Facilitating access to English and French patient education materials through the creation of a database and search interface for patients and health professionals.

Jill T. Boruff, MLIS; Martina J. Plejic, MLIS.

Shortened title for header: Facilitating access to patient education materials

Keywords: English language, French language, bilingual patient education materials, database design, metadata.

Authors' Affiliations

Jill T. Boruff*, MLIS (corresponding author), jill.boruff@mcgill.ca, Assistant Librarian, Life Sciences Library, McGill University, 3655 Promenade Sir William Osler, Montreal, Quebec, Canada, H3G 1Y6.

Martina J. Plejic*, martina.plejic@gmail.com, MLIS, Electronic Development Librarian, Canada Institute for Scientific and Technical Information, National Research Council Canada, M-55, 1200 Montreal Road, Ottawa, Ontario, Canada, K1A 0S6.

*formerly, Project Librarian, Education, Healthcare and Informatics Portfolio, McGill University Health Centre, Montreal, Quebec, Canada

Abstract

The Infothèque Health Education Collection is an Internet database with a bilingual search interface that addresses the search and language abilities of health professionals and patients alike and that facilitates access to the patient education materials used by the six hospital sites of the McGill University Health Centre. To best serve the targeted users, the authors debated metadata and controlled vocabulary options, and researched interface designs. The authors also conducted a usability study and used the results to refine the interface. The project drew on the expertise of a diverse group of librarians, doctors, and nurses and was successful in improving access to materials.

Introduction

The McGill University Health Centre (MUHC) is located in Montreal, Quebec, Canada, and is comprised of the six teaching hospitals of the Faculty of Medicine at McGill University. Each hospital was at one time a separate entity, and still bears its own name, but since 1997 the hospitals have been run as one administrative unit.[1] Although McGill is an English-language university, the staff and patients of the six hospitals speak English, French, or another language as their mother tongue. The hospital system is mandated by the government to produce all public documents in both English and French. The MUHC employs over 4400 health professionals who see an average of 995,000 patient visits yearly.[1;2]

Over the years, individual departments within each hospital of the MUHC developed different materials, with each hospital using its own methods. (Patient Learning Materials or PLM is the term that the MUHC uses to describe any patient education pamphlet, handout or booklet). Even though the hospitals formed one unit in 1997, the PLMs were not unified across the hospital sites. For example, a patient discharged from day surgery in one hospital received an entirely different pamphlet than a similar day surgery patient in another hospital. There was no central location where all of the PLMs were organized, catalogued, and stored, so there was no way of searching the collection or knowing which materials existed in what location. A department wanting to create a new breastfeeding manual, for example, would not be aware if another hospital was working on developing a similar product. Everything continued to be paper-based, even in the Internet era. The size of the MUHC made it impossible to know what PLMs were available to any particular patient or situation. The Infothèque Health Education Collection database (Infothèque) [http://infotheque.muhc.ca] was conceived as a method of digitally organizing, cataloguing, and if possible, distributing these PLMs that are found in six physically separate hospitals, but available for use by the entire MUHC.

A review of the literature was conducted at the start of the project and during database development to inform decisions. Logan and King's experience at Capital Health in Nova Scotia gave the librarian an idea of a similar project conducted in a hospital.[3] Kovacs' article on collection development in consumer health provided the librarian with important questions that focused the scope of the project.[4] Previous studies underlined the difficulties that patients have in expressing their health concerns and confirmed the need for a patient-friendly interface and controlled vocabulary.[5-8] Rubin and Nielsen's books were helpful in designing the usability study.[9; 10] The librarian also consulted two medical librarians at the MUHC. This paper was written in hopes of providing more information for similar projects in the future. Table one outlines the steps of this project.

TABLE ONE GOES HERE

Identifying the Scope of the Project

In 2007, a project to inventory all PLMs from the MUHC and to create a database in which to house them and through which to access them electronically was conceived by the Education, Healthcare, and Informatics Portfolio (EHIP). This committee of the MUHC has the mandate of establishing priorities and providing support for the creation, development, collection, distribution and storage of patient education materials as well as interprofessional teaching and learning activities. The project began in June 2007 with the collection of PLMs by two part-time staff members.

In late August 2007 a librarian was hired to work on the creation of a database to house the collection. The three staff members (the librarian, an administrative assistant, and a nursing student) worked from a small office in the administrative building of the MUHC; the librarian was hired specifically for this position and was not associated with a library, though library resources were available to her through the MUHC and McGill University. The project relied on the expertise of many different professionals who made up the EHIP committee, including medical librarians, physicians, advanced practice nurses, and hospital administrative officers.

