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EBSCO Discovery Service (EDS) Usage in Israeli Academic Libraries

Riki Greenberg

Abstract

Awareness to the problem that different search interfaces discourage patrons' use of library information sources has led academic libraries to implement web-scale discovery services. These services offer the user a "Google-like" search experience of library resources. This study aims to explore library professionals' satisfaction, patrons' information behavior, and use of EDS discovery tool service in academic libraries in Israel. Mixed research methods were used in this study: qualitative and quantitative. Qualitative research methods are through content analysis of library directors' interviews, and quantitative research method is through collected library metrics (from Google analytics) data analysis, regarding usage patterns and search session analysis. The study aims to gain insight regarding library implementation and patrons' information behavior of the EDS discovery tool, in Israeli higher education institutions.

Keywords: information behavior, academic libraries, Israel, EDS discovery service, search in the library

1. Introduction

Academic libraries are committed to providing their patrons with an easy and intuitive search experience, similar to what they expect from their favorite search engine, Google. Discovery services have an important role in revealing the library's collection to its users. These tools reduce time and effort spent in both searching and learning to use the various database interfaces. A query from one search box produces a list of organized results for the user to review. Assessing user information behavior and librarians' feedback are crucial for improving these services and presenting library patrons with a better user experience.

2. Information search in libraries

User expectations for library resources have changed dramatically; individuals have become too impatient to search in multiple databases to access desired information. Library patrons are challenged by alternate search interfaces that can discourage the full use of the given resources. Information overload has become another issue; users have online access to a variety of subscribed databases, but they have limited understanding of what they are and how to use them. Therefore, librarians are actively seeking better ways to integrate and present information [1].

Searching for sources in the library cannot be discussed without addressing the impact of the Google search engine. Google has become a powerful presence

in the life of all library users. It is the most popular search engine for queries about daily issues and for academic needs. It empowers library visitors to search for their academic information needs, within an easy and popular interface [2]. In libraries, some consider this an obstacle, and some see it as an opportunity for innovations and improvements. One thing is certain: Google redefined the search experience, and libraries should acknowledge this.

In 2004, Google launched Google Scholar, a tool for discovering scholarly information. Google Scholar is a search engine for academic articles, theses, books, abstracts, and court opinions from academic publishers, professional societies, online repositories, universities, and other websites. This free resource, with its basic and familiar interface, has the potential to serve as a scholarly metasearch information engine [3, 4]. Google Scholar has received mixed receptions from the librarian community. It has some advanced search features, but it provides no interface for refining the results. Users can set preferences such as language, year, author, and periodical title. They can also view an indication of the libraries from which it can access the source, citation export options, and how to cite the source (for many citation styles). The reviews and critiques of Google Scholar have been mixed, at best. Its content, its search engine, its interface, and its citation count have all been criticized. Patrons of libraries who have subscriptions to the digital archives of publishers are the greatest beneficiaries of Google Scholar, as with a single search they are led to the full digital text versions of the articles [4–6]. Google Scholar is very different from library database interfaces and their search options, yet it introduces library users to scholarly articles through a familiar and friendly interface.

3. Discovery tools

Discovery services are vital tools to increase search ability and accessibility of library resources. A combined search interface for multiple resources will help users discover relevant content. The tool reduces time and effort spent in both searching and learning to use the various database interfaces. It broadcasts a query across all sources and returns one organized list of results for the user [7, 8]. Discovery services have become almost essential in academic libraries. The libraries need to create a discovery layer that simplifies the search process while broadening the richness of resources availability in a Google-like interface. The discovery service is comprised of pre-indexed materials from many library information sources. The discovery solution enables faceted browsing, relevance ranking, and limitation options to refine the search results. Discovery tool services are the libraries' attempt to offer a "Google-like" search experience of library resources.

The discovery tool makes it possible to create a centralized index of an institution's information resources through a single point of access. Since the content is pre-indexed, response time is very quick and meets the user's needs. Discovery tools enable to connect patrons with the library's storehouse of information and search indexes and databases quickly and easily. These tools tend to be more popular with users, especially undergraduates, than traditional library search tools [9–12].

