variety of texts into the reading lists that address different student abilities. He further recommended that academics use the note feature to explain why a particular resource is valuable, what it covers, why it is included and what the student will gain from looking at it. Taylor (2019) highlighted the use of the note feature to personalize reading lists, to explain how the list works, their expectations of the students in terms of engagement with resources, the importance of texts, or quite simply, which chapter to read in an ebook. Kumara et al.'s (2023d) study confirmed that the note feature has been under-utilized by academics. They note that lack of awareness of availability and the use as the main reasons for that. Further, from their log analysis study, they identified that the majority of the 'lecturer notes' have not provided any pedagogical supportive guidance to the students.

A fourth feature in RL systems is 'labeling'. This allows academics to prioritize their list items. Chelin et al. (2005) highlighted that the reading lists could be improved through an explanation of the labels used by academic staff "to clarify the distinction between 'essential' and 'further' reading". Adolphus (2012) also highlighted the importance of this prioritization of the list items (via labeling). He explains that this will help students manage their time, and their money if they need to purchase certain items. Similarly, Siddall (2016) noted that lists with labels would

act as a communication device between staff and students and help to clarify expectations. However, Chelin et al. (2005), Siddall (2016) and Stokes & Martin (2008) found that a variety of 'annotations explaining terminologies' was in use across the institutions with respect to readings, e.g., 'indicative', 'core', 'essential', 'additional', 'further', 'recommended',' useful',' indicative', and 'suggested'. According to them, all these vocabularies added to the confusion and miscommunication of expectations to students. Interestingly, Siddall's (2016) study at the University of Northampton identified that the ranking and use of these terminologies varied according to the academics' disciplines.

The 'Bookmarks' feature allows academics to capture the available information from online resources and presents it in an easy to edit format, ready to save and add to the lists. Cross (2015) identified in his study at the Nottingham Trent University, for a large amount of online material not yet bookmark compatible, only basic information (URL, and page Title tag data) is extracted. He suggests that the bookmarklet feature needs a significant amount of sustained intervention to manually add the missing metadata and to create sustainable authentication-aware links. Bookmarking full-text documents was also seen as an issue by McGuinn et al. (2017) in their study at the University of Huddersfield, and they suggest that this feature needs to be further developed. Zhu (2018) also highlighted that academics dissatisfaction with the features like Bookmarks largely affects their intention to use the RLs system at the Auckland University of Technology.

One RLs system feature that prompted positive feedback from many academics was the 'content digitization' service, which allows academics to request copyright-cleared articles and chapters be made available online via the RL systems (Taylor 2019). This has greatly expanded the range of material available to students electronically (including articles outside the library subscriptions). From an academic and library point of view, it is a triumph for both copyright law and online library subscription usage statistics.

Some studies suggest new features for the RL systems. For example, Zhu (2018) reported that academics want to have a feature in RLs that allows students to 'submit resources'. McGuinn et al. (2017) suggests a more user-friendly interface to the RLs (mobile-friendly), and features such as download, e-mail and personalization.

7.3 Reading Lists Interfaces

This section presents the overview of the Online Reading Lists system that the UOW has adopted and introduces the interfaces of our new prototype designs.

7.3.1 Overview of the WRL

WRL is a Reading Lists Management System (powered by Talis Aspire; Talis.com, 2023) which the University introduced in 2016 to streamline the creation and management of course reading lists and make copyright compliance easier (UOW, 2022). At the UOW, reading lists are created by academics with the help of library staff to provide reading materials to students. Academics post required reading materials into the reading list for a course, and they could also use the note feature to guide the students' reading. Academics can link WRL and their Moodle course page by posting reading list references on their Moodle course page. Students can access those resources by directly logging in to the WRL account or via their Moodle account. Once logged in, the published list of materials is accessible via the resource lists interface.

Figure 7.1 illustrates the interfaces of the basic flow of interaction, which are briefed above.
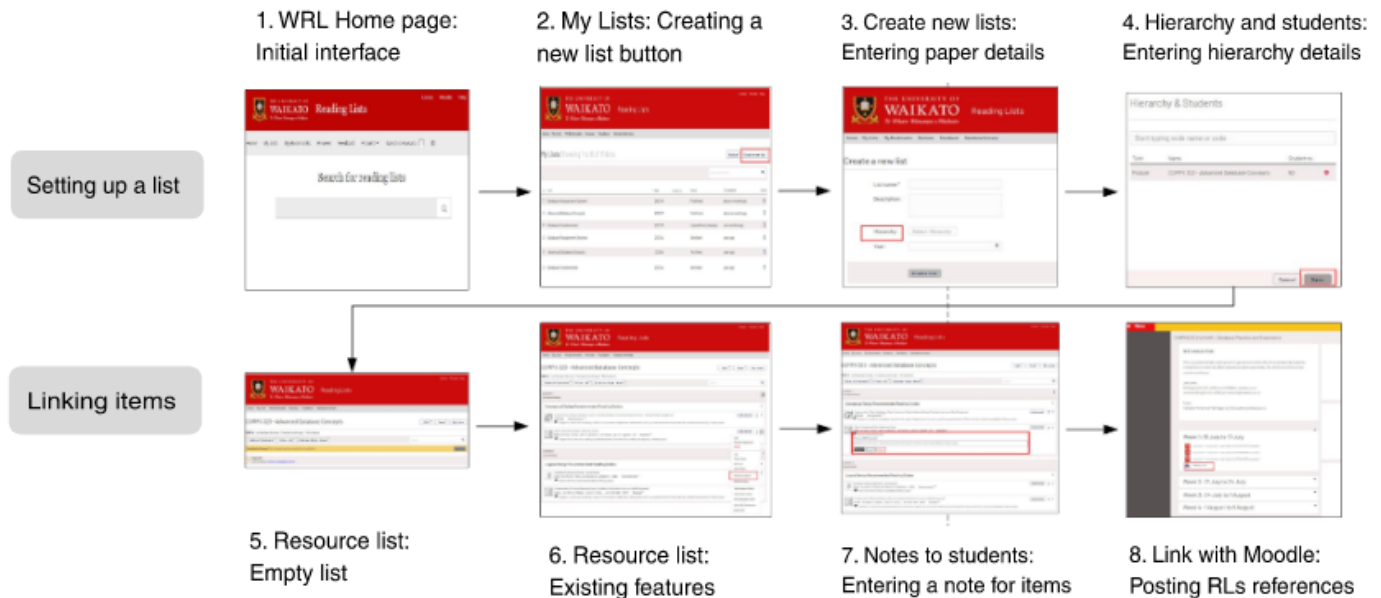
Figure 7.1. Basic flow of interaction (WRL Interfaces)

The *list setting up* process involves four interfaces: Home page, My Lists, Create a New List and Hierarchy & Students. *Linking items* also involves four interfaces: Empty Resource List, Resource List with features, Notes to students and Link with Moodle. These interfaces and their functionality are explained throughout the following sections (see Thesis Appendix C for expanded visuals of the WRL system's interfaces).

In our study, we focused only on RL aspects such as *creating a new list* (Interface 3, 4 in Figure 7.1)*, resource lists* (Interface 5, 6)*, notes for students* (Interface 7) and *Moodle integration* (Interface 8), as explained in order in the following figures.

Creating a new list: this feature allows academics to create a new list for their courses. The initial screen displays all existing lists and the option for creating a new list (see Figure 7.1, Interface 2). Once clicked on the 'creating new list' button, the following interface (see Figure 7.2) will appear to enter the basic details of the list.

Figure 7.2. Creating a new list (see Interface 3 in Figure 7.1)

Figure 7.3. Selecting a hierarchy when creating a new list (see Interface 4 in Figure 7.1)

While creating a new list, it is required to insert the paper details under 'hierarchy'. When clicking on the 'hierarchy' field in Figure 7.2, Figure 7.3 will appear to enter the hierarchy details. Once given all the required information and click on the 'create a new list' button, an empty list will be created (see Figure 7.4).

Figure 7.4. Resource lists interface (empty list), see Interface 5 in Figure 7.1

Resource lists: This is the main interactive interface that displays all the linked materials that the academics and the students are required to frequently engage with. In this interface, once clicked on the three dots appearing in the right-hand corner of each section, it will list down the available features (see highlighted areas of Figure 7.5).
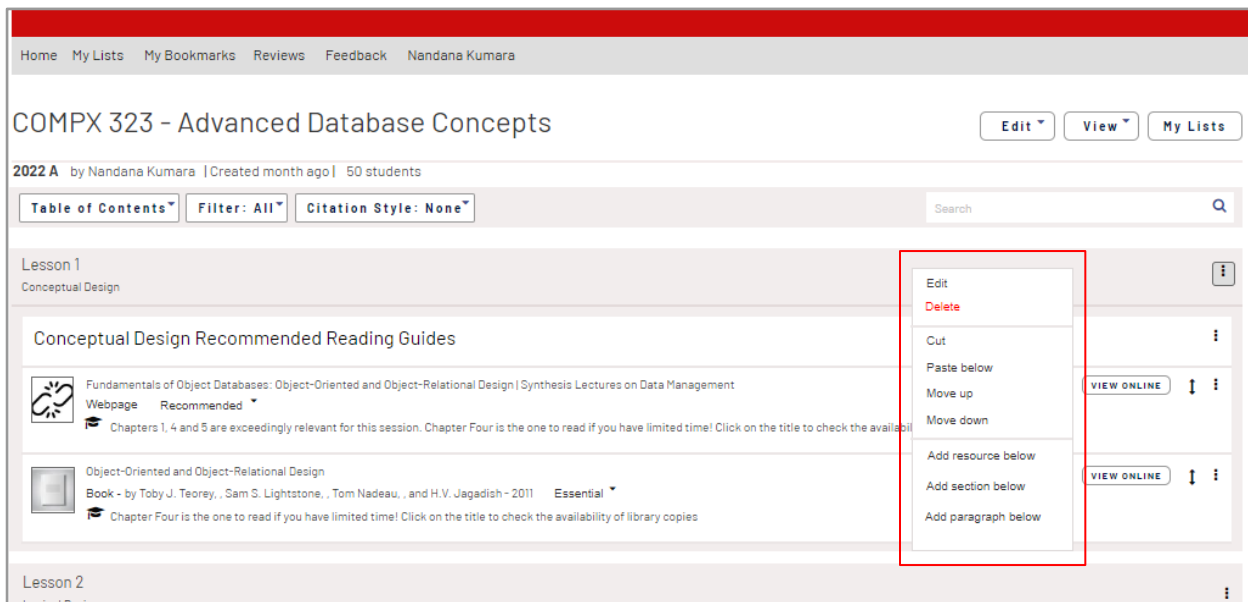
Figure 7.5. Academics view of the resource lists interface (see Interface 6 in Figure 7.1)

Notes to students: This feature allows academics to guide the students' reading. Figure 7.6, resource lists interface, displays all the existing features including *notes for students* (once clicked on three dots on each item in the right-hand corner). Once clicked on the *notes for students* feature (see Figure 7.6), the Interface in Figure 7.7 will appear to enter the note with respect to the selected item (see Interface 7 in Figure 7.1).
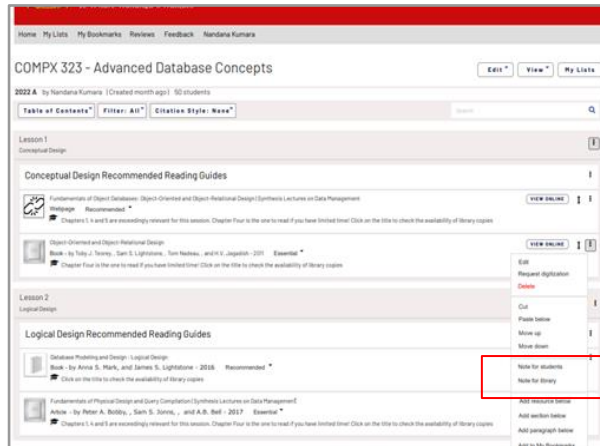
Figure 7.6. Initial interface for note for students feature (see Interface 6 in Figure 7.1)
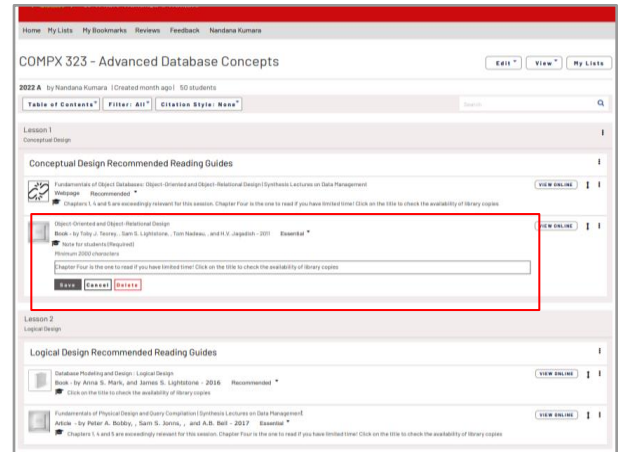
Figure 7.7. Note for students interface (see Interface 7 in Figure 7.1)

Moodle integration: This allows academics to link WRL and their Moodle course page by posting reading list references on their Moodle course page.
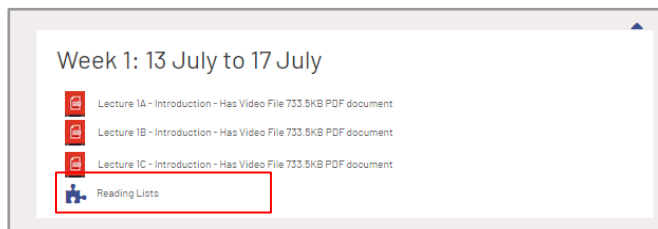
Figure 7.8. Waikato Moodle page with link to the WRL (see Interface 8 in Figure 7.1)

This interface shows a RLs link (highlighted area) that an academic posted with regards to the particular week. Once the students click on this link, they will be directed to the readings linked in the RLs.

7.3.2 Prototype Design

Our prototype designs include paper prototypes followed by a digital prototype. We introduce redesigned interfaces for the Reading Lists system, in comparison to the existing interfaces of the Waikato Reading Lists system. Our primary goal in this prototype design was to focus on enhancing the overall user experience by creating an intuitive and user-friendly interface. Other goals include gathering user feedback, creating a visual representation of the interfaces (including layout, typography, color schemes, and overall aesthetics), visualizing and validating the proposed features, and ensuring smooth and logical user flows. Furthermore, factors such as user flow (interaction sequences), interface elements (the layout, placement of buttons, icons, menus),

information hierarchy (ensuring that essential content is prioritized and easily accessible to users), navigation (clear and intuitive navigation pathways), and visual design (color, typography, and imagery contributing to the overall aesthetics and usability) were taken into account in our prototype design.

7.3.2.1 Paper Prototypes

We designed two paper prototypes to address the shortcomings of the interface (see Figure 7.1); here we discuss the first one only. The final paper prototype (paper prototype 2) was then implemented as a digital prototype. The expanded visuals of the prototype designs are available in Thesis Appendix D.

Paper Prototype Design 1

We identified that the academics wish for a simpler and intuitive reading list set-up process (see Section 7.2.2). Therefore, with this prototype design, we introduced a 3 steps process to set-up a list (Step 1 for entering the paper details, Step 2 for selecting the template and Step 3 for managing collaborators, see setting up a list in Figure 7.9). We expected that this design would be easy to remember for academics as it guides them systematically until creation of the list. The set-up process of the existing RLs system does not contain step 2 and step 3. Step 2 provides academics with flexibility of structuring their list, based on their discipline of teaching. Step 3 helps academics to save their time in maintaining the lists.

Further, we identified the requirement of improving the usability of the resource lists interface (Kumara et al., 2023a). Hence, with this design, we focused on improving the usability aspects. We introduced different color codes, labels, and tags to improve the visual appealingness. We made the features more visible, clearer, and understandable by introducing icons. Importantly, we structured the list the way it displays all the linked items based on their types (i.e., 1. Book/Chapters, 2. Article/Journals, 3. Other items, see resource lists interface in Figure 7.9). In addition, with this design, we introduced two new features for academics i.e. 'My Collection' and 'Recommendations' (see resource lists interface in Figure 7.9). The idea of the 'My Collection' features is that academics can save their readings and re-use it in the future or with another list. With the 'Recommendations' feature, it generates reading suggestions based on the academics' usage and the usage of similar lists in other domains.

Another aspect that we focused on is *notes to students*. In our previous studies with academics, we identified that the academics were struggling to find the *notes to students* feature (Kumara et al., 2023d). Therefore, we made the note feature more visible in the resource lists interface by placing it next to each linked item (see resource lists interface in Figure 7.9). Further, through our notes log analysis, we identified that the academics under-utilized this feature to guide the students. To mitigate that we improved the note feature by introducing a separate guided interface where academics can personalize their notes based on the resource that they linked (see notes to student in Figure 7.9).

Figure 7.9. 'Screens' for paper prototype design 1

Requirement of better integration of the RLs with Moodle system is another important point that we identified in our studies (Kumara et al., 2023a, Kumara et al., 2023d). Currently,

when academics post the required references inside the Moodle, it will display as an icon or reference to be clicked (see Figure 7.8). To make it simpler and clearer, we integrated the RLs and Moodle by embedding the required readings into the Moodle page as a separate section (see Moodle integration in Figure 7.9).

