Assessing a genre-based approach to online government information

Luanne Freund
luanne.freund@ubc.ca
University of British Columbia

Christina Nilsen
cnilsen@interchange.ubc.ca
University of British Columbia

Abstract

In this work we take some first steps to explore the potential value of a genre-based approach to improving access to online government information. We report on an analysis of the GOC Type metadata element and controlled taxonomy of genre types in use in the Canadian e-government domain.

1. Introduction

Digital government initiatives such as Canada's Government Online Project have made large quantities of government-produced information available via the Internet for public access and use (Nilsen, 2006). Much of this information is of high quality, in the sense that it is authoritative and current, and covers a wide range of information needs. However, putting large amounts of information online creates a problem even as it solves another, because it becomes increasingly difficult for the average citizen to find what they need in the face of information overload (Fountain, 2001). E-government portals have been implemented to facilitate access to information and services, but research shows that more people use general search engines (37%) than portal sites (8%) to reach government information (Horrigan, 2004). The findability and usability of government information are major issues, which will require more sophisticated tools and approaches as information and services continue to migrate online, and e-government matures into standard practice.

Our approach to these issues focuses on the role that document genre plays within e-government information environments. Genre theory developed in studies of language and communication (Bazerman, 1988; Swales, 1990), and has been applied in organizational behaviour research and more recently to information retrieval and information systems design (Freund, Clarke, & Toms, 2006; Päivärinta, 1999). The central idea of genre theory is that within communities, common activities are enacted through recognizable types or genres of documents that share common features of purpose, form and content. The value of genres is that they support and reflect the common ground in the communication process, and therefore carry meaning with respect to the creation and intended uses of documents, which can help members of the community find, assess and make effective use of documents in the framework of particular problems, tasks or situations.

The genre approach seems particularly well-suited to the e-government context for two reasons. First, genre offers a supplementary means of organizing and filtering large and heterogeneous documents collections. Second, effective use of genre has the potential to increase the alignment of goals and perceptions on the part of information producers and users, the lack of which has been identified as a major obstacle to effective information interchange in the public sphere (Marcella & Baxter, 2005).

In this work, we take some first steps in exploring the potential value of a genre-based approach to online government information in the Canadian context. Specifically, we assess an existing taxonomy of document types, developed as part of the metadata initiative of the Government Online Project (Canada, 2006). The taxonomy consists of a set of 50 controlled genre terms for use with the Type element of the Government of Canada (GOC) Metadata Schema. The study objectives are to determine how this taxonomy is currently used in the GOC domain, assess its effectiveness as a genre indexing tool, and to consider how this type of genre indexing might be used to improve information access.

2. Background

2.1 Seeking Online Government Information

Public use of government information on the Web is growing. Approximately 98 million (about 32%) Americans used government websites in 2004, an increase from 66 million in 2002 (Horrigan, 2004; Larsen & Rainie, 2002). Similarly, about one third of Canadians (8.2 million) used the Internet to access government information from their homes in 2005. Use is highest among younger adults who are experienced and heavy users of the Internet

(Underhill & Ladds, 2007). Common uses of U.S. government websites are to find tourism and recreation information, do research for work or school, download forms, find out what services an agency provides, and obtain information about public policy, health or safety issues (Larsen & Rainie, 2002). Among Canadians, searching for government-related information and information on programs and services are the main uses of government websites. To a lesser extent, use is directed at accessing services and contacting agencies and representatives. Lack of use among Internet users is primarily due to an expressed lack of need or interest in e-government, although difficulty in finding websites is an obstacle for some (Underhill & Ladds, 2007).

The difficulty of framing the "public" as information seekers stems from the fact that the public spills over all demographic, socio-economic, professional and disciplinary boundaries that are typically applied to the study of information seeking behaviour. Nevertheless, users of e-government have been characterized variously as "citizens" and as "customers," labels which imply particular roles and needs vis-a-vis e-government.

An alternative to the citizen or customer approaches is suggested by Savolainen's work on "everyday life information seeking." He proposed this as an alternative to "citizen information seeking" because the role of "citizen" implies "rights and obligations towards social institutions, as voters and so on" (1995, p. 266). Given that so much government information relates directly to individuals' daily lives, such as personal safety, health, diet, exercise, finances, home ownership, travel and leisure, the everyday information seeking approach provides a useful, user-centred frame of reference for this community of information seekers.

