

Technical Issues in Collaborative Multilingual Legislative Drafting

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1. Introduction

Legislation in its broadest definition is one of the key products of collaborative agreement processes in transnational civil society work. Legislation here refers broadly to some formal process of group deliberation that yields an output in the form of a written text. Such texts are usually structured and can take various forms, including bills, resolutions or declarations.

This memo presents a preliminary analysis of requirements for improving transnational, multi-lingual, collaborative work among non-governmental organizations (NGOs) and a review of applicable technologies. The focus of this research is document-based negotiation processes. This is in contrast with both the free form or conferencing communication modalities that are in increasing use in on-line collaboration.

This research addresses aspects of layers 1 and 2 of Ó Siochrú's model (2003) in the report -- Global Governance of Information And Communication Technologies: Implications For Transnational Civil Society Networking -- for the inauguration of the Information Technology and International Cooperation program of the Social Science Research Council. Layers 1 and 2 are: Physical Access and Enabling Tools and Resources; and Generating, Retrieving and Using Content, respectively.

The first memo in this series attempted to motivate the need for tool sets that support document-based collaboration. It drew on experiences from drafting processes in which civil society organizations engaged during the first phase of the World Summit on the Information Society. The first memo also proposed a high level architecture for such a system. This will be further developed in a subsequent memo.

This, the second memo in the series, presents a more detailed analysis of requirements for such a tool set. It does so by examining the research literature on software systems that support different aspects of legislative drafting. This memo also provides brief discussions of several commercial and non-commercial tool sets in this domain.

Section 2 provides discussions of fundamental issues for multi-lingual, collaborative drafting. Section 3 provides background on general technical domains that are relevant to legislative drafting and information technologies designed specifically to support

legislative processes. Section 4 contains concluding remarks, including topics to be covered in the third memo.

2. Issues in Multilingual Legislative Drafting

A modest body of literature exists in the area of legislative drafting in multilingual contexts. This derives from processes that have evolved in countries that conduct legislative processes in more than one official language, such as Canada; the Hong Kong Special Administrative Region; and Belgium; as well as International Organizations like the United Nations and the International Labor Organization.

2.1 Principles of multilingual legislative drafting

We use the term legislative system in a generic sense to refer to a collaborative or deliberative process among multiple entities that has as its goal the production of agreements or statements that are produced in the form of a text. This definition is meant to cover the spectrum of legislative processes from parliamentary systems to non-governmental organizations that have agreed to use some type of rules of procedure to produce documents. Texts under this definition of “legislative system” might then include, but not be limited to, bills, statutes, declarations or resolutions, or regulations. Such documents, including drafts versions, are said to be authentic texts if they are produced according to agreed-upon rules of procedure.

In multilingual legislative systems there is then the designation within the given rules of procedure -- by law in the case of a country or region -- of the official languages in which the legislative system may produce authentic texts. The term language version will be used here to refer to the instance of an authentic text in a particular language (e.g. Spanish language version).

Two central issues can be identified among societies and organizations referenced in this memo in their implementation of multilingual legislative systems. Decisions about these two issues constrain technological solutions for supporting a legislative system in significant ways. The first and most critical issue is that of defining the status of all of the official languages in the legislative system relative to one another. The second issue is that of defining the principles and processes for interpreting legislation where any authentic text may be represented by more than one language version. These two issues yield a number of corollary issues. All of these are discussed below.

2.2 Principle of equality

All official languages must have equal status if participants and "citizens" within the legislative process are to enjoy equal status. That is, one's officially recognized language must not be viewed as subordinate to any other official language within the process. Transitively, one language version of an authentic text must not be viewed as a translation of another language version. All language versions of an authentic text are thus said to be equally authentic under such a system.

The Vienna Convention on the Law of Treaties (United Nations, 1969) codified these concepts at an international level. Information about multilingual drafting in this memo has been gathered from legislative drafting guides that have been published by the Hong Kong Special Administrative Region (2001) and Canada (1995); as well as the

International Labour Organisation (2001).