7.3.2.2 Digital Prototype

The digital prototype implements our improved paper prototype (i.e., paper prototype 2). This digital prototype is a highly interactive functional prototype which was developed using Bubble web application development platform (bubble.io). Users can actively engage with the prototype. The interactivity serves as a bridge between the conceptual design and the actual user experience, providing users with a tangible sense of how the final product will operate.

This digital prototype includes the following revisions compared to our paper prototype 1: In the *set-up process*, we further simplified it by reducing the number of interfaces (from 3 to 1),

1. With the *resource lists interface*, following the same theme as in Paper Prototype Design 1, we structured the list the way it displays all the linked items based on their importance not the types (i.e., Essential Readings, Recommended Readings and Optional Readings),
2. In *notes to students* feature, we improved it by facilitating academics to further personalized their notes,
3. In *Moodle integration*, instead of displaying required readings as a separate section in the Moodle page, we embedded RLs contents into a particular week/topic in the Moodle page. These changes contributed to us selecting the Paper Prototype Design 2 to develop as a digital prototype.

This section explains the design of the prototype interfaces for the aspects such as *creating a list* (Interface 3, 4 in Figure 7.1)*, resource lists* (Interface 5, 6 in Figure 7.1)*, notes to students* (Interface 7 in Figure 7.1) and *Moodle integration* (Interface 8 in Figure 7.1). Figure 7.10 illustrates the interfaces of the basic flow of interaction of the new digital prototype design. The expanded visuals of the digital prototype designs are available in Thesis Appendix E.
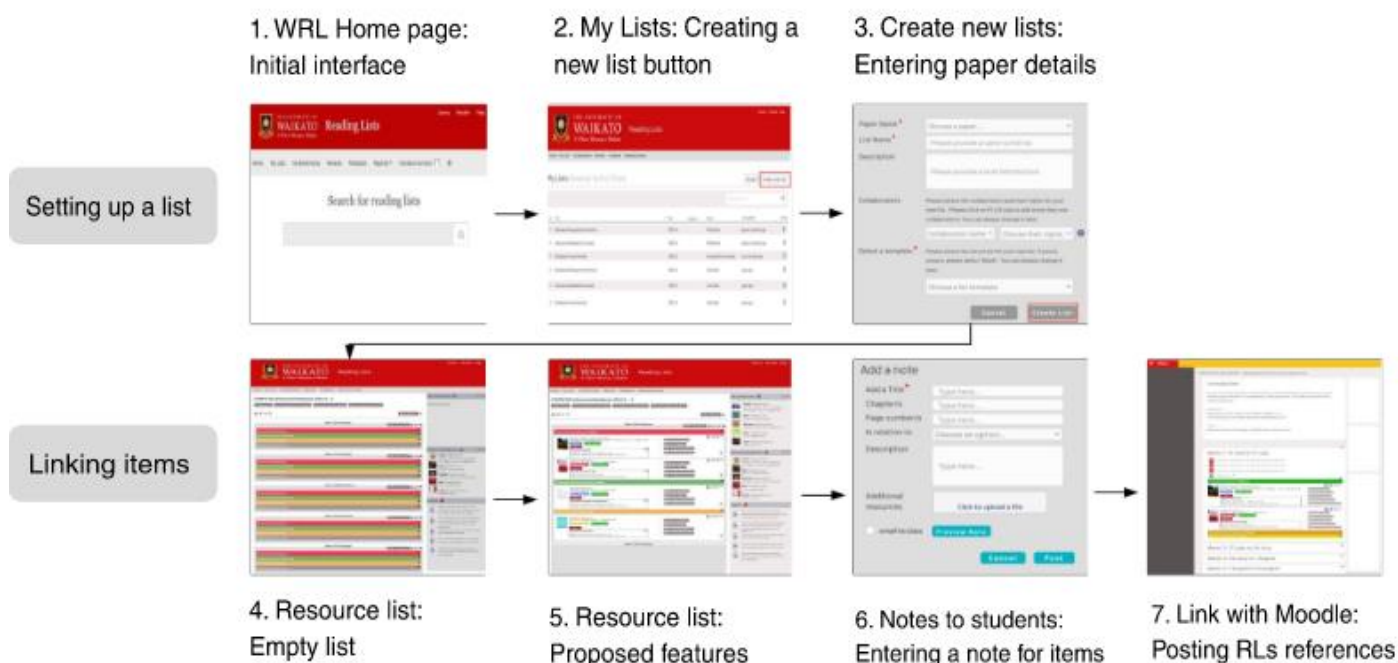
Figure 7.10. Basic flow of interaction (Prototype Interfaces)

Creating a new list: The *My Lists* displays all existing lists and the option for creating a new list (see Figure 7.10, Interface 2). Once clicked on the 'creating new list' button, Figure 7.11 will appear to enter the basic details of the list. In this design, first academics are required to select a paper name from the drop-down list. When they click on the drop-down, it will display all the registered papers (academics can narrow down the list by starting to type paper code or paper name).

Next, they must provide a name for their list (giving description is optional). Importantly, here we newly introduced 'add collaborators' and 'select a template' options. With the 'add collaborators' option, academics are able to share this list with other co-teachers or assistants. At the same time, academics can set access rights to their collaborators as well. We defined three access rights levels as follows,

- Manage: Collaborator has same rights as the list owner.
- Edit: Collaborator has the right to edit the details regarding the list items.
- View Only: Collaborator has right only to the view list items.

'Select a template' option provides academics with flexibility of structuring their list. They have the following list template options.

- Blank - Create custom sections

- Weekly - Arranged for weeks 1-12. They can add and remove as many weeks as they wish

- Section/Topic - Arranged by sections/topics. They can add and remove as many sections as they wish

- Faculty (faculty code) - This template is set for as per the requirement of a particular faculty.

Figure 7.11. Creating a new list (see Interface 3 in Figure 7.10)

Figure 7.12. Resource lists interface (empty list) - (see Interface 4 in Figure 7.10)

Once given all the required information and clicked on the 'create list' button, it will display a message indicating the successful creation of the list with the option of 'Go to list' or access it later *i.e.,* 'OK'. Once clicked on 'Go to list', the following interface (see Figure 7.12) will appear according to the selected resource list template. In this design, readings could be structured either by week, topic, or section (according to the selected template, see Figure 7.11) and

categorized into four types (i.e., essential readings, recommended readings, optional readings, and importance not set).

To make the interface more visually appealing, we used different color codes to distinguish each reading category. An empty list can be populated using five distinct options: *'add resource,'* *'bookmarking,'* *'my collections,'* *'recommendations,'* and *'content digitization.'* Items can also be easily dragged and dropped into the list, allowing them to be organized within a specific week. This functionality is particularly evident in the *'my collections'* and *'Recommendations'* options, as illustrated in Figure 7.12 on the right-hand side option bar.

For further reference, see Figure E.8 and E.9 in Thesis Appendix E, which depicts the interfaces associated with the *'add resource'* option.

Resource lists: Figure 7.13 shows how the resource list interface looks once added readings to a particular week. In this interface, with regards to each linked item (indicated in gray color), it shows all the available features that the academics are required to frequently engage with. Further, different color codes, labels and tags were used to identify each reading type (i.e., Book, article, or a web page) and its accessibility (i.e., view online or not).

Figure 7.13. Academics view of the resource list interface (see Interface 5 in Figure 7.10)

Notes feature: Academics could use our note features to include a variety of texts into the reading lists that address different student abilities. Once clicked on the 'note for students' option which is placed next to each linked item (see Figure 7.13), Figure 7.14 will appear.

This interface allows academics to personalize their notes based on the resource that they linked. The "in relation to" field facilitates academics to specifically mention that this note is relevant to an assignment, discussion, quiz or a test etc.

With the existing WRL, when the academics made a note to students for a linked item, students can see it only when they logged into their RLs. With our design, if the academics tick on the "email to class" option, that note will be sent to the students at the same time they post it in their list. Before posting their note, they can also preview it by clicking the "preview note" button (see Figure 7.15).
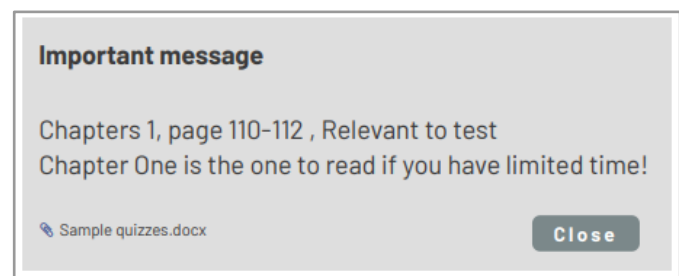
Figure 7.15. Preview note interface

Figure 7.14. Note for students' interface (see Interface 6 in Figure 7.10)

Moodle integration: In this design, all the readings that the academics linked in the RL system, they can embed them (week, section, or a topic), as it is in their reading lists, into their Moodle course page (see Figure 7.16).
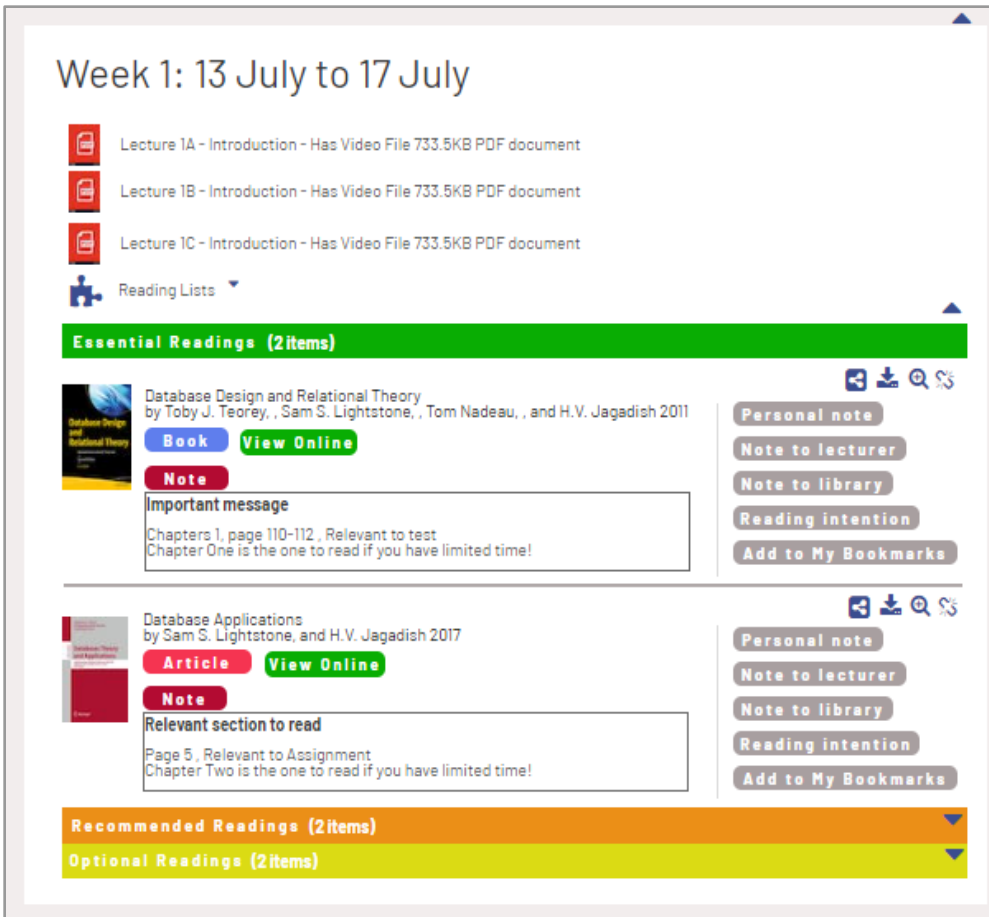
Figure 7.16. Moodle page with link to the RLs (see Interface 7 in Figure 7.10)

7.4 Evaluation Method

This section discusses institutional context, our study method and the method deployed for data analysis.

7.4.1 Institutional Context

The University of Waikato (UOW) has 13,360 students and 634 academic staff (UOW, 2021). Our study was conducted across all eight faculties: Art and Social Sciences (FASS), Education (FEDU), Science and Engineering (FSEN), Waikato Management School (WMS), Māori and Indigenous Studies (FMIS), Computing and Mathematical Sciences (FCMS), Health, Sport and Human Performance (FHSHP) and Law (FLAW) (see Appendix A for faculty details). RLs are typically created for each course instance, being assigned to different semesters and years, such as Summer Schools S and T, Semesters A and B, whole year Y courses, and Semester C (all other

periods). Most students attend Semesters A and B, with fewer in summer schools S, T. Y, and C are rarely used, mostly for postgraduate studies.

7.4.2 Study Method

As outlined in Section 7.3, we developed a series of paper prototypes (called 1 & 2) followed by a digital interface prototype. We named our digital prototype the 'Blue Lists' system and created an interface prototype of the existing WRL system, as the 'Gray Lists' system. Using an interface prototype instead of the existing system helped avoid bias.

A survey was conducted using online zoom sessions (one-to-one) that aimed to gather feedback on the Blue Lists and Gray Lists digital prototypes. Our study sessions had two components: a user experiences study (system walk through, that allows users to engage with it and experience the interface and its workflow) followed by the guided interview session.

At the beginning of the interview, academics were requested to perform selected tasks using both the Blue Lists system and the Gray Lists system (tasks such as: *setting up a list, accessing the resource lists interface and the use of note feature;* see Section 7.3.1 & 7.3.2.2 for designs). During this phase, academics navigated through the interfaces of the new digital prototype. Soon after they completed each system walkthrough, a set of questions were asked to explore academics' experiences with that system. Finally, we have asked another set of questions to gather the academics feedback on the comparison of both the systems. The interview questions comprised closed and open-ended questions and used three separate questionnaires as guidelines for the interview (one for 'Gray Lists' system another for 'Blue Lists' system and third one for comparison of 'Gray Lists' and 'Blue Lists' systems, see Annex B, C and D for details).

Following ethics approval, the interview invitation request was emailed to UOW's academics (including the academics who had used WRL and who have not used it) in June 2022. We recruited 15 participants from 6 faculties.

7.4.3 Method of Data Analysis

Since the questionnaire consisted of a mix of multiple choice and open-ended questions, several manual steps were taken to prepare the responses for analysis. The answers to multiple choice questions were first grouped according to their selection/ratings, frequent comments and the faculties they were attached to. Then they were analyzed and presented in a structured form using a range of representational tools such as charts, graphs, and tables.

To analyze the feedback to the open-ended questions, thematic analysis based on word/theme occurrence was deployed. The theme is a pattern found in the information that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon (Boyatzis, 1998).

7.5   Results and Analysis of Interviews

We interviewed 15 participants, representing 6 of 8 faculties [FASS (5), WMS (4), FEDU (1), FLAW (2), FCMS (1), FSEN (2), FMIS (0) and FHSHP (0)]. We gathered the academics feedback soon after they completed a one system walkthrough. We present the academics' feedback on the four main features throughout the next subsections. As we introduced in the Method section, we named our new digital prototype as the 'Blue Lists' system and the existing system used at Waikato as the 'Gray Lists' system.

7.5.1   Creating a New List

We here discuss the academics' experiences of creating a reading list (see Figures 7.2-7.4 & 7.11-7.12).

Feedback on each interface (creating new list)

We gathered the academics' feedback on each system with regards to two aspects; (1) clarity and ease of interaction (2) ease of remembering the process (see q3 & q4 of QA & QB in Appendix B, C).

Table 7.1 shows that academics found the existing system easy to use, intuitive and straightforward. However, two academics found the 'hierarchy' information difficult to identify. Those academics who commented negatively described that they struggled to create a list and did not see this process as intuitive or straightforward. On the other hand, academics found the new prototype design more user friendly, simple, intuitive, easy and straightforward to use. One academic felt that this interface was asking for too much information, which was not necessary to provide at this stage.

Table 7.1. Academics responses on the creating reading lists (q3- *I found the setting up of a new reading list to be clear and easy to interact with*; 1= Strongly Disagree and 5= Strongly Agree)

Responses	Ratings and feedback					
	1	**2**	**3**	**4**	**5**	**Detail feedback**
Existing system (15 responses)	-	3	3	6	3	"...Interface was **easy to use**, it was pretty logical what you do, how you set it up, so I thought. That was **intuitive**..." "...it's very **straightforward** for me…" "...look straightforward **except for the part about hierarchy**. I still **don't understand what hierarchy means**…" "...It was the **hierarchy question that made it difficult**…" "...It just **seems difficult**. It just **doesn't seem intuitive** and easy to read…" "...If I was on my own, I **might have struggled a little bit**…" "...It seems that there is **less information** on this list than on the other list. it **doesn't seem as straightforward** as the other…" "...I **had to struggle** like I wasn't sure where some of the commands were…"
New prototype design (15 responses)	1	2	2	3	7	"...It was **really obvious what to do and I really liked the options**. Setting the collaborator or account ...who else you can have control over the list and stuff. I thought that was really, I like that…" "...It's **easier**, It seems more **intuitive**. "...Very **simple and obvious**…" "...it just could **easily click,** and I particularly like the ease of adding someone to it, like the collaborators. **it's so easily laid out**…" "...**very straightforward** and I would say I appreciate the extra detail that it sorts of…" "...even **more user friendly** than the previous one for sure…" "...It seemed to be **very easy, intuitive**…" "...it looks **easy**. it looks **simpler**…" "...because I really hated dropdowns and I think that's **asking for too much information**…"

The academics' feedback on the ease of remembering the setting-up process (see Table 7.2) was more positive for the new prototype design than for the existing system. The new prototype design appears to them to be intuitive, more logical with clear steps and visually easier to follow (see direct quotes on new prototype design in Table 7.2). We did not receive any negative feedback about this.

