ABSTRACT

The paper contains an assessment of the fulfillment of the users’ needs by the online legislation databases in Switzerland. Firstly, a common evaluation grid is proposed: the users’ needs are expressed as use cases according to the UML 2.0 modeling language. Secondly, the federal and cantonal legislation databases are evaluated using this common grid. Moreover, third party solutions (Legifrance, LexFind, Lawsearch) are also discussed to provide some comparison. Thirdly, specific and general conclusions are presented on the basis of the evaluation. Finally, the CHLexML data format is discussed and critically evaluated.

In general, the level of fulfillment of the users’ needs by the online legislation databases in Switzerland can be described as satisfactory. But the legislation databases mostly offer only static features, providing simply electronic versions of legal acts. There is a huge improvement potential, namely to provide more advanced features allowing the user to interact with the databases. This would allow the shift to the Web 2.0 paradigm and, for example, let users actively create personalized documents containing different language and time versions of legal acts. In order to achieve this progress, legal acts have to be stored in structured XML files allowing complex and instantaneous document manipulation. Moreover, this new XML document format should be harmonized in order to allow interoperability between different online legislation databases.

CHLexML is a XML schema developed by the SVRI. This XML schema expressly addresses the need for a structured and harmonized data format to store legal acts in Switzerland. CHLexML proves that this need was correctly recognized in Switzerland. However, it is not known whether it is already in use or will be in use in a near future. Moreover, the existing 1.0 version could still be improved in order to include metadata about the creation of legal acts. To address this minor issue, a simplified improvement proposal is done, expanding the existing XML schema.

Key words: eGovernment, law and informatics, online legislation database, website evaluation, expressing users’ needs, XML, XML schema, CHLexML, SVRI.
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<th>Description</th>
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<tr>
<td>AB</td>
<td>Amtliches Bulletin</td>
</tr>
<tr>
<td>BBI</td>
<td>Bundesblatt</td>
</tr>
<tr>
<td>BR</td>
<td>Bundesrat</td>
</tr>
<tr>
<td>DOC</td>
<td>Document (MS Word file extension)</td>
</tr>
<tr>
<td>EJPD</td>
<td>Eidgenössisches Justiz- und Polizeidepartement</td>
</tr>
<tr>
<td>HTML</td>
<td>Hypertext Markup Language</td>
</tr>
<tr>
<td>IATE</td>
<td>Interactive Terminology for Europe</td>
</tr>
<tr>
<td>PDF</td>
<td>Portable Document Format</td>
</tr>
<tr>
<td>SS</td>
<td>Systematische Sammlung des Bundesrechts</td>
</tr>
<tr>
<td>SVRI</td>
<td>Schweizerischer Verein für Rechtsinformatik</td>
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<tr>
<td>UML</td>
<td>Unified Modeling Language</td>
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<td>XML</td>
<td>Extensible Markup Language</td>
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FOREWORD

The paper is a personal creation of the author and expresses solely his private opinions. The paper does not engage in any way the employer of the author, the Weblaw AG in Bern, or his supervisor, Mr. Franz Kummer.
INTRODUCTION

Problem statement
Law professionals work with legislation on a daily basis. Not only do they have to know the current version of a given act, but also have to consult previous and future changes to the act, trace the creation history of the act and compare it with other similar acts. Throughout the 19th and the 20th centuries, this had to be done using printed versions of legal acts as well as of the subsequent amendments. From the beginning of the 21st century, however, the access to legal acts has become easier as online databases of legal acts have become available.

Storing the texts of legal acts in a computer database and making it publicly accessible in the Internet by an official public body is a part of the eGovernment phenomena. According to the eGovernment Framework of the University of Fribourg presented in [Meier 2009, p. 6], the online access to legislation is situated at the Information & Communication level and can be qualified as eAssistance. The online access to legislation is not interactive: its main objective is to diffuse pertinent, actual and official legal information to interested organizations or persons. These might include citizens (A2C), businesses (A2B) or even other public organizations (A2A).