2.3 Natural language translation issues

The general characteristics of natural languages and the unique characteristics of each language often raise problems in multilingual legislative drafting given the fundamental requirement that equivalence must be obtained between language versions. A complete taxonomy of problems involved in natural language translation is beyond the scope of this memo. Miller (1995) provides an overview. We discuss instead key issues present in the literature on the specific domain of legislative drafting: whether an expression has a direct translation into another language, problems posed by polysemy, and the use of domain-specific terminology.

Any official language likely contains words that have no direct translation into another official language. It may also be the case that a domain-specific term in one language -- such as those found in legal, technical, or scientific literature -- has no direct translation in one of the official languages. These situations have been addressed in some legislative systems through the implementation of multilingual glossaries that attempt to harmonize translations between terms that commonly arise. This has the benefit of not only resolving translation problems, but also of making the overall process more efficient.

It is not uncommon in multilingual drafting to encounter a word in one official language that is polysemous or to find that one official language does not offer an appropriate word that has the same scope of meanings in another official language (Canada, 1995; the Hong Kong Special Administrative Region, 1998). In these cases, one language may require the use of several words to capture the breadth of meaning of its equivalent text in another language. Conversely, what may be required is the choice of a less polysemous word in the former language to constrain the possible meanings in the second.

2.4 Sequencing in the drafting process

Because all official languages are to be equivalent, the process of drafting legislation must not privilege one language version over the other. That is, drafting may start in any one of the official languages with translations into equivalent language versions made later. Another possibility that occurs in some legislative drafting systems is that language versions of a text are drafted in parallel in order that drafters can collaborate on finding equivalent meanings. This is known as co-drafting (ILO, 2001). The latter approach has the advantage that possible problems in differences across language versions can be dealt with immediately.

In Canada and Belgium both serial drafting and co-drafting are legal options, but it has become customary to use co-drafting. The International Labour Organization's legislation guidelines note that in Belgium drafting often commences in the "mother tongue" of the subject matter expert for the legislation in cooperation with a lawyer producing an equivalent version in the other language (ILO, 2001).

2.5 The scope of an authentic text

In multilingual legislative systems, a text is comprised of all of its language versions together. In countries such as Canada or the Hong Kong Special Administrative Region it may not only be the case that language versions are taken to be equivalent. There may be

further requirements in legal processes that a text must be considered to include all of its language versions together (Hong Kong, 1998).

2.6 Document structure and drafting conventions

Many legislative systems require documents to be produced according to established templates that dictate the types of sections that are allowed in a text, such as chapters, parts, sections, or subsections; how such section types are to be used; and constraints on the way language itself is used. The United States House of Representatives (2004), for example, has established several styles by which legislation may be structured. These have subsequently been articulated in the form of XML DTDs or schemas.

Multilingual drafting heuristics and the needs of legislative drafting call for each language version to have the same structure. Structural equivalence refers only to the section level organization of the legislation. It is recognized that sentence level structure between language versions must be allowed to differ due to the diversity of characteristics of each official language. Canadian guidelines, for example, recognize that approaches to reducing ambiguity in legislation differs significantly between French and English (2004, section 2.7).

2.7 Glossaries

Glossaries have important functions in legislative drafting in general and in multilingual drafting. Drafters in any language may require access to definitions and usage information about domain-specific terminology. Terminology in one language may not be amenable to direct translation into another language (see Canada, 1995 for examples). For this reason, multilingual glossaries have been proposed and implemented. The Hong Kong Special Administrative Region, for example, has implemented the Bilingual Laws System (BLIS) which has a glossary of legal terms in Chinese and English in addition to full texts of legislation (2001, Annex VII).

2.8 Drafting rules or heuristics

A system of drafting rules that specifically addresses multilingualism may be codified within a legislative system. This is the case for the ILO (2001); the Department of Justice in Canada (1995); and the Hong Kong Special Administrative Region (1998). A legislative drafting tool set should support adherence to such rules. A set of rules has been collected from these sources in table 1.