Libraries took upon themselves to review current web-scale discovery solutions and implement it accordingly. In their review, Karadia and Pati [13] suggest a summary of discovery tools' advantages:

- i. Connect users with the content from different sources
- ii. Quick search across a vast number of resources in a one-stop search box

- iii. Relevancy-ranked results in an intuitive interface expected by today's information seekers
- iv. Simplify the research process
- v. Increase the use of library resources

As Hanrath and Kottman [14] summarize, there is a wide consensus in the literature that discovery tools are one way of retaining patrons who are already immersed in the “world of Google” and to bring them back to the library world.

In this work, we present a case study of six academic libraries in Israel, who chose to implement EBSCO Discovery Service (EDS).

4. Study population

Education is highly valued within Israel's national culture, and its higher education sector has been acknowledged for helping to encourage the country's development. There are nine universities in Israel, as well as numerous higher education colleges. Courses are often taught in Hebrew, though Israeli universities also offer English-taught programs. In Israel, academic libraries started to implement discovery services in 2010 [9].

This study uses data from three governmental universities and three colleges (two governmental and one private), to reflect on information behavior and discovery tool use in different types of users and institutions. Every library in our study is unique, each with a diverse organizational culture, a distinct student population, and different educational programs and specialties. This enables us to draw a representation of academic library users in Israel.

5. Methodology

The study uses a mixed-methods approach to gather both quantitative and qualitative data on usage of EDS discovery service tool. We analyzed librarians' interviews regarding their professional perspectives and patrons search information behavior via Google analytics transaction logs to reveal interactions between users and the discovery system.

6. Findings and discussion

6.1 Qualitative research method

We contacted 10 academic library directors, according to a given list of Israeli libraries that implemented the EDS service (at least 2 years ago). The contact was made via email, which asked them to participate in the study; six of which accepted. We conducted an hour-long interview by phone or by face-to-face meetings, with each library director (two of which, referred us to the head of the discovery tool services in the library). We discussed three topics: the decision procedure, the essence of EDS discovery tool, and the search behavior of the library patrons. The questions were regarding their professional practice, general philosophies, and opinion.

6.1.1 Reasons for choosing EDS

Libraries based their choice to implement EDS discovery tool on peers' recommendations, joint committee discussions, and literature reviews. Massive library and information science (LIS) sources deal with issues regarding planning, choosing and implementing discovery tools. Librarians are exposed to information made available through peer-reviewed papers, presentations, and online discussions in various platforms (national and international). In her book *Planning and Implementing Resource Discovery Tools in Academic Libraries*, Mary Pagliero Popp [15] suggests that there is a framework for evaluating discovery tools. This framework discusses involving library staff from various libraries and asking them for their technical and functional experience. There is also a thorough review on selected features and best practice for the evaluation and the selection procedure.

According to the interviewees, the main reasons for choosing EDS were the ease of use and the Google-like interface. Shi and Levy [16] determined that EBSCO Discovery Services is one of the discovery search tools that is highly recommended by librarians. In her work on maximizing academic libraries' collections use, Kristine Calvert [17] declares that EDS presents a simplified search experience through a single search box, which exposes a far greater number of the library's resources. In their study, Thompson and her colleagues [18] studied the results of George Washington university library staff's focus group. The study was conducted to assess user satisfaction with EDS service, and it found that librarians like the familiar EBSCO host-type interface as their discovery tool search box.

The quality of metadata was another reason mentioned in the interviews and the fact that EBSCO is also the vendor of their most popular databases. Therefore, the librarians believed the service would reflect the same professional advantages. As mentioned in the literature, EBSCO has a solid reputation for their comprehensive collection of content, sophisticated search options, and responsive technical support. Kristine Calvert [17] studied the Western Carolina University library decision to use EDS discovery tool service. In her findings, she suggests that the preference for EBSCO's products was based on two primary reasons. First, West Carolina University library has subscription to a large number of databases on the EBSCOhost platform, therefore wanting to maximize use of those databases, and second, the confidence the library has in the product relevancy rankings.