2.2 Genre and e-government

The prevalence of genres on the Web, both new ones, such as FAQs and homepages, and familiar ones from the print world, such as newsletters and articles, has prompted recent interest in the role of genre in supporting information access and use (Rosso, 2008; Vaughan & Dillon, 2006). Genre types are identified based on some combination of the form, content and/or purpose features of documents (Orlikowski & Yates, 1994); however, genres are not simply document types defined by a set of features. Rather, they are expressions of a tradition: "they emerge from cultural-historical activity and represent, reflect, stabilize, and help constitute the activity" (Spinuzzi, 2003, p. 41). Because they are socially-constructed within particular communities, genres serve as carriers of context; they represent elements of the "who, what, where, when, why and how" of a document, which makes them particularly useful when people are trying to apply information in a real-world situation (Yoshioka, Herman, Yates, & Orlikowski, 2001). The sets of genres in common usage within particular domains or communities are known as genre ecologies (Spinuzzi, 2003) or genre repertoires (Orlikowski & Yates, 1994), and these serve to promote mutual understanding and make documents recognizable among members of groups. The strong visual identity of genres adds value, in that members of a community are able to quickly recognize and make use of them (Toms, 2001). While a specific genre carries contextual information with respect to documents of that genre, the genre repertoire as a whole serves as a framework for communication activities within a community.

In the nascent field of e-government studies, genre remains a largely unexplored topic. One notable exception is Haraldsen et al.'s (2004) use-case study of how genre can contribute to the definition of systems requirements in the design of a life-event-based e-government portal. The life-events approach is analogous to everyday life information seeking, in its emphasis on the events and problems people face as drivers for government information seeking and use: birth, marriage, graduation, death, etc. Life-events portals are user-centered access points to e-government information that reach across government departments, cutting through bureaucracy in order to meet the needs of the citizen-user (Kavaidas & Tambouris, 2003; Vintnar & Leben, 2002). Haraldsen studied the genres of communication used in exchanges between the government and the public in the context of the life event of "building a house" and then used the genres to derive system requirements for a life-events portal (2004). The study concluded that genre analysis can help bridge the gap between technological and social aspects of designing e-government systems and create greater understanding of the information system on both sides.

Genre has been explored as a user-centred approach to designing information systems in non-governmental settings, with some important implications. Genres carry the most meaning when local and specific genre types are used, rather than broad and generic types that may be defined by external

technologies or standards (Honkaranta & Lytikäinen, 2003). Genres evolve based on changes in the activities, needs and communication practices within a community, and therefore should not be constrained in a rigid system framework (Karjalainen, Päivärinta, Tyrväinen, & Rajala, 2000; Päivärinta, 1999). Finally, genre classification is not an exact science, and consistency seems to be particularly difficult to achieve in the context of the Web, in which multiple communities and perspective are represented. Rather than trying to apply a single genre label to a document, multiple and layered classification should be used to reflect this natural variation (Santini, 2008).

2.3 Type Metadata in the Framework of Canadian E-Government

In 2006, the Canadian government announced that its e-government initiative Government On-Line (GOL) had succeeded in making the Canadian government the world's most connected to its citizens. The main objectives of the GOL initiative were to make government more accessible, improve the efficiency and timeliness of online services, and to build trust and confidence in e-government by ensuring information privacy and security. Two basic principles guided these efforts : a user-centered approach to the organization of online information and services around client needs, rather than the structure and organization of government, and horizontal collaboration among government departments and agencies in order to transcend institution divisions known to impede citizen access to information (Canada, 2006).

An important part of the GOL initiative was the establishment of the Common Look and Feel Standards for the Internet, which were approved in 2006 and are now mandatory. A GOC Metadata Standard was implemented, which adopted Dublin Core to facilitate resource discovery through the required use of the following elements: title, creator, language, date and subject. Additional elements, including type are recommended, but optional (Treasury Board of Canada, 2006). However, Dublin Core is not presented as a complete solution, and GOC sanctions the use of domain-specific metadata elements to support records and information management, as well as portal content management for clusters and gateways (Treasury Board of Canada, 2006).