Table 7.2. Academics responses on the creating reading lists (q4-*I found that the process of setting up of a new reading list to be easy to remember*; 1= Strongly Disagree and 5= Strongly Agree)

Responses	Ratings and feedback					
	1	2	3	4	5	Detail feedback
Existing system (15 responses)	1	2	2	3	7	"...There's not a lot of steps involved, so once you've done it, you **may well remember**…" "...create a new list provided there are good instructions to follow it, it should be **fairly straightforward**…" "...**No**, it's just what I just said…"
New prototype design (15 responses)	-	-	2	5	8	"...Most of it is **self-explanatory**. At least the steps that we just went through were **very simple**…" "...it's asking for more information and sort of **stepping you through the steps more clearly**. The list to remember, and it's **quite intuitive**, so that was good…" "...it is easy to find where the commands were, so I think it's **visually easier to follow**. "...like the last one that it was **intuitively labelled**. It would be **easy to remember.** It was quite logical how to set it up…"

Comparison of Systems (creating new list)

When the academics were asked about which system they preferred in terms of clarity and ease to interact with the process of creating a list (q1 of QC in Appendix D), 14 of 15 participants chose the new prototype design whereas only 3 selected the existing system (see Figure 7.17). They described the new design as "more intuitive and tipped you through the process and more visually appealing", "easy to understand", "ease of adding collaborators", and "user friendly with dynamic interfaces".
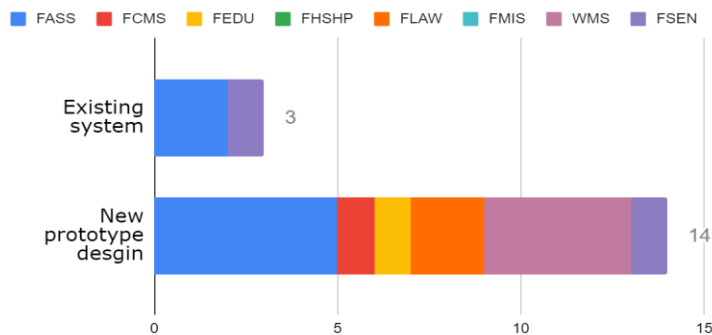
Figure 7.17. Preferred systems in terms of clarity and ease to interact (creating a new list)
[more than one answer permissible]

Next, we explored the academics' views on how easy it is to remember the process of creating a new list (q2 of QC questionnaire in Appendix D). 12 of 15 participants preferred the new prototype design (see Figure 7.18). Their given reasons include, "it's more logical and can organize it by topic or week or whatever", "don't have to remember as much because the system is strictly through it each time", "it relies a lot on the visual components of the different fields and that makes it easier for me to navigate and to follow". On the other hand, 4 of the participants preferred the existing system, with feedback such as "like the Gray Lists where it moved me to a full webpage whereas for the Blue Lists right it was a dialog box", "they both seemed quite similar and quite intuitive", and "once you've done that. It's easier to reboot".
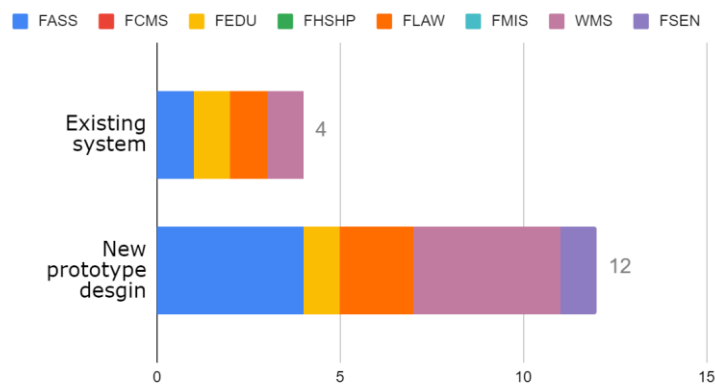
Figure 7.18. Preferred systems in terms of ease of remembering (creating a new list)
[more than one answer permissible]

In summary, the majority of the academics selected the new prototype design over the existing system in the process of creating a new list.

7.5.2 Resource Lists Interface

We here discuss the academics' experiences with the resource lists interface. Resource lists interface is the main interactive interface that displays all the linked materials that the students are required to engage with. Resource lists features refers to the features, which are visible in the Resource Lists interface to students to engage with (see Figures 7.5 & 7.13).

Feedback on each interface (resource lists interface)

Academics' feedback on the resource lists interfaces of each system was focused on its ease of use, displaying of the reading resources and features offered (see q5-q7 of QA & QB in Appendix B, C).

When we look at the academics' feedback on the ease of use of the resource lists interface of the existing system, their positive comments include that it's simple, easy to use and straightforward (see Table 7.3). Three academics who commented negatively said that it's too plain and less informative on what to do. For the new prototype design, their comments include: easier to use, visually helpful, good structure and logical. Some academics felt that the new prototype design's interface is quite busy as it contains a lot of functionalities.

Table 7.3. Academics responses on the resource lists interface (q5- *I found that the Resource lists interface to be clear and easy to interact*; 1= Strongly Disagree and 5= Strongly Agree)

Responses	Ratings and feedback					
	1	2	3	4	5	Detail feedback
Existing system (15 responses)	-	2	3	3	7	''...It's pretty **intuitive** and it has a nice display and is **easy to read**..." "...**simple, easy** to follow…" "...that was a **straightforward** thing to do…looks like it's **easy**…" "...there seems to be **fewer on the screen to indicate** what I would need to do…" "...I think the problem there is it seems **too plain** and it's **not very evident**. Other features or their buttons and what they do…" "...most **things are hidden in the hamburger buttons**. Which is fine, so long as you know that they are there…"
New prototype design (15 responses)	-	-	2	6	7	"... it is very **dumb**, so it's a really **good structure**, and it's probably employed **easy** for students to follow…" "...I think the **colour coding and the previews of the books** and all of that was really very **visually helpful**…" "...especially since its weekly…it seems **clear and logical**…" "...I found that it should be very **clear**…" "...I **like this one a lot more**…" "...it's quite **cluttered**. There is a **lot of functionality** there, and while that can be useful but can also be a bit of an overload…" "...it's **quite busy**…"

In displaying readings in the resource lists interfaces, for both the systems, we received positive feedback from the academics (see Table 7.4). They said the existing interface is cleaner, easier, and not busy. Their comments for the new design interface include: organization is a lot more structured and it's a lot easier and gives a lot of freedom in terms of how things could be organized. However, two academics were not happy with the new interfaces as they contain too many buttons, smaller texts, and big tags.

Table 7.4. Academics responses on the resource lists interface (q6- *I found that the Resource lists interface displays reading resources in an organized manner*; 1= Strongly Disagree and 5= Strongly Agree)

Responses	Ratings and feedback					
	1	2	3	4	5	Detail feedback
Existing system (14 responses)	-	-	1	5	8	"...it's a lot **cleaner**… it's **not as busy**…" "...it just **looks good**, like it…" "...I think it's an **easier screen** to look at and probably work through…" "...I think it's **very organized**. It's easy to follow…"
New prototype design (15 responses)	-	-	1	6	8	"...that looks **pretty organized** to me…" "...I think the **organization is a lot more structured** and it's a **lot easier** to follow and easier to communicate with students about the hierarchy of the different readings…" "...it gave a **lot of freedom** in terms of how things could be organized, so there'd be a **variety of ways of organizing** it…" "...it's **organized** there, so the readings and then it's functional in terms of the features that are available…" "...the interface looks like it has **too many buttons**…" "...the **text is too small,** and some **tags are too big**…"

When considering the academics' feedback on their satisfaction with the features offered in the resource lists interfaces, we note that they have more positive feedback for the new prototype design than for the existing system's interface (see Table 7.5). They liked the new interface because it offered many new features, used standard icons, straightforward, easy to understand and follow. Some academics felt that this interface confused them as it contained too many functionalities.

Table 7.5. Academics responses on the resource lists interface (q7- *I found that the features in the Resource Lists Interface to be easy to understand*; 1= Strongly Disagree and 5= Strongly Agree)

Responses	Ratings and feedback					
	1	**2**	**3**	**4**	**5**	**Detail feedback**
Existing system (15 responses)	0	1	5	5	4	"...easy, I think it's **pretty good**…" "...it's sort of similar there, so it seems to be **clearly intuitive** with the buttons being **well labelled**…" "…I think you need to make use of a hovering bubble to **explain what things do**…you have **very short descriptions,** and those **descriptions may not be universally understood**…" "...sometimes it's **difficult to find** some of the options…" "…relatively, the **information needed** for someone. Seems to be **minimal**…" "...sometimes I forget I have to and **it's not easy** for me to work through what I'm supposed to do…" "...Because **it's not evident**…"
New prototype design (15 responses)	-	1	2	3	9	"...This seems to be so **many new features**…" "...They're **pretty standard icons and things**…" "...it's **pretty well laid out**, and once you click on something you can see what it's talking about…" "...more **straightforward**…" "...they look **easy to understand**…" "... much more **user friendly** because of the arrangement and the **use of colours** so it's easy, **easier to follow**…" "...the features **looked easy to understand** for the most part…" "...This is too **much functionality**…" "...it's more **confusing** because I don't know where I have to click…"

Comparison of Systems (resource lists interface)

The academics were asked about which resource lists interface they preferred in terms of ease of use (q3 of QC in Appendix D). Most of the participants (12 out of 15) chose the resource lists interface of the new prototype design (see Figure 7.19). Reasons given for their selection were "more logical with the color coding", "has more features", "it's got the drop-down menus or what to choose next to the reading makes it quite simple" and "more visually appealing". 3 participants selected the existing system and their given reasons included "like the simplicity of the Gray Lists" and "Blue Lists is too confusing".
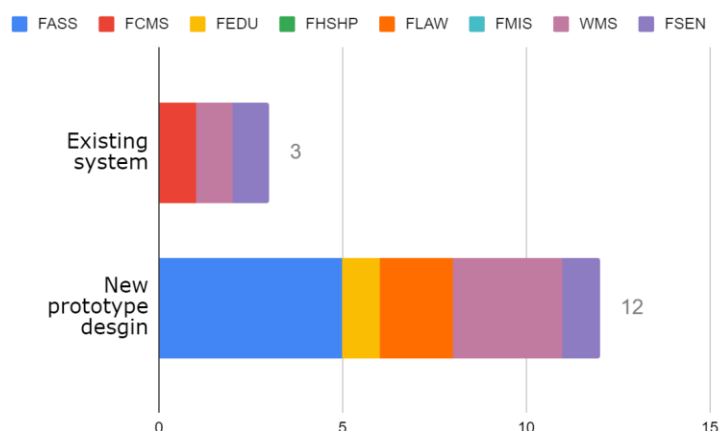
Figure 7.19. Preferred interface in terms of easier to use (resource lists interfaces)
[more than one answer permissible]

We then explored the academics' preference for the quality of organization of reading resources in the resource lists interface (q4 of QC in Appendix D). 14 of 15 participants chose the new design (see Figure 7.20). Their comments included "preview of the book chapters and papers, it's really obvious", "it very, obvious because of the color coordination for students", "I like the note feature and I like the way that things are color-coded by book or article or what kind of resource", "it clearly shows the hierarchy of the readings, so it's not buried" and "the ability to choose a template in to customize things very much". 2 participants who positively reacted to the existing system indicated that the existing system is "aesthetically more pleasing".
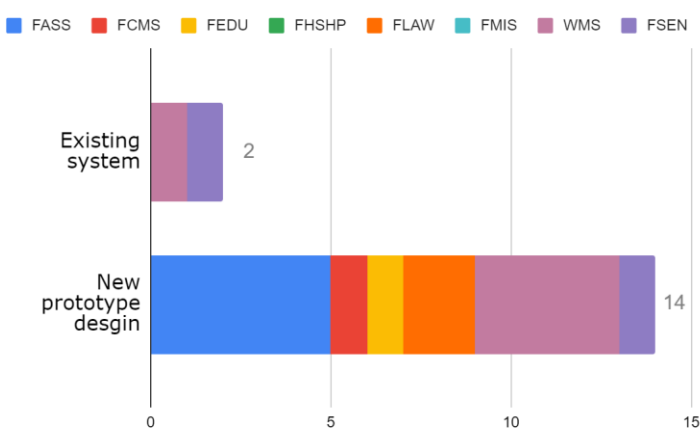
Figure 7.20. Preferred interface in terms of organization of reading resources (resource lists interfaces)
[more than one answer permissible]

As the final question regards the resource lists interfaces, we asked academics' preference for the interface in terms of features offered (q5 of QC in Appendix D). 14 participants preferred the new prototype design (see Figure 7.21). Their detailed feedback included "visual appeal thing for me", "great functionality and lots of selections that I could use", "have better integration and

more evident how to use them", and "like the color code and the way the color pops out between the recommended essential and optional". On the other hand, feedback from the 3 participants who chose the existing system included "blue has too many features", I like the features on the Blue Lists. I also like the simplicity of the Gray Lists so they both have strengths", "I think they're both much the same in terms of what's offer up".
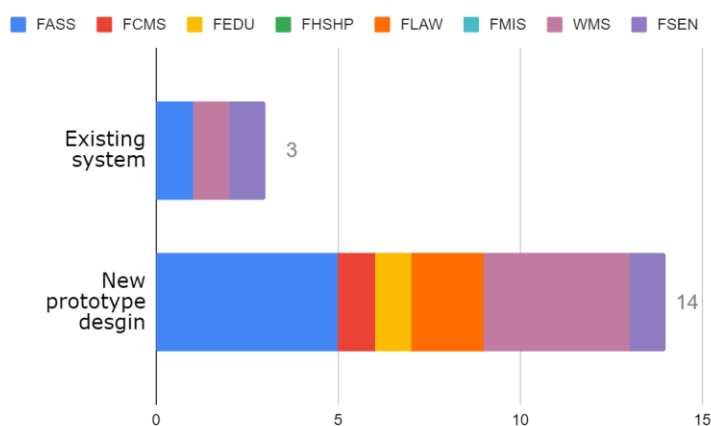
Figure 7.21. Preferred interface in terms of features offered (resource lists interfaces)
[more than one answer permissible]

In summary, we note that many of the academics preferred the new design over the existing system in terms of usability of the resource lists interfaces and its features offered.

7.5.3 Note Feature

We here discuss the academics' experiences with the use of a note feature. The *Note* is an important pedagogical feature available in the RL systems, which allows academics to guide the students' reading. This feature helps to make RL systems an important learning resource by adding pedagogical value to the lists. (See Figures 7.6-7.7 & 7.14-7.15).

Feedback on each interface (note feature)

We gathered the academics' feedback for the note feature of both the systems (see q8-q9 of QA & QB in Appendix B, C).

As shown in Table 7.6, for the existing system, they mentioned that it's easy and straightforward. However, some academics noted that the notes feature was difficult to find, and it was easy to use if they learned how to use it. On the other hand, the academics' feedback for the new design included many positive comments. They said it's direct, easy and provides many

customized options to make the notes more clearly to students. One respondent was not happy with the new design, as it requires entering too much information.

Table 7.6. Academics responses on the use of note feature (q8- *How easy was it to use?* 1= Very difficult and 5= Very easy)

Responses	Ratings and feedback					
	1	2	3	4	5	Detail feedback
Existing system (14 responses)	-	-	3	5	6	"...that's **straightforward**..." "...that's got **very easy**…" "...if I remember to click on the three dots, then I can follow through on the process, without you telling me where I should click, **I would be lost**…" "...it's **easy to use** once **you know where it is**. It's reasonably straightforward…" "...it seemed I **had to click in a different place** and then I was still clicking…" "...I don't really use the note feature. I would say **it was easy to use if you learned how to use it**…"
New prototype design (15 responses)	-	-	2	3	10	"...it seems **direct**…" "...I mean **straightforward**…" "...it's **pretty easy**…" "...I like the precinct decisions; I **don't have to type anything**. I like the **idea that you can email it**…" "...I would say **very straightforward step**s you through the process clearly…" "...it **looked fine**…that **helps adding notes** for students…" "...I think because you have the **drop-down menu and the very clear fields**…and it just **makes it very easy**…" "...that **looked good**, got **good fields and a good option** to be able to come .... able to **email it to the whole class** at the click of a button…" "...this is **completely too much**. One text box, that's it…"

Next, we asked for their suggestions for further improvements. Their suggestions for the existing system highlighted the requirement for the improved visibility of the notes feature (see Table 7.7). They suggest using the different color codes, buttons, or icons to easily identify the notes feature. For the new prototype design, they suggest having another option for linking their notes with their class discussion forums and renaming the note feature as description or something like that as it facilitates providing more information than a note.