Early in this project, the work divided itself into two distinct categories: database development and collection development. This division was not planned, but evolved as the project moved forward. The librarian focused on the details of database development while the administrative assistant and the nursing student contacted clinical departments within each hospital to ask for the PLMs used in each department. These two staff members had begun collecting materials several months before the librarian was hired, and their collection process continued while the librarian focused on the database development. When the librarian began, the collection consisted of about 700 paper PLMs in filing boxes and an unknown number of electronic PLMs. About 300 of these paper and electronic items had been documented in an Excel spreadsheet by the administrative assistant. During database development, the librarian was involved in the collection only to the extent that it informed the database metadata and usability study. Since the librarian was hired to work on the creation of the database, it was only after this portion of the project was complete that she was able to turn her attention to collection development questions and issues. The discussion of both database development and collection development is too much for one paper. Therefore, this paper discusses only the creation of the database; the content of the database and the evaluation of the materials are not in its scope. The goals of the database development were threefold: to create an Internet database with a bilingual (English and French) search interface, to address the search

and language abilities of health professionals and patients alike and to facilitate access to the patient education materials.

Selecting the Database Software

The librarian's first task in this project was to choose the software for the Infothèque database. Since a literature review did not reveal a precedent in hospital libraries, the librarian examined some reviews of integrated library systems. All of the integrated library systems proved to be too complex for the needs of the project; circulation software was unnecessary, and the cataloguing modules were designed for books and journals, not pamphlets and Internet sites. Open access software that would allow the librarian to modify the database for the project's specific needs was not an option; the librarian did not have the expertise to create a database without technical support.

The librarian then considered a suggestion made by a colleague at the MUHC: InMagic [http://www.inmagic.com/]. Since this project was not housed in a library, no one was certain who would be responsible for maintaining this database in the future; therefore, a database housed on only one computer was not the best solution. A database housed on an Internet server seemed to be a more viable option. Along with the suggestion for InMagic came the recommendation for a consulting firm named AndOrNot [http://www.andornot.com/] that tailors InMagic to its clients' needs, including using InMagic WebPublisher to make a user-friendly interface for a web-based InMagic database.

A phone meeting with this consulting firm confirmed the benefits of using their services. The firm made the project much more efficient and effective by removing the technical pressures from the librarian, acting as the bridge between the librarian and the InMagic database. The librarians at the firm worked with the project librarian to customize InMagic for the project's unique needs, particularly the bilingual searching capabilities. The firm had just recently completed a similar project for Vancouver Coastal Health. Through a demonstration of Vancouver Coastal Health's online patient learning material database [http://vch.eduhealth.ca], the project librarian saw that the firm understood what the EHIP committee was looking for and would be able to translate their ideas into a concrete resource.

Developing the Metadata

Before the firm could begin building the database, the database fields had to be determined. The fields that were chosen would affect the functionality of the database; therefore, the fields had to be in place at the start of database development. Choosing the fields was the longest part of the process, beginning in mid September 2007 and not fully complete until January 2008. The librarian used the Dublin core standards as a starting place and presented these standards to the EHIP committee, where there were many discussions about the implications of the field choices.[11] In addition to serving as a

resource for health professionals on the wards and patients at home, the EHIP committee wanted the database to function as a tool for assisting in the inventory and assessment of the PLMs. This requirement led to the creation of fields such as "next version due" and "review notes." In the end, each record had 36 unique fields needed to address the searching methods of all of user groups as well as the fields needed for administrative tasks. See table two for a more detailed look at the 36 metadata fields.

TABLE TWO GOES HERE

During the discussions about metadata, the EHIP committee focused on who would be searching for information and how they would be looking for it. It was important that the information be easily accessible to patients and health professionals, experienced computer users and novices, English speakers and French speakers. In order to have a more complete picture of the database users, and to ensure that the metadata fields covered all of their needs, the EHIP committee created user profiles for each potential user group: doctors, nurses, allied health professionals, patients and family members. The librarian elicited the help of the committee members, who are doctors, nurses, librarians, and health professionals, to write scenarios that reflected their experiences or experiences of their colleagues and patients. With these scenarios, the librarian was able to finalize the metadata and ensure that every user group would be served by the database. See appendix one for sample user scenarios.

a) Language

Since bilingual functionality was a goal of this project, dual language searching was built into the database from the very beginning. The French version and the English version of a PLM were treated as two separate documents by the database. In order to ensure that someone searching in French would be able to search, retrieve, and read the details about the document, the fields were doubled, so that there is an entry in French and an entry in English for all fields of the document, regardless of the language of the document. This doubling of fields allows for someone searching in French to retrieve documents in English (and vice versa) because that English document will have French metadata and a French abstract assigned to it. There is also linkage between the two parallel documents, so that if someone finds the English version and wants the French version (or vice versa), they just have to click "Available in English and French" link.