Our focus is on the optional metadata element - DC Type. Not to be confused with format, Type is defined as the "nature or genre" of a resource. The rational for use of the Type element is twofold: first, to help users narrow their search queries, and second to help content mangers manage their websites (Treasury Board of Canada, 2006). Consistent with Dublin core recommendations, the GOC Metadata Standard requires that Type be used with a controlled vocabulary, for which purpose the GOC Type Taxonomy was constructed. Consisting of 50 terms, plus a two-term aggregation-level scheme (to indicate when an item is part of a collection), the GOC Type taxonomy is a flat, alphabetical taxonomy, which may not be post-coordinated, although more than one Type value may be applied to a single webpage (Dublin Core Metadata, 2007; Treasury Board of Canada, 2003). The taxonomy contains a broad range of Types, including common Web and print genres (FAQ, report), government document genres (statistics, standards) and many more specific genres, related to particular disciplines and government services (licences, agreements).

3. Methods

We took a two-pronged approach to our analysis of the GC Type Taxonomy. In order to establish a baseline understanding of how the taxonomy is used in GOC metadata practices, we conducted a quantitative analysis of a large sample of documents crawled from the gc.ca domain. In order to assess the effectiveness of the Taxonomy as a genre indexing tool and its potential contribution to improved information access, we carried out a manual coding exercise on a smaller sample of 400 documents retrieved from the gc.ca domain using the Google search engine .Our analysis focused on two subdomains of government information at the federal level: health and the environment. Both Health Canada and Environment Canada are heavily used as information sources by the public, and these agencies have been active participants in the GOL project from its inception [1].

3.1 Type Metadata Use Analysis

An off-the-shelf web crawler package, Visual Web Spider, was used to collect a sample of 10,000 documents from the gc.ca domain. The crawler was

[1] Reports are available from both agencies at www.ec.gc.ca/egov-cgouv/egov-report.html and www.hc-sc.gc.ca/ahc-asc/pubs/gol-idg/2005/index_e.html

set to start from the main pages of the GOC domain (www.gc.ca), of Health Canada (www.hc-sc.gc.ca) and of Environment Canada (www.ec.gc.ca) and to crawl breadth first to a depth of ten links in order to obtain wide coverage. The crawler traversed 16920 pages to find 10000 within the gc.ca domain and drew pages from 500 different gc.ca sub-domains. The largest concentrations of pages were from Environment Canada (8.3%) and Health Canada (7.8%). The crawler retrieved the Title, URL, and all embedded metadata from all html documents. Available Type metadata was extracted from the documents and analyzed to determine the frequency and distribution of type values across the sample and within the health and environment domains.

3.2 Assessment of the GC Type Taxonomy

A sample of 400 documents was collected by retrieving the top-ranked documents for 20 queries issued to the Google search engine. Searches were restricted to the gc.ca domain, duplicate documents were manually removed from each result set, and the top 20 remaining documents were collected. Search queries were formulated as simulated work task scenarios and were developed by the researchers to represent a range of everyday information seeking needs (Borlund, 2003). The scenarios were balanced by domain (10 each related to health and environment) and five types of information tasks: learning, fact-finding, deciding, doing, and problem-solving. Sample scenarios are included in Appendix 1.

The resulting set of 400 documents consisted of 86% html files, 13% pdfs, and 1% other formats. Documents originated from 77 different Internet domains, with the largest concentrations from Health Canada (26%) and Environment Canada (20%) sites.

In order to assess the usefulness of the Taxonomy for genre description, we carried out a team coding exercise on this sample. As a preliminary step, the two authors and a graduate research assistant each coded the same twenty documents from the set, using the comments and examples in the Taxonomy as guidelines, and assigning as many genre categories as suitable to each document, or adding free-form labels if there was nothing suitable in the taxonomy. Comparison of the results of the first round of coding showed very little agreement due to different interpretations of the type categories and of how they should be applied. A major source of variation was due to different interpretations of sub-genres contained within documents and of meta-genres that documents were parts of. We took a number of steps to improve agreement.

- Developed a set of coding rules (Appendix 2);
- Reorganized the set of 50 types into groups of related categories, so that it would be easier to choose the best type among similar ones;
- Developed more detailed descriptions of each genre to disambiguate between similar categories;
- Added structured fields to the coding sheet.

The final coding sheet allowed each document to be described with a maximum of two main genres, two sub-genres ("contains a genre"), and two meta-genres ("is part of a genre"), as well as a free-form category. A second iteration of coding of the same set of 20 documents was conducted, in which agreement was much improved. Coders met once again to discuss and reconcile disagreements. The documents were then split up and two of the researchers each coded half of the remaining 380 documents.

Analysis of the coding focused on the frequency and distribution of codes across the sample and within domains and information types. Separate analyses considered the level of agreement between pre-assigned type values and researcher assigned values and examination of documents that were not assigned any genre values from the Taxonomy.

