User Interactions and Perceptions of an Academic Library’s Discovery Services

By

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Declaration

I declare that this dissertation that I have submitted to Dublin Business School for the award of MsC Information and Library Management is the result of my own investigations, except where otherwise stated, where it is clearly acknowledged by references. Furthermore, this work has not been submitted for any other degree.

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Abstract

Discovery services configured by Dublin Business School (DBS) library provide students with a one-stop gateway to access their catalogue and EBSCO’s Discovery Services (EDS). In order to assess the user experience they provide students, usability testing was conducted with 5 undergraduates and 5 postgraduates. Their interactions were observed as they completed three search tasks. Their task completion time, error count, and clicks were recorded, and a post-test survey (the System Usability Scale) revealed a quantifiable indication of their level of satisfaction. This assessment provides baseline data to assess the ISO usability attributes of efficiency, effectiveness and user satisfaction. All participants encountered similar errors and required assistance. Errors and their subsequent recommendations have been categorized under user education (tailored information literacy), local customization (to DBS homepage) and product enhancement (to EDS advanced search). Recommendations have implications for stakeholders of the services. Iterative testing is needed to determine if they lead to usability improvements.
Chapter 1 : Introduction

1.1 Exploring the User Experience (UX) of Library Services

UX principles are based on the concept of “user-centred design”; the notion that users should be the focus when designing products and services (Datig, 2015, p. 235; Krug, 2006; Priestner and Borg, 2016; Norman, 2002).

The idea of placing users as the focal point in designing products and services was popularised by Donald Norman in his seminal work, The Design of Everyday Things (2002). He posited that by factoring in users’ wants and needs, businesses could provide better quality products, leading to an increase in sales and return on investment (Datig, 2015; Norman, 2002). Inversely, Norman makes the case that products will fail if users’ needs are not taken into consideration.

Today, Priestner & Borg (2016) define UX as “the overall effect created by the interactions and perceptions that someone has when using a product or service” (p.3). UX studies have gained considerable traction across commercial industries as well as public services over the last 20 years, influencing the management and deployment of products and services (Datig, 2015, p. 235; Priestner and Borg, 2016; Norman, 2002).

It is exciting to see that academic libraries have also taken an active interest in adopting UX methods (Borg & Reidsma, 2016, Priestner & Borg, 2016). There are significant motivations for libraries to conduct UX studies; ultimately leading to the improvement of service quality and delivery (Kim-Wu & Lanclos, 2016, Lanclos, 2016, Borg & Reidsma, 2016, Priestner & Borg, 2016; Gross & Sheridan, 2010). They are an excellent opportunity for librarians to assess their physical and digital services and provide meaningful data to stakeholders showing how users actually interact with them, beyond traditional data techniques (Appleton, 2016; Kim-Wu & Lanclos, 2011; Priestner, 2015). This is exactly the intention of this research for DBS Library.
1.2 Rationale for Employing UX Methods

1.2.1 Going Beyond Traditional Data Collection

Traditional library data collection methods typically involve attitudinal surveys and questionnaires (Kim Wu & Lanclos, 2011; Priestner & Borg, 2016). Together with the quantitative reports pulled from library management systems, librarians are able to provide a basic overview of opinions, footfall and circulation. They may even have access to website usage and analytics, showing site visitation and article downloads (Priestner & Borg, 2016). Yet this data offers little insight into the quality of the users’ visit, or even whether their online search was successful (Priestner & Borg, 2016). Just because someone accessed the library website, doesn’t mean they found what they were looking for (Kim Wu & Lanclos, 2011). Surveys tend to attract pro-library users and anti-library users, with the middle ground hardly participating (Priestner & Borg, 2016). Thus, the opportunity to provide more meaningful data is attractive (Priestner & Borg, 2016).

1.2.2 To Provide Meaningful Data to Stakeholders

Furthermore, academic librarians are under pressure to provide a rationale for their services, and can use UX research findings to inform their decision making, and make a case for their stakeholders (Priestner & Borg, 2016; Datig, 2015, p. 243). By documenting the quality of the interactions experienced, librarians can confidently explain what works and what doesn’t, and demonstrate how their services are actually being used (Appleton, 2016, p. 224; Datig, 2015, p. 238; Priestner & Borg, 2016, Macdonald, 2017, p. 198). In some cases, the meaningful changes that are required are just slight tweaks; and may involve information architecture modifications, like simplifying terminology that ultimately improve the user’s online experience, which this research will demonstrate. In the case of an online library search system, simple changes can make all the difference; and may mean that a user stays on their platform rather than uses Google Scholar (for example).

1.2.3 To Improve Library Perceptions

By considering the needs of users, librarians also help keep the library relevant to their users (Macdonald, 2017). Decision making and management of resources improves, empathy and understanding of users increases, and outreach is positively affected (Macdonald, 2017). By demonstrating that users are important in library service design, and
responding to their suggestions, requests and feedback, user satisfaction is likely to increase and lead to the library being perceived more positively (Macdonald, 2017, p. 200). Since users feel heard, the library stays relevant to them. Empathy and responsiveness for users can also increase, and stereotypes and assumptions get quashed (Macdonald, 2017, p. 201). The System Librarian interviewed for this research has his own perceptions of how users interact with the discovery services. These perceptions will be compared to their actual interactions in the usability study.

1.3 Methods of UX: Ethnographic Techniques

In UX research, the physical and digital services that users engage with are typically examined by employing ethnographic methodologies, which provide an enriching context around them (Appleton, 2016 p. 224; Borg & Reidsma, 2016; Ramsden, 2016, p. 10). They are used to explore how users interact with services, and how they perceive service quality to be (Priestner, 2015; Duke & Asher, 2012; Foster & Gibbons, 2007). Such techniques typically include journey mapping, photo diaries, card sorting, usability studies as well as various types of observational activities (Priestner & Borg 2016). This research employs usability studies to examine the digital spaces being used by academic library users, specifically, Dublin Business School (DBS) library website’s discovery services.

1.4 Usability Studies

Usability studies are the go-to methodology for evaluating library websites (Borg & Reidsma, 2016; Datig, 2015, p. 239; Lanclos, 2016; Deodato et al, 2016, p. 183). They typically involve the “gathering and interpreting of users perceptions, and observing patterns of behaviour” and can provide the researcher with a comprehensive, in-depth analysis of users’ situations and contexts (Fidel, 2000, p. 96). They allow for the impact of the services on the users to be better explored, and the success and quality of the interaction with a service to be measured (Appleton, 2016, p. 224). In library website usability studies, users are observed as they perform a series of tasks that requires them to use a search interface or interact with a particular feature (Fagan et al, 2012; Perrin et al, 2014; Johnson, 2013). The user’s interaction is recorded and observed while they are completing the task (Lanclos, 2016; Datig, 2015, p. 239; Priestner & Borg, 2016). Search patterns can be monitored, A/B testing can be performed, tool customisation can be assessed, which all ultimately result in
aiding the researchers’ understanding of user behaviour, and leads to recommendations for how functionality can be improved (Fagan et al, 2012; Perrin et al, 2014; Johnson, 2013).

1.5 Website and System Usability

Website usability is best defined by Nielsen (2012a) as “the quality attribute that assesses how easy user interfaces are to use.” He makes claim that website structure should be driven by the tasks the users came to the site to perform (Nielsen, 2012a). According to the International Standards Organization (ISO 9241-11), there are three main attributes that comprise usability: effectiveness, efficiency and satisfaction and that it is about the “extent to which a product can be used by specific users to achieve specified goals” (ISO, 1998). Efficiency is typically measured by task completion time and number of page views or clicks in order to assess how quickly users perform the tasks (Bevan, 2008, p. 14; Sauro & Lewis, 2012, p. 10). Effectiveness is defined as “the accuracy and completeness” of tasks; and is typically assessed by recording the errors that participants make; the unintended actions, mistakes, or omissions, or if they require assistance to continue (Bevan, 2008 p. 14 ; Sauro, 2012 & Lewis, 2012, p. 10). User satisfaction is defined as “the extent to which users’ expectations are met” and can be assessed either after each task or after the entire testing session, through surveys (Bevan, 2008, p. 14; Sauro & Lewis, 2012, p. 10). This research provides baseline quantitative and qualitative data for each of these attributes.

1.6 Discovery Services

1.6.1 About Discovery Services

One of the ways that libraries attempted to improve usability and accessibility of library holdings whilst also intending to reduce the complexity of searching, was by introducing discovery search interfaces (Deodato et al, 2016, p. 184). Access to multiple types of holdings are consolidated into a single search box, acting as an integrated system (Gross & Sheridan, 2010, p. 238). This permits users to query library-supplied MARC data from their own catalogue as well as access databases, newspapers, video and other content (depending on the institution’s own configurations and subscription plans) (Asher et al, 2013, p. 465). Discovery interfaces provide users with faceted navigation, advanced filtering and sorting options, and relevancy ranking of results (Asher et al, 2013, p. 465; Bossaller & Sandy, 2017 p. 606). The single search box returns results that are intended to be easily
comprehended by users, which they can then control and interact with in a multitude of ways (“easily comprehended” really depends on the user; user behaviour will be addressed shortly). Discovery systems are considered a modern update to the federated search tools of the early 2000’s, of which their limitations are well documented (Asher et al, 2013, p. 465; Bossaller & Sandy, 2017 p. 606). OCLC’s Worldcat Local, Primo, Summon and EBSCO Discovery Service (EDS) are the most well-known discovery systems found in academic libraries, launched in the mid 2000’s (Asher et al, 2013. p. 465; Bossaller & Sandy, 2017 p. 606). They improved on federated search tools in terms of the their speed, relevancy ranking and the sheer amount of content that can be accessed (Asher et al, 2013 p. 465).

1.6.2 EBSCO Discovery Services (EDS)

EDS is perhaps the most ubiquitous and prevalent discovery platform used by academic institutions (Asher et al, 2013. p. 465). It is reassuring to learn that EBSCO values their users’ experience of their interface, and have a dedicated department of “User Research” that conducts usability studies and other ethnographic research at various academic institutions (Deodato et al, 2016, p. 184). The published (and available) reports of these collaborative studies seems to mostly originate from American college libraries; they even have a “North American Libraries User Group” (EBSCO, 2019). Since they claim that “one user experience doesn’t fit all,” it would be interesting to see if they have already or intend to conduct studies at European institutions (EBSCO, 2019). Findings from this research may assist them in understanding how DBS students interact with EDS.

1.6.3 DBS Library’s Discovery Services

For this research, users will completes tasks for usability studies using the discovery services on the DBS Library website. Dublin Business School is an independent third level institution in Ireland which provides a range of undergraduate, postgraduate, professional and executive education courses (DBS, 2019). DBS Library homepage features a discovery search interface that provides users with access to two options: to comprehensively search their print and e-book catalogue (Koha) or to search the EDS aggregate databases (DBS, 2019). DBS library, like others, have customised their right site menu (of the EDS results page) by placing a “discovery help guide”, an “Ask a Librarian” widget, RSS feeds and links to related content like YouTube and SlideShare. Off campus access to DBS library’s subscription services is provided through Shibboleth proxy login, via Ireland Edugate. DBS Librarians have
also uploaded subject-specific research guides onto the library website, which provide users with tailored research recommendations and a list of specialized databases. As Gross & Sheridan (2010) state, the aim of these services is to enable smooth navigation to information retrieval, relieve user frustration and maximize resource usage (p. 237).

The most relevant literature to this study are the case studies of academic libraries that have evaluated discovery services by conducting usability studies with their patrons (Asher et al, 2013; Deodato et al 2016; Fagan et al, 2012; Perrin et al, 2014; Johnson, 2013). The data collected from this particular research builds on their findings, by providing rich detail about how students are interacting with DBS Library’s discovery services, and revealing their user behaviour, which is central to usability studies (Fagan et al, 2012; Krug, 2000; Perrin et al, 2014).

1.6.4 Local Customization of Discovery Search Interfaces

Since discovery interfaces are the gateway for users to access an academic library’s online services, there is a tremendous need for them to be accessible and easy to navigate, in order to improve retrievability and findability for users (Bossaller & Sandy, 2017; Fagan et al, 2012; Perrin et al, 2014; Johnson, 2013). Furthermore, configuration and local customization options may help libraries tailor their services to the needs of their users (Deodato et al, 2016, p. 183). This could be in the form of adjusting default parameters, which is discussed by the System Librarian in the interview of this study (Asher et al, 2013, p. 473).

1.7 Challenges of UX and Designing Discovery Services

1.7.1 Impossible to Design for Everyone

It must be stated that academic library users are not a homogenous group; they have complex information needs and interact with online systems in different ways (Fidel, 2000, p. 79). This in turn is influenced by their individual skills, backgrounds, and education experience (Fagan et al, 2012; Fidel, 2000; Johnson, 2013). It is worth also mentioning that each information-seeking behaviour relies on specific tools to succeed (Laja, 2018). This is illustrated by the variety of behavioural responses elicited by the participants of this study. Furthermore, the findings indicate that participants speak all different native languages, are
of different ages, and without a doubt, displayed vastly different search habits and logic patterns.

The literature indicates that it is therefore, extremely challenging to design services that consider everyone’s abilities and circumstances (Datig, 2015, p. 241; Deodato et al, 2016, p.283; Fidel, 2000, p. 86; Macdonald, 2017. P. 210). However, Macdonald (2017) states that a few model users often suffice for library UX researchers to evaluate online search systems and discover the major issues that affect most users. This point is also supported by Nielsen (2012b), who makes the case that after five users, the maximum cost-benefit ratio of a usability test is achieved. This rationale was adopted for this study with 10 participants in total for the usability tests; comprising 5 undergraduates and 5 postgraduates.

1.7.2 Subjective User Feedback

Besides the challenges of trying to design for all users, UX studies do present a share of issues and concerns. For example, user feedback may be unrealistic in some cases because they reflect what patrons perceive, which may not, as Fidel (2000) puts it, be an “accurate picture of reality” (p. 86). Furthermore, the testing and outcomes are inherently subjective, because UX “exists in the mind of the user, not in the object” (Araz, 2018). Users each have their own contexts that affect their interaction with the object, and those contexts can vary even from day to day. Completing a particular task at a particular time compared to another may result in different outcomes. In addition, the outcomes that arise from usability testing do not always provide workable results for institutions (Becher & Schmidt, 2011, p. 210). In Becher & Schmidt’s (2011) case, product preferences of participants were driven by the discovery’s interface more than the content it provided them or its functionality, which doesn’t help the institution or vendor in attempting to improve the search capabilities (p. 210).

1.8 Student Search Behaviour

Findings from usability studies conducted in various academic institutions have reported that despite the rationale of implementing discovery tools to make searching easier for users, students still struggle with their interfaces -- they consider them to be complex and overwhelming, find the terminology to be complicated, and they still prefer
the simplicity of search engines like Google (Becker & Yannotta 2013 p. 7; Deodato, 2016, p. 187; Fagan et al, 2012, p. 101; Gross & Sheridan 2010 p. 237; Johnson, 2013, p. 60; Silipigni-Connaway & Dickey, 2010; Perrin et al, 2014, p. 66). This is even reflected in users’ search behaviour, with many relying on basic keyword searching, rarely modifying their default settings, using Boolean logic or advanced operators or even going beyond the first page of results (Asher et al, 2013; Deodato et al, 2016, p. 186; Johnson, 2013, p. 62).

Furthermore, there is a criticism of discovery tools that in blending different types of information under one umbrella, novice users may actually be ill-equipped at telling them apart (Deodato, 2016, p. 187). Fagan et al (2012) report that their users seemed unable to distinguish which information needs are suited to a discovery tool versus the catalogue or subject specific databases (Fagan et al, 2012, p.100). Users seemed overwhelmed by the myriad of options available within advanced search (Gross & Sheridan, 2010, p. 237; Becker & Yannotta, 2013, p. 7; Fagan et al, 2015; Johnson, 2013, Perrin et al, 2014). Perrin et al’s (2014) report that the majority of their users would actually be happier with a discovery search tool that had less capability and simpler options (p. 66).

This research project generally shares many of the same findings about user behaviour. All participants experienced some form of difficulty with at least one of the tasks and they constructed their queries and interacted with the discovery interface in various ways. Assistance was provided to all participants for a range of issues – such as understanding library terminology and/or locating/applying advanced features like filters, sorting and limiters.

1.9 Potential Rationales for Student Search Behaviour

1.9.1 Habitual Use of Google

In the literature, student search behaviour is often attributed to the habitual use of popular search engines like Google (Asher et al, 2013; Deodato, 2016, p. 186; Datig, 2015; Meadow & Meadow, 2012, p. 163). Silipigni-Connaway & Dickey, (2010) reported that search engines are the primary source that students choose to begin an information search (p. 6). Searching for scholarly literature changed significantly with the advent of Google Scholar, permitting search across many disciplines and sources (Asher et al, 2013, p. 465; Meadow & Meadow, 2012, p. 163). Google does not require precise queries, is quite
forgiving of errors and its relevancy ranking is able to process multiple string queries, which is not often not possible in an academic library’s discovery services (Deodato, 2016. p. 186). Google’s influence is so pervasive and ubiquitous, that users have come to expect their library search tools to be as intuitive and easy to navigate (Lanclos, 2016; Asher et al, 2013, p. 472). Users “satisfice” when they read their results; they choose the first reasonable option, which may not necessarily be the best fit for their information need (Meadow & Meadow, 2012, p. 163). It is also reported that users tend to rely on their library search engine to determine the quality of resources for them, as they would commonly do with Google (Deodato, 2016, p 187). They expect the most useful results to be displayed on the first page and “put their faith in the ranking algorithm” (Asher et al, 2013, p. 475; Deodato, 2016, p 187). Most notably, the research findings from this project supports Asher et al’s (2013) statement that users “treat every search box like a Google search box” (p. 473). The literature also mentions that by using a single search box, it may create expectations for users when they search library resources (Meadow & Meadow, 2012, p. 163). Interestingly, some literature criticises discovery interfaces by saying that the single search box may actually mislead users more, as they falsely assume that the library search functions like Google (Deodato, 2016, p. 186; Meadow & Meadow, 2012, p. 163).

1.9.2 Users Navigate Online Resources (Largely) Solo

In addition to the effect of Google on user behaviour, academic library users are also navigating online resources largely on their own; and no longer need a librarian to mediate (Fidel, 2000, p. 81; Datig, 2015, p. 237). Reassuringly, as the System Librarian mentions, despite information retrieval being performed directly by users, and libraries no longer having the monopolisation over content, there is still a role for librarians to play; in teaching web navigation and critical thinking skills to users. They have a tremendous responsibility to ensure their advanced search interfaces meet their users’ expectations and are as intuitive and uncomplicated as possible (Fidel, 2000, p. 81). Indeed, the pervasiveness of internet technologies has made library websites critical access points to all online information resources (Yoon, Hulscher & Dols, 2016; Gross & Sheridan 2010).

1.9.3 Complex Terminology: Library Websites are Designed for Expert Users

There is a call in the literature to demystify library terminology as a way of improving the user experience and simplifying library websites (Lanclos, 2016, p. 28). Words like “call
number” “academic source” “peer reviewed” are jargon that librarians are well versed in, however students may not be. Are they expected to know them? Are librarians dumbing down the search process by simplifying their language? That is a different discussion of academic expectations. The findings of this research support the claim that the information on many library websites has been organised according to principles that are likely to be unfamiliar to non-experts (Kim Wu & Lanclos, 2016). With library websites being designed by librarians (including DBS), Gross and Sheridan (2010) may be correct in saying that user behaviour is not always factored in (p. 237). Lanclos (2016) continues with this idea, describing how libraries need to take the risk of ‘de-centring their expertise’ – to allow people who are not librarians ‘to speak to what libraries mean for them,’ independent of institutional intentions (p. 26). After all, most library users are not expert searchers (Deodato et al, 2016, p. 186). Borg & Reidsma (2016) further support this by saying that library websites and discovery tools are for students, not information professionals (p.44). Ultimately, if patrons cannot work out how to access and navigate a resource like EDS, it does not matter the cost the librarian paid for the peer-reviewed journal access; they will not be used (Lanclos, 2016).