In Switzerland, online legislation databases are provided by public authorities on the federal and the cantonal levels. All these databases have different user interfaces and different functionalities. As a matter of a fact, Swiss lawyers often have to use many online legislation databases simultaneously to find the information they need. This is due to the Swiss political system in which a given matter is often regulated on the federal as well as on the cantonal level. The users’ needs in general, however, are mostly the same independent of the database they are using at a given moment.

Objectives
For this reason it is interesting to ask what needs the lawyers actually have and whether they are fulfilled by the existing online legislation databases in Switzerland. In order to provide an answer to these two questions, it is thus necessary to conduct a comparative analysis of the online legislation databases in Switzerland according to appropriate criteria.

Outline
The choice of the criteria to construct a common evaluation grid will be addressed in the chapter one. The chapter two will present the actual data collected using the chosen research method.
Specific and general conclusions will be presented in the chapter three. Finally, the chapter four will discuss solutions available to selected problems and propose improvements to specific issues.

CHAPTER ONE

Choice of the evaluation grid

The identification of users’ needs and the analysis of the fulfillment of these needs by an information system or a website is by far not an easy task. In general, this kind of evaluation is done when assessing the quality of a web service or of an information system. In the context of online web services, several approaches have been developed to measure the quality of web services. [Connolly et al. 2010, p. 650] give multiple examples, such as SERVQUAL, WebQual or E-S-QUAL. But the cited models have a significant drawback: they were created to rate commercial eCommerce services and not public eGovernment services. On the other hand, [Meier 2009, p. 27] describes the HONCode website quality evaluation system designed especially for eGovernment websites. However, the HONCode system is focused on eHealth and is not directly applicable to websites containing legislation databases.

All these web quality models offer a very broad scale of evaluation, including for example technical issues. In contrast, [Olsina et al. 2006, p. 114] remind the general ISO 9126 quality definition, which states that the quality is “the totality of features and characteristics of a software product that bears on its ability to satisfy stated or implied needs”. This definition is well suited for the scope of this paper, as it is focused solely on the users’ needs. However, a very general definition like this one does not precise how the users’ needs should exactly be captured. The precise users’ needs definition should be developed separately for each study, depending on the objective and the environment of the research.

In order to capture the needs of the lawyers using the online legislation databases in Switzerland, this paper will therefore adopt the “use cases” approach proposed by the UML 2.0 modeling language. According to the UML 2.0, the users’ needs are expressed in the so called use cases. A use case is a detailed description of a specific and distinct task a user wishes to perform while interacting with an information system. [Miles / Hamilton 2006, p.28] and [Morley et al. 2008, p. 85] explain that there is no formal structure imposed on the content of a use case and that the actual content depends heavily on the context and the objectives. In general, a use case contains elements such as the actor, the objective, the trigger, the input, the output, the sequence of actions and the textual description.
The use cases proposed hereinafter are not intended to provide a complete insight into a lawyer’s work nor do they intend to lay a complete foundation for a new web-based information system. Their main objective is to provide a structured evaluation grid to assess the existing online legislation databases in Switzerland and to enable a structured analysis. For this reason, a specific use case structure will be introduced. All the use cases listed in this chapter are basically independent from each other, even though some use cases would logically be executed before other use cases. This is why no <<include>> or <<extend>> relationships will be used. Finally, a use case diagram will be introduced in appendix A to present an overview of all the use cases proposed in this chapter.

**Structure of the use cases**

The structure of the use cases proposed in this paper is adapted to best suite the objective of the study. For this reason, some elements normally present in a use case will nevertheless be omitted. The elements retained are subdivided into two sub-groups. One element is the same for all use cases and so will be described only once for all. Four elements differ from one case to another and will be detailed for every use case separately.

**Common element**

The actor of a use case is a human person or an information system which interacts with a given information system in order to achieve a specific goal. In this paper, it will be hereinafter supposed that the actor is a human person accessing the online legislation database with an Internet browser. This person is a lawyer or another user of the online legislation database. The terms actor, lawyer and user are equal and will be used interchangeably. The actor is supposed the same for all the presented use cases: for this reason, it will not be separately specified for any use case. However, each use case should be understood as having an actor as described in this paragraph.