4. Results

4.1 Analysis of Type Element Use

Analysis of the metadata from the sample of 10000 documents indicates that, although the Type metadata element is optional, it is in fairly widespead use. Just over one fifth (22%) of pages had values in the dc.type field, and an additional 14.5% of the sample contained blank dc.type fields, evidence that metadata templates are often used. The use of type metadata is unevenly distributed across sub-domains within the government. For example, type values were included in 100% of pages from Services Canada, Public Works, and Canada Benefits, in 88% of pages from Health Canada, and in only 1% of pages from Environment Canada.

Of the pages with type tags, about 10% (220 pages) had two type values and another 3.8% had three or more type values assigned per page.

Throughout the entire sample, 34 of the 50 GC Type Taxonomy values were in use, in addition to 85 other values that were either taken from other controlled vocabularies or added free-form. The distribution of Type values has a long tail, and the ten most frequently assigned values (Table 1) make up more than 60% of occurrences. All of the most common Type values are from the GC Type Taxonomy, except for "text."

Table 1: Top GOC-Assigned Values

Type	% of all Type Values
Fact Sheet	10.0
Home Page	9.5
Resource List	8.1
Report	6.0
Media Release	5.9
Contact Information	5.5
Organizational Description	4.2
Text	4.2
Service	4.2
Administrative Page	4.2

The 16 values from the taxonomy that were not found are primarily specialized types of resources, such as geospatial materials, music notation, and manuscript.

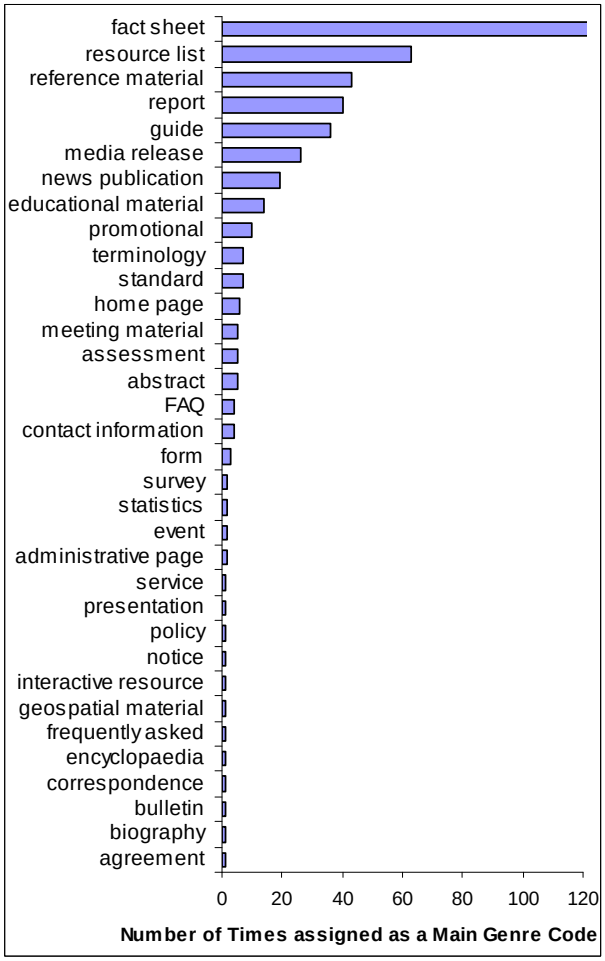
4.2 Assessment of GC Type Taxonomy

The smaller sample of documents collected using Google was meant to represent government information pages relevant to the everyday information needs of the public. Our coding exercise resulted in Type values being assigned to over 90% of the documents (39 of the 400 documents were left uncoded). Most documents were assigned a single main Type (66%), but 20% were assigned two main Type classes. Among all the main Type values assigned, 34 of the 50 Taxonomy values were used.

The distribution of these values is presented in Figure 1, showing a similar distribution to the larger sample, with a small number of genres predominating, and many occurring infrequently. There is considerable overlap in the most frequently assigned values between the two samples: fact sheet, resource list, report and media release are high up on both lists. However, others, such as reference material and educational material are more prominent in the smaller sample.

In addition to main Types, we assigned 159 documents one or more sub-genres using the "contains" field. Eighteen values from the Taxonomy were included as sub-genres, but the main ones were: resource list (44%), contact information (17%), fact sheet (7%), reference material (7%) and statistics (6%). We also assigned 68 documents one or more meta-genres using the "part of" field. Ten values from the taxonomy were listed as meta-genres, but the main ones were report (46%), reference material (24%), and news publication (14%).