1.10 A Responsibility to be Accessible to Users

Consequently, academic libraries have a responsibility to make their online services as accessible as possible (Gross & Sheridan, 2010, p. 237; Lanclos, p. 28; Becker & Yannotta, 2013, p. 7). This supports one of the founding usability principles which states that websites need to be as self-evident and self-explanatory as possible so as not to confuse or frustrate users (Krug, 2000; Nielsen 2012a). Indeed, the ease of use of a website is paramount to its success (Bossaller & Sandy, 2017; Fagan et al, 2012; Fidel, 2000; Gross & Sheridan 2010; Johnson, 2013; Perrin et al, 2014). Much research has been conducted on websites over the years indicating that bounce rates and search abandonment increase when the user experience of a website is poor (Laja, 2018).

1.10.1 The Need to Follow Information Architecture Principles

Simplifying and organizing a website in order to make it accessible involves following the key components of information architecture; which is reported to vastly improve a user’s online experience (Rosenfeld & Morville, 2015). The main difference between
information architecture and user experience is that the former concerns structure, while the later concerns emotion (Northcott, 2012). In order to make a system easy to use, knowledge of user emotions during usage is required (Northcott, 2012). Information architecture advocates claim that it is important for websites to be structured in obvious ways that guide users through a logical experience and flow, with clear navigation, engaging content and that they contain well organised and labelled information (Rosenfeld & Morville, 2015). In the case of labelling, terminology should be simplified, consistent and explicit about their purpose and the content they connect with (Laja, 2018; Rosenfeld & Morville, 2015). This effectively communicates the aboutness of both page and site content, and reduces user frustration and confusion (Rosenfeld & Morville, 2015). Findings from this research project suggest that that the current information architecture may not be as simple or as explicit as it maybe should be.

1.11 Information Literacy Instruction

Information literacy is best defined as a set of abilities requiring individuals to “recognize when information is needed, so that they can identify, locate, access, evaluate and effectively apply the needed information” (ALA, 2006). Information literacy forms the basis for lifelong learning, as it enables users to become self-directed and masters of information content (SCONUL, 2011). In our current environment of rapid technological change and proliferation of information resources, individuals are faced with diverse, abundant information choices and so information literacy skills have become essential in order to navigate them effectively and efficiently (SCONUL, 2011). When it comes to students, this means they need specific skills in order to find, retrieve and critically assess online academic content, either from within their library’s discovery services or on the Internet at large (Deodato et al, 2016, p. 189). Library instruction, therefore, plays an important role in improving student’s experience with discovery services, and it goes hand in hand with website architecture principles as the jargon informs the terminology used in the interface’s information organisation (Deodato et al, 2016, p. 189).

However, for other researchers, the results from their usability testing may not conclude that. For example, despite Foster & Macdonald’s (2013) users having some form of library instruction, they saw no increase in sophistication when it came to search query
construction or use of advanced discovery features (2013, p. 13). This may suggest that the system interface design itself caused more issues than the library terminology, for example. Furthermore, in Fagan et al’s (2012) study, 6 of 10 participants had no prior instruction in library skills, yet they were able to use the advanced search filters and limiters of EDS. Perhaps those interfaces were designed with users in mind and their features were more explicit and intuitive enough to use. It has been interesting to discover the differences and similarities between the participants of this research project, those in relation to information literacy among other variables.

### 1.12 Evaluation of Published Usability Studies

Amongst the UX research papers that have been published, there are several standout studies that employed usability studies to evaluate their library website’s discovery services (Asher et al 2013; Becker & Yannotta, 2013; Deodato et al, 2016; Fagan et al, 2012; Foster & Macdonald, 2013; Johnson, 2013; Perrin et al, 2014). They successfully assessed their users’ perceptions of the search interfaces and observed their interactions as they performed a range of tasks using them (Deodato et al, 2016; Fagan et al, 2012; Johnson, 2013; Perrin et al, 2014). EDS and Summon were the main discovery services investigated. A range of quantitative and qualitative data was collected from their participants; recording the time taken to complete the tasks, number of clicks and errors made, details of the errors as well as their search queries (Asher et al, 2013, p. 466). Furthermore, their logic patterns and search behaviour were documented using various software technologies.

Some studies administered their participants with a system usability scale survey after task completion to discover their users’ perceived satisfaction with the services (Fagan et al, 2012; Johnson, 2013; Perrin et al, 2014). Others performed A/B testing or compared multiple discovery platforms to determine which would be more suitable for their institution’s needs (Becher & Schmidt, 2011; Becker & Yannotta, 2013; Foster & Macdonald, 2013; Johnson, 2013). Some made subsequent changes to their services and then retested the participants, thereby performing iterative testing (Deodato et al, 2016). The researchers at Rutgers were able to collaborate with EBSCO to evaluate their user’s interactions with EDS (Deodato et al, 2016). Combined, these studies and their methodologies provided the inspiration and general idea for this usability study project.
Notable differences are that they administered more tasks to participants, they usually had a team of researchers (more than 1 person) that was able to accurately monitor their participants’ interactions, their usability sessions were much longer and they used recording software like Camtasia (Asher et al, 2013, p. 466; Becher & Schmidt 2011, p. 205; Deodato et al, p. 189; Fagan et al, 2012; Foster & Macdonald 2013, p. 7; Perrin et al, 2014). Furthermore, it is difficult to compare studies and findings because not all institutions have the same set ups for their discovery services. For example, the resources available via EDS depend on the type of subscription the library has, as well as the license agreements EBSCO has with its content providers at that time (Asher et al, 2013, p. 468). Differences in library collections may affect the outcomes of each study.

In their findings, they were able to uncover issues with their services. Recommendations and potential solutions for the issues largely fall into one of three categories; either changes needed to be made to the interface itself, or local customization was required to accommodate the particular needs of the institution’s users, or further user education was required to improve users’ knowledge of advanced database searching and library terminology (Deodato et al; 2016, p. 192). This categorisation proved applicable to the issues discovered in this study.

1.13 Lack of Published UX Library Research in Ireland

Most of the published UX library research has been conducted in the United Kingdom or United States. There is a noticeable lack of published UX library research in Ireland. Two published studies were found (Fitzgerald & Dunne, 2018; Hegarty & Wusteman, 2011). One looks at the usability of discovery services; specifically evaluating mobile EBSCOhost (Hegarty & Wusteman, 2011). However, the momentum may be gathering, as UX conferences are being regularly organised, and work is in the pipeline at various institutions (Connaughton, 2016). This study intends to fill the gap as well as respond to a call in the literature for more usability testing to be conducted and for discovery search interfaces to be further investigated (Bossaller & Sandy, 2017, p. 619; Deodato et al, 2016; Fagan et al, 2012; p. 105; Johnson, 2013, p. 62).
1.14 Conclusion

This introduction and literature review intended to demonstrate the value of UX studies to academic libraries and the usefulness of usability studies in aiding understanding of their patrons’ user experience of their physical and digital services. It is vital to an academic library’s success that they provide their patrons with access to sophisticated yet user-friendly discovery search functionality because it is the gateway they use to access their library’s online services (Datig, 2015, p. 237; Priestner & Borg, 2016). One must remember that discovery services are only useful when the users’ experience is positive, so evaluation and user feedback is crucial to their effectiveness and ongoing success (Gross & Sheridan, 2010, p. 238).

Hopefully, this research shines a light on the usability of DBS’s discovery services and that the findings reveal interesting, meaningful and contextual data about student search behaviour and their perceptions of the discovery services. This data can and should be shared among DBS library stakeholders, in order to improve service delivery to students. It is important to consider that many of the issues discovered can only be resolved by EBSCO; thus it is recommended that the findings be also shared with the vendor (Deodato et al, 2016). They are the ones that can make the most impactful changes and improvements to the interface and architecture, with the goal of improving user experience.

1.15 Research Aims

This research aims to:

- Discover how a sample of DBS undergraduate and postgraduate students (users) interact with the library’s discovery services by conducting usability testing;
- Compare users’ search behaviour with the perceptions of the System Librarian;
- Discover users’ perceptions of their interaction and level of satisfaction with the services by administering a System Usability Scale Survey;
- Provide baseline data required to measure the discovery services’ ISO usability attributes of efficiency, effectiveness and user satisfaction;
- Reveal the most prevalent errors and issues that users encounter and categorise their subsequent recommendations as “product enhancement;” “local customization” or “user education.”
Chapter 2: Research Methodology

2.1 Participants

2.1.1 Participants for Usability Testing

The total sample gathered for usability testing was 10 participants; 5 undergraduates and 5 postgraduates. 5 was considered a sufficient sample of each cohort, as the researcher followed Nielsen’s (2012b) recommendations which state that a sample of 5 is adequate in achieving the maximum cost-benefit ratio of a usability test. Figure 1 demonstrates this reasoning; indicating that after 5 users are tested, the likelihood of new issues being discovered diminishes.

![Figure 1](image_url)  

*Recommended Sample Size for Usability Testing (Nielsen, 2012b)*

Other case studies have used similar sample size; for example, Fagan et al (2012) recruited 10 participants. It is important to state that this sample is not intended to be representative or indicative of the entire DBS student population, however it does provide readers with a snapshot of current library users.

2.1.2 Recruitment of Usability Participants

Recruitment of participants and administration of the usability tests were first carried out at DBS Library (Aungier Street Campus). Initially, the goal was to focus on just one cohort of students (undergraduates), in order to explore whether the literature was still accurate.
about their search habits and behaviours. However it became apparent after the first 2 days at the Library that hardly any undergraduates were around. In addition to there being far more postgraduate students, they were also very willing to participate. Thus, the focus was shifted to allow for postgraduates.

Different days of the week and times of the day were chosen, to vary the selection pool as much as possible. The librarians offered to assist the researcher and had information sheets at hand about the study if they came to the desk. Those students that satisfied the basic criteria (were either an undergraduate or postgraduate student at DBS) and were willing to participate, were selected for the study, until the desired participant number was reached. This constitutes opportunity sampling, but because all participants were volunteers, it is not a statistically random sample. 5 postgraduates were obtained on site at the Library.

Although there appeared to be fewer undergraduates in the Library, there were still undergraduate courses in session. Thus, a different location was chosen – being the Castlehouse Campus, to increase recruitment chances. It was possible to approach 5 undergraduates after their classes at Castlehouse, and recruit them for participation.

It is worthwhile to state that the other case studies also recruited participants with varying demographics and characteristics. For example, different levels of library skills and experience, undergraduates and postgraduates, and from different majors (Fagan et al, 2012; Johnson, 2013; Perrin et al, 2014). Fagan et al (2012) and Johnson (2013), also included faculty members and student employees in their sampling. Their rationale being that the library website is used by a wide variety of users, that have varying perspectives, abilities and behaviours, and this should be reflected in the sampling. Thus, by recruiting both undergraduate and postgraduate students, the researcher has followed a similar rationale with this study, and has provided for more heterogeneity. One can therefore consider that this study appropriately follows on from the others.

2.1.3 Interviewee

The interview was conducted with the System Librarian (SL). The SL was selected because his role and responsibilities involve the technical configuration and maintenance of all library systems; including subscriptions, and hardware, for DBS Library. This meant he
could provide an accurate rationale for the configuration and search functionality of the discovery services and had knowledge of the user experience provided by the website.

2.2 Design

A mixed methods approach was taken for this project; with both quantitative and qualitative data collected in the usability studies, as well as a qualitative interview.

2.2.1 Usability Studies

It is well understood from the literature that the most useful method of evaluating a website is to conduct user testing through usability studies (Borg & Reidsma, 2016; Datig, 2015, p. 239; Lanclos, 2016; Deodato et al, 2016, p. 183; Gross & Sheridan 2010, p. 239). Usability studies fall under ethnographic research, and are an example of an exploratory correlational method, because the variables are not controlled; rather the users’ interaction are observed and recorded (Saunders & Lewis, 2015).

In usability testing, participants are asked to perform representative tasks using a particular website, application or system, their actions and behaviour are observed; what they do, their pathway taken, where they succeed, and where they face difficulties are noted (Gross & Sheridan, 2010, p. 239; Datig 2015, p. 239). This methodology is advantageous because it records events as they occur and does not have to rely on the user’s memory recall (Fidel, 2000, p. 96).

The intention of the usability study was to discover how users behave and interact with the discovery search interfaces (both catalogue and EDS). The research design was inspired by other case studies that took a similar approach, in collecting both quantitative and qualitative data (Fagan et al, 2012; Perrin et al, 2014; Johnson, 2013). Encouragingly, Borg and Reidsma (2016) claim that “all you really need is a computer and a willing patron” to conduct a usability study (p.43).

The usability test consisted of three search tasks. During each task, for each participant, the researcher recorded the following quantitative variables: time taken for task completion, number of clicks taken, and number of times errors that were made. A sample of the researcher’s page for recording participants’ results can be found in Appendix A. Errors were defined as either wrong turns, if assistance was required in order to continue, if
an incorrect answer was given, or if the required limiters were not applied. It is important to state that although quantitative data was collected, no hypothesis was in mind, rather, the data findings determined the outcomes; this data supports the other qualitative findings (Saunders and Lewis, 2015, p. 52). Furthermore, these measurements provide baseline data for assessing the ISO usability attributes of efficiency, effectiveness and satisfaction, as per the following rationale (ISO, 1998):

**Efficiency.**

Efficiency was measured by recording the number of clicks participants made during task completion and the time participants spent on each task. Time was started when participants began typing their query on the homepage; and stopped when they selected the desired book/article.

**Effectiveness.**

Effectiveness was measured by recording the number of errors participants made during task completion as well as the details of those errors. It was also measured by calculating the success rate of task completion for each participant. This calculation is explained in the analysis section.

**Satisfaction.**

Satisfaction was assessed by the qualitative System Usability Scale (SUS) Survey, administered to participants post usability testing. More information about the SUS is provided below. An overall average SUS score is calculated to determine user satisfaction.

**Participant comments.**

Recorded also were the researcher’s observations of the participants’ search behaviour and any comments they made after the testing session was complete.

**2.2.2 System Usability Scale (SUS)**

The SUS is a well-tested survey-framework that effectively gathers subjective feedback from participants about their interaction with a particular system or application (Brooke, 2013; Klug, 2017, Johnson, 2015, p. 65; Perrin et al, 2014, p. 59). It was developed by Brooke in 1986 and is one of the best known, standardized usability rating scales (Klug, 2017; Perrin et al, 2014, p. 59). It provides a very useful metric for overall system usability and user satisfaction (Bangor et al, 2008, p. 591).
When used in conjunction with findings from usability studies, SUS offers researchers easily communicable data that can be useful for stakeholder decision making about the user experience of systems (Fagan et al, 2012, Johnson, 2013, Klug, 2017, Perrin et al 2014). This provides the rationale for using SUS in this research project.

2.2.3 Interview

A semi-structured interview was conducted with the SL. This method was selected in order to allowed for the SL’s individual perspectives and perceptions to emerge. The purpose of the interview was to understand the configuration of the library homepage search box, and explore any perceptions the SL had about discovery services, as well as students and their search behaviour.

2.3 Materials

2.3.1 Pre-test Questionnaire

Prior to the usability testing, a pre-test questionnaire was administered to each participant. The questionnaire consisted of 9 short questions that explored basic background information about the participants as well as their library website usage, search behaviour and information literacy experience. Participants were required to answer the questionnaire verbally, while the researcher completed the form online using Google Docs.

The pre-test questionnaire was first trialled with a student and discussed with a librarian. It was important to pose the most accurate and interesting multiple choice options, in order to cross reference them as variables in the analysis stage.

Multiple choice options were given for 7 of the questions, with two questions requiring closed YES/NO response. Questions related to background information enquired about participants’ college level, major, age range, and whether or not their mother tongue was English.

Questions also related to library usage and behaviour, and enquired about the length of time participants spend on the library website per week, what their next step was if they could not find what they needed on the library website, whether they had any information literacy instruction, and in what format was that instruction. A copy of the full questionnaire can be found in Appendix B.
2.3.2 Task Sheet for Usability Studies

The 3 search tasks were presented to participants in paper form, on which they had to write their answers. 3 tasks were chosen, so as not to take too much of the participants’ time. The same tasks were given to each participant to allow for comparison and analysis.

The tasks ranged in difficulty, one being easier and introductory, another more taxing requiring the use of advanced search features, and the third being an optional “wild card.” Topics were selected to reflect potential interests and areas of study for students. The tasks are a blend of researcher-assigned and user-driven; and intended to address common patron requests. Assigned tasks (1 and 2) helped create a controlled environment, and the researcher was able to include different aspects of the discovery system (like filters, limiters and advanced features). The user-driven task (3) helped create a less artificial environment around the users. A copy of the task sheet is available in Appendix C.

Prior to sessions with participants, a trial session was first conducted with one of the librarians to gather feedback. This contributed to refinement of the tasks, in order to reduce complexity. A list of potential query results for task 2 can be found in Appendix D. All potential entries result in locating the desired article; providing that the correct limiters are selected and sorting has been set to Newest.

Task 1.

Task 1 required the participant to search for a particular book in the library catalogue using the discovery search box on the homepage. “Catalogue” option must be selected. Keywords provided were “small business management”; 9th Edition; and author “Norman Scarborough.” Participants were asked to identify the book’s title and call number. The purpose of this task was to understand how users completed a common task using the discovery interface (searching for a book) and allowed the researcher to determine whether they could complete the task and observe how they completed it. This task also helped familiarize participants with the discovery services.

Task 2.

Task 2 stepped up the difficulty level, asking participants to search for a particular journal article, by first selecting “Library Resources” on the discovery search box homepage, which opens EDS. Participants were given the topics social media and branding, and were
required to apply advanced search feature: specific limiters and facets like publisher, publication, and date of publication. This task aimed to determine whether the user could complete the task, and how they completed it. There are several ways to limit results in EDS, so this task also aimed to discover which limiters participants tried to use, how they accessed them, and which resulted in success or presented difficulty.

**Task 3.**

This task is the aforementioned user-driven “wild card” and was optional for participants to complete. It required participants to search for a topic of their own choosing. They were required to apply specific limiters to narrow their search in EDS in order to find a suitable journal article (e.g.: published within the last 5 years, by an academic journal). Essentially, this task looked at whether the participants were able to apply the skills learned from the task 2 to searching for their own topic. The task also aimed to discover if by having participants search for a topic that was relevant to them, they would be more motivated to engage with the results.

**2.3.3 System Usability Scale (SUS Survey)**

Participants were required to complete the SUS survey after their usability test. It was administered via Google Docs. The SUS consists of 10 general statements of which must participants must decide the extent to which they agree or disagree with (Brooke, 2013). A Likert scale is used with 5 responses ranging from “strongly agree” to “strongly disagree”

The statements are general and pertain to different characteristics of the application being evaluated. For example, participants need to think about the system’s level of complexity, consistency, ease of use, and their experience required to use it. A sample statement is, “I felt very confident using this system.” A copy of the SUS survey is available in Appendix E.

In Likert scales, it is common for participants to exhibit “central tendency bias” – a reluctance to select extremes in response categories (Lavrakas, 2008, p. 429). “Acquiescence bias” is another type of Likert scale bias, where participants select what they believe to be the “correct” answer instead of the most truthful answer (Lavrakas, 2008, p. 429). Statements in SUS alternate between positively and negatively worded items in order to avoid such types of response bias (Brooke, 2013, p. 34). Alternating the statements also
helps participants to think more carefully before declaring each answer (Brooke, 2013, p. 34).