b) Document Status

Since the patient learning materials were being collected at the same time as the database development, the database was designed without a clear idea of the permissions for access that would be granted for each of the documents in the database. Due to the large number of PLMs being

collected, the project committee wanted the database to assist with inventory and the eventual assessment of these items as well as serve as an access point for patients and health professionals. In order to allow for materials to have varying levels of accessibility, different levels of access were built into the database, with the levels of "All"(patients and health professionals), "MUHC"(health professionals only), and "Admin"(project administrators) for access to the document and access to the record. These levels allow the database to serve both as an access point for the public and as a method of tracking all materials available at the MUHC, regardless of whether they are made electronically available.

Choosing Controlled Vocabulary

As the database was designed to be used by both patients and health professionals, it was determined that assigning both consumer health terms and medical terms to describe the documents would be the best way to tailor the search capabilities of the database to its diverse users. It has been widely observed that patients do not have the proper medical terminology to search effectively [5-8]; therefore, the librarian needed to find the best way to assist patients in finding the materials they seek.

To address the medical terminology needs of the health professionals, the committee agreed that the National Library of Medicine Medical Subject Headings (MeSH) was the best controlled vocabulary to use to facilitate search and retrieval by the doctors, nurses and allied health professionals at the MUHC. MeSH is a controlled vocabulary with which the librarians on this project were already familiar and for which there is a French translation available.

To address the consumer health needs of the patients, some exploration was done to identify possible options. The funding of the project affected the decisions made when exploring these options. The creation and maintenance of the database was funded through special funds and its continuity would be determined by its success. Concerns were, therefore, raised over the ability to maintain the use of a complex controlled vocabulary, classification scheme or taxonomy in the case that there was no longer a medical librarian to assign these terms. This worry impacted the decision as to which solution to implement.

It was decided that a consumer health controlled vocabulary would be implemented to ensure some consistency in the entries in the keyword field and that a field for English and French MeSH would be created but would remain empty until a future date. The project librarian did not have the expertise to classify the documents using MeSH, and her time was needed to focus on the database development. After some investigation, the possibilities for the consumer health controlled vocabulary included the *Planetree* classification scheme[12], the *European multilingual thesaurus on health promotion*[13], the

IUGM's *Thésaurus du vieillissement et de la santé*[14], the *AIRS taxonomy*[15] and the Canadian Health Network's Controlled Vocabulary.

The *Planetree* classification scheme was only available in English and in paper format, which would have required manual entry of the entire scheme into the database. The *European multilingual thesaurus on health promotion* was available in both languages; however, there were some significant differences in the terminology used to describe medicine in Europe versus Canada. Also, where the MUHC required specificity for areas of expertise, the thesaurus was unable to provide them. The IUGM's *Thésaurus du vieillissement et de la santé* was more relevant as it is a product from Quebec and represented regional terminology in both languages, but it originated from a hospital dealing with a focus on an aged population. Although a thesaurus such as this one would have provided a solid foundation on which to build a project-specific thesaurus, a partially developed thesaurus could pose more problems later on if there were no longer the resources to build on it.

One option that came from outside of the field of health care was the *AIRS taxonomy*. This taxonomy was produced to support the 211 service (first in the US and then in Canada) which connects the public with all services available to them, including health care. The health care section of the thesaurus was briefly considered as it is available in Canadian French and English. However, the cost to implement and subscribe to such a taxonomy was prohibitive for this project.

In the end, the project librarian decided to use a resource that was provided free to the project from the Canadian Health Network (CHN). This now-defunct government organization had developed a simple controlled vocabulary to facilitate access to consumer health information that it made available in both English and French to Canadians through its website. After contacting the CHN, the project librarian was provided with an Excel spreadsheet at no cost from which English and French terms could be easily chosen for entry into the database. The original controlled vocabulary contained 808 terms, but the list was edited to 748 terms to reflect the needs of the Infothèque. The vocabulary is not hierarchical, but does feature parallel English and French terms for each concept. The following example demonstrates parallel terms in the CHN controlled vocabulary:

Breast Cancer	Cancer du sein
Frostbite	Gelure
High Blood Pressure	Hypertension artérielle
Gallbladder	Vésicule biliaire

Designing the Website and Interface

The design of the website was based on the design of the existing MUHC web pages. A complete match was impossible due to an impending, but not yet public, change to the MUHC web pages. As a result, the Infothèque website was based on the knowledge that the project librarian had of the forthcoming changes. The rest of the decisions for the design of the website were made based on what the consultant was able to do with the InMagic WebPublisher software within the confines of the above mentioned MUHC layout. Two identical home pages were created in English and in French.