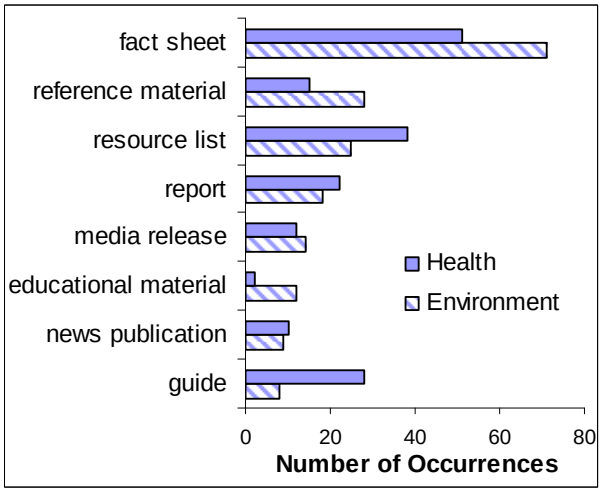
Figure 1: Frequencies of Researcher-Assigned Values



Based on the frequencies, some differences seem to exist in the Types of documents retrieved for the health and environment scenarios (Figure 2). More fact sheets, reference materials, and educational materials were retrieved for environmental scenarios, while more guides and resources lists were retrieved for health scenarios. However, as statistical tests were not conducted, this variation would need to be verified with a larger dataset.

Among the 400 documents in this sample, about one quarter contained metadata Type values as well as researcher assigned values, but the level of agreement was low. For example, among the 22 web pages with the metadata Type value fact sheet, only 13 were similarly classified by UBC researchers.

Figure 2: Frequencies of Common Genres by Domain



5. Discussion

Our findings indicate that Type metadata is used in about one in fifth of GOC webpages, although use is not consistent across agencies. This represents a minority of government webpages, but given the size of the gc.ca domain, it is still a substantial number of documents. The majority of Type values in use are drawn from the GOC Type Taxonomy, which is clearly the controlled vocabulary of choice. In both our samples the frequencies of Type values follow a Zipfian distribution, with a few very common types, a number of which are high in frequency in both samples, and many infrequent ones. The most common values are primarily information-rich genres used in a wide range of contexts: fact-sheets, reference materials, reports, resource lists, media releases, etc. This conforms with the public`s primary use of e-government as a source of information(Underhill & Ladds, 2007). It is worth noting, that although these genres all serve the similar broad purpose of informing, they also serve more specific functions. Fact sheets offer quick orientation and support fact-finding tasks; reference materials support more in-depth learning; media releases serve as notifications for current and recently changed factual information, etc. Thus from a genre perspective, the distinction between these documents is meaningful and potentially valuable for information seekers. Other genres, which have more specialized functions, such as search interfaces or biographies, or are context specific, such as correspondence or manuscripts, have lower frequencies. However, that does not make them less useful for information access, as they may be extremely useful in specialized situations; whereas , the common genres are likely to be fairly useful in most situations.

One of the obstacles to making use of genre variation is the lack of consistency in defining genres. Type metadata used to describe GOC websites is uneven and variable in its current application, which is not surprising, given how challenging we found it to reach a reasonable level of consistency in our coding exercise. Likely reasons for lack of consistency include the structure and content of the Type Taxonomy, which provides only brief definitions and limited examples for terms, combined with the tendency of webpages to embody multiple genres simultaneously. For example, fact sheet was the most common Type value in both samples; however, web pages classified as fact sheets in their metadata were not necessarily classified as such in our coding exercise, and the reverse was also true. We assigned values of media releases, resource lists, reference material, reports, guides and statistics, all to documents with fact sheet Type values. What then is a fact sheet? The GC Type Taxonomy defines it as “a brief essay or series of points on a single topic and/or intended for a specified audience” such as “tips” or “information/issue overviews” (Treasury Board of Canada, 2003). Such brief definitions are clearly difficult to apply to the wide range of Web documents in the GOC domain, which lead to inconsistent results.

In addition to the ostensible overlap between some of the types as defined in the GC Type Taxonomy, the multifaceted character of many web pages themselves may also contribute to their being inconsistently classified. For example, a news release may contain a fact sheet as well as a resource list. A page consisting of geospatial material may in fact be part of a report. A webpage which appears to consist entirely of standards may be part of a guide, and both may simultaneously be seen as reference material. The results of our coding exercise suggest that a structured approach to genre indexing is likely to be of value. This could include both part-

whole relationships, as well as broader and narrower genres. For example, the GC Type Taxonomy might be reorganized into the following groupings, which would allow for indexing at different levels of Taxonomy, which is unwieldy in its current form.