Table 7.7. Academics responses on the use of note feature (q9- *Any other suggestions to improve the note feature?*)

Responses	Detail feedback
Existing system (15 responses)	"...The colour is my suggestion for that **one coloured text** or some **way to differentiate** the text." "...so put the **pencil logo** rather **than the dots** so it's easy to know that's in the edit". "...make the **three dots more prominent** and perhaps the first time somebody logs in, have a little spotlight on it." "...**make the interface look like a note** and **not like a form**". "...It's useful to have its **own unique button** and maybe a combination of that the button has a title…"
New prototype design (15 responses)	"...I **liked how it had the option to email** the students the note." "...it seems **to be duplicating the function of announcement** in Moodle, especially given that the way we use reading lists before they've been sort of static. "...It's **more interactive** in a way that it aligns with how Moodle interacts with students…" "... linking it to the assignments …usually this will be in the notes for example, rather than a drop-down menu, because sometimes it **might be relevant for more than one**…" "... It would be helpful for my class design **if it had discussion forum**...in relation to a specific discussion forum". "...Did we call it rather than Note so sometimes it can just be a **description**"

Comparison of Systems (note feature)

We asked academics "*when comparing the use of note feature, which one do you prefer in terms of ease of use?*" (q6 of QC in Appendix D), and 11 of them chose the new prototype design (see Figure 7.22). The reasons given by them include; "it's clearer, you'd be able to use it easily", "particularly because of the interactivity with Moodle in terms of being able to push messages out to students", "I thought students would understand that better", "it's really tailor the notes, it has more options" and "being able to email it to the whole class very easily". Comments from the 3 participants who preferred the existing system included "blue has features that are completely unnecessary" and "it appears that the blue list requires a note for every resource".
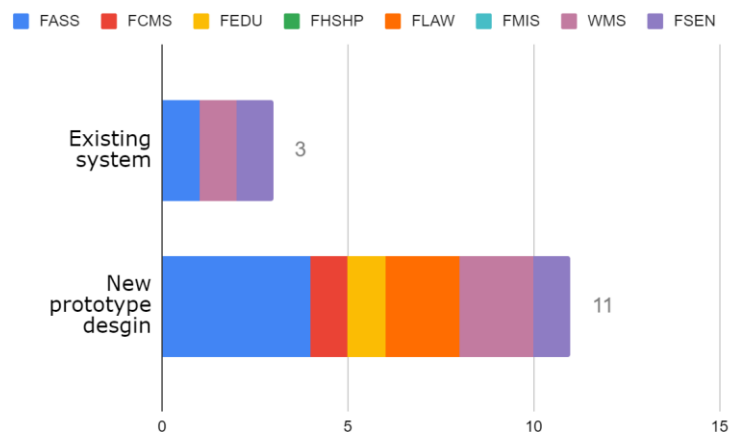
Figure 7.22. Preferred interface in terms of use of note feature
[more than one answer permissible]

In summary, we note that most of the academics preferred the note feature offered in the new design. This is mainly because of the improved interactivity, ability to customize their notes and the guidance provided by the new prototype.

7.5.4 Moodle Integration

We here discuss the academics' experiences with how the RL systems integrated with the Moodle (Figures 7.8 & 7.16).

Feedback on each interface (Moodle integration)

We gathered the academics' feedback for the Moodle integration of both the systems (see q10 of QA & QB in Appendix B, C).

When examining the feedback from academics regarding the integration of the existing system with Moodle, positive comments highlight its logical structure and its effectiveness in reducing clutter (see Table 7.8). However, three academics expressed negative views, emphasizing that it's not fully integrated, functioning merely as a link. For the new prototype design, academics provided comments that underscore its efficiency, visual appeal, usefulness, and error reduction. Nevertheless, some academics raised concerns that the new prototype design's interface might appear cluttered, potentially causing confusion among students.

Table 7.8. Academics responses on the Moodle integration (q10- *Overall, I'm satisfied with how Gray Lists/Blue Lists system is integrated with Moodle*; 1= Strongly Disagree and 5= Strongly Agree)

Responses	Ratings and feedback					
	1	2	3	4	5	Detail feedback
Existing system (14 responses)	2	1	1	2	8	"...that's pretty **logical**..." "...I like to prefer my **resources to open in separate windows** because that **reduces the amount of clutter** ...." "...It's **easy to navigate** and **follow** …" "...it's **not integrated**, it's just a link…." "...It **doesn't integrate**, you just copy it and put a link there. It's a static thing…." "...It's **not as good because it's just a link** and I admit the way even the icon for the reading list on Moodle…. It's not evident…"
New prototype design (15 responses)	-	1	1	4	9	"...I liked how it had the same interface. That's **really useful**…" "...I think it's a **good integration**…" "...**easy to follow** when you want something that's **quick and easy** to follow…" "...that's really **visually appealing**, and I think it makes it more apparent to students that they need to do it from Moodle rather than the way it currently is…" "...It **looks good**, because currently there's so many steps to achieve what you've just achieved... **Reduce my mistakes** and it **looks easy**…" "...obviously it's **very easy** for students to use as well, so they don't have to click on and not the link. It's **already visible** there…" "...mindful that **too much clutter** on the Moodle page **can lead** to students becoming **confused** as they work their way through the course…." "...I like to keep my Moodle very clean, very simple. It's taking up a **lot of the screen space just** for the readings, it's going to make it **much harder** for the students to actually…"

Comparison of Systems (Moodle integration)

When asked about the preferred system in terms of Moodle integration (q7 of QC in Appendix D), 11 academics positively reacted to the new design and only 4 chose the existing system (see Figure 7.23). Participants who chose the new design commented as; "can do a link to the specific block", "it actually displays in Moodle, so that's very helpful", "don't need to click on another window to see what the reading list is" and "students being able to see the whole reading list as a whole". On the other hand, participants who preferred the existing system commented about the simplicity of

the system. They said, "it is simpler, it didn't clutter the patch", "simplicity of an external link rather than something that takes up a lot of screen real estate".
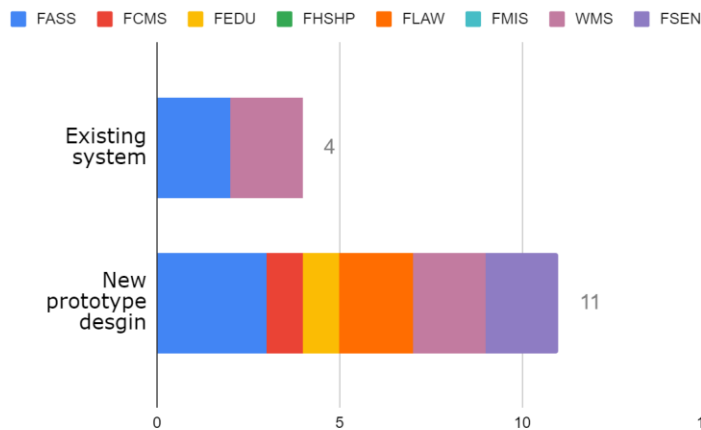
Figure 7.23. Preferred interface in terms of Moodle integration
[more than one answer permissible]

Like the feedback from academics on other features that we evaluated and discussed earlier, the Blue Lists system interfaces for Moodle integration also received positive responses from many academics. This suggests that most academics found the integration of the Blue Lists system with Moodle highly appealing.

7.6   Discussion

We here discuss the insights from our study results reported in this article with regards to our research question. Where appropriate, our findings are compared with those from related literature.

Creating a new list: Naturally, the 'set-up' feature is a core component that the academics use to engage with the RLs (see Thesis Appendix E.2.1 and E.2.2). However, previous studies identified the complexity of this feature as a major hurdle for academics due to its lack of intuitiveness and the amount of time taking to create a new list (Adolphus, 2012; Cameron & Siddall, 2017, Kumara et al., 2023a). In addition, Cameron & Siddall (2017) identified that the amount of set-up and maintenance requirements differed significantly depending on the individual academics' disciplines. When we designed our prototype for the setting-up of a list we aimed to address these issues. We improved the usability and made the process to be simpler and more understandable. Importantly, we newly introduced 'add collaborators' and 'select a template' options. With the 'add collaborators' option, academics are able to share this list with other co-teachers or assistants. They can set access rights to their collaborators as well. This helps

academics to save their time in maintaining the lists. 'Select a template' provides academics with flexibility of structuring their list, based on their discipline of teaching.

We tested the new design with the academics by focusing on two aspects; (1) clarity and ease of interaction, (2) how easy it was to remember the process. We received positive feedback (14 of 15 agreed with "ease of use", 12 of 15 with "easy to remember the process"; see Figures 7.17 & 7.18). The participants found the new interface intuitive, visually appealing, and easy to understand. They described the new setting-up process as self-explanatory, intuitive, and logical. For the new interface, participants no longer identified the time taken or disciplinary requirements as barriers to setting up a list. From this feedback, we conclude that most of the participants preferred the new set-up process. We now discuss selected features.

Resource lists interface: We previously observed that academics wished for more flexibility in structuring and formatting their lists and list items, and similarly, students complained about difficulties in resource accessibility, feature clarity, and user-friendliness of this interface (Kumara et al., 2023a & Kumara et al., 2023b). Brewerton (2004), Siddall & Rose (2014), Siddall (2016) and Thompson et al. (2004) also noted that the students preferred well-structured and annotated lists. In our prototype design, we made a list to be more dynamic and flexible where academics can structure it as they want (see Figure 7.12 & 7.13). We improved the visual appeal by introducing different color codes, labels, and tags. We aimed to make the features more visible, clearer, and understandable by introducing icons. Importantly, as new functional concepts to the RLs, we introduced two new features for academics i.e. 'My Collection' and 'Recommendations' (see Section 7.3.2.1). We believe these two features will help to address one of the issues that the academics experienced with the resource lists interface (*i.e.,* time constraint, Kumara et al., 2023a). The participants' feedback is overall positive and encouraging (12 of 15 agreed with "ease of use", 14 of 15 with "organization of reading resources" and "features offered"; see Figures 7.19–7.21). When we closely observe their reasons for all three categories and note that the visual appeal of the new interfaces became a deciding factor for academics.

Notes feature: Pedagogical value of this feature have been identified in many previous studies (Adolphus, 2012; Kumara et al.*,* 2023d; Secker, 2005; Taylor, 2019). We had found that many academics did not use this feature to provide pedagogical supportive guidance to the students due to lack of awareness of the availability and the use of this feature (Kumara et al.*,* 2023d). Our new design (see Section 7.5.3) made the note feature more visible by placing it next to each linked

item (see Figure 7.13). We further introduced an interface where academics can personalize their notes based on the resource that they linked (see Figure 7.14 & 7.15). Adolphus (2012), Secker (2005) and Taylor (2019) had reported the importance of such a personalization to the notes in their studies. The majority of the academics (11 of 15 participants) preferred our prototype design for notes feature as well.

Limitations: Due to Covid lockdowns, we were limited in our ability to test the interface to testing the digital prototype design using a system walk-through. Extending this to a longitudinal study of using the functional prototype would be useful and would be part of our future work.

7.7   Conclusions

This article provides insights into the academics' experiences for the new prototype design in comparison to the university's existing RL systems' interfaces. From the findings of our user experience study and the interviews, we note that the academics' feedback for the new prototype design (Blue Lists system) in comparison to the existing interfaces (Gray Lists system) was highly positive. We note that this is because our new prototype was simple, intuitive, visually appealing, and therefore it better integrates into their teaching activities. As future work, we are planning to carry out a companion study that explores the students' perceptions and experience of this new prototype design.

7.8   References

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Appendix A: Particularities of the each of Faculty

Faculty	Available support staff	Adopted teaching support systems
Faculty of Art and Social Sciences (FASS): Offers programmes in areas such as languages and linguistics, music, dance, theater, screen and media, anthropology, geography, environmental planning, history, philosophy, political science, social and public policy, sociology and social work.	Each faculty is assigned two academic liaison librarians.	Moodle as the Learning Management System.
Faculty of FCMS: Offers a stimulating and leading-edge environment of quality relevant teaching programmes in design, computer science, software engineering, mathematics, and data analytics.	Academic Liaison Librarians work with academic staff and postgraduate students to provide specialist tutorials and individual assistance for study and research.	The Paper Outlines System is to provide a centralized repository where subject outlines can be created, maintained, reviewed, presented and stored.
Faculty of Education (FEDU): Offers programmes in areas such as teacher education, counseling, human development, education, educational leadership and education studies.		Panopto enables University staff and students to capture and deliver audio and video content.
Faculty of Health, Sport and Human Performance (FHSHP): Offers qualifications that offer students who are passionate about health, hauora and wellbeing the opportunity to develop knowledge and skills to enhance the lives of individuals and communities.	Specialist staff also provide reference services, copyrights, tutorials and individual assistance to help staff and students to access and use Mātangireia and Map resources.	Library's information systems and technology includes Library Services Platform (Alma), Discovery Layer (Primo) and subscribed databases.
Faculty of Law (FLAW): Offers an innovative, student-focused Bachelor of Laws (LLB) degree in a stimulating academic environment.		Waikato Reading Lists for tracking copyrights and course reading management.
Faculty of Maori and Indigenous Studies (FMIS): Offers programmes in Māori language and linguistics, culture, customs, creative and performing arts, media and communication, Treaty of Waitangi, and development studies		Research Commons - institutional research repository
Waikato Management School (WMS): Offers a wide range of business education at all levels of study		O Neherā includes Digital Collections such as photographs, postcards, maps and posters.
Faculty of Science and Engineering (FSEN): Offers a range of innovative programmes for the undergraduate degrees of Bachelor of Science and Bachelor of Engineering.		

Appendix B: Questionnaire on Gray Lists System (QA)

No (q)	Question	Type	Options
1a	I am a staff member of the following school:	Open-ended	-
1b	My school is most closely aligned with the following previous faculty designation:		I. Waikato Management School (WMS) II. Faculty of Computing and Mathematical Sciences (FCMS) III. Faculty of Art and Social Sciences (FASS) IV. Faculty of Maori and Indigenous Studies (FMIS) V. Faculty of Science and Engineering (FSEN) VI. Faculty of Health, Sport and Human Performance (FHSHP) VII. Faculty of Education (FEDU) VIII. Faculty of Law (FLAW)
	The following questions are about your engagement with the Waikato Reading List.		
2	Which of the following statements explain your Waikato Reading List set-up?	Checkbox	I. I have set up Waikato Reading Lists by my-self II. Someone else set up Waikato Reading Lists for me III. With the help of others, I have set up Waikato Reading Lists IV. I have never set up a Waikato Reading List V. Other
	If you sought help from others to set up Waikato Reading Lists, please specify what kind of help you sought?	Open-ended	-
	The following Questions are about your experience with the Gray Lists system (setting up a reading list and the Resource lists Interface).		
3	I found the setting up of a new reading list to be clear and easy to interact with	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
4	I found that the process of setting up of a new reading list to be easy to remember	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral

			4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
5	I found that the Resource lists Interface of the Gray Lists system to be clear and easy to interact	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
6	I found that the Resource Lists Interface displays reading resources in an organized manner	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
7	I found that the features in the Resource Lists Interface to be easy to understand	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
The following Questions are about your experience with the use of note features in the Gray Lists system.			
8	How easy was it to use?	Likert Scale	1 - Very Difficult 2 - Difficult 3 - Neutral 4 - Easy 5 - Very Easy
	Please provide more details about your rating on the above question.	Open-ended	-
9	Any other suggestions to improve the note feature.	Open-ended	-
The following Questions are about your Perception and suggestions.			
10	Overall, I'm satisfied with how Gray Lists system is integrated with Moodle	Likert Scale	1 - Strongly Disagree 2 - Disagree

			3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
11	What features did you miss within the Gray Lists system?	Open-ended	
12	Any other suggestions to improve the Gray Lists system?	Open-ended	-

Appendix C: Questionnaire on Blue Lists System (QB)

No (q)	Question	Type	Options
1a	I am a staff member of the following school:	Open-ended	-
1b	My school is most closely aligned with the following previous faculty designation:		I. Waikato Management School (WMS) II. Faculty of Computing and Mathematical Sciences (FCMS) III. Faculty of Art and Social Sciences (FASS) IV. Faculty of Maori and Indigenous Studies (FMIS) V. Faculty of Science and Engineering (FSEN) VI. Faculty of Health, Sport and Human Performance (FHSHP) VII. Faculty of Education (FEDU) VIII. Faculty of Law (FLAW)
	The following questions are about your engagement with the Waikato Reading List.		
2	Which of the following statements explain your Waikato Reading List set-up?	Checkbox	I. I have set up Waikato Reading Lists by my-self II. Someone else set up Waikato Reading Lists for me III. With the help of others, I have set up Waikato Reading Lists IV. I have never set up a Waikato Reading List V. Other
	If you sought help from others to set up Waikato Reading Lists, please specify what kind of help you sought?	Open-ended	-
	The following Questions are about your experience with the Blue Lists system (setting up a reading list and the Resource lists Interface).		
3	I found the process for setting up of a new reading list to be clear and easy to interact with	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
4	I found that the process of setting up of a new reading list to be easy to remember	Likert Scale	1 - Strongly Disagree 2 - Disagree

			3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
5	I found that the Resource lists Interface of the Blue Lists system to be clear and easy to interact	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
6	I found that the Resource Lists Interface displays reading resources in an organized manner	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
7	I found that the features in the Resource Lists Interface to be easy to understand	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
The following Questions are about your experience with the use of notes feature in the Blue Lists system.			
8	How easy was it to use?	Likert Scale	1 - Very Difficult 2 - Difficult 3 - Neutral 4 - Easy 5 - Very Easy
	Please provide more details about your rating on the above question.	Open-ended	-
9	Any other suggestions to improve the note feature.	Open-ended	-
The following Questions are about your Perception and suggestions.			