Two of the librarians in the study did a cross search to compare relevancy of results in three available discovery tools and found EDS to have the highest result relevancy. In the literature there is not a definitive answer on which discovery tool produces the higher relevancy results. In their study, Shi and Levy [16] review EDS advantages in performing a smart search. They found that the service leads users to adequate results as well as offering suggested adjustments by narrowing or limiting the information sources retrieved in search. In a survey named "Librarian Assessment of the Quality and Relevance of Search Results" conducted by librarians at the Cornell University library [19], the responders ranked EDS as better in its interface and in its ease of use. As for the search results, EDS appears to work better only for some disciplines (compared to Summon). Asher, Duke, and Wilson [3] studied the ability of students to locate information resources, which indicated better results for the students using EBSCO Discovery Service.

6.1.2 First choice of search tool

All the interviewees thought that Google Scholar was and still is the student's first and primary choice. The fact that it is well-known and familiar to most of them makes it the preferable search interface. This fact is well supported by the literature;

Google Scholar receives higher usability and preference ratings from students because it is easy to access, convenient, easy to use, and fast [20–24]. They always prefer Google Scholar to library databases and discovery tools.

Interviewees mentioned the fact that libraries need to keep cooperating with Google Scholar and enable access to its subscriptions. Patrons of libraries, who have subscriptions to the digital archives of publishers, are the greatest beneficiaries of the Google Scholar services. With a single search, they are led to the full digital text of the requested item [6]. In their research, Dempsey and Malpas [25] studied the future of the academic library in the context of diversity and change. They suggest that library users have lost their track on content supply. There is an increasing overlap between library and Google Scholar in workflow and network identity when they disclose and share information sources.

Most library directors mentioned Google Scholar and EDS as part of the same instruction meetings for research students. Hanneke and O'Brien [26] found that while librarians always hope for the opportunity to provide instruction on advanced searching, students and faculty could successfully use discovery tools to perform a research process. Therefore, searching instruction is either not available or not desired. Contradicting their results, other studies [27] have found that information search interfaces including Google Scholar and discovery tools very often retrieve a large number of records in response to a simple query, which requires search expertise to manipulate the results to find adequate information. Users need librarian's guidance in order to find and retrieve information.

Another topic that arose from the study was regarding search results. According to the interviewees, the EDS system provides fewer but better results than Google Scholar. This is supported by the literature; Karen Ciccone and John Vickery from North Carolina State University Libraries [28] found that there was no significant difference in the results between Summon and EDS, for either known item or topical searches. They also found that the higher proficiency of students using EDS leads to higher quality academic resources. However, Google Scholar outperformed both discovery services, in topical searches.

The librarians recommend EDS to their students, and it is referred to as the library's "Google Scholar." Asher, Duke, and Wilson [3] well described it in their work *Paths of Discovery* when they review the advantages of discovery tools:

Providing a uniform search interface and aggregating content behind a single "brand," discovery tools like EDS, Summon, and GS help to diminish the "cognitive load" on students by eliminating the often difficult and confusing step of choosing an appropriate disciplinary database, as well as the need to repeat searches in multiple databases.

6.1.3 Coverage, relevance of results, and ease of use

Ease of use was the most popular motive in all the interviews. The fact that students do not need to learn how to use new database interfaces makes it much easier on the library clients. Studies of information seeking behavior indicate that users act according to the principle of least effort and ease of use [29]. Students also tend to minimize their effort at the expense of the quality of their results. Information sources that are found quickest and easiest are those that are most likely to be used by students [3].

All the library's directors mentioned examining usage statistics to ensure that the tool is highly used among the patrons. In the literature, we find that libraries must monitor their service efficiency by aggregating data from all available sources [20]. In his work, *The Future of Library Resource Discovery*, Marshall Breeding [30] discusses the considerable interest of libraries in the ability to measure the performance

of their discovery service. He suggests that patron's information behavior should be recorded and evaluated for the improvement of user experience and service.

Four out of six libraries use EDS solely for publishers' subscriptions. Their intention was to extend usage of the E-journals subscriptions and to enable their patrons to find and retrieve full-text articles. This notion is well supported in the literature. In her work, *Maximizing Academic Library Collections: Measuring Changes in Use Patterns Owing to EBSCO Discovery Service*, Kristin Calvert from the University of North Carolina's library [17] found that EDS discovery tool had a strong positive effect on E-journal use. Additionally, it appears to maximize the value of library subscriptions. Thompson and her colleagues [18] support these findings; according to their study, EDS has changed user behavior to better connect users to the library's E-journal collection and increases use of full text and abstracts, especially in the EBSCO host databases.