The SUS is relatively simple to administer, score and understand the results (Johnson, 2015, p. 65). SUS scores are affected by the difficulty of the tasks that users perform before taking it and the complexity of the system itself (Klug, 2017, p. 2). A SUS score can range from 0-100. Although it isn’t a percentage, it is converted to a percentile to communicate easier to stakeholders (Klug, 2017). Summing SUS scores of all participants leads to a general measure of perceived usability and satisfaction, which assesses that same ISO attribute.

In order to calculate the score, for items 1, 3, 5, 7, and 9 (the positively worded statements) the score contribution is the Likert scale position minus 1 (Brooke, 2013, p. 35). For items 2, 4, 6, 8, and 10 (the negatively worded statements), the contribution is 5 minus the scale position. The sum of the scores are then multiplied by 2.5 to obtain the overall value of SUS (Brooke, 2013, p. 35).

A score above 80.3 is in the top percentile, whereas a score of 68 is industry average (Klug, 2017, p. 2). Understanding what constitutes an “acceptable score” is important for researchers and system stakeholders to make sense of their result (Bangor et al, 2008, p. 575). Bangor et al (2008) continue and say that “scores of less than 70 should be considered candidates for increased scrutiny” and “should be judged marginal at best” (p. 592).

2.3.4 Interview Questions

Questions for the semi-structured interview were pre-prepared and printed out by the researcher. Questions pertained to the development of the library homepage and discovery services, including EDS search functionality, as well as enquiring about the SL’s perceptions of user search behaviour, how users interact with the services, and their user experience of them. Question samples: “What objectives did you have in mind when developing the discovery interface?” and “Can you change the layout, navigation, or terminology of the discovery services?”

2.4 Apparatus

The usability studies required the use of a standard stopwatch to record the time. The researcher’s iPhone stopwatch function was used. A manual tally counter was required
to count the clicks. The counter is a standard handheld clicker, branded EZONTEQ. The usability studies required participants to use their own computer, writing their answers down on paper answer sheets. Time recorded, clicks and errors counted, general observations and details of errors were noted by the researcher using pen and paper. The researcher’s laptop was used to record the responses to the SUS and pre-test questionnaire. No other recording devices were used, mainly to reduce ethical concerns, and to provide as natural an environment as possible to the participants.

The interview required the use of a recording device for the purposes of transcription and thematic analysis. A recording app (“Recorder”) on the researcher’s iPhone was used, with the researcher’s laptop also functioning as a recording device as a backup / failsafe.

2.5 Data Collection Procedures

2.5.1 Usability Testing

Usability testing sessions with participants were conducted one by one, on different days of the week, at different times of the day, between the 28th June and 5th July 2019. They were conducted face to face either in the Library or at the Castlehouse campus. It was important that all participants completed the test in their own, natural study environment. Permission was obtained from the Library staff beforehand to use their premises. A private study room was reserved at the Library in order to carry out the tests without distracting other students.

Prior to commencing the usability test, the researcher first presented the participant with the information sheet, explaining the purpose of the research, and obtained their written consent. The pre-test questionnaire was then completed by the participant. Following the questionnaire, the participant was provided with the task sheet, and was invited to answer the 3 tasks using their own computer to perform the searches. During each task, the researcher recorded the time, clicks and errors, and jotted down any observations, or comments that the participants made. Interference from the researcher was kept to a minimum, so as not to compromise the quantitative data measuring, unless the participant verbally requested assistance. After completing the tasks, the participant was invited to complete the SUS survey.
From start to finish, each session with a participant (explaining the instructions, reading and completing the consent form, the pre-test questionnaire, completing the 3 tasks plus the SUS survey) took approximately 20 minutes.

2.5.2 Interview

The interview with the SL was conducted face to face at the SL’s office in the Library, on the 28th June 2019. This was conducted prior to starting the usability study, and lasted approximately 51 minutes. Recording commenced once the set up was ready, and the interviewee read and signed their information sheet and consent form.

2.6 Research Ethics

It is well documented in the literature that UX research, particularly usability studies, can raise ethical concerns (Asher & Miller, 2011, p. 16). This research was simplified in its design and strategy in order to reduce such concerns. The official DBS ethics information form used to gain approval for this research back in April 2019 is available in Appendix F.

2.6.1 Compensation

Most students go to the library to study in a quiet place and prefer not to be disturbed. In order to increase the rate of participation, participants were offered compensation for their time and the inconvenience/disruption caused. Five Euro café vouchers were given to all participants. It was determined that there was minimal risk associated with participating in this research. Furthermore, it appears that it is extremely common for UX researchers to offer compensation to their participants; since recruitment is known to be otherwise difficult for UX studies (Borg & Reidsma, 2016, p. 43).

2.6.2 Consent and Anonymity

All participants confirmed they were over the age of 18. Participants in the usability studies have been anonymised; and only basic background information was collected from the pre-test questions; no personally-identifiable information has been collected. The interviewee is referred to as the Systems Librarian (SL) in this research paper, and the names of persons mentioned by him have been redacted in the transcription to ensure anonymity. Information sheets and consent forms were distributed and completed prior to commencement of both interview and usability studies, to ensure participants were aware
of the researcher’s intentions and their rights. A copy of this form is available in Appendix G. All signed consent forms have been scanned and are available in the separate data attachment. Data has been confidentially maintained as per the form’s ethics guidelines.

2.6.3 Minimal Observation

Although the usability studies involved the observation of participants, recording devices were not required, other than the counter and stopwatch. Qualitative observations were taken down as notes. Besides the ethical concerns associated with using video recording equipment, it is documented in the literature that they may also compromise the participants’ responses – because the conditions are artificial; and being recorded and observed may affect the participants’ behaviour and subsequently, their results (Foster & Macdonald, 2013, p. 11; Nielsen, 2005). Thus it was the researcher’s intention to keep the participants’ environment as natural as possible to improve the accuracy of the responses and reduce ethical concerns.

2.7 Data Analysis

2.7.1 Descriptive and Inferential Statistics

Due to the small sample size and relatively simple data collected, Microsoft Excel was selected to perform data analysis which consisted of descriptive and basic inferential statistics. The pretest questionnaire, SUS survey and quantitative usability completion data were inputted and organized into a master table which was then used as the basis for all analysis. This Excel document with all data, graphical representations and statistical calculations can be found in the separate data attachment.

Descriptive statistics cross-referenced qualitative responses to the pre-test survey with SUS survey responses, and the usability data (time taken to complete a task, number of clicks and error count) using pivot tables. The researcher intended to identify any trends or similarities between variables.

Statistical analysis was primarily performed on time taken to complete tasks 1 and 2 which were both mandatory and standardized tasks for all participants. Since the third task was a wildcard, non-standardized, and user-driven, it was primarily used for qualitative exploration.
Two tailed independent t-test were performed on time taken to complete tasks 1 and 2 across several different categories namely, information literacy instruction, university level and native language English (yes or no). An independent t-test checks whether there is a statistically meaningful difference between the two groups’ average times taken to complete a task or whether the difference is purely due to chance.

**2.7.2 Success Rate Calculation**

In order to remove any bias from an arbitrary grade assigned by the researcher, a relative success rating was computed for each task for each participant, determining whether they completed the tasks with Ease, Moderate Difficulty or High Difficulty.

The logic was to allocate 1 point for performing tasks in better than average time, better than median clicks and better than or equal to median errors. Due to the continuous nature of the time variable, the participants were compared to the average, while due to the discrete nature of clicks and errors, the participants were compared against the nearest lowest rounded down median.

The rating was assigned as follows: Score of 3 indicates that the participant was better than the sample average on the given task on all three measured variables and thus completed the task with ease. Additional allowance was given for scoring below average on one of the three metrics with a total score of two still qualifying as completing the task with ease. A score of 1 indicates moderate difficulty, while a score of 0 indicates the participant was below average across all measured metrics and therefore was assigned a difficult success rating. For task 3, this score is meaningless since their query was user-driven and not researcher assigned. Thus, they would vary in complexity.

**2.7.3 Thematic Analysis of the Interview**

The interview with the SL was transcribed from the recording into Microsoft Word. The recording and a copy of the transcript can be found in the separate data attachment. The transcription was uploaded to Nvivo software for thematic analysis. This method was chosen because thematic analysis offers a structured yet flexible process of handling qualitative data (Braun & Clarke, 2006, p. 78; Maguire & Delahunt, 2017, p.3). It is flexible because it can be used within different frameworks; which supports the mixed methods approach of this study (Braun & Clarke, 2006, p. 81).
The process of thematic analysis, according to Braun & Clarke (2006), involves the researcher actively selecting the most prevalent and important or interesting points of the data and grouping them together according to patterns that support or address the research topic and researcher’s aims (p. 82). These patterns become themes that allow the researcher to not only describe the data but also interpret the different facets of the topic (Braun & Clarke, 2006, p. 79).

The thematic analysis conducted for this research project took a mixed approach. Some themes required the researcher to be more semantic and deductive, as they are descriptive, for example, those offering a background explanation of the library homepage set up, and the explanation of discovery services (Braun & Clarke, 2006, p. 84).

However, a more data-driven and inductive approach was required to interpret the SL’s perceptions of user search behaviour, user experience and opinion of EDS, and the value of information literacy. The interviewee often spoken tangentially around these topics, which required latent interpretation to bring together the ideas required for the researcher’s aims (Braun & Clarke, 2006, p. 83).

The six-phased framework outlined by Braun & Clarke (2006) was followed, which involved first becoming familiar with the data, generating initial codes, searching for themes, reviewing the themes, defining the themes and finally writing (p. 87).

Initially, snippets of the interview were grouped under broad codes in order to become familiar with the data. These initial codes helped to put together an idea of the main overarching subjects the SL discussed. For example, his role as SL, homepage set up, EBSCO and EDS, opinion of users, information literacy, and library trends and future. Not all of the initial subject code were retained, since some of them were considered irrelevant to the research aims of this study. For example, the SL’s role and responsibilities do not pertain to the aim of understanding his perceptions of users. Similarly, although the SL discusses Libguides at length and this set up does affect user experience of some areas of the library website, it does not affect users’ interactions with the discovery homepage or EDS advanced search.

The codes were then reviewed in light of the research aims, and the points the SL mentioned that supported them or helped the researcher understand them better were
selected to form the themes. They were also refined where necessary. For example, EBSCO and EDS was split into advantages and disadvantages that effect user experience. The rationale for this is that the SL demonstrates his understanding of user experience by explaining the features of EDS and how they negatively or positively affect users.

The writing stage of the analysis involved choosing the most relevant quotations that supported the themes and thereby supported the researcher’s intentions. For example, one of the research aims is to understand the SL’s perceptions of student behaviour. Therefore, quotes that discuss how students search or interact with discovery and EDS are included in the theme “perceptions of student search behaviour.” This meant that the SL’s quotes about how Google has influenced students search capabilities and his opinions of postgraduates versus undergraduates were noted here.
Chapter 3 : Results

This section will show the results of the quantitative and qualitative data collected during the usability study, in light of the ISO attributes and SUS Scores and the participant success rates. Usability data has been correlated with certain questionnaire responses, using t-tests. Descriptions of the errors and observations made during testing and their recommendation categorisation are given. Lastly, the thematic analysis of the interview with the System Librarian, whose statements lend support to many of the usability findings and observations of participants.

3.1 Pre-test Questionnaire Responses

Responses to the pre-test questionnaire enabled comparisons to be made between the individuals participating in this study. It was interesting to compare their responses with usability data; specifically looking at their completion time with course type, information literacy instruction and native versus nonnative English speakers.

3.1.1 Diversity

As illustrated in Figure 2, demographics were fairly well balanced with an even split between undergraduate and postgraduate students across four courses namely: Business / Management (40%), IT (20%), Marketing (20%), and Psychology (10%). Half of the respondents were in the 22-25 age group, 20% were 26-29 age group, another 20% were over 34 years old, while only 10% were in the 18-22 age group. Only 20% of respondents were native English speakers with the remaining 80% represented by nonnatives.

This reflects reasonable diversity across the courses offered by DBS, and indicates that they have different information seeking needs. One should bear in mind that not all courses are in session at the time of usability testing (June-July).

Since the sample was evenly split between undergraduates and postgraduates, it was interesting to compare the two groups to investigate whether there was a significant difference between their completion time.
Figure 2

**Course of Study**
- Psychology: 10%
- Business / Management: 40%
- Marketing: 30%
- I.T: 20%

**Age Group**
- 22-25 years: 50%
- 26-29 years: 20%
- 34+ years: 20%
- 18-21 years: 10%

**Primary Language**
- Native English Speakers: 80%
- Nonnative English Speakers: 20%

Participant Demographics

Table 1 below shows group summary statistics as well as independent t-test analysis. With p values well above the 5% alpha confidence interval, there is no difference between the two user groups in terms of time taken to complete the tasks. The same analysis was also conducted to check whether English as a primary language was a significant advantage when completing the tasks. This yielded similar results, indicating that the native and non-native English speakers are not statistically different groups. A table illustrating this is available in Appendix H.

**Table 1 Average Time and Standard Deviation for Tasks 1 and 2 by University Level**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>t</th>
<th>df</th>
<th>p (Two tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time - Tasks 1&amp;2</td>
<td>Postgraduates</td>
<td>208.00</td>
<td>134.18</td>
<td>0.28</td>
<td>18</td>
<td>.782</td>
</tr>
<tr>
<td></td>
<td>Undergraduates</td>
<td>192.10</td>
<td>118.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time - Task 1</td>
<td>Postgraduates</td>
<td>90.40</td>
<td>38.39</td>
<td>-0.01</td>
<td>8</td>
<td>.496</td>
</tr>
<tr>
<td></td>
<td>Undergraduates</td>
<td>90.60</td>
<td>19.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time - Task 2</td>
<td>Postgraduates</td>
<td>325.60</td>
<td>66.80</td>
<td>0.71</td>
<td>8</td>
<td>.249</td>
</tr>
<tr>
<td></td>
<td>Undergraduates</td>
<td>293.60</td>
<td>75.57</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.1.2 Information Literacy

2 of the 10 participants stated they did not receive any form of information literacy instruction. Interestingly, both students were Postgraduate. In order to determine if there was a relationship between information literacy and speed of task completion, a third t-test was performed to measure both populations and determine if the difference was statistically significant.

All p-values are greater than 0.05; thus, with a 95% confidence interval, one cannot say that a significant difference exists between the two samples. In conclusion, there is no relationship between information literacy and speed of task completion. Appendix H also illustrates these findings.

3.1.3 Information Literacy Format

Of the 8 participants who stated they received instruction, 6 reported that a Librarian came to one of their classes (5 undergraduates, 1 postgraduate), 1 signed up for a Library workshop (postgraduate), and 1 remembered that some Library skills were covered at Induction (postgraduate). Perhaps the most impactful instruction for students has been the classes that are embedded in the modules, and if further training is needed, it should be taught in that format over the others.

3.1.4 Library Website Usage and Google Scholar Preference

Most of the participants (60%) stated they spent between 1-5 hours per week on the Library website. All of the undergraduates reported they spent less than 5 hours per week. Postgraduate ranged across the 3 options; with 3 of the 5 spending 1-5 hours, 1 spending less than 1 hour, and 1 spending more than 5 hours. Judging by their interactions and overall unfamiliarity with the EDS discovery search features, this sounds accurate.

Undergraduates (first year) were the group identified to most likely use the library website less than 1 hour per week - this can perhaps be attributed to lower academic research expectations and requirements for first year coursework.

60% of the participants stated they would consult Google Scholar or similar if they were unable to find what they were looking for on the DBS Library website, indicating their familiarity with using Google to conduct academic searches. This is illustrated in figure 3.
below. Interestingly, most of the postgraduates (3 of the 5) chose this option. Indeed, more students chose that option over consulting a librarian. No-one opted for online chat.

Figure 3

Next Step Taken by Participants if they are Unable to Locate their Desired Source on the DBS Library Site

3.2 Usability Data Results for Measuring ISO Attributes

The time, errors and clicks were recorded in order to be used as a baseline to measure the ISO attributes of efficiency, effectiveness and user satisfaction of the institution’s discovery services. These numbers whilst arbitrary now, will be more useful when future testing is conducted.

3.2.1 Task Completion and Errors: Efficiency & Effectiveness

The researcher’s recorded results as well as participants’ answer sheets (digitized forms) are available in the separate data attachment. The data has been tabulated in the excel file. Participants completed task 1 in an average time of 90.5 seconds with a standard deviation of 28.56 seconds. On average it took the participants 4.2 clicks to complete the task and average of 1.4 errors, although two participants completed the task with no errors. The slowest and the fastest participants happened to be 2 native English speakers.

Task 2 was more complex than task 1 resulting in participants taking significantly longer to complete and with a larger standard deviation. It took participants on average 309.6 seconds to complete task two with a standard deviation of 69.32 seconds. Task 2 also
took a higher number of clicks with an average of 12.8 clicks, since the task required facets and limiters to be opened and checked. This has a standard deviation of 2.2. There were also more errors made in task 2, with all participants requiring assistance at some point. The average error was 4.3 with a standard deviation of 1.42. Although the absolute value of clicks and errors was higher for task 2, the ratio of errors per click was on average the same for both tasks – 0.33 for task 1 and 0.34 for task 2. Table 2 below illustrates the average time, errors and clicks for each task, and includes standard deviation and ratios of errors per click.

For task 3, since it was user-driven, the time and clicks are not as interesting because the rationale for this task was to discover if participants improved their search skills with practice and if they engaged more with the result because the query was their own. They cannot be statistically compared, because all participants entered different queries. A list of the queries they entered and the articles they chose can be found in Appendix I. 70% of participants opted to complete task 3 and on average completed the task in 118.71 seconds with a standard deviation of 40.13, reflecting a lower general complexity than task 2. Similarly, their search took an average of 5.14 clicks to complete and 3 out of 7 participants completed the task with no errors, resulting in an average error rate of 0.57.

Table 2 Average Time, Clicks and Errors for Each Task Including Standard Deviation and Ratios of Errors per Click

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time (sec)</td>
<td>90.50</td>
<td>28.56</td>
</tr>
<tr>
<td>Clicks</td>
<td>4.20</td>
<td>1.03</td>
</tr>
<tr>
<td>Errors</td>
<td>1.40</td>
<td>1.17</td>
</tr>
<tr>
<td>Errors/Click</td>
<td>0.33</td>
<td>0.26</td>
</tr>
<tr>
<td><strong>Task 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time (sec)</td>
<td>309.60</td>
<td>69.32</td>
</tr>
<tr>
<td>Clicks</td>
<td>12.80</td>
<td>2.20</td>
</tr>
<tr>
<td>Errors</td>
<td>4.30</td>
<td>1.42</td>
</tr>
<tr>
<td>Errors/Click</td>
<td>0.34</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Task 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time (sec)</td>
<td>118.71</td>
<td>40.13</td>
</tr>
<tr>
<td>Clicks</td>
<td>5.14</td>
<td>1.46</td>
</tr>
<tr>
<td>Errors</td>
<td>0.57</td>
<td>0.53</td>
</tr>
<tr>
<td>Errors/Click</td>
<td>0.11</td>
<td>0.11</td>
</tr>
</tbody>
</table>
3.2.2 SUS Survey: User Satisfaction

Regarding the attribute of user satisfaction, the average SUS score awarded was 61.75 which is below the industry average of 68, but is still considered “marginally acceptable” according to Bangor et al’s (2008) descriptive scale (p. 592). The system therefore requires “continued improvement” since participants were not totally satisfied with their interaction (Bangor et al, 2008, p. 592). The median and mode SUS scores were slightly higher at 65 and 67.5 respectively. The lowest score was 37.5 and the highest score was 77.5.