10	Overall, I'm satisfied with how Blue Lists system is integrated with Moodle	Likert Scale	1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Agree
	Please provide more details about your rating on the above question.	Open-ended	-
11	What features did you miss within the Blue Lists system?	Open-ended	-
12	Any other suggestions to improve the Blue Lists system?	Open-ended	-

Appendix D: Comparison of Gray Lists VS Blue Lists System (QC)

No (q)	Question	Type	Options
Section 1: Comparing Reading List Setting Up Process (Gray Lists and Blue Lists)			
1	When comparing the processes for Reading List set-up, which system you preferred in terms of clarity and ease to interact with?	Checkbox	I. Gray Lists II. Blue Lists
	Why?	Open-ended	-
2	When comparing the processes for Reading List setting-up, which process is easier to remember (and repeat next semester)?	Checkbox	I. Gray Lists II. Blue Lists
	Why?	Open-ended	-
Section 2: Comparing Resource Lists Interface (Gray Lists and Blue Lists)			
3	When comparing the Resource Lists Interfaces, which interface do you prefer in terms of ease of use?	Checkbox	I. Gray Lists II. Blue Lists
	Why?	Open-ended	-
4	When comparing the Resource Lists Interfaces, which interface do you prefer for its organization of reading resources?	Checkbox	I. Gray Lists II. Blue Lists
	Why?	Open-ended	-
5	When comparing the Resource Lists Interfaces, which interface do you prefer in terms of features offered?	Checkbox	I. Gray Lists II. Blue Lists
	Why?	Open-ended	-
Section - 3: Comparing Notes feature (Gray Lists and Blue Lists)			
6	When comparing the use of notes feature, which one do you prefer in terms of ease of use?	Checkbox	I. Gray Lists II. Blue Lists

	Why?	Open-ended	-
Section - 4: Perception and suggestions			
7	When comparing the Moodle integration, which one do you prefer?	Checkbox	I. Gray Lists II. Blue Lists
	Why?	Open-ended	-
8	Any other feedback?	Open-ended	-

Chapter 8

Conclusions and Future Work

This chapter summarizes the contributions of the research carried out in the context of this PhD, addresses the Thesis Questions investigated and provides recommendations for future work. As one of the thesis outcomes, several peer-reviewed publications were prepared: two published conference papers (Kumara et al., 2021; Kumara et al., 2023c), two journal articles (one published, Kumara et al., 2023a, and one to be appeared, Kumara et al., 2023d), one journal article under review (Kumara et al., 2023b), and one further publication ready to be submitted (see Page 6 of this thesis).

8.1 Contributions of the Thesis

This section summarizes the contributions of this PhD.

Analysis of relevant literature

Our analysis of related work on RL systems in tertiary education focused on four aspects: (1) academics' experience of the RLs (3) students' experience and perception of the RLs (3) technical issues of RL systems and (4) make-up of RL systems. From our analysis across all four of these areas, we were the first to describe the RLs Systems landscape in tertiary education, and the current state of RLs uptake in universities. The outcomes of our literature analysis have been reported throughout the six research papers, and predominantly in the paper presented in Chapter 5.

Evaluation of RLs content across whole university

We performed a transaction log analysis on RL system at a single university, from 2016 to 2020. The log analysis explored the types of resources that are linked in RLs, in particular the inclusion of electronic materials such as eBooks. Our results confirmed the differences in RLs content across academic disciplines previously only reported through anecdotal evidence. Our study is the first to observe these differences based on a thorough data analysis. We believe our findings may help academic libraries to take a flexible approach and develop discipline-specific initiatives to increase the number of RLs. This aspect is part of our suggested future work.

Evaluation of pedagogical features across RL systems

While user interactions with RL systems had been studied previously, to the best of our knowledge, no work had been undertaken to explore the features of RL systems in depth. We conducted a comparative analysis of tertiary RL systems focusing on their pedagogical features together with core features required for course list management. We identified a variety of interactive features that we believe act as influencing factors for the success of an RL system. As an outcome of our analysis, we created recommendations for RL systems that offer increased pedagogical support.

Analysis of notes feature use

Typically, RLs are under-used in their capacity to provide pedagogical support. Instead of following the same method as most other studies (interviewing academics or student users), investigated the RL use though the means of a log study. From our analysis, we found that the 'notes' feature often seemed to be used by academics to provide pedagogical support for students. In order to investigate this further, and to understand if and how academics use the 'notes' feature, we performed a dedicated log analysis of RLs use for one academic year. Our study found that while the notes feature was indeed used to guide students, it was under-utilized as a pedagogical tool and rather employed to circumvent shortcomings of the vendor systems the RLs linked to. We therefore identified the need for better integration of the notes feature into teaching activities to embrace its full pedagogical opportunity.

Identification of barriers to engage with RLs

The aim of this thesis is to examine barriers to RL system uptake. Through a set of user studies, we explored the feedback of both academics and students with regards to RLs use. We found that accessibility of linked reading resources, feature clarity, and user-friendliness of the system interface are barriers for uptake. We identified the set of pedagogical features most valued by users and how the use of those may be integrated into academic teaching.

Design of new interfaces for Online RLs

Our research addresses a critical issue in the usability and clarity of Reading Lists (RLs) system interfaces. Recognizing that an unclear interface can pose substantial barriers to effective

utilization, we designed a new RLs system interface tailored specifically for academic users. We used the Waikato Reading List System as an example to explore interface issues and opportunities. The recommendations developed based on our exploration go beyond the specifics of the example system used.

Our design approach followed two steps. Initially, we developed two paper prototypes that served as a foundational blueprint for our interface design. These paper prototypes were instrumental in conceptualizing and refining our ideas before transitioning to the digital realm. The second phase of our design process led to the creation of what we termed "Blue Lists", a digital prototype that embodied the culmination of our design efforts. Blue Lists was carefully crafted to emphasize key RLs system features essential for academic users, including the streamlined setup of new reading lists and the user-friendly resource lists interface. Additionally, we incorporated pedagogical features, such as the ability to add notes to students and seamless integration with the Moodle learning management system. The use of the Waikato Reading List system allowed for practical exploration of an interface, while keeping the overall recommendations independent of a specific system. The software underlying the WRL system is well-known and widely used (e.g., across New Zealand's universities). As a consequence, any observation made there has a wider impact across the sector.

This contribution represents a substantial leap forward in enhancing the usability and accessibility of RL systems for academic purposes, ultimately benefiting both academics and students in their quest for efficient resource management and enhanced learning experiences.

Implementation and evaluation of functional prototype

We implemented our designed prototype as a functional model, enabling users to actively engage with it and immerse themselves in the interface, experiencing the entire workflow firsthand. This interactive approach served as a vital bridge between the conceptual design and the actual user experience, providing academics with a tangible understanding of how the final product would function. Furthermore, we conducted an evaluation of our prototype in comparison to the existing interfaces of WRLs. While some prior research had suggested strategies for enhancing user experiences with RLs, no specific designs had been proposed and evaluated until now. Our user feedback indicated that our new interface design was perceived as simple to use, intuitive, and visually appealing. Participants expressed that our design would seamlessly integrate into their

teaching activities. Based on our evaluation results, we are confident that our interface design significantly improves usability and meets the needs of tertiary educators.

Recommendations for RL Systems

We provide recommendations firstly for what RL systems should address overall, and secondly specifics for the design of RL interfaces.

The following are the recommendations that RL systems should address overall.

- Enhance the RL creation process, with a particular focus on improving the usability of the resource-linking process.
- Synchronize these enhancements with the university's teaching support and library support systems already familiar to academics, such as LMS and library systems.
- Recognize the significant need for pedagogical support within the RLs to seamlessly integrate into academic teaching.
- Consider faculty and discipline-specific needs and conduct further research in this area.
- Adopt a flexible approach that allows for the development of discipline-specific initiatives aimed at increasing the number of RLs.

The following are the recommendations for the design of RL interfaces.

- **Intuitiveness**: Interfaces should prioritize user-friendliness by being straightforward and intuitive. This means they should be designed in a way that users can easily understand and navigate without extensive training or guidance. The goal is to make the user's interaction with the system as simple and time efficient as possible.
- **Visually Appealing**: Visual appeal plays a crucial role in user engagement. Implementing different color codes to distinguish reading categories or structuring lists by themes or sessions enhances the visual organization. A visually appealing design not only makes the interface more attractive but also helps users quickly locate and access the materials they need.
- **Feature Clarity**: It's essential to ensure that all features are clearly visible and well-defined within the interface. Users should have no difficulty identifying and understanding the

purpose of each feature. This clarity contributes to a smoother user experience and maximizes the utility of the system.

- **Interactivity**: Interactivity enriches the user experience by allowing users to actively engage with the system. This might include features like real-time updates, drag-and-drop functionality, or collaborative tools that encourage user participation. Interactivity fosters user engagement and makes the system more dynamic.

- **Ability of Personalization**: Providing users with the ability to personalize their lists and list items enhances the system's flexibility. Users can tailor their experience to their specific needs, which is particularly beneficial in an educational context where individual preferences and teaching styles vary.

These considerations reflect best practices for designing a user-friendly and effective Reading Lists system, ensuring that it not only meets the functional needs but also the expectations and preferences of its users.

8.2   Answers to the Thesis Questions

This section summarizes our answers to the Thesis Questions (introduced in Section 1.2), which guided the research presented in this thesis.

TQ1:   What is the RLs landscape in tertiary education and the current state of RLs uptake in universities?

We found that the University of West London saw an increase in RLs from 4% in 2013/14 to 100% of courses by 2018/19. Few other studies have reported 100% saturation of RLs uptake by academics across a teaching division let alone an entire university. At the University of Worcester 95% of modules had RLs in 2018/19, after first introducing RLs in 2014/15. We observed that similar to other studies, the initial years of WRLs saw low numbers of lists, with only a few academics being involved. In later years, the number of RLs grew at UOW, similar to other studies.

Important insight from this study is that we identified two trends in the engagement of academics with RLs creation at UOW: RLs creation were at very high levels in four faculties (FEDU, FASS, FSEN, and WMS), and at low levels in the other four faculties (FMIS, FCMS, FHSHP and FLAW). The faculties showed great variation in RLs uptake ranging from 3% to 63%, with a mean of 41, which we believe may be due to differing disciplinary requirements and

differing faculty size. The University of Auckland and Loughborough University also confirmed similar variations between faculties, but the specific pattern observed in our study had not been observed. Studies conducted at the University of West London and University of Manchester reported on a number of interventions that helped with increasing RL numbers, e.g., library staff creating the lists, a dedicated team to create the lists, improving communication between library and academics, and continuous training. At the UOW, the situation was found to be somewhat different: while more RLs were created over time, their overall increase was lower compared to that found in other studies. Even though similar interventions were in place at Waikato (e.g., a team of librarians creating RLs), the overall academic engagement remained low.

Another important insight from our study is that the results from our log analysis confirmed the differences in RLs content across disciplines, which was previously only reported through anecdotal evidence. One group of faculties mostly linked articles/journals (FLAW 55%, FHSHP 55%, FEDU 52%, WMS 46%); another group had mostly books/chapters (FSEN 86%, FMIS 55%, FASS 51%). Most prominent here is FSEN with 86% books/chapters. FCMS was the only faculty to mainly link other items (55%)

In summary, in order to better support the various faculty teaching strategies, we recommended that the library take a flexible approach and develop discipline-specific initiatives to increase the number of RLs.

TQ2: *What aspects of RLs hinder uptake and use by both academics and students?*

We explored this question in three parts: (1) students' experiences, (2) academics' experiences and (3) how RLs systems' features support the pedagogical needs of the academics and students.

Academic experience: First insight is that at the UOW very few academics set-up RLs independently. The main reasons given were the complexity in setting-up lists, and time constraints, which reflect the observations in studies conducted at the University of West London, University of Northampton, and the Auckland University of Technology. Many Waikato academics felt that the RLs system was unnecessary, doubted the actual usage by the students, and disliked the lack of integration with other university's teaching support systems. One of the challenges identified by the academics and librarians' points to the inconsistencies between the

online systems offered by publishers in terms of linking to eBooks, and to chapters/parts of eBooks.

Second insight is that the Waikato academics did not find the WRL useful and not satisfied with the RLs' functionalities. This is only a slightly better result than that of the Auckland University of Technology where the majority of academics were dissatisfied with their RLs system, as they did not find it stable and easy to use. Similarly, at the University of West London half of their respondents did not feel comfortable using the RLs, due to time pressure, lack of training, and lack of confidence. Our study results thus agree with those two studies in observing that time constraints were a limiting factor in RLs engagement by academics. We conclude that similar to many other RL systems, the WRL system did not offer academics sufficient incentives (i.e., teaching-related benefits) to want to invest their already-limited time.

Another important insight from our study is that the WRL system does not currently offer comprehensive pedagogical support. We identified that the opportunity of establishing a RLs system as a pedagogical tool has so far been missed. We believe the reason is that the system was acquired predominantly to address the legal requirement of copyright reporting, and any potential pedagogical benefits to teachers or students were not considered.

Students' experience: First insight from our student-focused study is that the Waikato students appreciate the way that the RLs help in their learning, and they perceive the RLs as a useful tool for their learning process. However, we identified the factors that acted as barriers in the full use of the RLs' role as a pedagogical tool to develop students' independent learning skills. Those are: difficulty of interacting or to understanding the RLs, lack of visibility of the features and not updated lists with all the required readings.

Second insight is that in terms of the use of features in the Resource Lists Interface, we saw a clear usage gap due to the students' lack of awareness of the availability of existing features. This lack of awareness resulted because of poor visibility of the system's features. Further, we noted that the students appreciated well-structured and organized reading resources in the Resource Lists Interface. They remained dissatisfied when the reading resources were poorly organized, inconsistent and when the contents were not specific.

Another important insight is that students are facing challenges when they access ebooks via RLs. Students preferred to access eBooks that are separated into sections/chapters that could

be downloaded to PDF. However, they commonly encountered eBook as a single PDF document to download in WRL. Therefore, we note that the opportunity for students to get full value from their RL has so far been missed.

Reading List Features: We observed that the RL software solutions offer a variety of interactive pedagogical features. However, it has been identified that existing solutions support student learning in a partial, fractured way. We identified a need for RL systems' features that provide pedagogical support to better integrate into academic teaching. For these features to be truly beneficial, we identify a need to assist teachers to effectively use these tools in their daily practice. At Waikato, we also saw a significant need for pedagogical support in WRL to better integrate into academic teaching and learning.

TQ3: What type of intervention could address and rectify the issues identified in TQ2?

This question was also answered in three parts: (1) identifying the possible intervention, (2) designing prototypes for the intervention, and (3) testing and evaluating the proposed intervention to the RLs with academics.

Identifying the possible interventions: As discussed in the previous research questions, based on the findings of our user studies and the log analyses, we identified the interventions to the RLs, in particular, to increase academics' buy-in. For example, we found that aspects such as *setting-up*, *resource lists, notes & labels,* and similar features require improved support and implementation in RL systems to fully benefit all users. We identified the requirement of streamlining the user workflow for those features, improved usability of the user interfaces, and better synchronization with other teaching support systems.

Designing prototypes for the interventions: Our prototypes include a paper prototype followed by a digital prototype. We designed two paper prototypes for the above-mentioned aspects and after several revisions; we selected a one paper prototype to be developed as a digital prototype.

Testing and evaluating the proposed interventions: From our user study results, we found that the academics' feedback for the new prototype design was positive. Our new prototype design has been accepted by the majority of academics. We believe this is because our prototype was designed in a way that better integrates into their teaching activities to enhance the pedagogical benefits.

We note that reasons such as intuitiveness, simplicity, visually appealingness, feature clarity, interactivity, and ability of personalization of the lists/list items of the new design acted as academics' deciding factors for our new design.

8.3   Future Work

This section presents future research that follows on from the outcomes of our research.

Extending research with further users: Our studies reported here focused on exploring the experiences of those academics who were involved with creating RLs at least once. As an extension of our work, it may be interesting to explore the feedback from those academics that did not engage with RLs. We also recommend further investigation of the interfaces for students and librarians, as companion research to the one described here.

Exploring low adoption of RLs by Computing academics: An important avenue for exploration involves gathering comprehensive data and insights from academics from Computing discipline regarding their practices related to sharing reading lists with students. Specifically, the research will seek to answer the following key questions:

- **Current practices:** Investigate whether educators routinely share reading lists with their students for the papers they teach.
- **Motivations and barriers:** Delve into the reasons behind educators' decisions, seeking to uncover any barriers or challenges that may inhibit the sharing of reading lists.
- **Methods of sharing:** Examine the diverse methods employed for sharing reading lists, including the use of university learning management systems (such as Moodle), email communication, or specialized platforms like WRLs.
- **Integration with teaching tools:** Explore whether reading lists are seamlessly integrated into the teaching process, such as incorporation into lecture slides, utilization within discussion forums, or the adoption of specific applications or websites like Waikato Paper Outlines.