- Public Information (including abstracts, fact sheets, guides, media releases etc.)
- Web Structure and Navigation (including home pages, search interfaces, and administrative pages etc.)
- Transactions and Services (including forms or licenses and permits etc.)
- Special Formats and Materials (including manuscripts, literary material, moving images, geospatial material etc.)
- Government Documents (policies, statistics, standards etc.)
- Internal Administration (contractual material, correspondence, memorandums, etc.).

While these measures can be expected to improve consistency and ease of application of the Taxonomy, it is unlikely that very high levels of consistency will be either possible or desirable. Given that the power of genre is in its socially constructed and localized identity, genre-based systems need to allow for some natural variation.

6. Conclusions and Future Work

This study indicates that the Type Taxonomy can serve as a useful starting point for adopting a genre-base approach to information access in the Canadian e-government arena. However, this work has taken a document-centric perspective. It still remains to be seen whether or not the genres described in the Taxonomy carry meaning to the population of users and offer value with respect to the findability and usability of e-government information. Our future work will focus on seekers and users of online government information to assess the contribution of these genre categories, and to suggest further improvements.

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APPENDICES

1. Sample Search Scenarios (5 of 20)

1. You have recently decided that you would like to improve your health by eating better. Rather than following a fad diet, you decide you would like to use nutritional recommendations that meet government standards and develop your own meal plans. Search for information that would guide you in the process of designing healthy meal plans for yourself.
Domain = Health; Information Task = Doing
Query: healthy meal plans

2. You have a friend with a 2-month-old baby boy who suffers from severe colic. Your friend has started giving him gripe water, which she buys across the border in the United States where it is available. Thinking that there may be some reason it is not available in Canada, you decide to do some checking to see if gripe water is considered to be safe for infants. Search for official health and safety information on gripe water.
Domain = Health; Information Task = Fact-Finding
Query: "gripe water" safety

3. You've heard that the upcoming year will be a La Niña year. You've heard La Niña and El Niño mentioned many times on television and radio weather reports over the years, but you've never been exactly sure of what these terms mean. You want to learn more about them and how they impact weather patterns in different regions across Canada. Search for information that will help you learn about these weather phenomena.
Domain = Environment; Information Task = Learning
Query: la Niña el niño weather

4. You have just started a new job, which you enjoy, but the level of noise in the workplace is much higher than you are used to. You have a hard time concentrating and often have a headache at the end of the day. You have spoken with your supervisor, who thinks it is a personal rather than a workplace issue. You need to find a solution to the problem one way or the other for your own health and well-being. Search for information that will help you better understand and resolve this problem.

Domain = Health; Information Task = Problem Solving
Query: noise in workplace

5. Your brother is an avid birdwatcher and is making a trip out to Victoria to visit you next month. You want to take him to the best birdwatching spot on Vancouver Island, but you are not a birdwatcher yourself. Search for information that identifies some potential locations and can help you to decide upon the best one.
Domain = Environment; Information Task = Deciding
Query: Birdwatching Vancouver Island

2. Rules for Coding with GC Type Taxonomy

1. Classify an object by the code that best represents the specific object as a whole and separate entity.

2. Classify an object with more than one code if multiple codes all reflect the specific and complete nature of the object – for example: a "report" that presents "standards" , or an "FAQ" which is "educational material" or a "media release" which acts as a "notice".

3. Classify objects according to what they are; do not classify them according to what they are about. For example a media release about a new service should not be classified as "service".

4. Add a separate field for "Contains" – use this code if a substantial portion of the object is this other type – for example, for a "fact sheet" that contains a substantial "resource list" - put resource list in the "contains" field.

5. Use the "Part of" field if the object is obviously part of a larger object, which has some cohesive identify – for example – if it is a glossary ("terminology") which is a part of a report.

6. Use the "collection" field when an object is not one of any type, but is a group of them – for example, a collection of letters, or a collection of media releases.

7. The goal is not to be comprehensive, but to identify the categories that best express the type of page it is. So don't try to label all components parts (search interface, contact info, statistics, etc), or what the object is part of unless these are obvious and major elements of the object.

8. If an object is obviously of a type or genre that is not on the list – add this as a free form label.