**Distinct elements**

Besides the common actor element, each use case shall have four additional distinct elements. These elements will be described in detail for every use case separately.

The objective element describes the goal of the actor when using an online legislation database. In other words, it is the need to be satisfied with the help of an online legislation database.

The input element describes the information required to achieve the objective of the use case. They are supposed to be provided by the actor by the means of an appropriate interface.
The output element specifies the data sent to the user’s Internet browser once the user has successfully provided the input. For example, it can be a HTML formatted text or a download file in a given format.

The textual description element provides additional information in the form of a short text or a comment. It will contain an information, comment or observation that does not fit in any other category but is still relevant. It may also shortly describe the use case in a simple manner.

**Elements omitted**

Given the unique focus on the users’ needs, all the elements related to the more technical aspects of the use cases will be omitted. This is the case for two elements, namely the trigger and the flow.

The trigger element describes the actor’s action that immediately precedes and starts the use case. As the actor does not change and is supposed to use an Internet browser to access an online legislation database, the trigger would be the same for all use cases. Each use case would be triggered when a button or a link is clicked by the user in his web browser. The use cases being independent one from another, it can be supposed that each use case would be triggered separately and technically in the same manner. For this reason, the trigger will not be explicitly described for each use case.

The flow element describes the series of actions necessary to achieve the objective of the use case. Even though the actual flow might effectively differ from one case to another, technically all the action flaws would be very similar, including almost exclusively clicking links or web buttons, choosing some options and entering search terms. Furthermore, these are mainly technical issues which are beyond the objective of this paper. This is why the flow element is not included in the description of the use cases.

**Use case 1: Search for an act**

**Objective**

The objective is to find a legal text in the online legislation database. A successful research allows to access the web page dedicated to the researched act.

**Input**

The user has to provide at least a minimum of information concerning the researched act. These can be as follows: the name of the act, the (official) abbreviation of the act, a fragment of the text of the given act, the classification number of the act, a specific date or a time interval (for example the adoption date, the date of the entry into force, the date of the last modification etc.), keywords associated with the act, various other metadata available in the database.
Output

A link to the web page dedicated to the researched act or directly the web page of the act.

Textual description

Search functionality is an absolute must in a database counting hundreds of legal acts. The exact search possibilities depend on the data that is stored in the database for any act. The research possibilities should be as extensive as possible and include each possible data or metadata stored in the database. It would be welcome to include a set of indexes, for example an index of key terms, which would as well be multilingual (one could choose a legal term in only one language and obtain results in all three official languages). The search engine should also take into account not only the legal acts currently in force, but also the acts that are no longer in force or that have already been voted and will come into force later on.

Use case 2: Search in multiple databases

Objective

The objective is to perform a search in all online Swiss legislation databases at the same time and to find legal acts that share the same characteristics. A successful research should allow to access the federal and cantonal legal acts that satisfy a given criteria.

Input

The research could be done in two different ways. One possibility is to start a search from an act that was already found. The second is to enter a search term and to find similar acts in all Swiss legislation databases.

Output

A list of links pointing to the found acts. The list should be structured by database and should be comprehensive, i.e. it should contain all databases available, even though no result was found for the specific database (in this case a corresponding mention should appear).

Textual description

In some situations it is necessary to find legal acts not only on the federal, but also on the cantonal level. Instead of using several search engines and several databases at the same time, a common search engine could simplify and accelerate lawyers’ work. The main utility of such a research is to find all acts from a given domain. For this reason it would be mostly sufficient to provide search functionalities restricted only to the classification of the act or the domain description. The difficulty which may arise is that classifications and keywords or domain descriptions in different databases are not necessarily coordinated. This means there would have to be some sort of a common interface allowing cross-database research.
Use case 3: Display the current version of an act

Objective
The objective is to display the actual version of a legal act. It may be the entire act, a part of it or a single article.

Input
The user chooses the fragment of the act to be displayed.

Output
A web page displaying the desired fragment of the actual version of the act.