By addressing these aspects, the research aims to provide a comprehensive understanding of the dynamics surrounding the dissemination of reading materials to students in computing discipline, ultimately contributing valuable insights to enhance the learning experience and pedagogical practices in academia.

Further testing: Due to COVID limitations, we only tested our interface prototypes in system walk-throughs. Extending our design to a functional prototype and using it for a length period would elicit further useful feedback and potentially identify practical issues of such a solution. We carried out our user studies with the UOW's academics, librarians, and students. Repeating these studies at the other New Zealand Universities (who are using the same system) would be useful. We also suggest carrying out log analysis studies like ours at other New Zealand Universities covering a longer period of time. Several studies we carried out may also be repeated or extended. For example, exploring further features beyond the use of notes, and technical avenues for integrating RL systems into existing teaching support systems.

Integrations: We have identified the requirements of successfully integrating RLs with other teaching support systems. Therefore, examining the challenges, benefits, and best practices associated with such integration in online learning platforms will provide valuable insights to educators, instructional designers, and platform developers, helping them harness the full potential of RL systems to optimize the online learning journey (for both academics and students).

In this research, we could investigate various aspects of RL systems integration, including technical considerations, user experience, and pedagogical implications. The study will entail a comprehensive review of existing literature, which will help us to identify the successful integration models and potential pitfalls to avoid. Furthermore, we can engage in case studies with educational institutions that have successfully integrated RLs into their online learning platforms. To ensure the examination of the technological aspects of RLs integration, we can explore the interoperability with Learning Management Systems (LMS), data management, and scalability considerations. Ultimately, the findings of this study hold the promise of transforming the landscape of online education. By effectively integrating RLs within online learning platforms, educational institutions can curate tailored reading materials, promote critical thinking, and enhance the accessibility of educational content.

New generation of RL Systems: As we reported, RL systems have emerged as indispensable tools in tertiary educational institutions, streamlining the process of curating, sharing, and accessing academic resources. However, as the volume and diversity of educational content continues to grow, there arises a need for more sophisticated and efficient methods of knowledge representation within these systems. Therefore, it is timely to study the integration of Semantic

Web technologies as a solution to improve knowledge representation in RL systems. By leveraging the power of Semantic Web, we could transform the static nature of conventional reading lists into dynamic, interconnected, and contextually rich knowledge repositories. The incorporation of Semantic Web technologies holds the potential to revolutionize how academic resources are organized, accessed, and shared within RL systems, fostering a more intelligent, personalized, and efficient learning experience for students and educators alike.

Through a comprehensive investigation, this research could delve into the principles and functionalities of Semantic Web technologies, including RDF (Resource Description Framework), OWL (Web Ontology Language), and SPARQL (SPARQL Protocol and RDF Query Language). Understanding of these technologies' capabilities, helps us to design and implement a robust knowledge representation framework that facilitates seamless integration of diverse academic resources, ranging from research papers and textbooks to multimedia content and online learning modules. In addition, this study could assess the efficiency and effectiveness of the Semantic Web-based approach in organizing and retrieving academic resources, as well as its impact on improving students' learning experiences and educators' resource curation processes. Moreover, this study can explore the potential for interoperability and data integration, facilitating seamless knowledge exchange between different educational platforms and systems.

By embracing semantic knowledge representation, we can envision a future where students can explore and navigate academic resources with unprecedented ease and depth, empowering them to become lifelong learners in the knowledge-driven digital era.

Self-directed learning: Studies on RL systems have shown that they can play a crucial role in promoting self-directed learning. Self-directed learning in RL systems refers to the practice of empowering students to take ownership of their learning process by actively engaging with reading materials and resources. RL systems promote self-directed learning by allowing students to make choices about what they read, when they read, and how they engage with the content. We can explore how self-directed learning (ex. autonomy in resource selection, personalized recommendations, flexibility in access, collaborative learning etc...) within RL systems can foster a more dynamic and interactive learning environment for the students. This research will shed light on the potential benefits of RL systems in promoting self-directed learning, knowledge sharing, and collaboration among students and academics.

Standardization of vendor interfaces: While not suggesting academic research, we recommend publishers to address the inconsistencies between the vendor systems in terms of linking to whole or parts of eBooks in order to improve the user experience of students interacting with resources linked in RLs.

8.4 Conclusion

The research presented in this PhD thesis has extended academic knowledge about the experiences of tertiary educators, librarians and students when engaging with RL systems. We employed a mixed-methods approach combining a number of data gathering techniques. We identified barriers to uptake of online RL systems and suggested an improved interface to ease the use of RL systems. The contributions of this research have been presented in six research publications.

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Thesis Appendix A

Ethical Approval for the User Studies

This appendix contains the ethical approval letters for our user studies.

A.1. User study (Questionnaire) - 1

A.2. User study (Questionnaire) - 2

A.3. User study (Interviews) - 3

A.4. User study (Interviews) - 4

A.1. User study (Questionnaire) - 1

The University of Waikato
Private Bag 3105
Hamilton, New Zealand, 3240
0800 WAIKATO (924 528)

HECS Human Ethics Committee
Brett Langley
Telephone +64 77 838 4060
Hecs-ethics@waikato.ac.nz

THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

16 June 2020

Nandana Peramuna Pathirage

Supervisor: Associate Professor Annika Hinze

Re: HECS Ethics Approval of Application HREC(HECS)2020#06 "Use of EBook Technology in Tertiary Education"

Dear Nandana:

Thank you for submitting your amended application HREC(HECS)2020#06 for ethical approval.

We are pleased to provide formal approval for your project, including the following activities:

- An on-line questionnaire to be distributed to academic staff within the University who have made use of the Library's Waikato Reading Lists.

Please contact the committee by email (hecs-ethics@waikato.ac.nz) if you wish to make changes to your project as it unfolds, quoting your application number with your future correspondence. Any minor changes or additions to the approved research activities can be handled outside the monthly application cycle.

We wish you all the best with your research.

Kind regards,

Brett Langley, PhD
Chairperson
HECS Human Ethics Committee
University of Waikato

A.2. User study (Questionnaire) - 2

The University of Waikato
Private Bag 3105
Hamilton, New Zealand, 3240
0800 WAIKATO (924 528)

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Brett Langley
Telephone +64 77 838 4060
Hecs-ethics@waikato.ac.nz

THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

21 September 2020

Nandana Peramuna Pathirage
Supervisor: Associate Professor Annika Hinze

Re: HECS Ethics Approval of Application HREC(HECS)2020#41 "Use of EBook Technology in Tertiary Education"

Dear Nandana:

Thank you for submitting your amended application HREC(HECS)2020#41 for ethical approval.

We are pleased to provide formal approval for your project, including the following activities:

• Contacting students in papers where the lecturer uses the reading list facility;
• Emailing these students, a questionnaire, which clearly spells out the nature of the study, and provides them with a conscious action to submit the completed questionnaire, acknowledging their consent;
• Apart from demographic information, no personal identifying information with be recorded.

Please contact the committee by email (hecs-ethics@waikato.ac.nz) if you wish to make changes to your project as it unfolds, quoting your application number with your future correspondence. Any minor changes or additions to the approved research activities can be handled outside the monthly application cycle.

We wish you all the best with your research.

Kind regards,

Brett Langley, PhD
Chairperson
HECS Human Ethics Committee
University of Waikato

A.3. User study (Interviews) - 3

The University of Waikato
Private Bag 3105
Hamilton, New Zealand, 3240
0800 WAIKATO (924 528)

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Brett Langley
Telephone +64 77 838 4060
Hecs-ethics@waikato.ac.nz

THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

21 September 2021

PPNV Kumara

Annika Hinze

Nicholas Vanderschantz

Claire Timpany

Re: HECS Ethics Approval of Application HREC(HECS)2021#46 "Use of EBook Technology in Tertiary Education"

Dear Nandana,

Thank you for submitting your amended application HREC(HECS)2021#46 for ethical approval.

We are pleased to provide formal approval for your project, including the following activities:

- Recruitment of up to 50 academic staff member participants who have used Waikato Reading Lists.
- Conduct guided interviews via Zoom (approximately 30 minutes).
- Zoom interviews may be recorded.

Please contact the committee by email (hecs-ethics@waikato.ac.nz) if you wish to make changes to your project as it unfolds, quoting your application number with your future correspondence. Any minor changes or additions to the approved research activities can be handled outside the monthly application cycle.

We wish you all the best with your research.

Kind regards,

Brett Langley, PhD
Chairperson
HECS Human Ethics Committee
University of Waikato

A.4. User study (Interviews) - 4

The University of Waikato
Private Bag 3105
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Hecs-ethics@waikato.ac.nz

THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

15 June 2022

PPNV Kumara

Annika Hinze

Nicholas Vanderschantz

Claire Timpany

Re: HECS Ethics Approval of Application HREC(HECS)2022#21 "Use of EBook Technology in Tertiary Education"

Dear Nandana:

Thank you for submitting your amended application HREC(HECS)2022#21 for ethical approval.

We are pleased to provide formal approval for your project, including the following activities:

- Recruitment of up to 20 University staff participants for a study into the use of e-Book technology and reading lists.
- Carry out guided interviews with participants about their experience with proposed designed digital prototypes for reading lists.
- Interviews will take place via Zoom and should take no longer than 30 minutes and may be recorded.

Please contact the committee by email (hecs-ethics@waikato.ac.nz) if you wish to make changes to your project as it unfolds, quoting your application number with your future correspondence. Any minor changes or additions to the approved research activities can be handled outside the monthly application cycle.

We wish you all the best with your research.

Kind regards,

Brett Langley, PhD
Chairperson
HECS Human Ethics Committee
University of Waikato

Thesis Appendix B

Co-Authorship Forms

This appendix contains the co-authorship forms for the published and unpublished papers.

B.1. Resource Types linked in Academic Reading Lists

B.2. Online Reading Lists: A Mixed Method Analysis of the Academic Perspective

B.3. Online Reading Lists: Evaluating Students Experience

B.4. Reading Lists Systems' Pedagogical Features: A Comparative Analysis

B.5. Academics' Experience of Online Reading Lists and the Use of Reading List Notes

B.6. Improving User experiences of Online Reading List Systems: An Academic Perspective

B.1. Resource Types linked in Academic Reading Lists

Co-Authorship Form

THE UNIVERSITY OF
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Te Whare Wānanga o Waikato

This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work.

Chapter 2: Kumara, N., Hinze, A., Vanderschantz, N., Timpany, C. & Saravani, S.J. (2021). "Resource Types linked in Academic Reading Lists," ACM/IEEE Joint Conference on Digital Libraries (JCDL), pp. 266-269, doi: 10.1109/JCDL52503.2021.00080.

Nature of contribution by PhD candidate	Literature analysis, identifying appropriate research methodology, developing details of method/procedure, conducting log analysis, structuring and writing the paper
Extent of contribution by PhD candidate (%)	95%

CO-AUTHORS

Name	Nature of Contribution
Annika Hinze	supervision
Nicholas Vanderschantz	supervision
Claire Timpany	supervision
Sarah-Jane Saravani	library liaison

Certification by Co-Authors

The undersigned hereby certify that:
❖ the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
PPNV Kumara		12/12/2022
Annika Hinze		13/12/2022
Nicholas Vanderschantz		13/12/2022
Claire Timpany		13/12/2022
Sarah-Jane Saravani	retired from the university and still working on getting her signature.	

B.2. Online Reading Lists: A Mixed Method Analysis of the Academic Perspective

Co-Authorship Form

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This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work.

Chapter 3: Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2022a). Online Reading Lists: A Mixed Method Analysis of the Academic Perspective, International Journal on Digital Libraries (In print).

Nature of contribution by PhD candidate	Literature analysis, identifying appropriate research methodology, developing details of method/procedure, conducting log analysis, structuring and writing the paper
Extent of contribution by PhD candidate (%)	95%

CO-AUTHORS

Name	Nature of Contribution
Annika Hinze	supervision
Nicholas Vanderschantz	supervision
Claire Timpany	supervision

Certification by Co-Authors

The undersigned hereby certify that:
- ❖ the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
PPNV Kumara		12/12/2022
Annika Hinze		13/12/2022
Nicholas Vanderschantz		13/12/2022
Claire Timpany		13/12/2022

B.3. Online Reading Lists: Evaluating Students Experience

Co-Authorship Form

THE UNIVERSITY OF
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Te Whare Wānanga o Waikato

Postgraduate Studies Office
Student and Academic Services Division
Wahanga Ratonga Matauranga Akonga
The University of Waikato
Private Bag 3105
Hamilton 3240, New Zealand
Phone +64 7 838 4439
Website:
http://www.waikato.ac.nz/sasd/postgraduate/

This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work.

Chapter 4: Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2022b). Online Reading Lists: Evaluating Students Experience, International Journal on Digital Libraries (In review).

Nature of contribution by PhD candidate	Literature analysis, identifying appropriate research methodology, developing details of method/procedure, conducting log analysis, structuring and writing the paper
Extent of contribution by PhD candidate (%)	95%

CO-AUTHORS

Name	Nature of Contribution
Annika Hinze	Supervision
Nicholas Vanderschantz	Supervision
Claire Timpany	Supervision

Certification by Co-Authors

The undersigned hereby certify that:
❖ the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
PPNV Kumara		12/12/2022
Annika Hinze		13/12/2022
Nicholas Vanderschantz		13/12/2022
Claire Timpany		13/12/2022

B.4. Reading Lists Systems' Pedagogical Features: A Comparative Analysis

Co-Authorship Form

THE UNIVERSITY OF
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Te Whare Wānanga o Waikato

This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work.

Chapter 5: Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2022c). Reading Lists Systems' Pedagogical Features: A Comparative Analysis, ACM/IEEE Joint Conference on Digital Libraries 2023 (Ready to submit).

Nature of contribution by PhD candidate	Literature analysis, identifying appropriate research methodology, developing details of method/procedure, conducting log analysis, structuring and writing the paper
Extent of contribution by PhD candidate (%)	95%

CO-AUTHORS

Name	Nature of Contribution
Annika Hinze	Supervision
Nicholas Vanderschantz	Supervision
Claire Timpany	Supervision

Certification by Co-Authors

The undersigned hereby certify that:

❖ the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
PPNV Kumara		12/12/2022
Annika Hinze		13/12/2022
Nicholas Vanderschantz		13/12/2022
Claire Timpany		13/12/2022

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B.5. Academics' Experience of Online Reading Lists and the Use of Reading List Notes

This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work.

Chapter 6: Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2022d). Implication of Academics' Perceptions of Reading Lists and the Use of Reading Lists Notes, International Journal on Digital Libraries (In review).

Nature of contribution by PhD candidate	Literature analysis, identifying appropriate research methodology, developing details of method/procedure, conducting log analysis, structuring and writing the paper
Extent of contribution by PhD candidate (%)	95%

CO-AUTHORS

Name	Nature of Contribution
Annika Hinze	Supervision
Nicholas Vanderschantz	Supervision
Claire Timpany	Supervision

Certification by Co-Authors

The undersigned hereby certify that:
❖ the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
PPNV Kumara		12/12/2022
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Claire Timpany		13/12/2022

B.6. Improving User experiences of Online Reading List Systems: An Academic Perspective

Co-Authorship Form

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This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

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Chapter 7: Kumara, N., Hinze, A., Vanderschantz, N., & Timpany, C. (2022e). Usability Improvements for Online Reading Lists Systems: the case of the University of Waikato, International Journal on Digital Libraries (Ready to submit).

Nature of contribution by PhD candidate	Literature analysis, identifying appropriate research methodology, developing details of method/procedure, conducting log analysis, structuring and writing the paper
Extent of contribution by PhD candidate (%)	95%

CO-AUTHORS

Name	Nature of Contribution
Annika Hinze	Supervision
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Claire Timpany	Supervision

Certification by Co-Authors

The undersigned hereby certify that:
❖ the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
PPNV Kumara		12/12/2022
Annika Hinze		13/12/2022
Nicholas Vanderschantz		13/12/2022
Claire Timpany		13/12/2022

Thesis Appendix C

Introduction to the Waikato Reading Lists System

This appendix contains the introduction to the reading lists management software application used by the University of Waikato. The visual representations showcased in this section do not merely comprise screenshots extracted from the WRL system. Instead, we meticulously reproduced these interfaces according to our study's requirements using the Bubble web development platform.

C.1. Waikato Reading Lists System: An Overview

C.2. Waikato Reading Lists System's Interfaces

C.1   Waikato Reading Lists System: An Overview

Waikato Reading Lists (WRL) is a reading lists management system (powered by *Talis Aspire; Talis.com, 2023*) which the University introduced in 2016 to streamline the creation and management of course reading lists and make copyright compliance easier (UOW, 2020). At the UOW, reading lists are created by academics with the help of library staff to provide learning materials to students. This includes copyrighted materials such as scanned or photocopied print book chapters, book sections, or journal articles. In addition to that, it allows academics to add eBooks, eBook chapters, online articles, web pages/blogs, audiovisual materials, images etc.