All the study participants indicated the quality of results, quality of the search algorithm, and quality of metadata as factors that enable high-precision search. Marshall Breeding [30] indicated that discovery tool interfaces include features such as relevancy-based search results, faceted navigation, and presentation of search results listed either in a brief form or in full-record displays. Studies have also proven that discovery systems generally support better relevancy rankings and deliver higher quality resources [1, 3, 18].

All interviewees mentioned the good customer relations they have with EBSCO representatives. The transparency, the flexibility of the system, and the responsiveness of the support team add to their positive user experience. In his report on index-based discovery services from 2018, Marshall Breeding [31] writes that EBSCO Discovery Service success among libraries is due to its interoperability with strategic systems implemented in libraries, its content coverage, and its interface design.

One of the interviewees referred to EDS as a starting and more general search point, primarily for bachelor's degree students. In her opinion, research students prefer a more accurate search in their native databases. Thompson and her colleagues [18] found that students like the EDS search interface and frequented it, because of prior successful searches. Asher et al. [3] found that student's search strategies use simple keyword searches, as they do in Google. They also feel that they could get access to full-text resources more quickly and easily.

Two university library directors specified that in the fields of social sciences and humanities, the system produces good results but less so in the exact sciences. McCracken and her colleagues at Cornell university library [19] also found that EDS appears to produce better and more accurate search results, only for some disciplines (in comparison to other discovery tools available).

One of the library directors mentioned a specific case in which the university had a few hours of technical difficulties. During which, she received many complaints from faculty and students on the unavailability of the service. This is well supported in studies that indicate the popularity of the discovery tool search interface for library patrons [3, 18].

Three of the interviewees declared that the reference librarians use "native databases" for economic, business, and legal data. In her work on librarian's search preferences, Foster [32] found that when helping patrons, librarians choose web-scale discovery systems or subject-specific databases as starting point of the search. When librarians perform an independent search, they prefer only subject-specific databases as their chosen starting point.

6.1.4 Access point

All libraries use EDS search box in the main menu of the library home page. Two of the interviewees indicated that they choose to include a tab in the search box for

native databases and a separate tab for the EDS service. The other four interviewees used the EDS service as their default search tab for English articles. The libraries' goal is to improve the accessibility and visibility of its online resources while providing user experience shaped through consultation and engagement. In his work on improving access to e-resources for users at the University of Derby, Kay [33] describes the planning and designing of the EDS discovery search box. He reviews the process made up of a few stages: first, student's feedback on what kind of search tab they would prefer, and second, the library presented a selection of potential icon designs and asked them to choose their favorites. The same procedure was made for library staff from different services. The implementation staff also met with EBSCO representatives to become familiar with the best practices at other institutions. As a result, they designed a bigger search box with a more dynamic look and brighter color scheme.

In our study, all participants indicated concern regarding too many results per search. Some activated only subscribed periodical archives while eliminating open access and other articles. They also commented that keyword search is the most common and popular search among their patrons. The literature indicates [10, 34, 35] that a careful evaluation needs to be made on which settings and customization of the discovery tool will best serve the students. Since these settings will affect their search results and research outcomes, students will use basic search functionality and usually rely on the first page of search results due to their trust in the algorithm relevancy rankings. By structuring and ordering the way information is presented, libraries can influence their user's information behavior.

The librarians believe that students use EDS without any instruction, just click and go. The literature on this points out that librarians need to reevaluate instructions at the reference desk and in the classroom. Instructions can be used to teach patrons basic search skills, allowing more time to focus on research skills and encourages them to evaluate the information [35, 36].

All the participants declared that EDS is the portal for full-text search. If the patron does not have access to a link to the full article, in their opinion the service does not meet the expectations. Therefore, the link resolver has to be precise and as transparent as possible to the end user. This finding matches Marshall Breeding's work on the future of library resource discovery [30]. He characterizes the discovery tool interface as interoperable with a link resolver, to present links to full text from citation records in search results.

Libraries have adopted web-scale discovery services as one-stop research shops over the past years. Studies report that users find it easy of use and that it produces better search results with high-quality resources. To complete librarians' interviews and to learn more about the users' point of view, we have to analyze and understand their interactions with EDS. The usage data and log files analyses are extremely useful and valuable for libraries, in order to reveal the user's information behavior. It can also indicate how the library can implement this for a better and successful experience with its information resources.