Textual description
Once a desired legal act is found, the most obvious and the most common action is to display the current version of it. The user should have the possibility to choose the fragment he wishes to display. This may vary from the complete text, through some hierarchical sections (chapter, title etc.) to single articles.

Use case 4: Display an act in different languages

Objective
The objective is to display an act in all its official languages simultaneously. The fragment to display might be the entire act, a part of it or a single article.

Input
The user chooses the language versions to be displayed.

Output
A web page displaying the desired fragment in the chosen languages. The layout of the text allows to compare easily the different versions.

Textual description
All the federal legal acts and some of the cantonal legal acts are published in more than one official language. For this reason, Swiss lawyers often have to work in two or more languages simultaneously. As a matter of a fact, different books or scientific articles referring to one legal act might be written in different languages as well. Seeing a legal act or a single article in all its official languages at the same time helps to work simultaneously in different languages.
Use case 5: Consult the lifecycle of an act

Objective
The objective is to display the complete lifecycle of a given legal act and to consult any documents related to it. The lifecycle should contain all information concerning the creation procedure and the adoption of the act, all past modifications of the act as well as all future modifications that will come into force later on. Should the lifecycle contain any mention of a document, a direct link to the document should be provided.

Input
The act whose lifecycle is to be displayed.

Output
A web page containing all information referring to the lifecycle of a given act. The information is displayed chronologically. All mentions of documents are directly linked to the respective documents.

Textual description
A legal act is not created on the date of its entry into force. The creation of an act is preceded by a long legislation process, involving different public offices and parliamentary commissions. The creation process produces many different documents, such as drafts, reports, minutes of debates etc. From a lawyer’s point of view, it might be important to know when and how a given legal act was created. It might also be important to know when and how an act was changed or will be changed in the future. It is thus important to obtain easily all information relevant to the lifecycle and to directly access any document related to the given act.

Use case 6: Display different versions of an act

Objective
The objective is to display a version of an act as it was in force at a given date. The fragment displayed can be the entire act, a part of it or a single article.

Input
The user chooses the fragment to be displayed and the date of his interest.

Output
A web page containing the desired fragment of the act as valid at the given date.

Textual description
The text of a legal act might change in time following the successive modifications. The same legal act, but in different versions, might apply to events that happened before or after a given
modification. For this reason it is very important to know the version of the act that was in force at a given date. This is valid not only for past modification, but also for any future modification. This can also help lawyers to adapt to the future versions of a legal text.

**Use case 7: Compare different versions of an act**

**Objective**
The objective is to view simultaneously and to compare two different versions of a legal act.

**Input**
The user provides two distinct dates and the fragment to be displayed.

**Output**
A web page containing the desired fragment in the chosen versions. A visual help marking the changed fragments would be helpful.

**Textual description**
During its lifecycle, a legal act can undergo many subsequent changes. Some of them are important, but some of them imply only minor changes, replacing single and separate words. The possibility to directly compare two different time versions of a legal act would definitely help to understand how an act changed between two different dates.

**Use case 8: Display all versions of an act**

**Objective**
The objective is to view an act with all subsequent modifications as applied to the chosen fragment of a given act.

**Input**
The fragment of the act to be viewed.

**Output**
A web page containing the subsequent versions of each article of the chosen fragment of the act. For each version the date of the modification is displayed.

**Textual description**
In some cases an act has been modified so many times that it is not sufficient to simply compare two different versions. On the other hand, it would not be practical to compare more than two versions at the same time. In some situations it might be useful to view all the different versions at the same time, displayed subsequently one after another for each article from the chosen fragment of a given legal act.
Use case 9: Download an act

Objective
The objective is to download a legal act in a chosen file format.

Input
The user chooses the desired file format.

Output
A file in the selected format is downloaded to the user’s computer.

Textual description
When accessed with a web browser, an online legislation database is only suited to be viewed while having an active Internet connection. The possibility to download a legal act to a distant computer can be useful when working offline. It might also be useful to use the downloaded file in order to prepare another document. In most cases, the file to be downloaded will simply be the current version of a given legal act. It would be a desired extension, however, to be able to download a text previously chosen by the user in his web browser (for example simultaneously in several languages, several different versions of the same act etc.). The file formats available should allow the user to view the act in a platform independent way and to copy, paste or modify the text of the act.