It must be stated that in such a relatively small sample like this, the SUS results do not imply a scientifically valid statistical measurement. Like the usability data, the SUS score will have more meaning once the necessary changes have been implemented and a second round of testing has been performed.

A few interesting trends were noticed in the SUS results. The average SUS scores increasing by age group, with the oldest user group scoring significantly higher than youngest. This is illustrated in Figure 4. The same was also true when looking at the average SUS by university level with first year undergraduate students giving the system the lowest score, third year undergraduates students gave on average a marginally higher SUS, while the postgraduate students gave a substantially higher SUS scores than the two undergraduate groups. Perhaps postgraduates have more previous experience with similar or discovery systems, or they spent more time using those systems.

Surprisingly, those without information literacy instruction on average, rated the system higher, with an average SUS of 65, than those with information literacy training whose average SUS was only 60.94. Those who spent less than 1 hour per week on the library website on average rated the system lower than those who spent 1-5 hours and those who spent more than 5 hours per week. Perhaps they were more frustrated because they had less experience using the features.
3.3 Success Rate

The success rate enables comparisons to be made between the tasks and the participant data. Success rates calculations developed 3 categories; With Ease, Moderate Difficulty and High Difficulty. Most participants completed Tasks 1 and 3 with Ease. Task 2 was the most challenging, with most participants completing it with either Moderate or High Difficulty. It does not seem to make a difference whether the participant’s native language was English or not; since of the 2 native English speakers, 1 completed it with Ease and 1 completed it with High Difficulty, similar to their completion time results. Table 3 summarizes the success rate for each participant and each task.

3.4 Errors and their Categorization

As previously stated, all participants required assistance at some stage to complete the tasks, and it was observed that most participants made the same errors, indicating strong need for updates and changes to be made to the EDS system, as well as for user education and local customization, depending on the error type. Appendix J lists the errors and observations for each task and participant. The categorization of the most prevalent errors according to their recommendations can be found in Appendix K.
Table 3 Participant Success Rate by Task

<table>
<thead>
<tr>
<th>Variables</th>
<th>Task</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Easy</td>
<td>Difficult</td>
<td>Easy</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Difficult</td>
<td>Moderate</td>
<td>Easy</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Easy</td>
<td>Moderate</td>
<td>Difficult</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Easy</td>
<td>Easy</td>
<td>Difficult</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Difficult</td>
<td>Moderate</td>
<td>Easy</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Difficult</td>
<td>Difficult</td>
<td>Easy</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Easy</td>
<td>Easy</td>
<td>not completed</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Easy</td>
<td>Moderate</td>
<td>not completed</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Easy</td>
<td>Difficult</td>
<td>Difficult</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Moderate</td>
<td>Moderate</td>
<td>not completed</td>
<td></td>
</tr>
</tbody>
</table>

3.4.1 Task 1 Errors

The most common error recorded for this task was that participants tried to search for the book in “library resources” and did not select “catalogue” in the homepage discovery search box (6 out of 10 participants). This is an error of terminology and library jargon, which can be easily customized since the homepage is managed by DBS Library. A screenshot of the homepage discovery search box is available in Appendix L.

Furthermore, 3 participants did not know what a call number was. All 3 of those participants stated they had received some form of information literacy instruction. This perhaps indicates that their instruction may not have covered the necessary library jargon, and that more user education is needed.

Another error example for task 1 was when a participant tried to enter all known information from the task description into the discovery search box in one go (author, topic, and edition number), which then yielded no results. Whilst doing this in Google will yield users’ results, Koha Catalogue appears more sensitive with its relevance ranking and keyword proximity. This indicates perhaps an update is needed to their relevance ranking to improve findability for users. In addition, participants may need more education on search query construction. Figure 5 illustrates the errors and number of occurrences for task 1.
3.4.2 Task 2 Errors

Participants encountered issues locating all of the required limiters in the task 2 description except for peer reviewed. Locating the sort feature proved to be the most challenging, with 9 out of 10 participants failing to locate it at the top of the EDS results page. A screenshot of the page showing sorting feature is available in Appendix M. The errors and number of occurrences for task 2 are illustrated in figure 6.

Locating the correct publisher and journal title within facets were the next most difficult tasks. Participants appeared confused by the advanced windows, and struggled to distinguish terms “source type,” “publication” and “publisher.”

Yet again, participants were confused about the options on the homepage search box window, and several did not switch to “library resources,” attempting to search for a journal article in the “catalogue.”

A potential flaw in the EDS advanced search “publisher” and “publication” windows caused grievances and frustration to users. The sorting options do not make it obvious to users that alphabetization is possible. The default setting is “Hit Count” and sorting alphabetically is available on the left by clicking “Name.” Since this was not explicit, participants wasted time scrolling through the listing in order to find the required publisher and/or publication. This is illustrated in Appendix N, which shows screenshots of the
publisher windows. This perhaps indicates that the labelling was not clear enough to participants about the functionality of this feature; as there is no mention of “Sorting;” therefore requiring EDS product enhancement.

Figure 6

Errors and Number of Occurrences for Task 2

3.4.3 Other Observations for Task 2

Various search behaviors were observed for Task 2. 90% of the participants searched for social media and branding without any quotation marks, and did not augment their search query once EDS opened, using Boolean logic, etc. All but one participant entered the terms all in one field. This may indicate that they are either unaware of what Boolean logic is, or that they can enter additional information, or that they are more used to searching without them (for example, due to frequently using Google). This may indicate that more user education is needed to improve search query construction.

Another interesting search behavior was observing one participant attempting to locate the limiters by keyword using the find function shortcut (CTRL + F). They appeared unwilling to scroll or study the sections of the EDS results page. Perhaps they felt under pressure because they were timed; however it appeared as normal behavior.
An interesting system error occurred for several participants. The required publication (*Journal of International Marketing*) was not appearing in the EDS advanced search windows until after participants entered the date in the left window. This is illustrated in Appendix O – which shows screenshots of the same list of publications before and after the date was entered.

A different system issue that several participants encountered was difficulty moving the date slider; it often got stuck, causing frustration, and participants were unaware they could manually type in the date above. Such system design issues indicate a strong need for EDS product enhancement in order to improve the advanced search features of the results page.

### 3.4.4 Task 3 Errors

Apart from more date slider issues, participants encountered far fewer errors whilst completing task 3 compared to the other tasks. Although it was user-driven and they chose their own search query, they were required to apply certain limiters and filters similar to task 2. For example, publication date, source, peer reviewed, full text and available in library collection. Thus, their results may indicate that they learned skills in task 2 and were able to apply them. It also may indicate that they prefer to engage with user-driven queries over researcher-assigned ones.

### 3.5 Informal Feedback From Participants

After usability testing was complete, some participants gave informal feedback. 4 participants admitted that they were inexperienced using the Library’s discovery services and advanced features. 3 participants commented that they found the EDS options and features easier to use after practicing on the other tasks. 1 participant commented it was their first time using EDS (they were a first year undergraduate). Perhaps most notably, was the postgraduate who remarked, “I am a novice at this... I don’t use the library website; I use Google” (Participant 9, Appendix J).

### 3.6 Thematic Analysis of Interview

As previously stated in the Analysis section of the Methodology, the themes were refined from initial overarching subjects into more specific points that support the
researcher’s aims; which constitutes steps 2-5 of Braun & Clarke’s (2006) thematic analysis process (p. 87). Therefore, only the most relevant and refined codes, themes and quotes have been retained here. A transcript of the recording is available in the separate data attachment. It is page numbered 1-11 to which the following page numbers reference. A copy of the transcript can be found in Appendix P.

3.6.1 Perceived User Experience of Library Homepage and Discovery Search Box

This theme was initially coded as “homepage set up.” However since the research aim revolves around understanding the SL’s perceptions of students and their user experience and their interactions with discovery services, it was more important to focus on how he believes the homepage engages students.

It can be stated that the SL is very mindful of the user experience provided by the DBS library homepage. He feels that the discovery search box provides a “good user experience” to students and that “most people are satisfied” with the set up and search functionality (SL, 2019, p. 6,10).

The discovery search box is front and centre of the homepage; and the SL expresses that people find it to be “user friendly” because the page is configured to be “clean looking” (SL, 2019, p. 2). He expresses that “everyone likes the search box; everyone likes the results” (SL, 2019, p. 5). By providing “nothing else other than a search box,” he feels that users are provided with a “Google-interface” and that it is “fairly intuitive” (SL, 2019, p.2,3,7).

He subsequently feels that, “We”, [the librarians and himself] are not under pressure to change” (SL, 2019, p. 6,7). He mentions that although some customization is possible to make, like minor design changes using JavaScript and CSS, or toggling “between the [EDS] landing pages,” he is “weary’ to make any that may “alienate our user base” (SL, 2019, p. 4,6). “You can do some customization – but at the same time, we’re loathe to do that – because – we’re kind of in a groove” (SL, 2019, p. 5). He feels that it is better to keep the website layout and configuration as is.

3.6.4 Perceived Advantages of EDS and their Effect on User Experience

These points were previously coded as “EBSCO and EDS.” Of interest to the research aims was the importance of fleshing out and demonstrating the ways in which the SL has modified EDS to improve user experience and how he is conscious of user experience.
The SL feels that although EBSCO databases are a “bit of a lucky dip,” they are still “very good value for money” (SL, 2019, p. 3). The SL reports that statistics from EBSCO and Google Analytics show “very good usage” of EDS (SL, 2019, p. 3). He explains that the set-up of EDS is configured to display users the “basic search” version, and feels that if he were to display the advanced search options, it would be “pretty daunting” to unaccustomed users (SL, 2019, p. 4). This demonstrates his perceptions and assumptions of users and their EDS preferences.

In addition, the SL has configured the default settings for users in order to improve their user experience. Full text and peer reviewed limiters are ticked by default on the EDS results page “as a way of reducing the information overload” because otherwise “[they] are going to be inundated with results” (SL, 2019, p. 2). This reflects the types of changes that can be made from the institution’s side (local customization).

3.6.5 Perceived Disadvantages of EDS and their Effect on User Experience

Similar to the previous theme, these points were coded under “EBSCO and EDS.” However, it was important to separately highlight the individual issues that the SL thought negatively affect a user’s experience of EDS.

The SL surmises that one of the reasons users struggle with discovery interfaces is the lack of standardization between vendors. He mentions, for example, that EBSCO and ProQuest’s advanced search options and results pages appear vastly different to one other, requiring users to learn new behaviour when going between them, which can be very frustrating; “There’s no common standard amongst vendors for search -- you know, limiters, facets, advanced search options, and displaying results” (SL, 2019, p. 7).

Another criticism the SL has about EDS is its lack of “automation and app searching” referring to automatic full-text finders and links (SL, 2019, p 4.). Lack of access to full text is, allegedly, the number one complaint made by students to the librarians regarding EDS (SL, 2019, p. 7). He adds that “you [users] get frustrated when it’s just the abstract” (SL, 2019, p. 5).

Lastly, the SL explains that he is limited in terms of the amount of back-end customization he is permitted regarding EDS’ information architecture, acknowledging that
“We [the librarians and himself] are at the mercy of our vendors” and “can’t change the terminology” (SL, 2019, p. 4,10).

3.6.6 Perceptions of DBS Student Demographics

This theme was included to demonstrate that DBS users are as diverse as the literature claims them to be. Previously it was coded as “opinion of users” and also included “search behaviour” (below). It was recoded in order to distinguish the two points. In order to improve the discovery services, one must understand the characteristics of the user using them, because user education may be just as important as making changes to the site’s features through customisation or enhancement.

The SL mentions that DBS users have varying socio-economic and education backgrounds, and may not be able to come into the library face to face to ask for help if they are learning by distance. The SL explains that it is challenging to provide library services for different types of users, but is absolutely important that they are of the highest quality (p.6).

“We have lots of international students from different education systems ... folk who come in direct from school... mature students doing bachelors courses... [there are courses] for people who have been out of education for a while”... for the unemployed” (SL, 2019, p. 7).

He also acknowledges that many students interact with the library almost exclusively online via the website. Although this may be out of personal preference for some, others are completing online diplomas, or may even be studying overseas (SL, 2019, p. 6).

3.6.7 Perceptions of Student Search Behaviour

It was important to describe the SL’s perceptions of student search behaviour and explore any rationale he had. His comments about undergraduates vs postgraduates were also noteworthy, considering this research looks at both cohorts. Understanding how students are currently interacting with the search functions of discovery is paramount to this research.

The SL feels that the use of Google and other internet search engines has negatively impacted students; that it has “destroyed [their] searching capability” (SL, 2019, p. 4). He
explains this by saying that less work is required to search on Google because it is “set up for ease of use rather than functionality” (SL, 2019, p. 4). Since students have “been trained with Google,” they also expect library search interfaces to behave the same way (SL, 2019, p. 4). Their search behaviour reflects that they do “superficial searches” and they are “happy with” them but they are not “doing anything in depth” (SL, 2019, p. 8). This could possibly justify their lack of awareness about advanced search features. He feels that when students Google, “it’s not about using [their] critical faculties” (SL, 2019, p. 9). “You just use the basic search, no-one really looks at the advanced search” (SL, 2019, p. 2).

Furthermore, the SL completely agreed with the interviewer’s statements about the literature indicating that many students find library interfaces to be complex and overwhelming, struggle to understand advanced features, and seldom go past the first page of results (SL, 2019, p. 9).

He describes users who display this type of search behaviour as the “Google generation” and that many of them live in an age of “instant gratification;” where if they don’t find full text for an article, its “the end of the world” (SL, 2019, p. 10,11).

In order to accommodate users who display this type of search behaviour, the SL rationalises the current set up of the discovery homepage by saying “we have to be at a pretty basic level... and we keep things simple” (SL, 2019, p. 7).

The SL suspects that a students’ level of study influences which type of library search they opt to use on the website. He feels that the “Google-like interface” of the discovery homepage suits undergraduates SL, 2019). He believes that postgraduates “tend to use individual databases rather than discovery” (SL, 2019, p. 4). He considers the specialist databases to be more appropriate for graduate studies and that “Masters’ students shouldn’t be using the discovery homepage so much” (SL, 2019, p. 4).

3.6.8 Insufficient Information Literacy Instruction

This theme was previously coded under “information literacy.” However the main point the SL is making is that the current information literacy instruction is insufficient; in order to adequately use the advanced search features of EDS and perform more effective search requests. This point is discussed in the literature, is asked as part of the pre-test
questionnaire, and supports the findings from the usability study. The comments about library jargon and terminology are especially pertinent to this study.

The SL acknowledges that the advanced options of EDS require certain research and library skills and that “maybe you need to know what you’re doing with database searching” (SL, 2019, p. 2). It is clear that the SL places esteemed value in library instruction, and believes that it improves students’ ability to “construct search terms, ... critically assess” the information they come across, and properly “read [their] results” (SL, 2019, p. 7). It can assist students with finding “the right things” so that they won’t just be satisfied with the first option they come across (SL, 2019, p. 7).

The SL explains that various forms of library instruction are provided to students and that workshops are taught by a “dedicating teaching librarian” (SL, 2019, p.8). There are drop-in classes which students can sign up to, there are classes embedded in both undergraduate and postgraduate modules, a workshop is provided to all students on their induction (or orientation) day, and students can make an appointment if they need one-on-one assistance (SL, 2019, p. 8). These options were given in the pre-test questionnaire which enquired if participants had any information literacy training. The one class that is embedded is expected to cover searching databases as well as referencing and academic expectations (SL, 2019, p. 9).

Despite the various formats, he believes that more information literacy should be taught at DBS. He feels that one class in a module isn’t enough for students, and the workshop provided on induction day is a “waste of time” because students are “bombarded with information” for that whole day (SL, 2019, p. 8). He feels that “all modules should have an information literacy skills section within their course,” of several classes so that topics can be covered in greater depth (SL, 2019, p. 9).

Furthermore, he acknowledges that many students coming into DBS may need extra classes because they don’t “have that much experience... with the western... learning [and research] process” and are unfamiliar with DBS’ academic expectations (SL, 2019, p. 7).

The SL surmises that perhaps more attention should be paid to “demystify[ing] library jargon” for users (SL, 2019, p. 6). He reflects that “we [librarians] do use a particular terminology... its ambiguous” (SL, 2019, p. 6). Explaining and simplifying words like call
number may be beneficial to unfamiliar users, and may also be necessary for them to successfully use the discovery services on the library website, as the results have demonstrated.
Chapter 4 : Discussion

4.1 Findings in Light of the Research Aims

This research intended to discover how a sample of 5 undergraduates and 5 postgraduate DBS students interact with and perceive DBS library’s discovery services by conducting usability testing. The results indicate that the participants displayed a range of search behaviours and logic patterns, and interacted with EDS discovery features in a number of ways. Their progress was recorded and observed during the completion of 3 search tasks, 2 of which were researcher-assigned and 1 user-driven. The quantitative data recorded (time, clicks, error count and SUS score), whilst arbitrary now, provides a baseline for the next round of testing, after the given recommendations have been implemented. It will then provide a more accurate understanding of the ISO attributes of the discovery system; efficiency, effectiveness and user satisfaction.

The SUS survey was helpful in gauging participants’ level of satisfaction and overall opinion of the system. A score of 61.75 means that participants did struggle with elements of the system and found it to be complex, requiring assistance and finding it awkward to use in places. They also felt that they required prior knowledge and expertise in order to effectively use the system. This is reflected especially in their task 2 success rate; where they struggled to identify and apply advanced features of EDS. The literature states that although a SUS score provides a very useful metric for overall product usability, it should not be used in isolation to determine the usability of a system (Bangor et al, 2008, p. 591; Perrin et al, 2014). This is why other factors have been measured and described in this particular research; like the success rate, error descriptions, observations of behaviour, System Librarian perceptions of user behaviour and EDS user experience, which all contribute and present a fuller context of the system’s usability and the users themselves (Klug, 2017, p. 2).

Regarding the errors, most participants faced the same issues and performed the same errors as each other. Changes are required not only in the form of (EDS) product enhancement and (DBS) local customization, but also recommend that information literacy instruction needs to include more precise skills for using these services (user education).
4.2 Findings in Light of the Literature

Task 1 was completed overwhelmingly with ease for most participants, meaning they successfully used the homepage search box to open Koha catalogue and find the required book. This may support Fagan et al’s (2012) statement about the catalogue being a less complex tool than EDS since it provides access to a smaller set of information (2012, p. 103). The main issue most users faced was struggling to discern the library terminology of the search box options. 60% of the participants selected “library resources” instead of “catalogue,” and subsequently chose a wrong turn. This issue was also reported by Deodato et al (2016) & Perrin et al (2014) (p. 197; p. 65).

Participants faced the most difficulty using the advanced search features of EDS in task 2. All participants struggled to locate the required journal article without assistance. Their errors relate to locating limiters, sorting features and distinguishing source types (be it journal, publication or academic source). As stated in the introduction, users in other usability projects experienced similar issues (Deodato, 2016, p. 187; Fagan et al 2012; p. 104; Foster & Macdonald, 2013, p.13; Gross & Sheridan 2010 p. 237; Johnson, 2013, p. 60; Perrin et al, 2014, p. 66). This can perhaps be attributed to several reasons, which will be discussed shortly.

Task 2 was the most interesting in terms of observed search behaviour. For example, the participant who was keen on using the CTRL+F (Find) function in order to quickly locate the required EDS limiters rather than read through the page. This echoed the SL’s discussion of users wanting “instant gratification” while they search (SL, 2019, p.10). Furthermore, participants were observed to rather begin a new search than refine their query, which was exhibited by Deodato et al’s users (2016, p. 187).