6.2 Quantitative research method

Every action that a user does is recorded and represents the way he or she uses the discovery tool. The study uses data mining from Google Analytics platform, monitoring all the involved libraries. We implemented an automatically generated tracking code to record every EDS page generated, on basic and advanced search screens and search result pages. The study reviewed reports regarding information behavior and technology metrics. Reports were generated in Google Analytics and exported as Microsoft Excel spreadsheets. The Excel spreadsheets provided the ability to sort searches for more detailed data analysis.

The data was collected during the first semester of the 2018–2019 academic year, from December to January.

Terragni and Hassani [37] found that there are some limitations in Google analytics data analyses:

1. No indication about which user made a particular choice.
2. The system cannot provide end-to-end process maps that can show and explain choices and loops between activities.
3. There is no analysis of the processes from different perspectives (e.g., time constraints, bottlenecks, or relations between resources).

However, we chose this platform in order to gain an overall idea of how the library patrons behave, to compare this behavior with what library professionals expected, and to make the user experience more efficient and successful.

6.2.1 Usage patterns

On average, a single user performs two sessions. Session duration is 11 min, and every user uses eight pages per session. The average session duration is impressively high, since we find that studies report on session search duration of 5 min [38] or even shorter duration of 3.46 min [17]. We may assume that this is because Israeli students are mostly native Hebrew speakers and use English mostly for academic and spoken language. Because of this, they might require extra time to linguistically decode the research items they find [20].

6.2.2 Devices

Most patrons (93%) use EDS from their desktop computers, 4.14% are mobile users, and less than 1% use tablets. The data resembles the Cohen and Thorpe study [39] on EDS usage statistics in two Indiana University campuses. They found that 98% of the discovery tool visitors were desktop users (PC and laptops). This indicates that EDS visitors mainly use desktops for their information searches. In their work, Chang and Liu [40] discuss how mobile use of the Internet is gradually changing people's information behavior. They studied mobile application reading sessions and suggest four stages model for mobile user interaction: (i) accessing the applications, (ii) searching for the content, (iii) reading, and (iv) interacting. It would be interesting to further study, check, and characterize mobile usage of discovery tools and determine why it is relatively low according to our research data. This study clearly demonstrates that EDS is not one of the patron's preferred mobile applications. Therefore, libraries must assess and improve the EDS mobile user experience.

6.2.3 Users' information behavior

On average, 65.48% of the total users turn to the basic search box as their starting point of access (first interaction data (see **Figure 1**)). In all six libraries, the default page on EDS is the basic search page. Users must intentionally navigate to the advanced search page, so most of them will use the default and basic search box. When students use the discovery service, they type a few relevant keywords, which enable them to find rich, fast, and ranked search results [36]. Asher et al. [4] also found that students usually trust the search engine's algorithms. They trust