CHAPTER TWO

On the basis of the use cases proposed in the chapter one, the existing official online databases will now be systematically analyzed. All the analyzed websites will be tested empirically by the author. For each use case, a quantitative and qualitative analysis will be made. The objective of the quantitative analysis is to find out how many online legislation databases provide the functionality described by a given use case. The objective of the qualitative analysis is to discover how and to what extent each use case is fulfilled. All the relevant Internet addresses are provided in the appendix B.

The online legislation database of the federal law will be analyzed in the first place. The functionalities described in all the use cases will be subsequently empirically tested and evaluated. The analysis of the legislation databases of the cantonal law will take place afterwards. Given the high amount on databases to test, the tests will not be presented for each database separately. Instead, a summary of the results will be provided for each use case.
Furthermore, some other databases or third party solutions will be presented for the sake of comparison. However, for each additional solution presented only the relevant use cases will be discussed.

**Federal database**

The online legislation database of the federal legal acts is accessible at the website admin.ch, section Documentation. As a matter of fact, this website contains several separate databases, which correspond to the publication system of the Swiss federal law. For example, the BBl database contains all the issues of the official publication journal BBl, whereas the SS database contains all the legal acts in force classified according to the domain of the act. In the present paper, only this last database will be treated as an online legislation database, the other being solely a collection of successive journal issues.

**Use case 1**

The federal database provides multiple searching possibilities. Two search engines and three indexes are available.

The first search engine presents multiple search possibilities, namely a word or phrase search, as well as a search with the classification number or the official abbreviation of a legal text, eventually with an indication of a researched article. This search engine is only partially multilingual. The results of a research are influenced by the language used on the main web site: if the main web site is in French, only results in French are displayed. A research for a German word or phrase using the French version of the web site gives no results. Only the official abbreviations are taken into account in all languages: a research with a German abbreviation using the French version of the web site will provide a correct link to the researched legal act.

The second search engine is actually the standard web search engine of the federal administration. The research can be restricted to include only the web sites of the database of the federal legislation. This search engine, however, is much less effective than the first one, as it is not optimized for searching of legal acts only.

The first index contains all legal acts classified according to the official classification of the federal acts. Each act is given a unique and hierarchical number which corresponds to a given domain. For example, the number one stands for State - People - Authorities and the federal constitution has the number 101. All the acts are sorted in a hierarchical manner and can be found by choosing the successive levels of the classification hierarchy.
The second index contains a list of keywords. The list is available in all three official languages, but only one language can be viewed at a time. Each keyword directs to a specific classification number.

The third index contains all legal acts which are no more in force. The legal acts are classified by year in which they were abrogated. Unfortunately, the index does not allow the user to access directly the abrogated acts: there is only a mention of the issue of the official journal in which the act was published for the first time. Moreover, the abrogated acts are not classified by the date of abrogation but by the date of adoption. It means that the section “2001” contains all acts which were adopted in 2001, and not the acts that were abrogated in 2001.

**Use case 2**

The federal database does not allow the user to search for similar legal texts in other databases.

**Use case 3**

The actual text of a legal act can be viewed in two possible ways. First of all, the user can view the text directly in the web browser. The user can only display one article at a time, but he can easily access the table of content listing all the articles. The other possibility is to view the actual text in the PDF file format, either directly in a web browser or by downloading the file.

**Use case 4**

When viewing the text of a single article in a web browser, the user can easily change the language in which the article is displayed. This change, however, affects the whole web site as well. There is no possibility to view more than one language version in the same browser window or tab. The PDF file with the current version of an act is available in all the official languages. Multiple language versions can be viewed in different documents opened in different windows, but not simultaneously on a single web page.

**Use case 5**

It is not possible to visualize the lifecycle of a legal act on a single web page. The information and the documents are, generally speaking, available but scattered across many different databases and web pages.

The information and the documents related to the pre-parliamentary procedure are available from the web site of the federal department concerned by the creation of the new legislation act.