Most participants completed task 3 with ease. However it is worth noting that they did not need to select a specific article, since the topic was of their own choosing. It was observed that all participants selected the first article listed, without reading the rest of the results. Similar behaviour was observed in Deodato et al’s (2016) findings (p. 187). Furthermore, it indicates evidence that they “satisfice” when they read their results (Meadow & Meadow, 2012, p. 163). However, since the participants had to apply similar limiters and facets to task 2 (publication date, academic source), their success rate could
indicate that through repeated practice and experience with the system, their skills improve. Deodato et al’s (2016) users also displayed similar behaviour where “the use of facets and limiters increased as testing progressed” (p. 186).

4.3 Google’s Effect on Search Behaviour

The rationale for student search behaviour has been somewhat explored in the introduction, and many of the points are supported by the System Librarian in his interview. Most notably was the ubiquitous effect of Google (Asher et al, 2013; Deodato, 2016, p. 186; SL, 2019, p. 4). The search behaviour of these participants indicated they may use Google habitually and one might even say that they expected the discovery services to behave in the same way Google does (Lanclos, 2016; Asher et al, 2013, p. 472).

For example, the participant who typed all known information (author, edition and topic) about the book (for task 1) in one go in the discovery search box only to retrieve no results. Doing this in Google will normally yield results because its relevancy ranking and keyword proximity is sophisticated (Asher et al, 2013). Koha is not as forgiving of errors or multi-string queries as Google (Deodato, 2016, p. 186). Perhaps that one participant is an “outlier;” a term that Nielsen (2005) uses to refer to those individuals who exhibit unusual habits that are not shared by many other users. Or it may be that testing with a larger number of participants will reveal more cases of this.

In addition, participants in task 2 did not augment their search query with Boolean logic, quotation marks, or use field searching. They relied on basic keyword searching and entered their search all in one line, just as one easily does in Google. This was also reported in other studies (Asher et al, 2013; Deodato, 2016, p. 194; Datig, 2015). The SL explains that because users are “trained with Google” they lack the “critical faculties” required to perform more advanced searches. Perhaps, as some literature has noted, the “nice, clean…Google search box interface” of the homepage that the System Librarian describes actually makes students “treat [it] like a Google search box” (Asher et al, 2013, p. 473; Deodato, 2016, p. 186; Meadow & Meadow, 2012, p. 163; SL, 2019, p. 4).

Supporting this notion are the alarming discoveries from the pre-test questionnaire: that most participants’ prefer to use Google Scholar rather than interact with a Librarian if they could not find what they were looking for on the library site. 3 of the 5 postgraduates
chose this option. The students clearly assume that the content provided by Google Scholar is trustworthy, peer reviewed, researched and cited (Asher et al, 2013, p. 475). The System Librarian is, however, reassuringly hopeful, despite Google’s pervasive influence. He feels that librarians have a duty to help users navigate online resources as well as library ones, and that “anyone can use the internet, but few people can use it well” (SL, 2019, p. 11). This search behaviour also shows evidence of Datig’s (2015) claim that library users no longer rely on librarians as the gatekeepers of information, and are accessing online information largely solo (p. 237).

**4.4 Diversity and Similarity**

Although one tries to search for similarities in behaviour in order to design systems that appeal to the most users, the reality, as has been mentioned by Fidel (2000), is that users are not a homogeneous group (p. 79). It is clear from all of the findings (the System Librarian’s statements, the participant demographics and the usability results), that this sample of DBS students are indeed, a diverse group (2000, p. 79). The System Librarian reflected that in addition to there being different cohorts (undergraduates, postgraduates), and speaking different native languages, DBS library website users also have different circumstances; being mature age students, straight from high school students, international students, and even distance learners (SL, 2019, p. 6). They also possess varying skill levels; with some students not “hav[ing] that much experience with the western learning process”, (2019, p. 7).

One may be forgiven then, for expecting to find differences in their quantitative usability data. However, the variables that the T-Test results investigated actually indicated that no differences exist between certain groups. Within this sample, native English speakers did not complete task 2 faster than non-natives, neither did those with information literacy instruction compared to those without, nor did postgraduates compared to undergraduates. They also committed the same errors and displayed similar search behaviour as each other.

It is very important to remember that there were only 2 non-native English speakers and only 2 participants stated they did not receive information literacy instruction, so sampling does need to be higher in order to draw more accurate conclusions. However,
judging by this sample, it appears that language may not be a barrier for users, it is perhaps more a matter of the specific skillset required to use the system, and the interfaces themselves.

Therefore, the most reliable sample size to compare are the postgraduates versus the undergraduates, since there are 5 of each. Although no hypotheses were in mind, one would expect (and the System Librarian also expressed), that postgraduates would perform better than undergraduates because they would have more experience with academic search systems (SL, 2019, p. 4). Thus, it was very surprising to see no difference in their success rate or time completion. Perhaps as the System Librarian suggests, the lack of standardization between vendors has them confused when they use EDS, if they previously used Summon, for example (SL, 2019, p. 7). Whatever the reason, the postgraduates participants appear to not be as proficient as the System Librarian presumed them to be. Deodato et al (2016) may be right in saying that most users are not expert searchers (p. 186). The postgraduate’s remarks of “I am a novice at this.. I don’t use the library website.. I use Google” echo this (Participant 9, 2019). The results may also indicate that the discovery system is not as attuned to their user behaviour as the librarians think (Gross and Sheridan, 2010, p. 237; Lanclos, 2016, p. 28).

However, differences between undergraduates and postgraduates were discovered in their SUS responses, with undergraduates rating the system lower than postgraduates. The lowest rating given was 37.5; the highest 77.5. Older participants also rated the system higher than younger ones. The other studies did not analyse their participants in this way or mention SUS comparisons within their sample; so this is an area of potential interest. Reasoning could be as the Pearson report (2018) indicates, that technology has already shaped the educational expectations of Generation Z (undergraduates) even more so than millennials (postgraduates). Since they are “digital natives,” they have higher expectations, and “demand flexible, adaptive educational tools” (Pearson, 2018).

**4.5 Designing the Library Homepage with Users in Mind: Local Customization**

This brings to light again the idea that users struggle with library discovery systems because they are not designed with users in mind (Gross and Sheridan, 2010, p. 237; Lanclos, 2016, p. 28). The fact that several participants struggled to even select the
catalogue to search for a book provides evidence that this discovery homepage has been organised according to library concepts that are unfamiliar to non-expert users (Gross & Sheridan, 2010, p. 237; Kim-Wu & Lanclos, 2016). Users unfamiliar with library jargon may be forgiven for not being able to distinguish “Library Resources” from “Catalogue.” By locally customising the page and adding clarifying subtext like “Database Access” underneath “Library Resources”, it may reduce the wrong turns that get made here and improve a student’s user experience. Similarly for “Catalogue,” adding the word “Books” as subtext or a hover over, may help users make the right search decision, improve their findability and reduce search abandonment.

4.6 Tailored Information Literacy Instruction: User Education

Clearly some of the errors participants made indicate that, indeed, specific skills are required in order to find, retrieve and critically assess academic information (Becker & Yannotta 2013; Deodato et al 2016; Fagan et al, 2012; Fidel, 2000, Johnson, 2013). Specifically, the findings present evidence of a lack of user awareness of library jargon as well as advanced search query construction, despite 8 out of 10 participants stating they received some form of library instruction. These results support Foster and MacDonald’s (2013) findings which also report that although some of their users attended a library instruction session, they still performed only the simplest of searches (p. 13).

The System Librarian explained that DBS offers students several options to learn library skills (SL, 2019, p. 8). Participant responses indicated that the most common form were the embedded classes within their courses. It appears that their instruction did not seem to influence their ability to perform these search tasks more efficiently. However, one must not be too quick to judge, or dismiss the value of information literacy. Firstly, these results may be due to sampling, chance or participant selection. A larger group of students who did not receive instruction should be tested, and then again after they receive it, to determine if it actually influences their success rate.

Perhaps a more likely rationale, as the System Librarian also states, is that not enough skills are taught to students at the right time, and that the right kind of instruction may not have been provided (at least in order to effectively and efficiently complete the 3 tasks) (SL, 2019, p. 9). A lesson on library jargon may help students understand what a “call
number” and a “catalogue” is. Reviewing search query construction may reduce frustration and the case of “no results” retrieved during the catalogue search. Explaining the various source types and the “show more” advanced search features will build their confidence in learning the facets and limiters of the EDS results page. It is pertinent to mention that a one-off class in a module may not be sufficient to adequately teach the nuances and complexities of advanced database searching as well as referencing, plagiarism avoidance and other subjects the teaching librarian is expected to cover. Additionally, one must consider that students do not find information literacy topics “exciting” and they (especially generation Z) are generally unwilling to invest significant time and effort in order to retrieve needed information (Yevenson and Bronstein, 2018, p. 537). Thus, recommendations also include classes being repeated and that they include engaging, relevant, and user-driven activities.

4.7 EDS Product Enhancement

As stated in the findings and in the recommendation categorisation, many of the errors that the participants of this study encountered can only be resolved by EBSCO product enhancement. Some local customization is possible, like setting the default limiters to peer reviewed and full text in order to reduce “information overload” as the System Librarian has already done (SL, 2019, p. 2). However, it still appears that the EDS interface is designed for expert users, since participants did not find it to be intuitive, and some features were found to not be explicit enough about their function. Although all participants eventually made their way to the advanced search windows, most were reluctant to open the facets and limiters, particularly those required like “Journal” “Academic Source” and “Publication.” The terminology itself may require simplification, in order to improve the user experience as Lanclos (2016) recommends (p. 28). Nevertheless, expecting users to just learn the system and brush up on their library jargon isn’t enough – the page element design and functionality also need improvement. For example clarifying the sorting feature by adding “Sort by” above the drop down options or improving the design of the date slider boxes, as per information architecture recommendations (Rosenfeld & Morville, 2015).

It has been demonstrated that it is often the simplest updates and changes that can make a difference to a user’s online experience (Perrin et al, 2014, p. 66). Hopefully, such
changes are possible, however it is a known difficulty that UX researchers face with
discovery systems (Deodato et al, 2016, p. 183). EDS has full control over the information
architecture of their results page and the System Librarian confirms this by saying we are “at
the mercy of our vendors” (SL, 2019). Therefore, library-vendor collaboration is critical in
order to influence the design of the service (Deodato et al 2016, p. 183). Perhaps the
findings from this research will persuade EBSCO’s “User Research” department to
investigate them further.

4.8 Strengths of this Research

One of the key strengths of this research is that it follows a set-like criteria, which is
recommended for small scale usability testing, so that the enquiry can be more focused on
the aims and goals (Ramsden, 2016, p. 13). Models are tried and tested; from the SUS to
the sampling, and even to the task design and ISO usability data collection. The SUS is a tool
designed for systems, which provides results that are easy to share (Klug, 2017, p. 6).
Fortunately, the sampling target was achieved; and response rate was 100%.

A holistic approach was taken with the mixed methods of this research; collecting
data from multiple sources in several ways, in order to offer a full context of the users and
their experience (Klug, 2017, p. 2). This includes the system librarian interview, pre test
questions, error details, as well as the usability data and success rate calculation.

The scoring for the success rate is based on the quantitative averages and medians
of the actual data, and is not arbitrarily assigned by the researcher, as some studies may be.
Regarding the task design, the third user-driven task attempted to make the session more
engaging to participants, and explores a more natural response than perhaps the other
researcher-driven requests enable (Asher & Miller, 2011).

Furthermore, the observational ethnographic data was condensed to noting the
participants’ online behaviour and the details of their errors. This reduced the timeframe for
analysis, the ethical concerns, as well as the subjectivity of the observer (the researcher),
which are common issues in observational ethnographic studies (Asher & Miller, 2011, p.
16). Similarly, interruption and intrusion by the researcher during the testing sessions were
kept to a minimum (unless assistance was verbally requested) so as not to interfere with the
quantitative data being collected.
4.9 Weaknesses of this Research

Researchers of other usability studies had their participants complete several tasks; and most have them complete more than five tasks (Becker & Yannotta, 2013, p. 12; Fagan et al, 2012, p. 83). Only three tasks could be realistically assigned for this research project so as not to take up too much of the participants’ time, and risk low interest in participation. This study favoured searching for a book and journal articles in the task descriptions, because they are the most commonly accessed library materials by college students. Other aspects of the discovery system were not assessed; like downloading a pdf of an article and emailing it yourself, assessing and evaluating articles, exporting references, etc (Perrin et al, 2014, p. 58).

This research may lack sufficient qualitative feedback from participants regarding their usability experience which would have further enriched their context, like that conducted in other studies, or those that do “think aloud” testing (Fagan et al, 2012, p.99). Few comments were made by participants of this research after the testing. Asking specific questions after each task would have revealed interesting details, for example, about which aspects of the system they preferred, which features they found confusing, etc. One question after could be, “would library instruction on EDS advanced search features be helpful to you?” (Perrin et al, 2014, p. 58).

The wording of the SUS survey presented confusion to some participants. Some did not know what the word “cumbersome” meant – and required assistance. The wording may need updating to more modern everyday terms. For example, cumbersome could have been changed to awkward.

Since all participants completed the tasks (albeit with assistance), a completion rate could not be measured, which is a fundamental measure of usability (Sauro, 2012). However, if the researcher had not provided assistance, then it would have been 0% completion rate! Thus, it was considered more important to record the error details and the specific areas of the system they encountered difficulty with.

Regarding the interview, in hindsight, perhaps more questions could have been asked about Koha Catalogue and its relevancy ranking. Some questions were answered indirectly, partially or tangentially, requiring much interpretation and inference. However, the System
Librarian’s points about student behaviour, the library homepage, and information literacy were still clear and very supportive to the findings.

4.10 Limitations of the Research Methodology

4.10.1 Influence of Testing Conditions

One of the major cautions for usability studies is that users who are invested in completing a task behave differently to those who are not (Hoekman Jr, 2009; Nielsen, 2005). Despite informing participants that “the system is being tested, not you” Nielsen (2005) argues that it is human nature to want to do well on a test. Similarity, searching for a book or an article that a student actually has a vested interest in is different to searching for a random request made by a researcher (Becher & Schmidt, 2011, p. 203). The assigned task questions also gave participants perhaps more query criteria to start with than is typical with more user-driven tasks. This was considered beforehand, and was the rationale for the third task – by allowing participants to search for a topic of their own choosing with the intention to elicit a more natural response. However, is not clear whether the participants in this case would have taken more care in evaluating their search results if they were selecting them for a real assignment or project.

It is also documented in the literature that the presence of an observer influences the state of the participant during usability testing (Foster & Macdonald, 2013, p. 11; Hoekman Jr, 2009; Nielsen, 2005). In order to minimise this affect, interference from the researcher was kept to a minimum.

4.10.2 Influence of Compensation

Furthermore, a student who really wants to search for a particular subject will behave differently to one whose only motivation is to be compensated. For this research, compensation greatly assisted with recruitment. Whilst compensation us unlikely to have affected participants’ task success rate or search behaviour, it is unknown, however, if it has influenced their SUS survey responses.

4.10.3 Sampling

As mentioned throughout this study, the sample size of this participant group is not reflective or indicative of the experiences of all DBS students. Care must be taken when
drawing conclusions. A greater sample number is required, especially of native English
speakers, and those without information literacy, in order to draw more accurate
comparisons. Since most students were from Business / Management and Marketing
courses, sampling could also be conducted during the more populated semesters when
other courses are in session (for example, September to December and January to April).
Selection bias may also have occurred during sampling, as it was performed exclusively in
the library and at Castlehouse campus (Asher & Miller, 2011, p. 12).

4.10.4 Lack of Accuracy in Recording Data

Only one researcher was present during the usability testing. That researcher needed
to use a stopwatch, a clicker counter, and be simultaneously watching the participants’
screens in order to observe their online path and note their errors. It is inevitable that
inaccuracies have been made in the usability data collected, due to human error. A click may
not have been audible and the stopwatch may not have been stopped at the exact same
time for each participant. Hence why UX studies conducted at major institutions involve
sophisticated technologies, which for example trace mouse movements, use heat maps, and
easily record online paths and clicks (Priestner & Borg, 2016, p. 7). Facial expressions can
even be assessed. These were simply not within the researcher’s means for this project.

4.10.5 Response Bias

Response distortions are common in surveys. For example, participants may
overestimate or exaggerate their abilities, in order to make themselves seem more “socially
desirable” (Lavrakas, 2008, p. 429). This type of bias may have affected the responses for
one of the pre-test questionnaire questions which asks how long they spend each week on
the library website.

4.10.6 Lack of Time

Usability testing, especially for websites, is normally an iterative process run over an
extended timeframe (sometimes up to 18 months). Websites go through multiple redesigns,
with user feedback collected at each stage (Becker & Yannotta, 2013). In order to effectively
assess the ISO attributes, iterative testing does need to be conducted. This research can only
provide baseline data within the limited timeframe of assessment (3 months). Furthermore,
accurate qualitative analysis of detailed ethnographic data is a very lengthy process. Hence why the scope was narrowed, and only basic observational ethnographic data was collected.

4.11 Recommendations and Conclusion

This study generated several valuable insights about how DBS students interact with the discovery services on the library website. Whilst most observed user search behaviour matched the expectations of the System Librarian, some findings indicated that users are not completely understood and assumptions may not be entirely correct. For example, postgraduates do not appear to be more experienced searchers than undergraduates; as the findings showed no statistical difference in completion time between the two groups.

Similar to other usability studies, none of the participants observed displayed “expert user” traits. Issues were encountered with search query construction, interpreting library jargon, understanding facets and labelling, sorting, and locating limiters. Issues can also be attributed to EDS system errors; relating to the date slider and source listing within “show more” windows. Their perceived satisfaction level also reflected their difficulty and frustration; as their average SUS score was 61.75.

Potential reasons for their problematic user experience have been explored; most notably seen was the influence of Google, as the literature highlighted, and the System Librarian emphasised. Google and Google Scholar seem to have had a pervasive impact on the participants’ approach to academic searching. Subsequently, they struggled to find and apply the advanced features within EDS; (these are not required to use Google in order to yield results). Koha’s sensitive relevancy ranking and word proximity also led to user error.

EDS intends to reduce search complexity for users, however for novices, it seems to have had the opposite effect, and no wonder Google has the appeal (Gross & Sheridan, 2010, p. 238).

A lack of practice with the system and knowledge of library terminology may be another reason for user difficulty. The interface itself on the DBS homepage may be contributing to user frustration and/or search abandonment; given the labelling of the search-box options. However, most difficulties were experienced with EDS, which requires the bulk of interface updates and tweaking.
Based on these observations, a categorisation of the recommendations have been made; into product enhancement, user education, and local customisation, which provides a useful overview for how the main issues can be resolved. This carries implications for the stakeholders of the discovery services; those that are developing and managing them (EDS, Koha and DBS librarians), as well as those teaching the library skills needed to use them (Deodato et al, 2016, p. 184). These recommendations are made with the intention of improving the user experience of the discovery services, and the findability and retrievability of library resources (Becker & Yannotta, 2013, p. 9).

The quantitative data collected from the usability studies and SUS survey scores provides a base line for the assessment of the discovery system’s ISO attributes (efficiency and efficiency and user satisfaction). Iterative testing is required after the recommendations have been implemented, to determine if indeed, the services are meeting the needs of the users (Deodato et al, 2016, p. 183). Tracking SUS scores over a period of time is a simple way to communicate to stakeholders how the system performance has improved or declined (Klug, 2017, p. 6). Conducting before and after studies will help stakeholders and researchers determine if the changes make improvements to the usability of the systems (Becker & Yannotta, 2013, p. 9).