A general review of existing health information websites was conducted in order to assess the standard features and functions, and to identify innovative features that might be considered in the design of the database search interface. The user scenarios were consulted once again to ensure that the needs of every type of user were considered during this design stage. Screenshots of elements from existing InMagic WebPublisher database websites were used to create mock-ups of potential Infothèque websites. These mock-ups allowed the project librarian and the committee members to imagine different possibilities before any coding took place. The following websites were particularly influential in their design and function:

Mohawk College Virtual Library [http://brainlinks.mohawkcollege.ca/]
Canadian HIV/AIDS Information Gateway [http://hivinfovih.ca/search.aspx]
Vancouver Coastal Health Print Health Education Materials Resource Catalogue [http://vch.eduhealth.ca/]
Neuro-Patient Resource Centre [http://infoneuro.mcgill.ca]

The project librarian also used a design checklist provided by the consulting firm of features that were available for the creation of the search interface. The checklist included standard InMagic WebPublisher features along with some proprietary features that the consulting firm had developed. With the help of other medical librarians, the project librarian went through the checklist and discussed the benefits and downsides of the options. While space does not allow for a discussion of every element of the search interface, the following elements are particularly important.

a) Browsable "Health Topics"

From the beginning, the goal of the project was to provide access to the users in the manner that best suited the way in which the users would be searching the database. As the Infothèque had two distinct target user groups, it was important to build in search functions that addressed both groups.

Based on experiences with users of the Neuro-Patient Resource Centre's online resources [www.infoneuro.mcgill.ca], it was determined that being able to browse through subjects for information was a feature that users appreciated. The decision was further confirmed by the National Library of Medicine's own work on creating a browsable interface.[8] A browsable subject list, referred to as "Health Topics", was created for the main page of the website in order to allow for canned searches.

b) Search Box

With both patients and health professionals in mind, a main search box was created that allows the users to enter their own keywords, referred to as the "Anyword" search box. This is a common feature on consumer health websites. The search box was designed to automatically combine the terms entered using "AND" (unless quotation marks were used to search for a phrase) and searches in the title, description, keyword, MeSH, and department fields.

For the professional users of the site, a more detailed search was created on the advanced search page, which allows for the searching of nearly all of the visible fields, including clinical care area, audience, and information type. Table two provides more information on the searchable fields and limits.

c) Dual language searching

This database is not only fully bilingual but also facilitates the access of documents in the other language for a user who is not bilingual but requires information in another language. For example, a nurse is looking for a PLM for a French-speaking patient, but the nurse prefers to search in English. The search interface and results display page allows the nurse to search using English keywords and retrieve French documents. The results display an English abstract, keywords, and notes for the French documents. This dual language display ensures that the user is able to read the keywords and abstract to verify that an appropriate document has been retrieved. This same functionality is available for searching in French and retrieving English documents.

d) Flags

Flags indicating the origin of the materials are in the basic display of each record. The Neuro-Patient Resource Centre was already using flags to indicate the origin of the information, and this feature was adopted for the Infothèque. PLMs created at the hospital level, at the provincial level and at the national level might have differing levels of specificity and relevance to clients. If an MUHC

client looked at a nationally-produced PLM, he or she may not be provided with information about resources or services that are provided directly in the local community.

Conducting Usability Testing

The main purpose of conducting usability testing was to expose any major usability deficiencies of the database and the web-based search interface through the use of the database and interface by potential users. The following distinct user groups were represented: Health Care Professionals, Administrators, and Patients. Both native English and French speakers were included. Due to time constraints, only thirteen participants were tested: three patients, five health professionals, five hospital administrators. The test subjects were employees or patients of the MUHC who were referred to the librarians by EHIP committee members.

During a 20 minute testing session, a participant was provided with a pre-test questionnaire, a set of seven tasks in his or her native language (English or French), a post-test questionnaire, and debriefing letter with the librarians' contact information. The tests took place in the test participant's office or the hospital library. One librarian served as the test monitor and facilitated the testing, while a second librarian served as the data collector, observing and noting the performance of each participant. Each session began with the test monitor reading the same detailed script, so that each participant had the same instructions before beginning. A great deal of preparation went into ensuring that each task was aligned with a specific functionality of the search interface that the librarians wanted to test. The tasks included searches for patient learning materials using the quick search, advanced search and browse by subject capabilities of the database as well as the viewing and retrieval of the documents from the database using both the brief and full bibliographic display screens. See table three for the specific search tasks and corresponding usability questions. Similar usability studies and textbooks on usability testing were used to design the questions,[8-10; 16] but limited content in the database restricted the questions that could be asked. The study took place over the course of one month.