As far the parliamentary procedure is concerned, all the information and the documents are mainly available in two separate online databases: the database of the publication journal BBI or the database containing the minutes of the Swiss Parliament AB.
Finally, a list of the modifications of an act already in force can be displayed using the main federal legislation database. The user can access a list of all the consecutive modifications indicating the date of a modification and a link to the document that modified the legal act concerned. The user can also consult another list indicating which articles were modified on a given date.

**Use case 6**

It is not possible to consult any version other than the original or the actual one.

**Use case 7**

It is not possible to compare or to visualize simultaneously two different versions of a given legal act.

**Use case 8**

It is not possible to visualize a given fragment of a given legal act with all the subsequent changes displayed simultaneously.

**Use case 9**

Legal texts can be downloaded, but only in the PDF file format. The PDF file contains the actual version of the act. The original version, as published in the official journal, can be downloaded separately from the database of this journal, but this has to be done separately by the user (no direct link available). There is no possibility to download an intermediate version between the original and the actual ones.

**Cantonal databases**

Each of the 26 Swiss cantons has its own online legislation database. These databases vary considerably, offering to the user different interfaces and different functionalities. This section of the paper presents a synthesis of the functionalities of all the 26 databases.

**Use case 1**

All cantons provide a search possibility using the classification of the legal acts in the database. Almost all cantons (23) provide also textual research possibilities. Other provided features are: research with the classification number of the act (14 cantons), research with the abbreviation of the act (7 cantons) and research with an index of keywords (7 cantons).

**Use case 2**

All cantonal legislation databases allow only the research in its own database. No simultaneous research in multiple databases is possible.
Use case 3

All the cantonal legislation databases allow the user to consult the actual version of a legal act. The large majority of the cantons (21) make it possible to view the actual text of a given legal act in the PDF format. Some cantons (12) allow consulting the actual text in the HTML format directly in a web browser. Only one canton (FR) let the user access the actual text of a legal act in the DOC format.

Use case 4

Four cantons (BE, FR, GR, VS) have more than one official language. The online databases and the texts of the legal acts are accessible in all the official languages of a given canton. However, it is not possible to consult simultaneously different versions of the same act.

Use case 5

Not a single cantonal legislation database provides a complete overview of the lifecycle of a legal act, including the creation procedure and the change history. However, the majority of the cantons (16) do provide a complete change history for all the legal acts in their databases. On the other hand, 5 online cantonal legislation databases allow the user to consult the legal acts that are yet to enter into force. Only 2 cantons allow the user to access the documents from the ongoing parliamentary legislation procedure.

Use case 6

From the 26 Swiss cantons only 7 allow the user to consult an ancient version of a given legal act. These ancient versions can be viewed as a PDF file or downloaded by the user.

Use case 7

Amid the 7 aforementioned online cantonal legislation databases, not a single one offers the possibility to directly compare two distinct versions of a given act. This difficulty can be overcome, however, using multiple windows or tabs in a web browser and switching between them to compare the different versions. Unfortunately, this workaround does not allow to directly mark changes between the compared acts.

Use case 8

No cantonal online legislation database offers the possibility to view a fragment of a legal text with all the successive versions.

Use case 9

21 online legislation databases let the user download the actual version of a given legal act in the PDF format. Among these 21 cantons, one canton (FR) allows as well to download the actual version in the DOC format. The remaining 5 cantons offer no explicit download possibility: the only available version is the HTML version directly displayed in the web browser.
In the 7 cantons where it is possible to access an older version of a given legal act, this older version can be downloaded as a PDF file (7 cantons) or, additionally, as a DOC file (one canton, FR).

**Legifrance**

Legifrance is the official French online legislation database. One of its most interesting futures is the possibility to easily access different versions of the same act. This functionality corresponds to the use case number 6.

**Use case 6**

For each legal act displayed, the user has the possibility to directly access a future version of the act, i.e. a version with modifications that will come into force later on. For each such version available, the date of the entry into force of the version is displayed.

Moreover, the user has the possibility to display the version valid at a freely chosen date. This functionality allows the user to view a future or a past version of a given act. The past versions, however, are only provided from 2007 and later on.