Table 1. Rules and heuristics for multilingual drafting

Category	Rule/Heuristic	Sources
Principle of Equivalence	The overriding rule is only to make the substance of all of the language versions equivalent.	ILO
	Each draft of each language version must be grammatically correct.	ILO
	Do not use "phrases or expressions that suggest" one language version has a higher status than another.	Hong Kong
	One language version must not be "forcibly" changed "to fit the particularities of another language."	ILO
Document Structure	Make the structure of a text identical across each language version with respect to enumerated organizational units.	ILO
	Allow the structure of lower level, non-enumerated units of text such as paragraphs to diverge across each language version if the characteristics of the natural language require it.	ILO, Canada
	Allow the syntax to diverge if necessary.	ILO
	Allow the number of sentences to diverge if necessary.	ILO
Drafting Process	Draft in the singular in languages where multiple modifiers can lead to ambiguity.	Canada
	Use paragraphing in languages where it can help to disambiguate the syntax of a sentence.	Canada
	Structure texts using a hierarchy of enumerated clause types to facilitate parliamentary debate on the text on a part-by-part basis. (This is the normal approach and is not strictly a multilingualism issue.)	Canada
	Use co-drafting when possible, where persons fluent in each official language collaborate closely to produce language versions in parallel.	ILO, Canada

3. Related Work in Collaborative Technologies

The development of tools to support multilingual legislative drafting must draw on the broad technical areas of markup languages and hypertext, computer supported collaborative work (CSCW), and versioning; as well as the more narrowly focused area of research and development around legislative drafting systems. This research also draws from policies and guidelines that have been established by parliamentary and inter-governmental organizations to manage multilingual drafting processes.

3.1 Markup languages and hypertext

Markup languages are now associated almost entirely with the World Wide Web; however, markup languages were originally concerned with typesetting. These languages were used first as written annotations in documents to give layout specifications to human typesetters. Eventually these languages evolved into electronic analogs that could be embedded into electronic documents to direct typesetting machines.

It has been noted that legislative drafting methodologies have been influenced in a significant way by the evolution of markup technologies (United States House of Representatives, 2004). The particular typesetting machines that were chosen dictated the languages that were used. In turn, the forms that these languages took guided the development of text editing software to be used by drafters to produce texts with embedded markup. Legislative drafters then evolved organizational conventions and procedures that were, in part, adaptations to the capabilities and limitations of these text editing systems made in attempts to achieve greater efficiencies and ease of use. For example, numerous keyboard shortcuts have been introduced into drafting systems used in the U.S. House of Representatives.

Markup languages are used today not only for presentation, which encompasses typesetting, but also to provide structural and semantic information about documents. Correspondingly, the styles used to guide the production of legislative documents are often highly structured and the management and use of legislative documents benefits greatly from having access to meta-data -- data about the content data in the document -- that semantic markup makes possible. The style now commonly used in the U.S. Congress to produce bills provides for a hierarchy of as many as eight types of sections, the basic unit; as well as seven higher level types of groupings (United States House of Representatives, 2004). The formats used by many other countries as well as international organizations, such as the United Nations and the International Labour Organization, can be observed to be highly structured as well.

The current generation of markup technologies for these purposes revolves around the XML standard (W3C 2004). XML (for Extensible Markup Language) is designed to enable structural and semantic markup. It can in conjunction with XSLT, an XML-based technology, be used to automatically produce corresponding presentational markup.

Traditional legislative drafting processes make heavy use of cross-references. These take the form of in-text citations to other documents or to specific sections within the same or other documents (e.g. an act being superceded). An example is the following, which is an act of the U.S. Congress mandating a change to an existing act:

(a) In <<NOTE: 26 USC 3304 note.>> General.--Section 208 of the Temporary Extended Unemployment Compensation Act of 2002 (Public Law 107-147; 116 Stat. 30) is amended to read as follows:

(U.S.C. Pub. L. 108-1)

Thus, a natural part of the application of current markup language technologies to legislative drafting processes has been to make use of hyperlink capabilities to model the various types of cross references in use. For example, applications used for drafting in the U.S. House of Representatives offer functions to automate the use of internal cross-references within a document (e.g. to refer to section numbers) and for retrieving information from other documents (e.g. other legislation) (United States House of

Representatives, 2004). Relevant XML-based recommendations and standards here include XML Pointer, XML Base and XML Linking (see W3C 2003).

3.2 Groupware

A tool set to support legislative drafting would fall into the broad category of groupware systems, which Ellis, Gibbs, and Rein (1991, p. 40) defined as:

computer-based systems that support groups of people engaged in a common task (or goal) and that provide an interface to a shared environment.