TABLE THREE GOES HERE

While the usability study was small and quick, it allowed the librarian to refine the interface to better suit both user groups (patients and health professionals). An example of a major change was the default language of the search results. In the same way that the design of the database enables users to find documents in all languages, the option to restrict database results to a particular language is also provided beneath the search box. The default search results were initially set to "All languages"; however, the usability testing revealed that most users expected the results to be in the language of the interface

homepage. As a result, the default language of the search was changed to the language of the search interface that the user had chosen. The study also confirmed some assumptions, including the fact that the patients would show a preference for browsing the "Health Topics" over conducting a search using the search box.

Summary and Conclusion

In July 2008, the database and search interface were complete. The database and search interface are fully bilingual (English and French). The search interface is simple and patient-friendly, with a sophisticated database working in the background. One disappointment is the design layout of the search interface. Even after creating mock layouts, the authors did not obtain the look they had envisioned. The authors had hoped that the "Health Topics" would be more prominently displayed for the patients. In looking back at the management of the project, a librarian with more experience in database development might have been more of an asset, but the project may have never happened if the project directors had waited for a candidate with more technical expertise. It also would have been ideal to wait until the database was built to begin the collection of PLMs; the organization of the data has been a continual problem because PLMs were collected before a librarian was working on the project. The issue of access (which materials patients should be allowed to access and which materials should be restricted to health professionals) is an ongoing point of discussion. The librarians involved in this project are pushing for the launch of the database to the public via the Internet, but it continues to be delayed. The Internet launch date is unknown, but the site will be found at the following address: [http://infotheque.muhc.ca]. The authors' main concern is about the sustainability of the database and interface, both financially and technologically, particularly since the database as been designed for a specific audience and might be more difficult to upgrade and update in the future. Currently, Matthew Flanagan serves as the project librarian, and his contract has been renewed through June 2010 with the possibility of further renewal. This fact gives the authors hope that the project will continue.

Overall, the database development was successful. The MUHC has a database that was created from the beginning with both patients and health professionals in mind. The search interface functions in two languages, makes use of a controlled vocabulary, a simple layout, and plain language searching capability to ensure that members of both the patient and health professional community can access the information they require. Most importantly, access to patient learning materials has been greatly improved; health professionals can now print off up-to-date PLMs from their computers instead of handing their patients potentially out-of-date photocopies. As of December 2009, the database housed 1530 English documents and 1345 French documents. All six hospital sites have access to the database

through the hospital intranet. Since the launch of the database in July 2008, the current project librarian has focused his time on continuing to collect and review PLMs and on developing collection criteria for the database. For the foreseeable future the focus will be on the collection development rather than database development. Further work is being done to promote the database, to update the database with new materials on a regular basis, and to continue to gather feedback from the actual users of the database. More information can be obtained by contacting Jill Boruff at jill.boruff@mcgill.ca and Matthew Flanagan at matthew.flanagan@muhc.mcgill.ca.