First Interaction

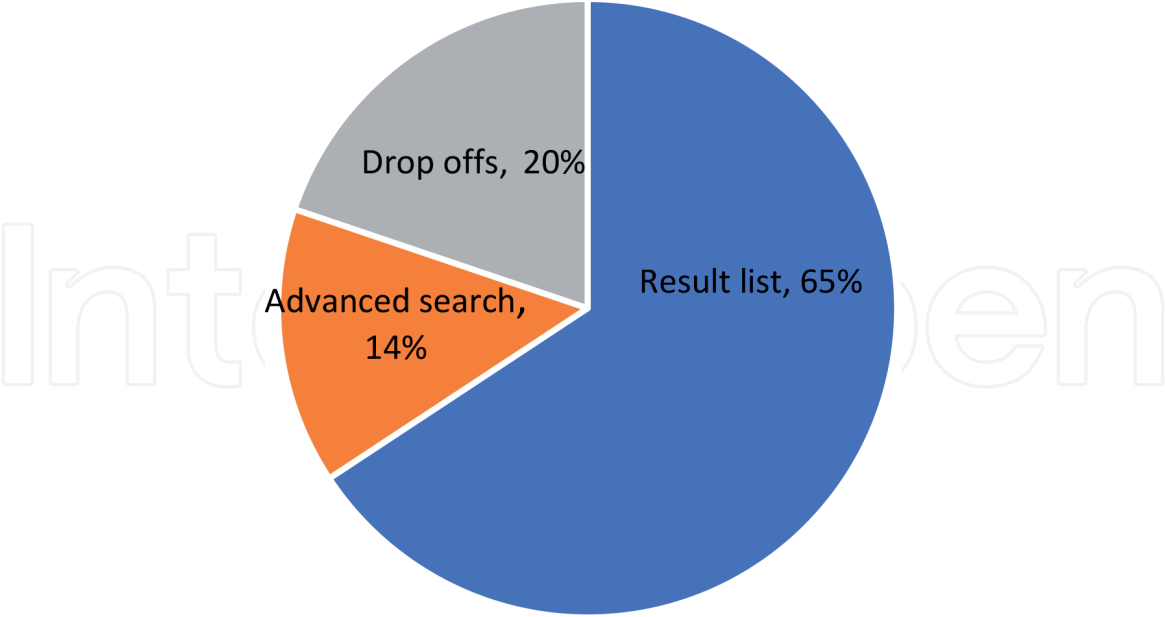


Figure 1.
First interaction behavior flow (Participants that dropped out were not included in the analysis).

its relevancy ranking and are satisfied with its results. Calvert [17] suggests that if users find something sufficient for their information needs, they will use that resource instead of seeking a better one.

On average, 14.42% of the total users turn to the advanced search box as their starting point of access (first interaction data (see **Figure 1**)). In their work on discovery services usage at Indiana University, Meg Galasso and her colleagues [36] found that although librarians assumed discovery tools were intuitive and easy to use, many users are not using it effectively. This small percentage of users indicates that they find the basic search interface inadequate for their needs. It can also indicate that users act according to the principle of least effort and ease of use [29]. In her work *Millennial Students' Mental Models of Search*, Holman [41] found that most students prefer simple searches even if they retrieve a larger quantity of results. Studies also found that unlike undergraduates, more experienced students are already familiar with focusing their search and make use of the advanced search features of the discovery tool. Navigation to this option suggests a deeper level of understanding and a more sophisticated research processes [42]. In their work *Discovering User Behavior*, Cohen and Thorpe [39] suggest to characterize discovery service users as either light users or heavy users. The heavy users should be taught advanced searching techniques for their information needs. While this study observed users search behavior, it would prove useful for further study of different types of user's information behavior (undergraduates, graduates, doctoral students, and faculty) while conducting their research assignments.

On average, 49.28% of the total users entered the details of their bibliographic records as their second interaction with EDS (see **Figure 2**). We can assume that these patrons find the search results adequate for their information needs. We can also assume that clicking on the full-record option enables patrons to check if the item matches or exceeds their expectation. In her work, Calvert [17] found that academic users read the abstracts in order to judge the relevancy of the specific information source, prior to accessing the full text. She also found that patrons avoid additional result pages; they are likely to access only six detailed records in a result list before leaving the search service or modifying the search. Cassidy and her