Hopefully, this research will inspire DBS Librarians to continue conducting usability testing, not only to discover issues that their patrons may be facing with their discovery services, but also to observe and take note of their search behaviour. They will be better equipped to assess their information needs and expectations, and to make the most out of their subscriptions. It also makes the process of customizing their services more meaningful and more locally targeted. Librarians will be able make more informed decisions about the services they provide their patrons, with the goal of improving their user experience.
References


Appendices

Appendix A: Sample of Researcher’s Results Page

<table>
<thead>
<tr>
<th>Task</th>
<th>Time Spent on Task: Minutes &amp; secs</th>
<th>Number of Clicks</th>
<th>Number of Errors, Wrong Turns, or Times Assistance is Required</th>
<th>Details of Errors, etc &amp; Any Observations, Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
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</tr>
</tbody>
</table>
### Appendix B: Pretest Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Which course are you studying?</td>
<td>(Accounting/Finance, Arts, Business/Management, Counselling, IT, Journalism, Law, Marketing, Psychology)</td>
</tr>
<tr>
<td>2 Which year of college are you in?</td>
<td>(First Year Undergrad, Second Year Undergrad, Third Year Undergrad, Fourth Year Undergrad, Postgrad)</td>
</tr>
<tr>
<td>3 Which age bracket applies to you?</td>
<td>(18-21, 22-25, 26-29, 30-33, 34+ years)</td>
</tr>
<tr>
<td>4 Is your mother tongue (native language) English?</td>
<td>(YES / NO)</td>
</tr>
<tr>
<td>6 Roughly how many hours per week would you say you spend using the library website?</td>
<td>(Less than 1, 1-5, 5-10, More than 10)</td>
</tr>
<tr>
<td>7 If you cannot find what you are looking for on the library website, what do you do?</td>
<td>(Go to library help desk, Use online chat, Search on Google Scholar or similar for free access, Give up and look for a different resource, Ask a friend at another institution)</td>
</tr>
<tr>
<td>8 Have you ever had any kind of library skills (information literacy) training or workshop before?</td>
<td>(YES / NO)</td>
</tr>
<tr>
<td>9 If YES to Q.8, in what format did you receive the training?</td>
<td>(Someone from the library came to one of my classes, I signed up for a library workshop, They spoke about it on Orientation Day, It was part of my schooling before I came here)</td>
</tr>
</tbody>
</table>
Appendix C : Copy of Participant Task Sheet

Please complete the following 2 tasks. The 3rd task is optional.

1). You are looking for a specific book in the DBS Library catalogue about _small business management_. You do not know the title, but you remember you need the _9th Edition_ and one of the author’s names is _Norman Scarborough_.

Use the Discovery Search on the Library website to find the book. Write the title and call number.

Title __________________________________________

Call Number____________________________________

2). In your digital marketing class, you have an assignment on _social media and branding_.

Use the Discovery Search on the Library website to find a specific article about that topic and answer the questions below.

Ensure that the following filters/limiters are used. _It may help you to check them off as you go._

- Peer Reviewed
- Published by the American Marketing Association
- Full text
- Journal of International Marketing
- Available in the Library collection
- Published in 2018

How many search results are showing? What is the title of the most _recently_ published article?

Number of search results____________________________________

Title __________________________________________

______________________________________________________
OPTIONAL

3). What is a topic you are interested in/studying?

Find a journal article about that topic using the Discovery Search on the Library website. Write the title of the most relevant result. Ensure that the following filters/limiters are used:

- Peer Reviewed
- Published within the last 5 years
- Full text
- Published by an academic journal
- Available in the Library collection

Title __________________________________________________________

Thank you for your response.
Appendix D: Potential Queries for Task 2

<table>
<thead>
<tr>
<th>Query entered in EDS</th>
<th>Additional Info Provided</th>
<th>Title of most recently published article</th>
<th>Publication Date</th>
<th>Number of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>social media and branding</td>
<td>No punctuation or additional information entered in advanced search</td>
<td>The Interface of International Marketing and Entrepreneurship Research: Review, Synthesis, and Future Directions.</td>
<td>Dec-18</td>
<td>8</td>
</tr>
<tr>
<td>&quot;social media&quot; and branding</td>
<td>No additional information entered in advanced search</td>
<td>The Interface of International Marketing and Entrepreneurship Research: Review, Synthesis, and Future Directions.</td>
<td>Dec-18</td>
<td>8</td>
</tr>
<tr>
<td>social media and branding</td>
<td>No punctuation. Journal title entered as source in advanced search</td>
<td>The Interface of International Marketing and Entrepreneurship Research: Review, Synthesis, and Future Directions.</td>
<td>Dec-18</td>
<td>8</td>
</tr>
<tr>
<td>social media, branding written as 2 separate entries</td>
<td>No punctuation. Journal title entered as source in advanced search</td>
<td>The Interface of International Marketing and Entrepreneurship Research: Review, Synthesis, and Future Directions.</td>
<td>Dec-18</td>
<td>8</td>
</tr>
<tr>
<td>social media, branding written as 2 separate entries</td>
<td>No punctuation or additional information entered in advanced search</td>
<td>The Interface of International Marketing and Entrepreneurship Research: Review, Synthesis, and Future Directions.</td>
<td>Dec-18</td>
<td>8</td>
</tr>
<tr>
<td>&quot;social media&quot;, branding written as 2 separate entries</td>
<td>No additional information entered in advanced search</td>
<td>The Interface of International Marketing and Entrepreneurship Research: Review, Synthesis, and Future Directions.</td>
<td>Dec-18</td>
<td>8</td>
</tr>
<tr>
<td>&quot;social media&quot;, branding written as 2 separate entries</td>
<td>Journal title entered as source in advanced search</td>
<td>The Interface of International Marketing and Entrepreneurship Research: Review, Synthesis, and Future Directions.</td>
<td>Dec-18</td>
<td>8</td>
</tr>
</tbody>
</table>

NB: Results assume all limiters have been set correctly. If sorting is not set to "Date Newest," results will present "Social Media Ties Strategy in International Branding: An Application of Resource-Based Theory" as the first article.
Appendix E: System Usability Scale Survey

Reflecting on your interaction with DBS Library’s discovery services, please indicate the extent to which you agree or disagree with the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think that I would like to use this system frequently.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I found the system unnecessarily complex.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I thought the system was easy to use.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I think that I would need the support of a technical person to be able to use this system.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I found the various functions in this system were well integrated.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I thought there was too much inconsistency in this system.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I would imagine that most people would learn to use this system very quickly.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I found the system very cumbersome to use.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I felt very confident using the system.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I needed to learn a lot of things before I could get going with this system.</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
### Appendix F: Ethics Information Form – MSc Postgraduate Studies

#### Student Details

<table>
<thead>
<tr>
<th>Student Identifier:</th>
<th>10386194</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submission Date:</td>
<td>22 April 2019 (proposal deadline)</td>
</tr>
<tr>
<td>Proposal Research Title:</td>
<td>UX at Dublin Business School: Library Website Usability Studies</td>
</tr>
<tr>
<td>Brief Description of the research:</td>
<td>Simple usability studies will be conducted with library users to discover their perceptions; specifically looking at the search functionality, assessing its efficiency, effectiveness, and user satisfaction. Quantitative data will be collected (time taken, success rate, error rate, clicks taken; comments made). A short survey will be administered afterwards. No recording devices are required. Stopwatch, counter and pen/paper will be used. An interview will be conducted with the Librarian to discover the rationale behind site structure, navigation and design, requiring a voice recording device.</td>
</tr>
</tbody>
</table>

#### Sampling

<table>
<thead>
<tr>
<th>Population of interest: (brief description)</th>
<th>Undergraduate &amp; postgraduate students. They have varying levels of information seeking behaviour and information literacy which affects how they search online.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample of interest: (brief description of size and how it is chosen)</td>
<td>Minimum 5 participants for usability studies. Nielsen (2012) states that at 5, the maximum cost benefit ratio is achieved, and no new problems are likely to be discovered with any additional participants.</td>
</tr>
</tbody>
</table>

#### Primary Research - Data Management

<table>
<thead>
<tr>
<th>Is the data anonymised – how is this done?</th>
<th>Yes data will be anonymized, participants will be numbered. Names will not be collected. Simple demographic questions. No personally identifiable information will be collected.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How is data confidentiality maintained:</td>
<td>Participants will be requested to sign a consent form prior to commencing usability studies/interview. Data will not be shared or disseminated to unauthorized persons.</td>
</tr>
<tr>
<td>Where will the data be stored:</td>
<td>Data sheets (SUS survey), notes, usability scores and interview transcription will be safely stored in a locked room at researcher’s home. Electronic versions will be stored on a password protected computer.</td>
</tr>
<tr>
<td>When will the data be destroyed:</td>
<td>The day after the time period for appeal-of-grade period has expired. Or, the day after any grade appeals have been finalized and closed. This can be extended if you are planning to publish the dissertation.</td>
</tr>
</tbody>
</table>
## Specific Ethical Considerations

Detail any aspects specific to your proposal that will require further ethical approval e.g. interaction with under-18 year-olds, experiments requiring deception, anything that might cause respondents any distress, etc.

| Student Name: Loida Small | Date: 22 April 2019 (proposal submission date) |
Appendix G: Copy of Participant Information Sheet and Consent Form

PROJECT TITLE  UX at Dublin Business School: Library Website Usability Studies

My name is Loida Small and I am a Masters student at DBS. I need to collect data for my dissertation on *DBS Library website usability*. This study has been approved by DBS and is supervised by Marta Bustillo.

WHAT WILL HAPPEN

There are 2 parts to this study:

1). I will first ask you some basic demographic questions. Then I would like you to attempt 2 research tasks using the DBS Library website. I will count the number of clicks, record the time it takes, the number of errors/wrong turns, and the success rate while you complete the tasks. If you make any comments afterwards, I will also make note of them.

2). I will then ask you to complete a short survey about your perceptions of your interaction with the Library website.

TIME COMMITMENT

The study typically takes about 15 minutes in total.

I would like to compensate you for your time and any inconvenience caused with a voucher.

PARTICIPANTS’ RIGHTS

You may decide to stop being a part of the research study at any time without explanation required from you. You have the right to ask that any data you have supplied to that point be withdrawn / destroyed. You have the right to omit or refuse to answer or respond to any question that is asked of you.

You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study’s outcome. A full de-briefing will be given after the study). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

CONFIDENTIALITY/ANONYMITY

The data collected does not contain any personally identifiable information about you.

Basic demographic information is requested. All your responses will be anonymised and coded with a number.

The data collected will be used solely for research purposes for my dissertation. Data will not be shared or disseminated with any unauthorised persons. Data will be safely stored in a locked room. Electronic versions will be stored on a password protected computer. Data will be destroyed in accordance with DBS guidelines.
FOR FURTHER INFORMATION

I and/or Marta Bustillo will be glad to answer your questions about this study at any time. You may contact my supervisor at bustillom@gmail.com

PROJECT SUMMARY:

Usability studies will be conducted in order to understand your perceptions of the Library website. Specifically looking at the website’s search functionality, assessing its efficiency, effectiveness, and user satisfaction.

While you complete 2 research tasks, quantitative data will be collected (time taken, success rate, error rate, clicks taken). Any comments you make afterwards may also be noted (qualitative).

Basic demographic questions will be asked.

A short survey will be administered after task completion to assess the quality of your website interaction.

No recording devices will be used.

Required instruments: Stopwatch, counter and pen/paper.

By signing below, you are agreeing that:

(1) you have read and understood the Information Sheet,
(2) questions about your participation in this study have been answered satisfactorily,
(3) you are aware of the potential risks (if any), and
(4) you are taking part in this research study voluntarily (without coercion).

________________________________________________________________________
Participant’s Name (Printed)                                              Participant’s Signature
________________________________________________________________________
Research Student’s Name (Printed)                                         Research Student’s Signature
________________________________________________________________________
Date
Appendix H: T-tests Investigating Group Differences

Average time and standard deviation for tasks 1 and 2 for native and non-native English speakers

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>df</th>
<th>p (two tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time - Tasks 1&amp;2</td>
<td>Native Lang. Eng. - No</td>
<td>203.94</td>
<td>125.77</td>
<td>0.27</td>
<td>18</td>
<td>.787</td>
</tr>
<tr>
<td></td>
<td>Native Lang. Eng. - Yes</td>
<td>184.50</td>
<td>131.81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time - Task 1</td>
<td>Native Lang. Eng. - No</td>
<td>92.25</td>
<td>18.95</td>
<td>0.37</td>
<td>8</td>
<td>.722</td>
</tr>
<tr>
<td></td>
<td>Native Lang. Eng. - Yes</td>
<td>83.50</td>
<td>68.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time - Task 2</td>
<td>Native Lang. Eng. - No</td>
<td>315.63</td>
<td>70.90</td>
<td>0.53</td>
<td>8</td>
<td>.612</td>
</tr>
<tr>
<td></td>
<td>Native Lang. Eng. - Yes</td>
<td>285.50</td>
<td>81.32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average time and standard deviation for Tasks 1 and 2 for groups with and without information literacy instruction

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>df</th>
<th>p (two tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time - Tasks 1&amp;2</td>
<td>Info Lit-Yes</td>
<td>207.00</td>
<td>122.63</td>
<td>0.49</td>
<td>18</td>
<td>.628</td>
</tr>
<tr>
<td></td>
<td>Info Lit-No</td>
<td>172.25</td>
<td>142.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time - Task 1</td>
<td>Info Lit-Yes</td>
<td>98.88</td>
<td>22.57</td>
<td>2.22</td>
<td>8</td>
<td>.057</td>
</tr>
<tr>
<td></td>
<td>Info Lit-No</td>
<td>57.00</td>
<td>31.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time - Task 2</td>
<td>Info Lit-Yes</td>
<td>315.13</td>
<td>70.66</td>
<td>0.48</td>
<td>8</td>
<td>.643</td>
</tr>
<tr>
<td></td>
<td>Info Lit-No</td>
<td>287.50</td>
<td>84.15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix I: Task 3 User-Driven Queries and Results

<table>
<thead>
<tr>
<th>Participant #</th>
<th>Query &amp; Chosen Article Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cloud computing</td>
</tr>
<tr>
<td></td>
<td>Green and sustainable cloud of things: enabling collaborative edge computing</td>
</tr>
<tr>
<td>2</td>
<td>digital marketing</td>
</tr>
<tr>
<td></td>
<td>Incorporating digital marketing in the marketing curriculum: An approach for small colleges and universities</td>
</tr>
<tr>
<td>3</td>
<td>artificial intelligence</td>
</tr>
<tr>
<td></td>
<td>Distributed Linear Quadratic Optimal Control: Compute Locally and Act Globally</td>
</tr>
<tr>
<td>4</td>
<td>Big data in health care</td>
</tr>
<tr>
<td></td>
<td>Big data in health care – opportunities and challenges</td>
</tr>
<tr>
<td>5</td>
<td>Supply chain in food wastage management</td>
</tr>
<tr>
<td></td>
<td>Assessing alternative production options for eco-efficient food supply chains</td>
</tr>
<tr>
<td>6</td>
<td>Quality management practices in the construction industry</td>
</tr>
<tr>
<td></td>
<td>Analysing supplier quality management practices in the construction industry</td>
</tr>
<tr>
<td>9</td>
<td>Sports journalism</td>
</tr>
<tr>
<td></td>
<td>Radical Sports Journalism?: Reflections on Alternative Approaches to Covering Sport-Related Social Issues</td>
</tr>
</tbody>
</table>
## Appendix J: Details of Errors and Observations By Task and Participant

<table>
<thead>
<tr>
<th>Participant Number</th>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OBS: Searches by authors name</td>
<td>Tries to stay in catalogue to search articles; (wrong turn &gt; assistance)</td>
<td>Search query: cloud computing</td>
</tr>
<tr>
<td></td>
<td>Does not know what call number is</td>
<td>cannot find # search results (at top of page) &gt;&gt; assistance</td>
<td>error: Did not click avail. In lib. collection</td>
</tr>
<tr>
<td></td>
<td>Requires assistance for: sorting (relevance is default);</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cannot find publisher info &gt;&gt; requiring assistance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>is unsure if finished or not &gt;&gt; assistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS: combo left side &amp; advanced search</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS: Entered terms all in one line social media and branding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tries to search in &quot;library resources&quot; for a book</td>
<td>Requires assistance with locating &quot;show more&quot;</td>
<td>Search Query: digital marketing</td>
</tr>
<tr>
<td></td>
<td>trouble selecting correct book (could not find 9th edition)</td>
<td>cannot find # search results (at top of page)</td>
<td>OBS: struggles using date slider</td>
</tr>
<tr>
<td></td>
<td>OBS: Searches by authors name</td>
<td>Could not locate sort by at top of page / did not sort (error)</td>
<td>general comment: Uses the library site only when assignments are due</td>
</tr>
<tr>
<td></td>
<td>Requires assistance with locating &quot;show more&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS:Entered terms all in one line social media and branding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS: Likes to use FIND short hand keyboard function (Ctrl F) to locate keywords on page; if not found, gives up easily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Tries to search in &quot;library resources&quot; for a book</td>
<td>Tries to stay in catalogue to search articles; (wrong turn &gt; assistance)</td>
<td>Search query: artificial intelligence</td>
</tr>
<tr>
<td></td>
<td>OBS: Searches by authors name</td>
<td>Cannot find publisher info &gt;&gt; requiring assistance.</td>
<td>Error: did not select correct date</td>
</tr>
<tr>
<td></td>
<td>Cannot find full text button &gt;&gt; assistance</td>
<td></td>
<td>OBS: struggles using slider</td>
</tr>
<tr>
<td></td>
<td>Enters incorrect journal title, requiring assistance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requires assistance for sorting (relevance is default);</td>
<td></td>
<td>general comment: doesn't know much about how EDS works</td>
</tr>
<tr>
<td></td>
<td>Requires assistance with locating &quot;show more&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS: Entered terms all in one line social media and branding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS: Does not realize that discovery page opens search results in new window.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Task Description</td>
<td>Issue/Assistance Required</td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>OBS: Searched by topic NOT author</td>
<td>Requires assistance with locating &quot;show more&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Search query: &quot;Big data in health care&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cannot find publisher info &gt;&gt; requiring assistance.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: system - Publisher not selected as it is not listed in the window under show more</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(date must be selected first)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>assistance required: had to re-do limiters in advanced window – all</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>must be selected before pressing enter in window</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>requires assistance for: sorting (relevance is default);</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: Struggles with date slider to select 2018</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: Entered as 2 separate search entries</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Tries to search in &quot;library resources&quot; for a book</td>
<td>OBS: Struggles using slider for selecting date</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>search query: Supply chain in food wastage management&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>error: incorrect date selected</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does not know what call number is</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cannot find publisher info &gt;&gt; requiring assistance.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>comment: Found it easier once knew where limiters were</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS; searches by authors name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>requires assistance for: sorting (relevance is default);</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: Entered terms all in one line social media and branding</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Requires assistance with advanced search window and finding the correct limiters</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>OBS: Inputs ALL search terms at once: author, 9th edition, title, subject</td>
<td>Cannot locate journal title</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;&gt;&gt;&gt; NO RESULTS</td>
<td>Search query: &quot;Quality management practices in the construction industry&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Takes 4 attempts before selecting correct article – requires</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>assistance to be told to try searching using less terms</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cannot find publisher info &gt;&gt; requiring assistance.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comment: Found it easier once knew where limiters were</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>requires assistance for: sorting (relevance is default);</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Requires assistance with advanced search window:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Search resets because all limiters need to inputted at same time</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: Entered terms all in one line social media and branding</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>OBS: Searches by authors name</td>
<td>requires assistance for: sorting (relevance is default);</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>general comment: They prefer to first look up on Google &gt;&gt; go to Researchgate or Google</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>scholar etc to find article and then try to find that article title in OBS ED5 to search</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>for full text.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>cannot locate publisher (but locates correct answer)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: Entered terms all in one line social media and branding</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Tries to search in &quot;library resources&quot; for a book</td>
<td>requires assistance for: sorting (relevance is default);</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: Searches by authors name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cannot find publisher info &gt;&gt; requiring assistance.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>journal title not selected</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: system - limiters need to be entered in order if using left menu (ie – if you don't</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>click &quot;show more&quot; under date to open up advanced window). Once date selected, then</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>able to locate publisher Otherwise AMA publisher is not displaying</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>general comment: doesn’t use lib website much</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: Date entered manually (slider not used)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: Entered terms all in one line social media and branding</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OBS: Even though journal title not selected got correct answer in the end</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Tries to search in &quot;library resources&quot; for a book</td>
<td>Tries to stay in catalogue to search articles; (wrong turn &gt; assistance)</td>
<td>assistance required: Confused between publisher and source type – needs general academic journals not specific one</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>OBS: Searches by authors name</td>
<td>OBS: Entered terms all in one line social media and branding</td>
<td>search Query: “Sports journalism”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cannot find publisher info &gt;&gt; requiring assistance.</td>
<td>comment: - surprised by how many results – wants to filter more!!</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requires assistance with locating &quot;show more&quot; in order to find publisher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requires assistance to find journal article</td>
<td>Comment: Found it easier once knew where limiters were</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS: system - date slider doesn’t move on right side from 2020 &gt;&gt;&gt; 2018 (if left side moved first). does not realise can enter date manually above slider.</td>
<td>general comments: &quot;I am a novice... I use Google&quot; - do not normally use the DBS lib website; search online by themselves. Not familiar with EDS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS: frustration with moving date slider.</td>
<td>Comment: easier to enter date manually than drag the bar</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Tries to search in &quot;library resources&quot; for a book</td>
<td>Tries to stay in catalogue to search articles; (wrong turn &gt; assistance)</td>
<td>general comment: first time using advanced search</td>
</tr>
<tr>
<td>Does not know what call number is</td>
<td>Needs assistance to understand that they can type 2018 into date field [struggled with slider]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBS: Searches by authors name</td>
<td>OBS: Entered terms all in one line social media and branding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>requires assistance for: sorting (relevance is default);</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cannot locate journal article &gt;&gt; assistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS: locates publisher easily (as date entered first)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OBS: uses left menu only; not advanced search window</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix K: Categorization of Errors and their Recommendations