References

1. McGill University Health Centre. "About the MUHC". 2009. Available from <<http://www.muhc.ca/about/>. Accessed May 2, 2009.
2. McGill University Health Centre. "MUHC at a Glance" McGill University Health Centre. 2009. Available from <http://muhc.ca/homepage/page/muhc-glance>. Accessed December 18, 2009.
3. Logan, P., and King, E. "Ensuring access to consumer health information pamphlets at Capital Health." Journal of the Canadian Health Libraries Association 27 (December 2006): 105-108.
4. Kovacs, D. K. "Electronic collection development for consumer health information." Journal of Consumer Health on the Internet 7 no. 4 (2003): 31-52.
5. Zielstorff, R. D. "Controlled vocabularies for consumer health." Journal of Biomedical Informatics 36 (August-October 2003): 326-33.
6. Burnham, E., and Peterson, E. B. "Health information literacy: a library case study." Library Trends 53 no. 3 (2005): 422-433.
7. McCray, A. T., Loane, R. F., Browne, A. C., and Bangalore, A. K. "Terminology issues in user access to Web-based medical information." Proceedings / AMIA Annual Symposium (1999): 107-11.
8. McCray, A. T., Dorfman, E., Ripple, A., Ide, N. C., Jha, M., Katz, D. G., Loane, R. F., and Tse, T. "Usability issues in developing a Web-based consumer health site." Proceedings / AMIA Annual Symposium (2000): 556-60.
9. Rubin, J. Handbook of usability testing: how to plan, design, and conduct effective tests, Wiley technical communication library. New York: Wiley, 1994.
10. Nielsen, J. Usability engineering. San Francisco, CA: Morgan Kaufmann Publishers, 1993.
11. Hillman, D. "Using Dublin Core--The Elements." Dublin Core Metadata Initiative. 2005. Available from <http://dublincore.org/documents/usageguide/elements.shtml>. Accessed September 11, 2009.
12. Cosgrove, T. L. "Planetree health information services: public access to the health information people want." Bulletin of the Medical Library Association 82 (January 1994): 57-63.
13. NIGZ Netherlands Institute for Health Promotion and Disease Prevention. "European multilingual thesaurus on health promotion in 12 languages." NIGZ Netherlands Institute for Health Promotion and Disease Prevention. 2001. Available from <http://www.hpmulti.net>. Accessed September 15, 2009.
14. Institut universitaire de gériatrie de Montréal. "Thésaurus du vieillissement et de la santé." Institut universitaire de gériatrie de Montréal. 2003. Available from <http://www.iugm.qc.ca/thesaurus/>. Accessed September 15, 2009.
15. Information and Referral Federation of Los Angeles County. "AIRS/211 LA County Taxonomy of Human Services: Canadian English Taxonomy." Information and Referral Federation of Los Angeles County. 2008. Available from <http://www.211taxonomy.org>. Accessed September 15, 2009.
16. Munger, H. L. "Testing the Database of International Rehabilitation Research: using rehabilitation researchers to determine the usability of a bibliographic database." Journal of the Medical Library Association 91 (October 2003): 478-83.

Table 1: Project Steps

	Step	Description
1	Identifying the Scope of the Project	Identify the need for the project and end goals through discussion with the stakeholders. Determine requirements that can or cannot be included in the scope of the project.
2	Selecting the Database Software	Research database platforms. Estimate cost and feasibility of creating the database in-house or contracting out the work. Purchase database licenses and begin work on database.
3	Developing the Metadata	Decide upon bibliographic information to be housed in database, to be displayed in search results, and to be used to increase the search functionality of the database.
4	Choosing Controlled Vocabulary	Research bilingual consumer health vocabulary options. Estimate cost to acquire or use pre-existing vocabularies versus creating vocabulary in-house. Decide upon vocabulary and begin assigning terms to collected materials.
5	Designing the Website and Interface	Determine web page design and embedded search interface possibilities. Create web pages and adjust layout, color and general aesthetics as necessary.
6	Conducting Usability Testing	Create usability test questionnaire and activities. Find test participants and conduct testing. Gather and analyze data. Make appropriate changes to interface and its functionality as required.

Table 2: Database Fields Note: En/Fr after the field indicates that there are parallel English/French entries for this field.

Field Name	Description of Field	Searchable Fields	Display Fields
File Number	The sequential accession number of the record.		
Title	Title of document in language of document	✓	✓
Level	Source level of the document (MUHC, non-profits outside of MUHC, for-profit organizations)	(Limit)	✓
Publisher-En /Fr	Entity responsible for making the document available to the public.		✓
Status	Status of the record in the database		
PDF File Name	File name of the PDF that is associated with this document		✓
Link To Website	Link to the PDF on an external website.		✓
Has Translation Related Record	Indicates if the record is only available in English or French or if it is available in both languages.		✓
Has Version Related Record	Indicates if the record has earlier versions available		
Description-En/Fr	Short abstract in both English and French.	✓	✓
Keywords-En/Fr	Consumer health controlled vocabulary in English and French.	✓	✓
Subject Heading-En/Fr	Medical Subject Headings (currently empty)	✓	✓
Author-En/Fr	Person(s) or organization(s) primarily responsible for creating the document		✓
Contributor-En/Fr	Person(s) or organization(s) that have secondary responsibility for creating the document		✓
Sponsor-En/Fr	Person(s) or organization(s) that have contributed money for the creation of the document		✓
Location-En/Fr	Department where the document was physically collected		✓
Hospital Site–En/Fr	Full name of the hospital where the document was collected.		✓
Department-En/Fr	Clinical care area of the document (examples: Oncology, Surgery)	✓	✓
Format-En/Fr	Physical format of the document (examples: fact sheet, pamphlet)		✓
Type –En/Fr	General type of information contained in the document (examples: Tools for Caregivers or Families; Disease or Condition)	✓	✓
Country-En/Fr	Country of origin of the document		✓
Rights-En/Fr	Specific rights that the MUHC has for using the document (printing, modification, distribution)		
Language-En/Fr	Language of the document	(limit)	✓
Date Published	Publication year of the document		✓
Date Archived	Date the record was archived		
Date Record Created	Date the record was created in database.		
Date Record Modified	Date the record was last modified		
Version Number	Version of a document represented in this record.		
Next Version Due	Estimated date for a new document		
Audience-En/Fr	Intended audience for the document (patients, health professionals, adults, children)	(limit)	✓
Contact Information	Contact information for the creator(s) of the document		✓
Reading Level	Fleisch-Kincaid Grade Level score		
Flag	Place of origin flag that is associated with this document.		✓
Notes-En/Fr	Open field for notes pertaining to the document.		✓
Admin Notes	For internal administrative notes.		
Review Notes	For notes involving the review of the document		