In our problem domain, the common tasks include the drafting and deliberations over drafts of a legislative text. The legislative text itself and the computing environment in which it is created and managed constitute the shared environment.

Under the definition given above, a groupware system is typically characterized by its characteristics along three dimensions (Ellis et al. 1991, p. 41):

- whether or not it allows multiple users to engage in common tasks or to work in the shared environment in real-time;
- the degree to which it allows or requires users to share common tasks; and
- the degree to which it allows or requires users to share a common environment.

The combinatorial possibilities, thus, yield the classic class space and time matrix to characterize groupware systems. Examples of how this might apply to legislative drafting systems are given in table 2.

Table 2. Space-time characteristics of possible legislative drafting systems

	Working on common tasks at the same time	Working on common tasks at different times
Sharing of space	Collaborative editing of a shared document in real-time.	Collaborative editing of a shared document at different times.
No sharing of space	Collaborative editing of different copies of a document in real-time. Real-time display of editing process for observers.	Routing of a document to different users for editing.

Conceptually, a legislative drafting system might need to exhibit characteristics of all four quadrants in table 2. Heuristics for multilingual drafting suggest tools that allow group editing in real-time given that drafters in each official language would ideally work in close collaboration. This type of collaboration might be facilitated by editing of a shared document representing an aggregation of language versions or through no sharing of a common document, but rather communication of results between distributed drafting sites. Legislative drafting may at times lend itself to asynchronous interactions, where editing takes place at different times. One scenario is that of editing one instance of a document in a shared repository, but at different times. The other is that of routing the document to different locations for editing by different users at different times.

3.3 Versioning

Vitali (1999) defines versioning as "the management of multiple copies of the same evolving resource, captured at different stages of its evolution" (p. 1). Legislative drafting involves another layer of complexity here in that the "evolving resource" is a legislative text that is typically consolidated from sections that were authored independently. From a parliamentary perspective these sections often represent proposed amendments to the text. Multiple copies or versions of the text then come into existence as each section is added. Further changes to the text may occur in parliamentary processes where text is "marked up" to signify desired edits.

Arnold-Moore (1995) points out that because existing legislation may be subject to amendment, it may be necessary for proper legal interpretation (e.g. in a court case) to be able to see the state of the text at any point in time during its evolution. Furthermore, historical scholars may learn more about the intent of a document's authors and the events surrounding its creation by examining its various versions. A legislative drafting tool set should, therefore, be able to represent the content of a legislative text in such a way that it can be reassembled at any stage in its "evolution."

Several research efforts are relevant here. Versioning methods for hypertext have been studied since at least the 1980s. Vitali (1999) provides a survey of many of these. More recent work has focused on lower level database indexing schemes specifically for XML (Chien, Tsotras, & Zaniolo, 2002). The WebDAV protocol includes mechanisms for supporting versioning in a Web environment. All of these approaches solve essential concurrency control, access, and storage problems for version management at the level of the markup language and, in the case of WebDAV, at the network level. These approaches are, however, domain-independent and do not address the specific needs of consolidation and modeling legislative document structures.

The EnAct system (Arnold-Moore, 2002) is designed to address version management specifically for legislative drafting. In particular, it supports the consolidation process and allows legislation to be viewed at different points in time. It makes use of an XML-based change description language that is used to articulate proposed changes to a text, including elimination and substitution of text.

3.4 General Collaboration Technologies

A number of systems have been developed that support various aspects of versioning and collaborative work described above, but which are not specifically designed to support legislative drafting. Notable examples include BCSW (Appelt, 1999) and Hyperwave (formerly Hyper-G) (Andrews, Kappe, & Maurer, 1995). Both systems are not free and open source and, thus, do not meet the criteria that we argue are necessary for supporting civil society. Nonetheless, they provide important models for Web-based content management and collaboration that can be adapted to this domain.

Hyperwave's strengths are in the areas of content and link management. Any applicability to collaboration is, thus, a side effect of strengths in these areas. Content and links are stored separately in a database in this system, which allows greater flexibility in the types of objects that can be assigned links, as well as allowing dangling references to be dealt with more effectively. Hyperwave also provides mechanisms for aggregating content, such as multiple language versions, of a single "document" into one object.