The benefit of having a reading list is that the lecturer can create context and guidance around the learning material intended for student engagement, which can be done within a weekly schedule. Academics post required learning materials into the reading list for a course and students can access those learning materials by directly logging in to the WRL account or via Moodle account (academics can link WRL and their Moodle course page by posting reading list references on their Moodle course page). Once they are logged, the published list of materials is accessible via the Resource Lists Interface which is the main interactive interface that displays all the linked materials that the students are required to engage with. The following figure illustrates the interfaces of the basic flow of interaction, which are briefed above.
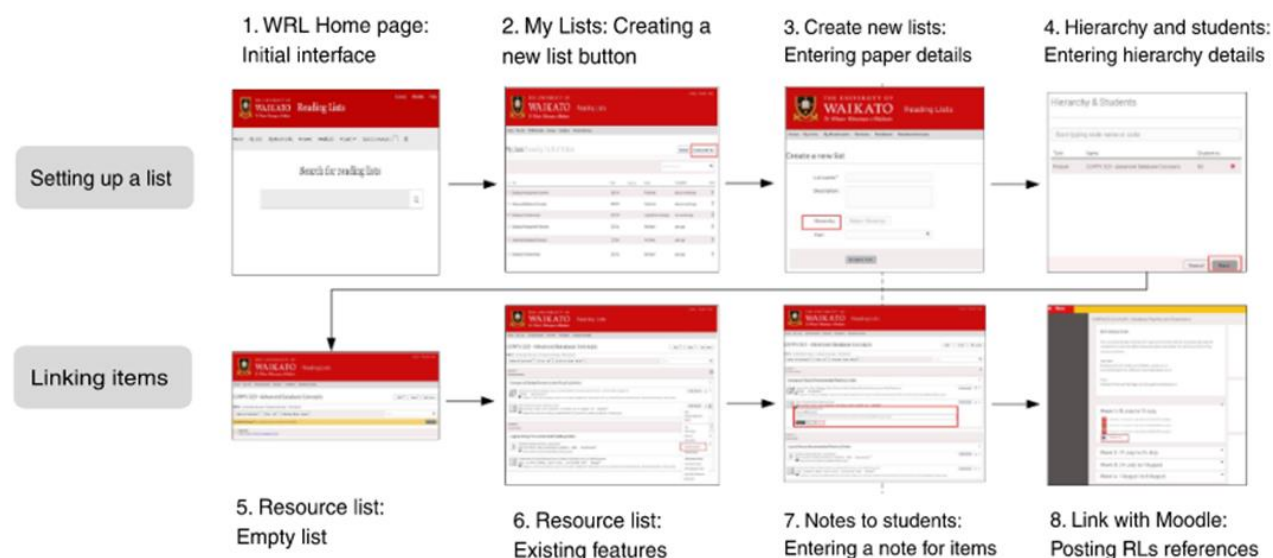
Figure C.1. Basic flow of interaction

C.2 Waikato Reading Lists Systems' Interfaces

This section presents the user interfaces of the WRL with regards to the processes highlighted in Figure C.1. In our study, we focused only on RL aspects such as creating a new list (Interface 3, 4 in Figure C.1), resource lists (Interface 5, 6), notes for students (Interface 7) and Moodle integration (Interface 8). All these interfaces and their functionality are explained in order in the following sections.

C.2.1 Setting up a list

As illustrated in Figure C.1, the list setting up process involves four interfaces: Home page, My Lists, Create a New List and Hierarchy & Students.

1. *WRL home page*
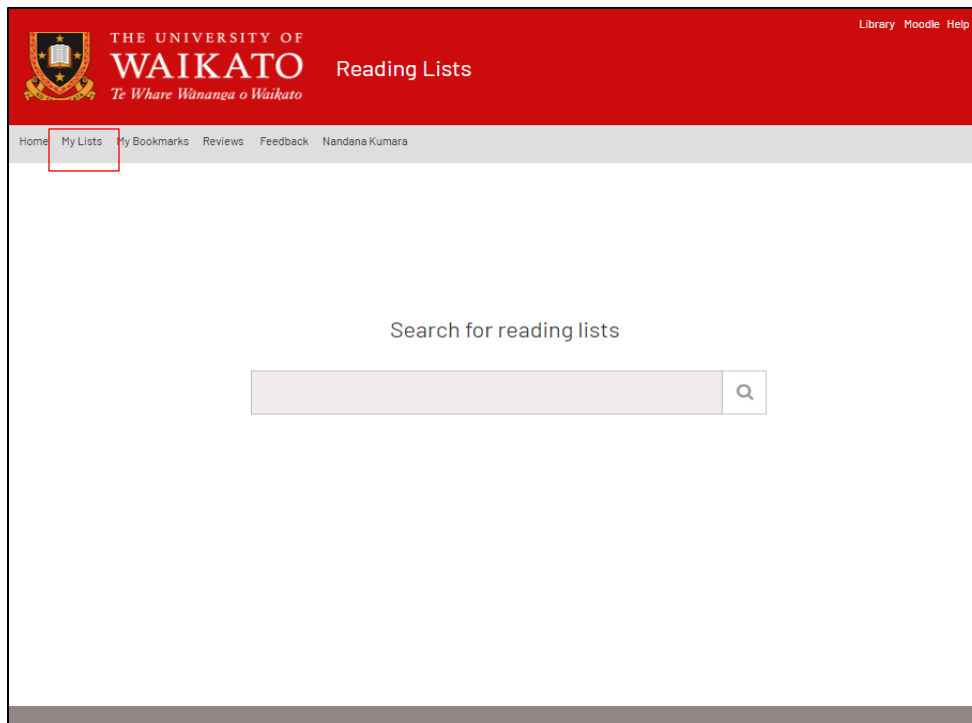
Figure C.2. WRL home page

2. *My Lists: Creating a new list*

This feature allows academics to create a new list for their courses. Once you click on the My Lists tab of Figure C.2., the initial screen which displays all existing lists and the option for creating a new list will appear (see Figure C.3.).

Figure C.3. My lists interface

3. *Creating a new list: entering paper details*

Once clicked on the 'creating new list' button, the following interface will appear to enter the basic details of the list.

Figure C.4. Creating a new list

4. *Hierarchy and students: entering hierarchy details*

While creating a new list, it is required to insert the paper details under 'hierarchy'. When clicking on the 'hierarchy' field in Figure C.4, Figure C.5. will appear to enter the hierarchy details. Once given all the required information and click on the 'create a new list' button, an empty list will be created (see Figure C.6).

Figure C.5. Selecting a hierarchy when creating a new list

C.2.2   Linking items

The *Linking items* also involve four interfaces: Empty Resource List, Resource List with features, Notes to students and Link with Moodle.

5. *Resource list: empty list*

Figure C.6. Resource lists interface (empty list)

We can add resources to the empty list using three options such as *add resource, bookmarking,* and *content digitization.* Figure C.7. shows the *add resource* option.
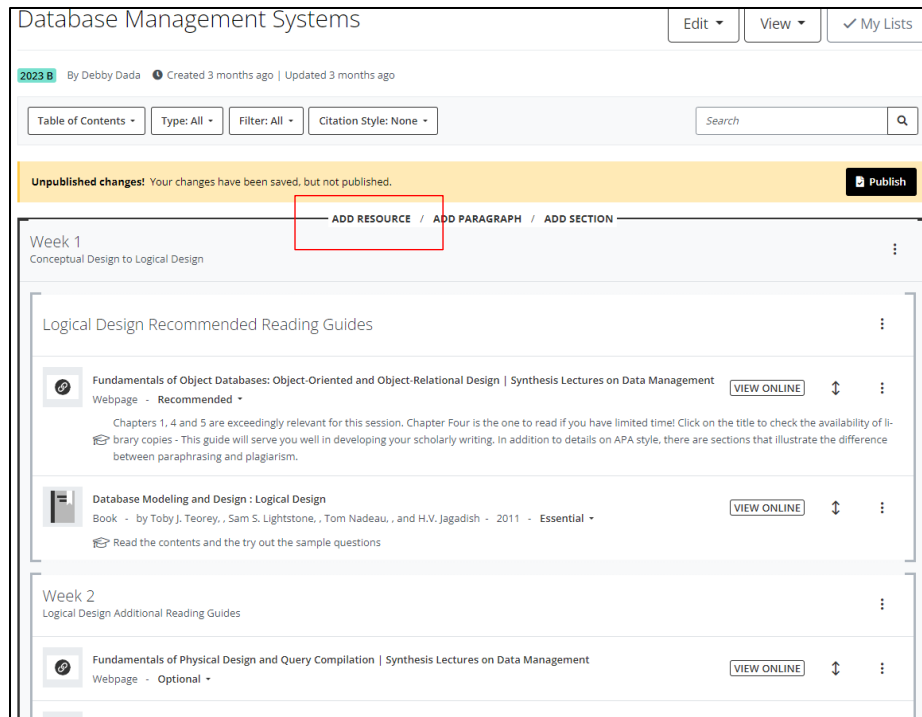
Figure C.7. Selecting add resource option

Once clicked on the add resource tab in Figure C.7., the following figure will appear to select, or search required materials from the library catalogue.
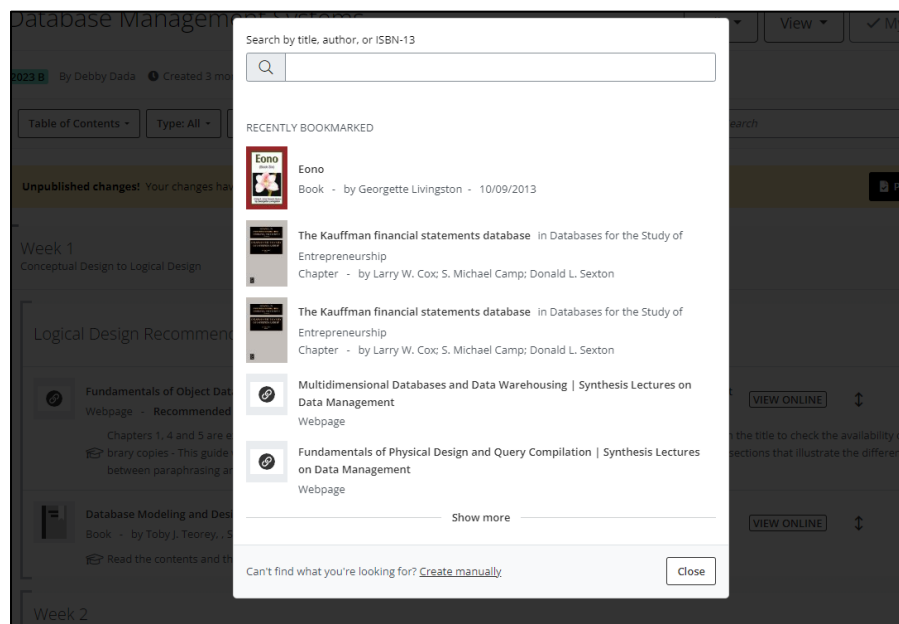
Figure C.8. Searching resources using add resource option

Another way of adding resources to the list is using the *bookmarking* option. Before using this option, we must add the *Talis Aspire Bookmarking* extension to our web browser. Once we search for a resource online (using Library Search / databases / Google Scholar / websites), click on the *Talis Aspire Bookmarking* icon on the toolbar, or web browser extension (see Figure C.9.). The selected resource will display in a separate interface (see Figure C.10.) in WRL to confirm the meta data before entering the list details to be added (see Figure C.11.).
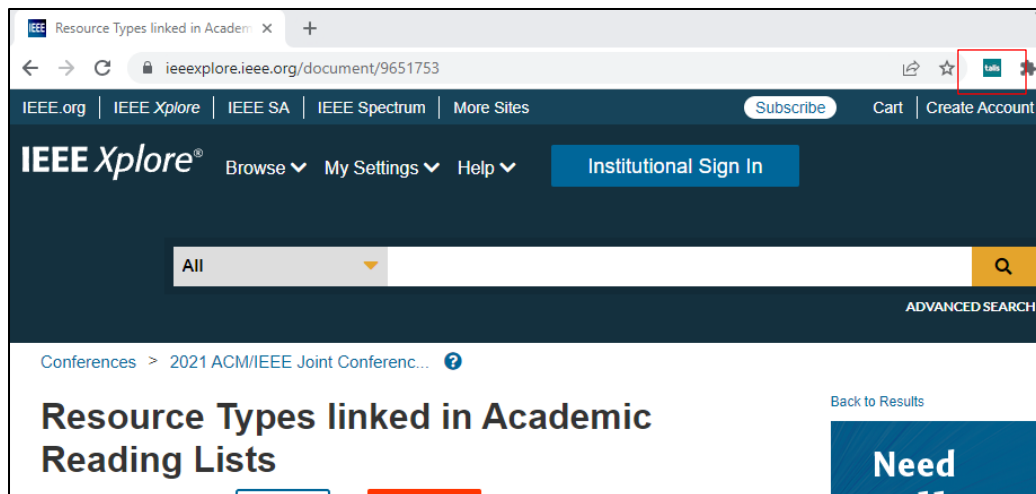
Figure C.9. Add resources using bookmarking, Talis bookmarking extension
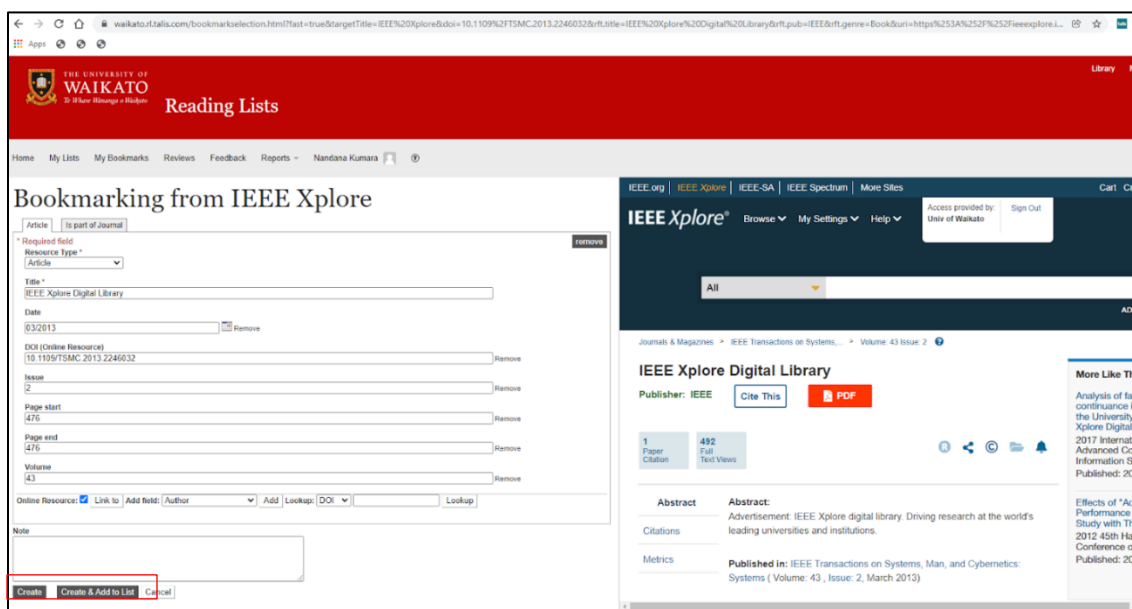
Figure C.10. Add resources using bookmarking option

Figure C.11. Add resources using bookmarking option, list details selection

Content digitization is another way of adding resources to the list in which you send a request to the library mentioning the details of your resources such as chapter or article, including page ranges where available (see Figure C.12.).

Figure C.12. Add resources using content digitization option

6. Resource list: existing features

This is the main interactive interface that displays all the linked materials that the academics and the students are required to frequently engage with. In this interface, once clicked on the three dots appearing in the right-hand corner of each section, it will list down the available features (see highlighted areas of Figure C.13.).