<table>
<thead>
<tr>
<th>Errors and Observations</th>
<th>Recommendations</th>
</tr>
</thead>
</table>
| Several participants were unable to distinguish **Catalogue** from **Library Resources** on the library homepage’s discovery search box. | **Local Customization.**
Use more clarifying terminology for search options.
Add subtext under **Catalogue** saying “Access Books and E-books.”
Replace **Library Resources** with “Databases” and add subtext “Access academic journal articles, newspapers, magazines and more.” |
| Some users were unaware of what a call number was.                                       | **User Education.**
Include library jargon in information literacy classes.                             |
| User entered all known information about a book in one go only to receive no results.  | **Product Enhancement.**
Improve relevancy ranking of Koha database to pick up better word proximity (for example, if user enters author’s name as well as book title).
**User Education.**
Include Koha search query construction in information literacy classes.               |
| Several users struggled to locate **show more** in EDS left advanced menu in order to apply various limiters. | **Product Enhancement.**
Increase text size of “show more.”
**User Education.**
Include limiting advanced search options in information literacy classes.             |
| Most participants did not realize they could alphabetize publishers and publications under **show more** options of EDS left advanced menu. | **Product Enhancement.**
Clarify the sorting feature by adding text at top: “Sort by”. Add dropdown box with sorting options (Alphabetical by Name, Number of Results). |
| Several participants struggled with using the date slider in EDS left menu. Possible system errors encountered. | **Product Enhancement.**
Consider removing date slider unless functionality can be removed. Users can easily type desired date range manually. |
| Most participants struggled to locate the sort feature at top of EDS results page.       | **Product Enhancement.**
Add text above sort feature "Sort Results" with more visible dropdown box and sorting options (Relevance, Date Oldest, Date Newest). Enlarge text size. |
| Most participants could not locate correct publication and/or publisher in EDS left advanced menu. In some cases this was due to a system error that required date to be entered before publisher or publication could be selected. | **User Education.**
Include sources and types of publications and publishers in information literacy classes.

**Product Enhancement.**
Correct the system error.
Appendix L: Screenshot of DBS Library Homepage Discovery Search Box

Appendix M: Screenshot of EDS Results Page


Subjects: Branding (Marketing); Marketing strategy; Brand name products; Websites; Internet Publishing and Broadcasting and Web Search Portals; Social media; Online social networks; Mobile apps
Appendix N: EDS Advanced Search Limiters - Publisher Windows

Default Setting “Hit Count”

<table>
<thead>
<tr>
<th>Publisher</th>
<th>Hit Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>wiley-blackwell</td>
<td>386</td>
</tr>
<tr>
<td>emerald publishing</td>
<td>289</td>
</tr>
<tr>
<td>taylor &amp; francis ltd</td>
<td>268</td>
</tr>
<tr>
<td>springer nature</td>
<td>174</td>
</tr>
<tr>
<td>mdpi publishing</td>
<td>156</td>
</tr>
<tr>
<td>sage publications inc.</td>
<td>63</td>
</tr>
<tr>
<td>cambridge university press</td>
<td>54</td>
</tr>
<tr>
<td>public library of science</td>
<td>50</td>
</tr>
<tr>
<td>epi scp</td>
<td>46</td>
</tr>
<tr>
<td>oxford university press / usa</td>
<td>46</td>
</tr>
</tbody>
</table>

Alphabetized by Publisher “Name”

<table>
<thead>
<tr>
<th>Publisher</th>
<th>Hit Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>a &amp; v publications</td>
<td>1</td>
</tr>
<tr>
<td>a. kollischwar</td>
<td>1</td>
</tr>
<tr>
<td>american bar association</td>
<td>10</td>
</tr>
<tr>
<td>american library association</td>
<td>29</td>
</tr>
<tr>
<td>american marketing association</td>
<td>42</td>
</tr>
<tr>
<td>asian research consortium</td>
<td>1</td>
</tr>
<tr>
<td>berghahn books, inc.</td>
<td>8</td>
</tr>
<tr>
<td>broadcast education association</td>
<td>12</td>
</tr>
<tr>
<td>cambridge university press</td>
<td>54</td>
</tr>
<tr>
<td>educational publishing foundation</td>
<td>12</td>
</tr>
</tbody>
</table>
**Appendix O : EDS Advanced Search Limiters - Publication Windows**

**Before date entered:**

**Publication**

<table>
<thead>
<tr>
<th>Name</th>
<th>Hit Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>journal of business ethics</td>
<td>449</td>
</tr>
<tr>
<td>journal of consumer affairs</td>
<td>40</td>
</tr>
<tr>
<td>journal of consumer behaviour</td>
<td>179</td>
</tr>
<tr>
<td>journal of management information systems</td>
<td>72</td>
</tr>
<tr>
<td>journal of marketing</td>
<td>346</td>
</tr>
<tr>
<td>journal of marketing management</td>
<td>627</td>
</tr>
<tr>
<td>journal of medical internet research</td>
<td>40</td>
</tr>
<tr>
<td>journal of nonprofit &amp; public sector marketing</td>
<td>71</td>
</tr>
<tr>
<td>journal of public affairs (14723891)</td>
<td>199</td>
</tr>
<tr>
<td>journal of regional science</td>
<td>166</td>
</tr>
</tbody>
</table>

**Update**  **Cancel**

**After date entered:**

**Publication**

<table>
<thead>
<tr>
<th>Name</th>
<th>Hit Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>journal of business ethics</td>
<td>26</td>
</tr>
<tr>
<td>journal of competitiveness</td>
<td>7</td>
</tr>
<tr>
<td>journal of consumer affairs</td>
<td>8</td>
</tr>
<tr>
<td>journal of consumer behaviour</td>
<td>26</td>
</tr>
<tr>
<td>journal of folklore research</td>
<td>6</td>
</tr>
<tr>
<td>journal of international marketing</td>
<td>16</td>
</tr>
<tr>
<td>journal of marketing</td>
<td>16</td>
</tr>
<tr>
<td>journal of pan african studies</td>
<td>10</td>
</tr>
<tr>
<td>journal of public affairs (14723891)</td>
<td>19</td>
</tr>
<tr>
<td>journal of the academy of marketing science</td>
<td>52</td>
</tr>
</tbody>
</table>

**Update**  **Cancel**
Appendix P : Transcription of Interview with Systems Librarian

Date of Interview: Friday 28th June 2019

Interviewer: Please describe your role and responsibilities as Systems Librarian for DBS.

Interviewee: I look after all the Library Systems – I’ve been in this role since May 2008. I wouldn’t call myself a fantastic Systems Librarian – I’m not that techie, but I’m techier than anyone else; and in the country of the blind, the one-eyed man is king! So this role suits me and I’m quite happy to do it and I seem to have done a decent job and its been an interesting role. I look after all library systems; the library management system (KOHA) - for circulation, patron information, books, enforcing library policies & regulations. I look after the library website. I look after all the other software, the calendar and booking software; anything that we use – the instant messaging - basically any software that we use. I also look after the hardware; the service stations, and the electronic resources. I’m kind of the first port of call if anything goes wrong with the software. I’m kind of like a triage nurse – I decide who can fix this – is it myself? Is it I.T department or does it have to go externally? So its been an interesting role. I’ve done a lot of things here, most of them have worked, some haven’t. But you’ve got to keep trying stuff – as much as to improve the experience of the users as well as for your own progression and career development.

Interviewer: How did you develop the Library website?

Interviewee: I think I’ve been through 5 iterations of the website, there was one before I came here, there was one when I started here, and they were pretty basic. There was no control over them. We got a new Head Librarian who was very boisterous – very active and wanting a library website, so in 2008, the powers that be, assented and turned it over to 2 guys in the I.T department. And they set about constructing an inhouse content management system for a library website. So we had some input into menu headings and pages but the look and feel and design of the website, we had no control over. And the results were pretty basic; I mean even for 2008, I think they’d be pretty bad and the worse thing about that was the content management system they designed, the WYSIWIG editor, which was appalling in that it was a complete lottery as to how the format, and font and colour, and size of the text would turn out. So you’d put stuff in and you’d think you were adhering to the rules, but actually you had 20 pt Comic Sans in red instead of 12pt Arial or whatever. And you’d get emails from people saying, “This looks awful!!” So that didn’t last very long... One of the 2 guys involved was a complete jerk as well... which didn’t help. So you can be a lovable fool, you can be lovable and competent – you can be competent and a jerk. But if you’re incompetent and a jerk, its not a good user experience! So we made noises again, and we went to them, and said, “This is rubbish!” and the powers that be agreed and said, “Well, we’re putting together a new website. We’re getting a professional content management system, we can set something up.” So again, we did the same, menu headings, pages that we wanted. We had access to the content management system as well, so we could do things ourselves. But we kind of had one hand tied behind our back, we didn’t have full control, full access to the system. So a lot of the stuff we wanted to do, we couldn’t do. One thing we wanted, one thing that comes up a lot, in the instant messaging, the library chat, is “what time are you open to?” So we thought it would be great if we had the opening hours on maybe the front page, so I did this: I found some Javascript that I could adapt, and we were using Google Calendar to display the opening times and I put the opening hours on the homepage and then when on holiday... When I came back, the opening hours had been removed and there was a terse email from one of the IT guys saying my Javascript had added 0.07 seconds to the loading time. And this was poor for the users. So they’d taken it off. What can you do? They had ultimate...
control over the website. So we struggled along for a while, with this, I mean, it wasn’t the worst, it was better than what we had before. And for the time, it looked fairly good. But we thought we could do better. Eventually, the head librarian and I went down to the National College of Ireland to talk to the librarian there, [name redacted]. We’d been using Open Athens – an access management system, but we were investigating switching to Shibboleth, something we did subsequently. We didn’t talk much about Shibboleth, but [name redacted] showed us libguides. She said, “You’ve got to get libguides!” So libguides is a content management system designed specifically for libraries; it’s part of a suite of products produced by a company called Springshare; and they’re all library-friendly products: so calendar and booking system we use called libcal, that we use, tutorials, forms and surveys wizard, FAQs. So we investigated libguides and thought this would be great. We approached the management again and said, “Can we have our own website using libguides?” And they said, “OK.” And we went and got libguides and started designing our website. And they came back to us and said, “Hang on a minute – Libguides, that’s gonna be hosted elsewhere; it’s not going to be on the DBS servers... You can’t do this!” and we said, “But we’ve spent the money, and we’ve got all these pages and we can do so much more than we can on Site Finity.” So we kind of agreed on a compromise by we would have a landing page on the DBS server and we could go off and do our own thing with our own pages, which would be hosted by Springshare. So we’d more control over the website this time. I got to put the opening hours on every page which has cut down on the number of queries on Ask a Librarian about opening hours. Which in a way is bad thing, cuz it means Ask a Librarian isn’t being utilized so much but its better for users if they can find information themselves then having to ask the Library staff.

**Interviewer:** Swings and roundabouts...

**Interviewee:** Swings and roundabouts, yeah. We still have the messaging; but usage has gone down. But people who use it still think it’s wonderful and that’s the main thing. And its dirt cheap.

**Interviewer:** Which company provides the database access and discovery services?

**Interviewee:** The homepage of the library website on the DBS server has a search box that searches our discovery set up and we use EDS (EBSCO Discovery Services/Systems?) and we have a nice clean looking homepage with not much on it other than search box – nothing else. What we did was, I constructed some code, a search box code; configured it, and gave it to the IT department and they added some bells and whistles, and put it on the homepage of the library website. And it’s a nice clean Google-like experience and it gets very heavily used. The marketing and IT are quite happy that we have the search box on the homepage. We don’t have a search box per se on any of our libguide pages. So a lot of traffic gets driven to the DBS homepage so everybody’s happy.

**Interviewer:** into the catalogue and the online library services – the articles.

**Interviewee:** Yeah.

**Interviewer:** What objectives did you have in mind when developing the search interface?

**Interviewee:** Well we wanted something nice and clean and we wanted... if you go in and look at the search yourself, as I’m sure you have done on numerous occasions, you’ll see there’s limiters. In the first instance we limit to full text and peer reviewed, to reduce the number of results. The search on the homepage is kind of a gateway to DBS library resources but at the same time if you do a kind of general search you’re going to be inundated with results so limiting to full text and peer reviewed is a way of reducing the information overload. That’s something were very conscious of. There’s an advanced search option, with the EDS, but maybe you need to know what you’re doing with
database searching. Everyone uses Google, or another search engine, but you just use the basic search, no-one really looks at the advanced search so we try and keep it nice and simple for users. Its kind of a gateway drug to other databases. You can see most of our databases through discovery – but not all of them. But you’ll be told what databases they come from, and maybe think about going away and searching individual databases themselves.

**Interviewer:** So it would only be advanced users using the advanced options, really. Postgrad...

**Interviewee:** The nice and Google-like interface for the undergrads, and we have on our website, subject guides. And we have a databases page where you’ll get recommended the best databases for particular subjects. And we have another search box which is a subset of Discovery Service with resources in the Discovery database server which best fit the topic at hand. Best of both worlds there.

> recording # 2 starts here<

Our roles are functional, and for the most part, the menu headings reflect our functions – there’s an E-resources page, or an E-library menu heading, which reflects me; there’s a research heading which reflects what [name redacted] does - he’s a research librarian. There’s a sort of information skills heading which reflects [name redacted] role. There’s a – well – not a menu heading, but a page of collections and that’s [name redacted] – [name redacted] does cataloguing and acquisitions and the collections page is a nice wee mini website in itself. And apart from maybe the “about page,” we tried to keep things to a minimum; not too boxy and not too cluttered. We’ve used what’s called an accordion set up so everything is boxed. You click in the box to expand or close the box so you can control the amount of text you can see. So hopefully for the users they wont be overwhelmed by huge swathes of text.

**Interviewer:** Below the fold, yeah.

**Interviewer:** What (if any), usage statistics does EBSCO send you? Regarding - homepage hits, articles opened.. Do you get log files, or details of advanced search options?

**Interviewee:** EBSCO’s really good. There’s 2 types of databases providers – or 3 actually –EBSCO - and Proquest (which we also have) – are aggregators that take material from other publishers. You know the publishers – Elsevier, Emerald, they all have their own platforms. There’s also the sort of business intelligence – the data sites as well like Passport and [inaudible]. The aggregators are very good, and particularly for providing administration platforms which give you a user name and password and you can login, and you have a lot of control over the databases that you show, how you search the databases, and they’re very good with statistics. So they don’t send us anything, unless I specify in the admin platform – so I have the monthly usage stats from EBSCO themselves and I can see how many articles are being downloaded and how many searches are being done. It’s a bit of a cheat though, in terms of.. well.. In addition to EDS from EBSCO, we have lots of EBSCO databases, because we think they’re very good value for money, bit of a lucky dip really.. You know, you can get full text for some journals and then just metadata for other journals. You have a 3 year contract with Science Direct to put up 100 Elsevier journals, and then the contract expires, and Elsevier raised their prices by a factor of 10, and EBSCO say no. So all of a sudden the full text disappears from the EBSCO platform so it can be quite random – a bit of a lucky dip. But we have a broad range and very good usage, we can look at all the searches but because we have EDS as well as EBSCO databases, these are all incorporated into the EDS central index, so if you’re searching a
Library and information Science source, you’re not actually searching through Discovery. But when you’re searching academic search complete, you are searching Discovery. So your search on academic search complete counts as a search for library and information science source as well. So the numbers are grossly inflated. You can, with some fine tuning, look at individual databases, I think, but everything is basically lost because of the number of hits on Discovery. And we get some ridiculous figures, you know hundreds of thousands of searches a year.

**Interviewer:** Do they give you abandoned query numbers?

**Interviewee:** No. But I have a Google Analytics account, so I’ve added a bit of code so I can see what pages are being looked at on EBSCO Discovery. They’re mostly meaningless results pages, but you can see the search query, so you can see what the most popular search queries are. It’s something we haven’t done, but we could look at... you know... I’m pretty sure, I know there will be peaks of searches over time. I mean looking at circulation, for example, the Business MBA’s; there’s a business ethics assignment in October/November, so all, you know we have a stack of business ethics books, and in October/November, they go out the door and there’s nothing on the shelf, and they’re all put on hold. And outside of October/November, there’s very little usage. I’d imagine if we looked at Discovery, we’d see the same peak in searching, which is good, because you don’t expect everything to come up all the time.

**Interviewer:** Any other trends in those statistics – in terms of downloads, and the different cohorts, and years coming into DBS? Nope?

**Interviewee:** No..

**Interviewer:** What about undergraduates vs postgraduates?

**Interviewee:** No.. The postgraduates tend to use individual databases rather than Discovery. There’s a MSC and Data Analytics that I might rant about later... We recently acquired a resource subscription called IEEE Xplore which is very good for Computing and IT and AI, and tangentially of interest to LIS students as well -- in terms of automation and app searching, and all that kind of thing. So there’s not enough of that on Discovery; not enough of that through other databases, so we got a subscription specifically for our MSC students; but we have IT students, fintech students, library students, undergraduates doing computing degrees, so this resource would be of interest to them. Our Masters’ students shouldn’t be using the Discovery homepage so much – as much as they should be using specialist databases.

**Interviewer:** I guess related to that, so, to what extent does the provider allow you to customize and personalize features for users? Can you change layout, navigation, terminology?

**Interviewee:** We can’t change terminology, we can change the layout perhaps, we can toggle between the landing page – talking specifically about EBSCO and Proquest – because we have the same kind of features with Proquest – they can toggle between basic search and advanced search, I think we have basic search switched on because the basic search is a nice clean Google search box interface, whereas your advanced search is full of boxes, and limiters, and options – you know and if you’re not accustomed to that, it can be pretty daunting. You’ve been trained with Google and other search engines, shown a nice clean interface, and I think, the internet is set up for ease of use, rather than functionality. I think that Google in particular has destroyed the searching capability of folk.