**LexFind**

LexFind is a project developed by the Institute for federalism of the University of Fribourg. The focus of the project is to allow the user a simultaneous search in all the official legislation databases of Switzerland. Thanks to the use of the cache memory in the search engine, it is possible to display and to compare different versions of the same legal act.

**Use case 2**

LexFind offers to the user a single search engine with a homogenous search mask, but allows a search in all the Swiss online legislation databases simultaneously. The user can perform a full text search, a keyword index search or a search using the classification of the legal acts. In the last case, the different cantonal and federal classifications are synchronized, i.e. a research done using a single classification returns valid results for all the cantonal and federal databases. According to [Tercier / Roten 2007, p. 54], Lexfind uses specially prepared concordance tables between the different federal and cantonal classification systems. The user merely has to choose the databases in which the research should be performed and the results are displayed in a list. However, the list cannot be ordered in any way.
Use case 6
For each legal act found, a link to the actual version is provided. It is equally possible to access directly all the previous versions stored in the cache memory. The latter functionality is provided for all modifications from 2006 on.

Use case 7
The user can choose any two versions from all the versions provided (i.e. the actual and the previous ones) and compare them directly in a new window. The two different versions of the same legal act are displayed simultaneously on the same page. Different colors are used to mark the changes between the two displayed versions.

Lawsearch
Lawsearch is a search engine developed specially for lawyers by the company Weblaw AG in Bern. Lawsearch is a wide project, allowing the user to perform a search within various distinct databases for lawyers, such as legislation, case law, specialized publications and journals etc. Among many possibilities available, the user can perform a search in all the Swiss cantonal and federal online legislation databases simultaneously.

Use case 2
The user can perform a full text search simultaneously in the online legislation databases of his choice. When browsing the list of results, the user can choose to view the original document of his choice or to view the cache version. In the cache version, the researched terms are highlighted in different colors.

CHAPTER THREE
After the creation of the common evaluation grid in the chapter one and the empirical research done in the chapter two, it is now possible to reach some conclusions. Firstly, specific conclusions related to each use case will be presented, as well as a conclusion related to the differences of the federal and the cantonal databases. Secondly, more general conclusions will be reached.

Specific conclusions
Use cases 1-2: Search
In the most cases, the internal search possibilities offered by the online legislation databases are sufficient for a regular use. As a general rule, the possibility to make a full text search coupled with the systematic research proves to be a satisfactory tool. All sorts of indexes, however, are very helpful and make the search even more efficient. On the other hand, it should not be forgotten that these online legislation databases are mostly aimed at law professionals and, as such, require
some existing knowledge to be used in an efficient manner. It means that it is often necessary to have a good idea of the systematic of a given database to perform a successful research.

As far as the simultaneous research within several databases is concerned, this domain still needs to be developed. The LexFind project shows that such a search tool is perfectly feasible using the modern web technologies instead of a direct database access. A direct common project of all the Swiss cantons and the Federal State, however, could possibly benefit from the direct access to the internal databases and offer even more functionalities for the users. This direct access to data would require a common data standard or at least a common interface to access different data.

In general, the internal and simultaneous research tools should stay up to date, implementing the actual best practices and state of the art solutions, such as text mining. Further, specific information on online legal research in Swiss legislation databases can be found in [Wyss / Kummer 2010, p.20], [Kummer / Kern 2004], [Kummer 2003a], [Kummer 2003b] and [Kummer / Güggi 2003].

Use case 3: Display
Displaying the actual text of a given legal act is the main functionality of all online legislation databases. For this reason, all the databases provide such functionality. However, in all the databases the chosen legal act is simply displayed as plain text, in HTML or PDF format. The texts of the acts contain no internal or external links or additional metadata.

A possible explanation of this fact is that the legal acts themselves are stored as plain text only, be it in DOC or PDF format. This prevents them to be automatically indexed and enriched with links and metadata. In order to improve the situation, the texts of the legal acts should be stored in a structured data format, such as XML. Given the large amount of documents and the high rate of change of legal acts, the whole process of extracting and structuring the texts should be as automated as possible. This could involve special OCR software and text mining software capable of automatically recognizing and classifying parts of a legal document.