Figure C.13. Academics view of the resource lists interface

7. Notes to students: entering a note for items

This feature allows academics to guide the students' reading. Figure C.14., resource lists interface, displays all the existing features including *notes for students* (once clicked on three dots on each item in the right-hand corner). Once clicked on the *notes for students* feature (see Figure C.14.), the Interface in Figure C.15. will appear to enter the note with respect to the selected item.
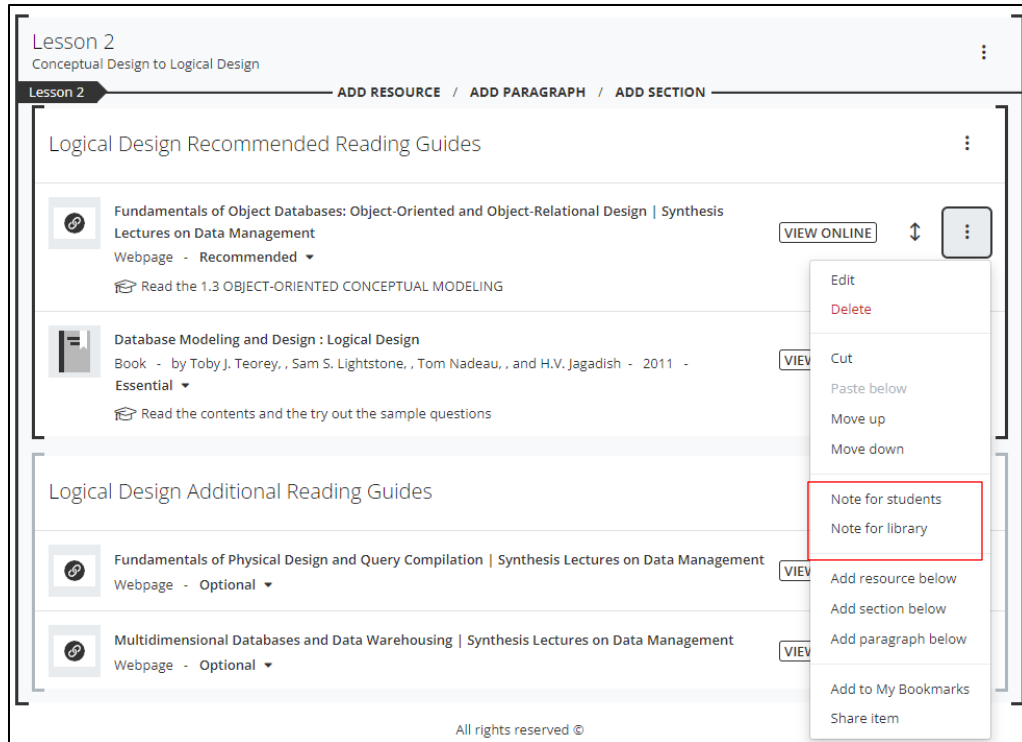
Figure C.14. Initial interface for note for students feature
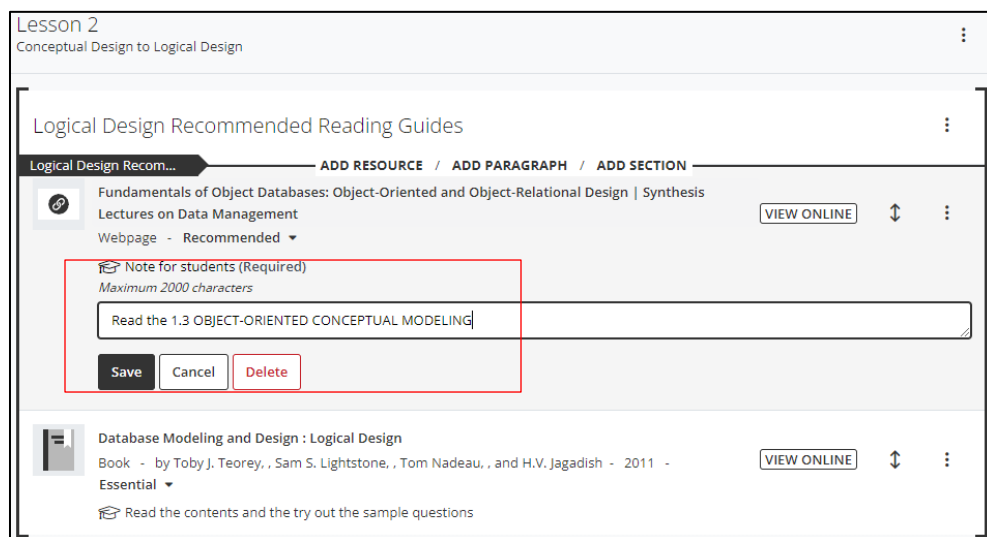
Figure C.15. Note for students' interface, entering a note
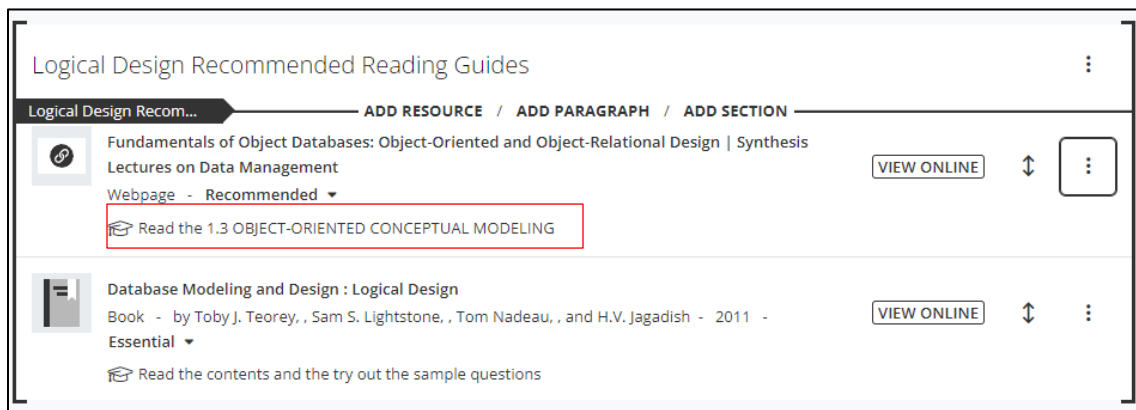
Figure C.16. Note for students' interface, after entering a note

8. *Link with Moodle: Posting RLs references*

This allows academics to link WRL and their Moodle course page by posting reading list references on their Moodle course page. This interface shows a RLs link (highlighted area) that an academic posted with regards to the particular week. Once the students click on this link, they will be directed to the readings linked in the RLs.
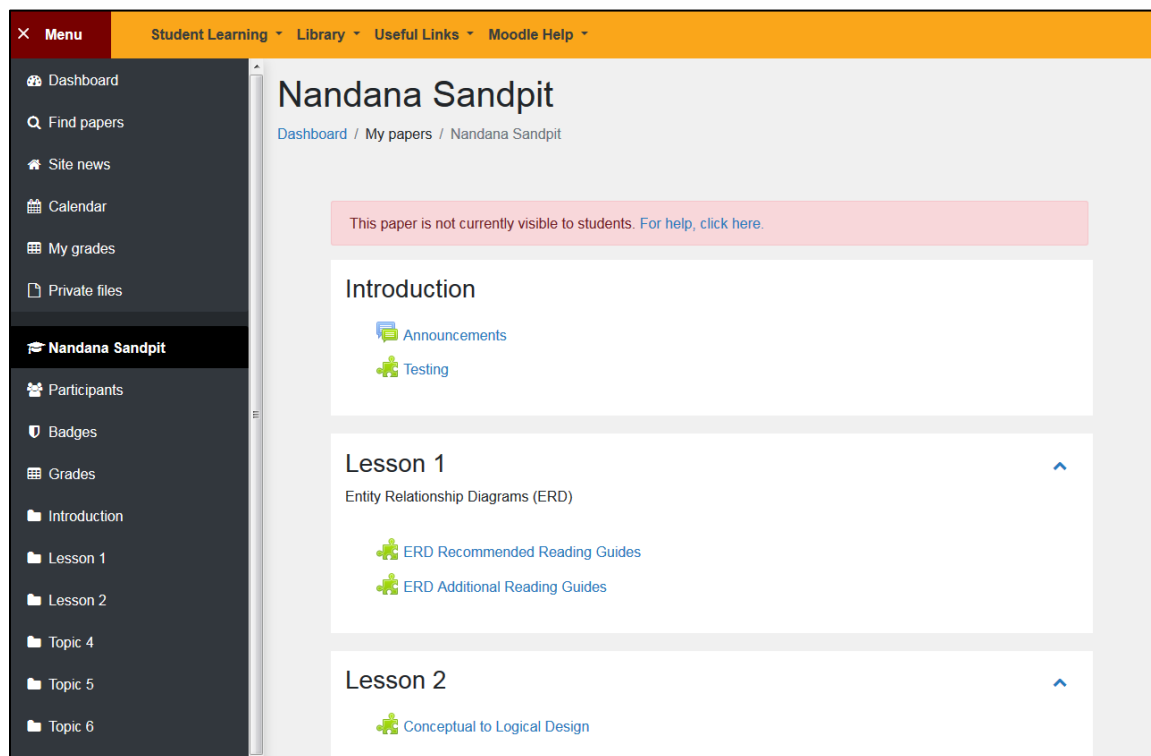
Figure C.17. Waikato Moodle page with link to the WRL

Figure C.18. directed readings linked in the WRL

Thesis Appendix D

Paper Prototype Designs

We designed two paper prototypes to address the shortcomings of the WRL interfaces. Here we present the design of our paper prototypes. The paper prototype 2 was then implemented as a digital prototype.

D.1. Paper Prototype Design 1

D.2. Paper Prototype Design 2

D.1 Paper Prototype 1

> **Screens for setting up a list**

Step 1 for entering the paper details

Figure D.1. Entering the paper details

Step 2 for selecting the template

Figure D.2. Selecting the template

Step 3 for managing collaborators

Figure D.3. Managing collaborators

➤ **Screen for Resource lists interface**

Figure D.4. Resource lists interface, academics view

➢ **Screen for Note feature**

Figure D.5. Note for students interface

➢ **Screen for Moodle integration**

Figure D.6. Interface for Moodle integration

D.2   Paper Prototype 2

➢ **Screen for setting up a list**

Figure D.7. Interface for creating a new list

➢ **Screen for Resource lists interface**

Figure D.8. Resource lists interface of design 2, academics view

➢ **Screen for Note feature**

Figure D.9. Note for students' interface, design 2
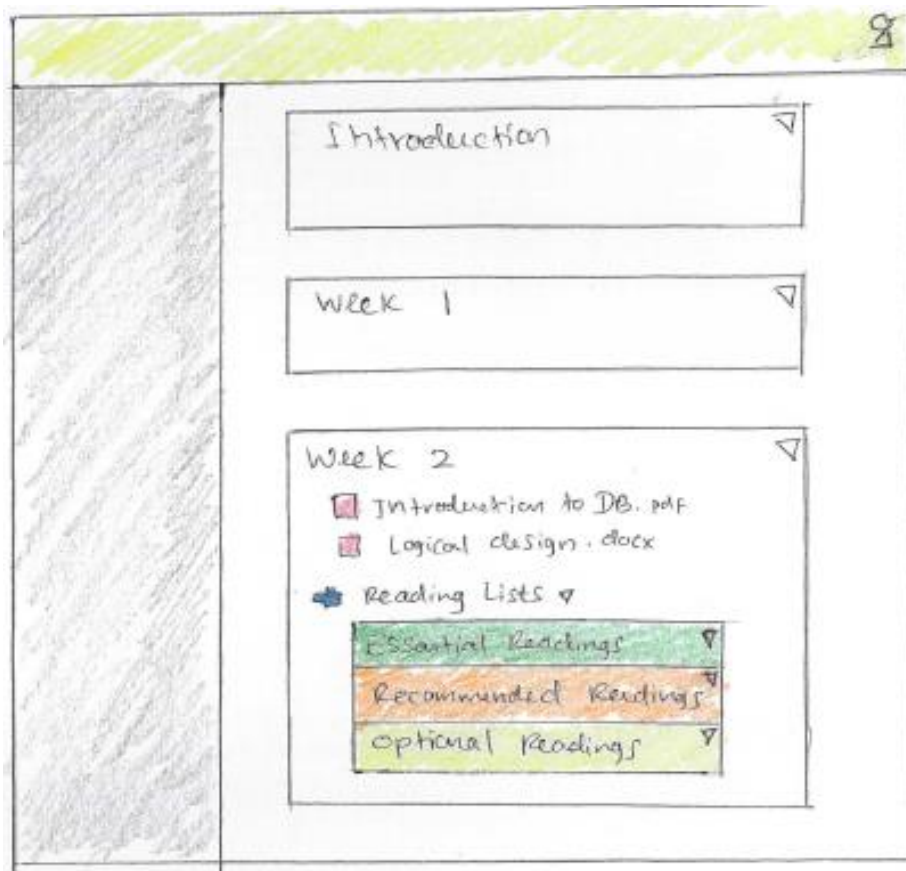
Figure D.10. Interface for Moodle integration, design 2

Thesis Appendix E

Digital Prototype Designs

This appendix contains the design of our digital prototype interfaces for the aspects such as *setting up a list, resource lists, notes to students* and *Moodle integration.*

E.2.1 Setting up a list

As illustrated in Figure 7.10, the list setting up process involves three interfaces: Home page, My Lists, Create a New List. In this digital protype, the first two interfaces are same as existing WRL interfaces (see Thesis Appendix C). Therefore, here we present third interface which appear when you click on "Creating a new list" option in Interface 2 (see Figure C.2. in Thesis Appendix C).

Creating a new list: entering paper details

Once clicked on the 'creating new list' button (see Figure C.2. in Thesis Appendix C), the following interface will appear to enter the basic details of the list.

Figure E.1. Creating a new list in digital prototype

Figure E.2. Creating a new list in digital prototype (chose a paper drop down options)

Figure E.3. Creating a new list in digital prototype (collaborator name drop down options)

Figure E.4. Creating a new list in digital prototype (rights drop down options)

Figure E.5. Creating a new list in digital prototype (template drop down options)

Once given all the required information and clicked on the 'create list' button, it will display a message indicating the successful creation of the list with the option of 'Go to list' or access it later *i.e.,* 'OK' (see Figure E.6). Once clicked on 'Go to list', the following interface (see Figure E.7) will appear according to the selected resource list template.
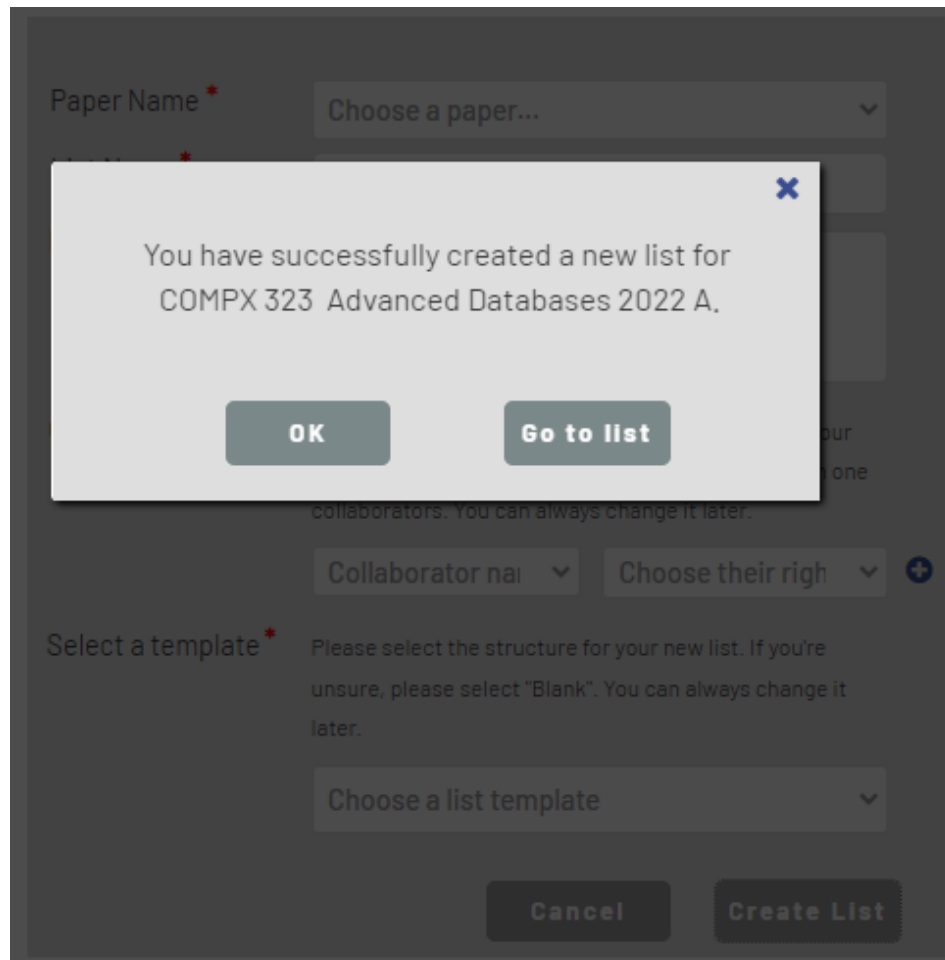
Figure E.6. Creating a new list in digital prototype (completion message)

E.2.2 Linking items

The *Linking items* involve four interfaces: Empty Resource List, Resource List with features, Notes to students and Link with Moodle.

Figure E.7. Resource lists interface (empty list)

We can add resources to the empty list using five options such as *add resource, bookmarking, my collections, recommendations, and content digitization*. We can drag and drop the items to the list (to a particular week) from *my collection* and *recommendations* options (see Figure E.7, right hand option bar). Figure E.8 and E.9 shows the interfaces of the *add resource* option.

Figure E.8. Add resource (search)   **Figure E.9.** Add resource (create manually)

Figure E.10. Resource lists interface with feature and linked materials

Notes feature: Academics could use our note features to include a variety of texts into the reading lists that address different student abilities. Once clicked on the 'note for students' option which is placed next to each linked item (see Figure E.10), Figure E.11 will appear.

Figure E.11. Adding a note

Figure E.12. Adding a note (chose an option)

Figure E.13. Note preview message

Moodle integration: In this design, all the readings that the academics linked in the RL system, they can embed them (week, section, or a topic), as it is in their reading lists, into their Moodle course page (see Figure E.14).

Figure E.14. Moodle integration