Table 3: Usability Testing Search Tasks

	Search Task (given to the participant)	Usability Question (used to create the task)
1	Please take a moment to look over the Health Education Collection website. When you are ready, please find some documents about blood transfusions.	Do participants notice and use the Health Topics canned searches?
2	Please find a document in French that deals with the subject of grief.	In which language does a participant choose to enter their search terms when asked to search for materials in a language other than their native language?
3	Please open the English version of the document that you have found.	Do participants use the "Available in English and French" Link?
4	Please use the Advanced Search page to find MUHC produced publications about cancer and exercise.	Do participants use the search limits on the Advanced Search screen?
5	Please find the author of the document entitled "Exercise & cancer".	Do participants use the link to the full description of the document?
6	Please use the "Search by Department" feature on the Advanced Search page to find all of the documents from the Surgical Oncology department.	Do participants use the search by department index?
7	Please find the document entitled: "Activity guidelines for gastro-oesophageal surgery".	Do participants use the search by title feature?

Appendix 1: Example User Scenarios

Mary has limited experience on the computer. Her patient is going home with a PICC line tomorrow. She would like to print off a copy of the educational material so that she can give it to her patient and his daughter who will be doing the flushing. She is using the unit computer.

Susan is a 28 year old nurse who has been working in NICU for 6 months. She will soon be discharging a patient who had seizures and will go home on anticonvulsant medication. Susan is looking for information to assist her in preparing the parents to take home this infant. She will search from the hospital ward for information for the parents in French.

Betty is a 54 year old woman married with 2 daughters aged 18 and 24. Her mammogram shows a suspicious lesion and cancer is confirmed by biopsy. She wants to know what to expect in the way of treatment at the MUHC knowing that surgery, radiotherapy and chemotherapy are all used according to Google. She is particularly concerned about her daughters. She has an appointment with the surgeon to plan surgery and wants to prepare pertinent questions for that encounter.

Sam is a 30 year old father of a 7 year old girl. His 7 year old has been diagnosed with asthma. Sam knows nothing about asthma and wants to learn more about asthma and the treatment options for his daughter. Sam has a 10^{th} grade education and is only familiar with Google for finding information. He is francophone and wants the information in French. He searches for information from his home.

Caption for screen capture:

Screen capture of English homepage of the Infothèque Health Education Collection.

TABLE 1. Project Steps

	Step	Description
1	Identifying the Scope of the Project	Identify the need for the project and end goals through discussion with the stakeholders. Determine requirements that can or cannot be included in the scope of the project.
2	Selecting the Database Software	Research database platforms. Estimate cost and feasibility of creating the database in-house or contracting out the work. Purchase database licenses and begin work on database.
3	Developing the Metadata	Decide upon bibliographic information to be housed in database, to be displayed in search results, and to be used to increase the search functionality of the database.
4	Choosing Controlled Vocabulary	Research bilingual consumer health vocabulary options. Estimate cost to acquire or use pre-existing vocabularies versus creating vocabulary in-house. Decide upon vocabulary and begin assigning terms to collected materials.
5	Designing the Website and Interface	Determine web page design and embedded search interface possibilities. Create web pages and adjust layout, color and general aesthetics as necessary.
6	Conducting Usability Testing	Create usability test questionnaire and activities. Find test participants and conduct testing. Gather and analyze data. Make appropriate changes to interface and its functionality as required.

Table 2: Database Fields
Note: En/Fr after the field indicates that there are parallel English/French entries for this field.