BSCW (Basic Support for Collaborative Work) is a system that has explored the use of HTTP servers and HTML to provide an environment for collaboration. BSCW is based on the concept of workspaces, which are locations where multiple users can collect documents and other types of objects for joint tasks. Another major feature the system provides is monitoring and notification of events within workspaces, such as document changes. BSCW implements concurrency control and versioning, which are critical for the collaborative use of shared resources.

An alternate approach that is not dependent on a specific set of systems is a protocol-based focus on collaboration. The key example here is WebDAV (Whitehead & Goland, 1999), an open standard for collaboration on the Web. WebDAV articulates an HTTP-based protocol for supporting distributed authoring and versioning. Its goal is to achieve network-based interoperability of tools. This approach opens the possibility for existing applications, such as word processors, to be used for collaborative authoring through minimal extensions necessary to satisfy the protocol. WebDAV provides for concurrency control; the management of “namespaces,” which can represent aggregations such as in BSCW; and an approach to extensibility that does not “break” existing applications.

3.5 Technologies for Legislative Drafting

Software systems have been used to support legislative drafting since at least the 1960s through the adaptation electronic typesetting software like the Master Typography Program (MTP) used by the U.S. Congress (n.d.). The lineage discussed here is distinct, though not unrelated to, legal retrieval systems (see Arnold-Moore, 1998). Later with the availability of WYSIWYG authoring tools, applications such as Xywrite and Xmetal were integrated into the drafting process of the U.S. Congress through user-level customizations, such as keyboard shortcut definitions, to support the specific needs of legislative drafting.

Since at least the 1990s, efforts began to develop systems that support both the authoring and version management aspects of legislative drafting. Version management in these systems seem to have focused less on the concurrency control features required facilitate collaborative drafting with emphasis being placed on automating the consolidation of legislation from amendments and facilitating point in time retrievals, as described above. A key example is the EnAct system (Arnold-Moore, 2002) that was developed for the provincial government of Tasmania. In addition, some efforts have been made at addressing multilingualism in the context of legislative drafting. One example is the Bilingual Laws Information System (BLIS) designed for the Hong Kong Special Administrative Region (2001). These systems appear to be closed and proprietary and, thus, not useful for supporting civil society organizations.

For reasons discussed above, legislative drafting technologies have followed the move to XML-based data management. Thus, in addition to XML-based software architectures, such as EnAct, open XML Schemas (and DTDs) have also been developed specifically for legislation. These include open XML-based schemas and style sheets developed for the U.S. congress (n.d.) and the MetaLEX open standard for legal documents developed in the Netherlands (Winkels, Boers & Hoekstra, 2003).

4. Conclusions

This memo examined a very specific and crucial computing domain for improving collaboration within civil society networks: technological support for collaborative,

multilingual, legislative drafting. The development of legislation, as broadly defined in the first section, is only one mode of production within transnational civil society networking, but one that appears to be gaining in importance as non-governmental organizations continue to participate more fully in international conferences and summits.

The dilemma for civil society organizations is that while a limited number of technologies have been developed to support legislative processes, including drafting, they are proprietary and it appears from our survey that major work remains in addressing the multilingual dimension at a technological level. Free and open source technologies do exist that support various forms of on-line collaboration, but none appear suitable or tailored for supporting the specific needs of legislative drafting, much less the needs of drafting in multiple languages.

Fortunately, the bodies of research in the constituent areas relevant to multilingual legislative drafting and collaborative computing are sufficiently mature to inform the development of free and open tool sets. Well-defined heuristics for multilingual legislative drafting have been derived from experiences in intergovernmental organizations, countries and regions that have multilingual legislative processes. These heuristics can inform the development of preliminary requirements for a tool set to support this form of collaboration. A number of areas within computer science, including CSCW and database systems, have produced well-understood techniques for supporting document versioning, point in time retrieval, and concurrency control for the safe manipulation of a shared document by several authors simultaneously.

The most promising approach to the development of a free and open tool set for collaborative, multilingual drafting will combine the open WebDAV protocol with use of XML-based document technologies. In the aggregate, these technologies will allow a wide array of existing software applications to be leveraged to produce a solution. They are open and flexible enough to create a solution that can evolve. Solutions based on these technologies can and have been ported to many different types of computing platforms.

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