**Interviewer:** Do you face any issues with the provider regarding metadata indexing?
**Interviewee:** Yes... So we used to subscribe to something called Emerald, it’s a publishing platform; which was very heavily pushed by us, to the lecturers and staff. The lecturers would use Emerald articles in their reading lists, so it got a lot of use; because it was our main business resource. And their reps would come and visit us, and say, “We love you! You’re one of the top 10 users of Emerald in the entire world!” I bet you say that to all the people you’re visiting! So it was good, and we want our resources to be used. If people don’t use them, there’s no point in subscribing to them. Emerald wasn’t cheap. Last time we renewed, it was something like 28,000 Euro (plus VAT); so if it costs that much, you want it to be used, you want downloads. So this was great! And then, Emerald and EBSCO came to an agreement, whereby Emerald metadata would be indexed in the EDS index, and after that Emerald use plummeted! Partly because people were searching EDS because we were promoting it, instead of searching the individual databases but you know, we thought, Emerald is in there, so, they should get results back. So EDS, same with Proquest... Proquest have a Discovery service of their own, called Summon, which pretty much has the same features as EDS; its perhaps more customizable. At the time, you know, EBSCO and Proquest don’t like it each other, so you don’t get much cross over... in terms of... you know, you won’t find lots of EBSCO journals in Proquest, and vice versa. The thing about EDS, is, I’m saying, [it looks like] it’s set up to maximize the return of EBSCO journals, and promote articles in EBSCO databases. Their algorithm is biased towards EBSCO in general.. So what happens is that...

**Interviewer:** So it will affect how students are using it – how they are retrieving then...

**Interviewee:** Ya – because there’s non-EBSCO databases in there; there’s Emerald, there’s J-Stor, Proquest, but everything looks like an EBSCO search result. Which is not necessarily the same as something you see in J-Stor or Emerald, or whatever, but also you do a search, and - by God! We did enough of this – we searched for specific articles from Emerald journals in the EDS, and we’d look at the results, and the Emerald result might not be in the first page, it would be relegated... because you might have access to lots and lots of databases which contain the metadata. And so we spoke to Emerald about this, and we spoke to EBSCO about this, and the answer we got from EBSCO said that their algorithm promotes “rich metadata” – that was the exact phrase that they used. So.. people who use EBSCO, they’re looking for full text, but the search algorithm isn’t necessarily returning full text. Its returning the “rich metadata” .... I mean, I went to university in the ‘80s and this is before CDs and the internet and stuff... and we had access to big books called ‘The Abstract Series’—there was biological abstracts, chemical abstracts... and you looked up a big index and it would give you a page number, and an article number, and you go to the page and article number, and you’d get the metadata. You know you’d get the abstract, and the title. And that did you! I mean, if you were really keen, you could submit an Inter-library-loan request. But you knew enough to get by on just the abstract, that if it was something you wanted or not. But kids these days -- its full text or nothing! They want full text; which is understandable. I can’t blame them. You get frustrated when its just the abstract. So if you’re searching Discovery, be prepared for lots of abstracts. Which is why – the limiter we have on the search box on the homepage – is full text.

**Interviewer:** What factors are considered when making changes and updates to the search interface? do you consider student feedback; library survey results; statistics; new trends you want to try out...

**Interviewee:** New trends, yes. But you know, there’s some stuff we can do, you can play about a bit with the CSS, you can play about with HTML. For some changes you need JavaScript.. I can write whole worlds in JavaScript, or I could... I could do more sophisticated things a few years ago, but I’ve forgotten it all. Programing is something you need to keep up with, otherwise it just goes away. EBSCO are fundamentally EVIL they’re basically... Elsevier as an aggregator -- they’re not very nice,
but at the same time, there’s lots of lovely people who work for EBSCO and their customer service is second to none. If you go to them with a request, they will do their best to help you out. We subscribe to EBSCO and Proquest databases – EBSCO customer service is head and shoulders above Proquest. So you can do some customization – but at the same time, we’re loathe to do that – because we’re kind of in a groove – where everyone likes the search box; everyone likes the results. No feedback to say otherwise. People like the resources so if it’s not broken, don’t fix it. And for something as important as that, we’re weary of making changes, in case we alienate our user base.

**Interviewer**: What types of feedback do you receive from students about the library website? do they ever make comments about navigation, layout, terminology; search....

**Interviewee**: Terminology, you can do nothing about really, because library terminology is so ambiguous; you have a catalogue, you have OPAC....

**Interviewer**: Call numbers...

**Interviewee**: Call numbers... holds.. Maybe we should have a page on the website where we explain...

**Interviewer**: Jargon?

**Interviewee**: Jargon, yeah... Maybe we should do something like “the library de-mystified...” that’s a very good idea! Whether people would actually look at it, is another matter. But we do inductions... we do classes... You know... and we do use a particular terminology... we hope that folk can pick it up... we do try and explain stuff, as things arise. The feedback... well... its mostly good. If you look at the library survey, you’ll see that most people are satisfied; most people talk about the user-friendliness of the website, which makes my heart glow. And at the same time, you might find comments like, “The website is not very user friendly!” You’re not gonna satisfy everyone. Most people are satisfied with the website, so were happy with that. Most people prefer the libguides website to the old one, so we’re happy with that.

**Interviewer**: By what means can students ask the library staff for help?

**Interviewee**: There’s... well, at the desk, we have fantastic desk staff – [name redacted] and [name redacted] – I mean, we all help out at the desk one way or another, and we all try to be very helpful because we realize that the users are the reason we’re here. If we stop providing good quality service, then, our jobs might go... So, you can come to the desk, we have phones, we have library email, we have our contact details on the website; our telephone and email addresses. The “ask a librarian service” which I mentioned – the instant messaging, which is fantastic, I think. It’s myself and [name redacted] which are the mainstays of that. [name redacted] mostly, cuz somedays I forget to go in, but [name redacted]’s always in. So it’s either myself or [name redacted] who are answering your questions, if you’ve used the “ask a librarian service.”

**Interviewer**: I have...

**Interviewee**: Very good! So there’s a variety of methods.. It’s good that we have... you know... it’s not just a person... we have students who are entirely online, and so, they don’t come into DBS, they do online diplomas. We have a bunch of students in Malaysia, who do a DBS course. So, you know, there’s been lots of interaction with them on “Ask a Librarian.” And email as well. You can’t have too many access points for help.
**Interviewer:** Definitely. That’s related to the next question; about which cohort of students do you think ask for help more? (undergrad/postgrad) ?

**Interviewee:** We have lots of international students coming from different education systems. So we have lots of students from India and they won’t have that much experience of sort of the western...

**Interviewer:** Research process?

**Interviewee,** Ya, the research process.. the learning process. So there’s of lot of... ignorance, for want of a better word there. Some of them undergo a pre-Masters’ course before they start their Masters’, and that makes a world of difference for them, and everyone should be doing that, I think.

**Interviewer:** So that they understand the academic expectations?

**Interviewee:** Ya, and then they have a better idea of what’s expected of them. What the... rules and regulations, the sort of framework that they’re based in. I can’t really... You know, the folk who come in direct from school, as it were.. and the mature students who are doing Bachelor courses or Masters’, we do Springboard courses, certificate courses, that’s for folk, you know, unemployed people, or who have been out of education for a while, they might not be using libraries for the most part. They can be a lot more challenging. You have folk who come to you... Demographics are all over the place. You’ll have Irish folk, you’ll have foreign folk, young folk, old folk; who’ll come to the desk – or on “ask a librarian,” and they’ll ask questions like, “how much is it to rent a book?” “It’s free here! It’s a library!” It’s expectations, in terms of.. I mean, we have to be at a pretty basic level. And we keep things simple, to accommodate...

**Interviewer:** Everybody. Yea, exactly. **What is the most common search-related issue students ask about?**

**Interviewee:** “Why can’t I get full text?” They go off and do their own searches... A lot of the non-EBSCO stuff that’s indexed in EDS, in theory, there are links that are set up that can take you to the full text. But these are very flittery - they’re very difficult to get right, and a lot of the time, they don’t work.

**Interviewer:** How intuitive and easy to use do you think the search is for students?

**Interviewee:** We’ve kept it simple... A Google-like search box. Type your query, press search. And away you go. So I think its fairly intuitive. Its good.. In a way, we should have the EBSCO databases set up like that. A lot of our databases are EBSCO databases, particularly the themed ones. You can use EDS, you can use the other EBSCO databases. Where things fall down, perhaps, is that there’s no common standard amongst vendors for search -- you know, limiters, facets, advanced search options, and displaying results. So everything is different, and, of course, you have different options on different databases. We do run classes... [name redacted], our information skills librarian, will run classes on searching databases. He gets invited into classes as well. He’ll explain, how to search.

**Interviewer:** So overall, do you think the search interface is meeting the users’ expectations – are they finding what they’re looking for?

**Interviewee:** I think, it meets their expectations, but at the same time, being happy with what you find isn’t necessarily meaning that you’re finding the ‘right things...’

**Interviewer:** You have to define “successful search...”

Interviewee: Yeah...
Recording #3 starts here:

**Interviewer:** Do students require a certain level of expertise in information literacy in order to use the search? If so – what types of skills?

**Interviewee:** Yes and no… They do need to be able to critically assess what they find. They do need to be able to construct search terms. You can’t just search for management – you have to be specific. You have to look at your results, you have to read your results. So going back to EBSCO again, keywords will be provided for results – you should look at the results, look at the title, are you interested in it? What are the keywords associated with this article? Can these keywords be of interest? Should you go away and do a supplemental search using those keywords? That’s the thing with being ‘happy’ with what you find. You might just be happy because you’ve done a superficial search and you’ve got a few results back; but you’re not doing anything in depth. Again… that’s the Google-generation for you, I think.

**Interviewer:** How does DBS Library provide library and information literacy skills to students?

**Interviewee:** We’re involved in the induction process. I think honestly, that’s a waste of time, because if you’re fresh off the boat from school, or from somewhere far away, and you come in, and you’re being bombarded with information...

**Interviewer:** All in one day...

**Interviewee:** All in one day, yeah... And it’s difficult to take in. We have a dedicated teaching librarian in information skills, [name redacted]. [name redacted], as well, has postgraduate in law specialty. They’ll do one-on-ones, which you can book. [name redacted], in particular, does a series of classes covering different topics; how to reference, how to find sources, where to search, how to search. There’s several kinds of classes, there’s classes which are embedded in to the modules themselves, there’s classes put on when a lecturer can’t make it, or there’s a gap in the schedule, and “Can someone from the library come in and do a class on using the library?” And there’s also drop in classes you can book. So 3 kinds of classes. And they get good feedback, so it’s primarily through the medium of... it’s personal communication... We have guides on the website, but... there’s ways of doing guides and I’m not sure we fully adhere to them – or that we optimize the way that they’re done, but we try... We have a “useful websites” page – you know – don’t just accept any old rubbish on the web that you find – do a...

**Interviewer:** CRAAP test!

**Interviewee:** CRAAP test, yeah, exactly. Cuz a lot of the Internet is crap, let’s face it. We have guides to the website, but I don’t think there’s any substitute for someone talking to you.

**Interviewer:** How does the teaching faculty utilize the library services – like accessing reading lists?

**Interviewee:** We have something called LORLS – which is a reading list software, that allows you to... put your reading list up and it links directly to the catalogue. Or you can put a link to an article. So you can do more things with it – not just having a list. Some of our faculty, enthusiastically, use LORLS. Others, its left to [name redacted]. Some people are very good at using the library – and promoting the library. Other people have never set foot in a library. Which is sad, because if you using the library, then you’re gonna promote it to your students. And if you’re not using the library... You talk to some folk – “Oh, I just use Google Scholar.” So chances are, his students are using Google Scholar... There were staff inductions in the past, and we’ve been involved in them. But again, same conditions that applied to the students – there’s just too much information. Couple of years ago, I
did do a sort of study into the impact of the library, in terms of usage – and if it affects final grade. And there is a correlation (I can’t say its causation), but there is a correlation between using the library and getting a better exam grade. So we have this nice graph – library usage by first class honors students, second class, third class... That’s the one thing we put in induction which I think sticks: use the library and get better results. QED. We tell staff about that and we tell students. We did have a staff open day and we’d have a stand. [name redacted] would talk about reading lists and buying the books for the course. You can be at the desk and you’ll have a student come up to you with a list -- “I can’t find any of these books” — “We don’t have any of these books because your idiot lecturer didn’t provide the reading list to the library!” We’d have the staff open day and we’d explain these things - but we found its just the same people coming along year after year… They love the library and they like to listen to us speak, and that’s great, but... the folk who aren’t here, we want them to come instead!

**Interviewer:** Yep. Exactly. Many researchers have been commenting that students, particularly undergraduates, struggle with library interfaces – finding terminology to be complex and overwhelming. Not understanding how advanced features work – and in many cases, don’t go beyond the first page of results. To what extent do you agree/disagree with those statements?

**Interviewee:** I totally agree. I think, I said earlier, search engines are all about providing results, and never mind the quality – and they have their own algorithms – as to what gets promoted, what appears on the front page. Then you have SEO ‘dark arts’ – whereby folk will try and game the system. Google – their secret sauce involves the number of pages that link to you, I think, as to how high you appear in the search results. So there’s folk who go around sending emails to people saying – “Put our site on your site!” We get emails... we have the useful websites guides on our website – and you know, once a week well get an email from someone – “Hey I saw your site and it’s brilliant! I saw all these useful resources, would you consider putting this site up, it’s really good!” and the answer is always “No.” It’s a well know SEO technique... So... I think... you know, folk are ruined by the internet – it’s all about ease of use, it’s not about depth – it’s not about using your critical faculties. Also - I think a lot of this stuff needs to be taught at second level – having libraries in secondary schools are very important, and having dedicated libraries doing classes in these kinds of things. We have no say in second level policy – we struggle with the library at our own institution. What can we do? Maybe it’s something for the LAI here – the Library Association of Ireland – to get involved and try to promote and advocate for libraries in schools to teach information skills at secondary level.

**Interviewer:** What measures could be taken by the institution or by the provider – to alleviate and improve this situation?

**Interviewee:** DBS – I think there’s a lot of talented people in the library, a lot of us are good at communicating and we don’t mind speaking to students. I think all modules should have an information library skills section or separate module within their course, not necessarily running the full semester or anything, but certainly several weeks..

**Interviewer:** One class isn’t enough?

**Interviewee:** Ya. [name redacted] does classes on arts and business databases, finding sources, preparing your literature review, searching databases. All these things should be covered in the module. I think. Or you have a separate module for all this.

**Interviewer:** You mentioned that students encounter issues locating full text– what do you think can be done about that?
Interviewee: A lot of stuff. The rise of open access which is great. We produce an open access peer reviewed business journal. It’s great. We call for papers. So having stuff more freely available. Academic publishing is a bit of a scam, but it’s not just that... You might... You know, there’s various layers of open access – green open access - you can put a version of the paper you submitted to an evil academic publisher and put that on your institutional repository or you can put that on your own website. I think that librarians have to make users more aware of alternative avenues to acquire full text. There’s that Russian site that we won’t name, because it’s a very... well, it’s breaking copyright... but - Researchgate. You might find stuff on there. I’m sort of ambiguous about that. some stuff is allowed to be there, some stuff, isn’t. But you have lots of institutional repositories, you have subject repositories. And people need to be made aware of these. And you have things like the OA button – unpaywall apps and small add ons... browser extensions...

Interviewer: Like Lazy Scholar...

Interviewee: Ya, EBSCO have a series of apps which you’re probably aware of, where you can save pdf to cloud and export to Zotero... Youtube search, that kind of thing. They’re preparing OA buttons / Unpaywall apps in EBSCO Discovery. But you should be able to get information about full text access elsewhere. That would be great. There’s a sort of box were in – in terms of us, we have these subscribed resources... this is how you search them and this is how you get full text. But there’s a wider world of academic full text out there. Librarians have to be more aware of this, and have to make users more aware of this. If you’re looking for something on Discovery and the full text isn’t there, it’s not the end of the world.

Interviewer: What new features are currently being developed for the library search? You mentioned the OA button...

Interviewee: Ya, We’re very interested in acquiring that from EBSCO. Were in a bit of a lull at the moment in terms of... so we switched from Open Athens to Shibboleth so its one password for everything. That was 2017. The new website was 2017. So were in a quiet phase. I mean there’s always things to be done. But there’s nothing big at the moment. We do process the feedback from the library survey. A lot of the questions are open-ended. But were always contactable. And users are happy with our services at the moment so were not under pressure to change. And, you know, if It’s not broken, don’t fix it. It would be nice to experiment with a few things on the website...

Interviewer: With trends that are happening in the industry overall? To improve discoverability & retrievability.. Like offering more personalization...

Interviewee: Personalization.. I mean a lot of vendors these days, you can sign up for a personal account and you can save articles and save your search history, which is very important. But, there a lot of stuff which isn’t going to affect us. Geolocation mapping kind of thing – were a small library – there’s the stacks. We don’t need to tell you where a particular book is. We’re not big enough. A lot of the stuff might be geared towards bigger academic libraries. We’re small, fast and mobile. The paradox is that we can do this stuff quicker. But there’s a lot of stuff we don’t need to do.

Interviewer: What about breadcrumb trails? That lead from one source to the other?

Interviewee: Again, were at the mercy of our vendors. We do have links on pages, but they don’t always work unfortunately, and that’s the thing. It’s something that we can look at improving, but again, we rely on the vendor for that. Were quite happy where we are at the moment. If something comes along that we can improve upon, something new we can incorporate, well do our darndest to do so, but I think we provide a good user experience here. I have to say a lot of UX work, I think is
done for the benefit of the UX researchers, not necessarily the users. I think to do UX properly you need to do a lot of ethnography – you need to observe users in their natural habitat and see how they get on. We have a small staff – So it’s difficult to…

Interviewer: You need a dedicated person to do it...

Interviewee: Ya.

Interviewer: Some critics are saying that the Library’s role in discovery and delivery will diminish – Because – traditionally they would provide users with access to materials behind paywalls >> and increasingly, nowadays, they can be found for free : you mentioned the advent of google scholar, using plugins like lazy scholar; open access, and this reduces the need for institutional discovery services.

Interviewee: Ya but it’s the awareness of these things…. It’s one thing to know about Google Scholar and another to know about the plugins. Again... few people go past the first page of search results on Google. I cowrote a papers for a business journal in 2017 and I did have to use Google Scholar to look for material for the literature review. And I got to page 56! The things I saw... We live in an age of instant gratification: “Nothing on the first page? Well, then there’s nothing there!” People don’t have patience anymore.

Interviewer: So how do you think the role of the librarian will evolve to cope with this behaviour?

Interviewee: The demise of libraries has been suggested for decades... centuries probably. The internet hasn’t really made a dent in libraries I don’t think. They come to us looking for the good stuff. We know where the good stuff is. Anyone can use the internet, but few people can use it well.

Interviewer: We’re there to help them navigate through...

Interviewee: Ya, navigate through.

Interviewer: Take a librarian as a guide...

Interviewee: Ya! I don’t see us disappearing anytime soon. You have your self-service stations. We love the self service stations. We were early adopters of self service stations but our rationale was that it freed up the staff to deal with more interesting queries. It made their job more interesting, not just stamping books.

Interviewer: Not just circulation...

Interviewee: Ya. So you can be with the students and spend the time. If you’re here during the day, you’ll see hapless looking students sitting behind the desk with [name redacted]. She schools them in the research process, so I mean, that’s more interesting that issuing and returning books. So, by all means, you can automate the boring stuff, but machines are never going to be able to sit down with you and explain things to you.

Interviewer: Thank you so much, [name redacted].