Field Name	Description of Field	Searchable Fields	Display Fields
File Number	The sequential accession number of the record.		
Title	Title of document in language of document	✓	✓
Level	Source level of the document (MUHC, non-profits outside of MUHC, for-profit organizations)	(Limit)	✓
Publisher-En /Fr	Entity responsible for making the document available to the public.		✓
Status	Status of the record in the database		
PDF File Name	File name of the PDF that is associated with this document		✓
Link To Website	Link to the PDF on an external website.		✓
Has Translation Related Record	Indicates if the record is only available in English or French or if it is available in both languages.		✓
Has Version Related Record	Indicates if the record has earlier versions available		
Description-En/Fr	Short abstract in both English and French.	✓	✓
Keywords-En/Fr	Consumer health controlled vocabulary in English and French.	✓	✓
Subject Heading-En/Fr	Medical Subject Headings (currently empty)	✓	✓
Author-En/Fr	Person(s) or organization(s) primarily responsible for creating the document		✓
Contributor-En/Fr	Person(s) or organization(s) that have secondary responsibility for creating the document		✓
Sponsor-En/Fr	Person(s) or organization(s) that have contributed money for the creation of the document		✓

Location-En/Fr	Department where the document was physically collected		✓
Hospital Site–En/Fr	Full name of the hospital where the document was collected.		✓
Department-En/Fr	Clinical care area of the document (examples: Oncology, Surgery)	✓	✓
Format-En/Fr	Physical format of the document (examples: fact sheet, pamphlet)		✓
Type –En/Fr	General type of information contained in the document (examples: Tools for Caregivers or Families; Disease or Condition)	✓	✓
Country-En/Fr	Country of origin of the document		✓
Rights-En/Fr	Specific rights that the MUHC has for using the document (printing, modification, distribution)		
Language-En/Fr	Language of the document	(limit)	✓
Date Published	Publication year of the document		✓
Date Archived	Date the record was archived		
Date Record Created	Date the record was created in database.		
Date Record Modified	Date the record was last modified		
Version Number	Version of a document represented in this record.		
Next Version Due	Estimated date for a new document		
Audience-En/Fr	Intended audience for the document (patients, health professionals, adults, children)	(limit)	✓
Contact Information	Contact information for the creator(s) of the document		✓
Reading Level	Fleisch-Kincaid Grade Level score		
Flag	Place of origin flag that is associated with this document.		✓
Notes-En/Fr	Open field for notes pertaining to the document.		✓
Admin Notes	For internal administrative notes.		

Review Notes	For notes involving the review of the document

TABLE 3. Usability Testing Search Tasks

	Search Task (given to the participant)	Usability Question (used to create the task)
1	Please take a moment to look over the Health Education Collection website. When you are ready, please find some documents about blood transfusions.	Do participants notice and use the Health Topics canned searches?
2	Please find a document in French that deals with the subject of grief.	In which language does a participant choose to enter their search terms when asked to search for materials in a language other than their native language?
3	Please open the English version of the document that you have found.	Do participants use the "Available in English and French" Link?
4	Please use the Advanced Search page to find MUHC produced publications about cancer and exercise.	Do participants use the search limits on the Advanced Search screen?
5	Please find the author of the document entitled "Exercise & cancer".	Do participants use the link to the full description of the document?
6	Please use the "Search by Department" feature on the Advanced Search page to find all of the documents from the Surgical Oncology department.	Do participants use the search by department index?
7	Please find the document entitled: "Activity guidelines for gastro-oesophageal surgery".	Do participants use the search by title feature?

APPENDIX

Example User Scenarios

Mary has limited experience on the computer. Her patient is going home with a PICC line tomorrow. She would like to print off a copy of the educational material so that she can give it to her patient and his daughter who will be doing the flushing. She is using the unit computer.

Susan is a 28 year old nurse who has been working in NICU for 6 months. She will soon be discharging a patient who had seizures and will go home on anticonvulsant medication. Susan is looking for information to assist her in preparing the parents to take home this infant. She will search from the hospital ward for information for the parents in French.

Betty is a 54 year old woman married with 2 daughters aged 18 and 24. Her mammogram shows a suspicious lesion and cancer is confirmed by biopsy. She wants to know what to expect in the way of treatment at the MUHC knowing that surgery, radiotherapy and chemotherapy are all used according to Google. She is particularly concerned about her daughters. She has an appointment with the surgeon to plan surgery and wants to prepare pertinent questions for that encounter.

Sam is a 30 year old father of a 7 year old girl. His 7 year old has been diagnosed with asthma. Sam knows nothing about asthma and wants to learn more about asthma and the

treatment options for his daughter. Sam has a 10th grade education and is only familiar with Google for finding information. He is francophone and wants the information in French. He searches for information from his home.