Second Interaction

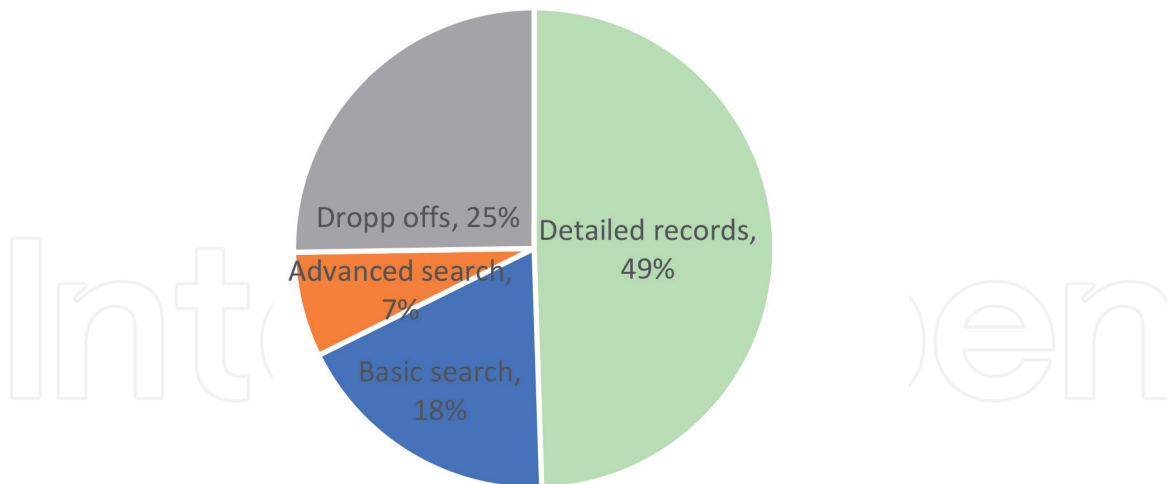


Figure 2.

Second interaction behavior flow (Participants that dropped out were not included in the analysis).

colleagues [34] found that the majority of students would not click on additional result pages. They expect the discovery tool to retrieve the most relevant information items on the first page and therefore checking the detailed relevant records and accordingly accessing the full text.

On average, 17.67% of the total users decided to preform another search using the basic search dialog box as their second interaction with EDS (see **Figure 2**). This small percentage of users was seemingly not satisfied by their initial search results. From this study data analysis, we cannot ascertain the exact reason these users choose to leave the current search and preform an alternate one. It is important to specify that these users did not choose an advanced search box to modify their preliminary search; they simply restarted their search on the basic search box. The reason for this might be a poor choice of keywords, misspelling, looking for a specific item, or inadequate search results. Cassidy and her colleagues [34] also suggest that students are more likely to modify a search than to proceed through a number of result pages.

On average, 7% of the total users decided to continue and refine their search strategy through the advanced search dialog box as their second interaction (see **Figure 2**). As mentioned in the literature review, patrons tend to adopt a simple search string and consider themselves both successful and satisfied with the results. Therefore, what is found most quickly and easily is often most likely to be used [34, 41]. In this study, 7% of the users choose differently; thus, we assume they found that the results did not meet their expectations. This may be due to an information overload or too many results in their first interaction, which caused them to narrow down the search, via advanced search. In his work on discovery tools and information overload, Shapiro [35] claims that libraries expect their discovery services to simplify the search process for their clients. In practice, it did not simplify the task of conducting research nor did it ease the patrons' information overload. Calvert [17] summarizes that library patrons use the discovery service as they would use Google. This may result in an unproductive search, which in our study lead experienced patrons to reuse the discovery service in a more efficient matter, through the advanced search option.

7. Summary and conclusion

This study sought to bring a broad overview of EDS discovery service use in Israeli academic libraries by analyzing librarian's interviews and Google Analytics

usage data. Here are the main focal points of the research: the main reasons for choosing EDS platform by the Israeli libraries were high relevancy, quality of metadata, and ease of use. According to the librarians, Google Scholar is the first choice of library users. In all participating libraries, EDS is the default search tab for non-Hebrew articles. All the libraries in the study used the basic search box as the default interface. The librarians thought that only a minority of users would use the advanced search box options. According to Google Analytics data, each user performs on average two sessions, with an average duration of 11 minutes. The vast majority (93%) of patrons use EDS service from their desktop. Most patrons (65.48%) use the basic search box as their starting point, while 14.42% of total users first use the advanced search.

In their second interaction, most patrons (49.28%) entered the details of the bibliographic records. Some (17.67%) decided to preform another search using the basic search box. Only 7% of the total users decided to continue and refine their search through the advanced search dialog box.

8. Recommendations

The study findings reveal user behavior trends, which may be implemented for a better understanding of the usage of EDS and may encourage libraries to develop strategies to improve instruction techniques, as well as discovery service interface enhancements. Further studies need to investigate specific information behavior of different user populations (undergraduate, faculty, and advanced users). It is important to study further the pros and cons of the service in light of usability testing.

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Appendix

Library administrators' interview questionnaire regarding EDS (EBSCO Discovery Services).

Demographic details:

Name of University/College _____.

× Governmental.

× Private.

Name of library _____.

Job Title _____.

Interview Questions:

1. Reasons for choosing EDS

2. Students' first choice of search tool

3. Coverage, relevance of results, and ease of use

4. Access point

Comments and questions:

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