Use case 4: Language
In the multilingual databases, all acts are available in all the official languages, which is clearly positive. The downside is that all the acts are handled separately, the user not being able to compare directly different language versions of the same act. Even though this drawback can easily be overcome using two documents at the same time and switching between them, this is not optimal. Should the texts of legal acts be available in a structured format, it would be relatively easy to implement a web service allowing to directly compare different language versions of a fragment of a legal act.
Some cantonal databases are only available in one language, the canton concerned having only one official language. This situation can be problematic to users having another Swiss official language as their mother tongue. A specialized legal automatic translator would be very helpful in such a case. Unfortunately, automatic translators still need to be improved in order to be reliable enough to be safely used in legal work. As for now, the users can only consult special online databases allowing translations of single legal terms. There is one such online database in Switzerland (legal thesaurus Jurivoc run by the Swiss federal court) and one for the entire European Union (IATE).

**Use case 5: Lifecycle**

Not a single database provides an easy way to display the complete lifecycle overview of legal acts. Most databases provide a listing of changes applied to a given legal act, and some databases provide also the creation history of future acts. The federal database is by far the most complete, providing almost the complete information about legal acts, from the creation procedure till the abrogation of a legal act. However, the data is scattered in many different databases and is not directly linked with each other. To find all the information and to access all the documents requires manual research in different databases or, in some cases, on web pages of a federal department concerned.

Several steps are required to improve the situation in this domain. First of all, the necessary data from the creation procedure has to be stored in public databases. While this is already the case on the federal level, it still has to be implemented in most of the cantons. Secondly, all the data should be correctly linked with each other. This does not imply merging all the separate databases to a single global database, but rather creating a common interface allowing to access all the data from a single web page. Lastly, not only data but also documents relative to the lifecycle of a legal act should be accessible from the same web page. Ideally, these documents would also be provided in a structured format, containing links, metadata etc.

**Use cases 6-8: Versions**

Staying up to date is one of the most important aspects of a lawyer’s work. It is also extremely important to know which version of a legal act was in force at a given date. The functionalities proposed by the Swiss online legislation databases in this domain are mostly unsatisfactory. Some cantons provide no structured data on the change history whatsoever, the only help for the user is provided by footnotes directly in the text of an act. Most of the cantons and the federal database do provide a structured list of all the modifications of a given act, but the user has to recreate a future or a past version of the act on his own, which can be very tedious and error prone. Only very few cantonal databases do provide all the successive versions of legal acts. As is the case with the
language versions, these different time versions are available as separate documents and cannot be compared directly. On the other hand, private projects (such as LexFind) or public online legislation databases abroad (such as Legifrance) prove that managing different time versions of legal acts is not something that should be out of reach for the Swiss administration.

The support of the different time versions is the most urgent improvement to be made to the Swiss online legislation databases. In order to achieve this progress, two important steps have to be taken. First of all, the internal data schema of the legislation database should support multiple different versions of the same legal act. One way to adopt this improvement could be to use structured documents which can contain multiple versions of the same text in one XML file. Secondly, all the subsequent versions that appear should be correctly integrated in the database. While this condition might seem obvious, one should not forget that some legal acts are in force for almost hundred years and have undergone tens of important modifications. In order to make the system fully functional, these past documents should also be included in the database in the new data format. This might require important time and money investment in text scanning and verification of OCR versions of the scanned document.

Once the database should be completed, however, it will be possible to easily fulfill all the needs described in the corresponding use cases. As a matter of a fact, this will only be a question of adapting the user interface accordingly to display the different versions in a desired manner. The user could easily change from viewing the actual version to comparing two or more different versions of the same act or displaying a chosen fragment in all its subsequent versions.

Moreover, including the future changes of a given act as they are decided could enable new forms of informing the users of the upcoming modifications. For example, users could choose to subscribe to RSS feeds or register to receive push e-mails from a given law domain. These options would make following the ever changing legislation even easier.

**Use case 9: Download**

While some cantonal databases offer no download possibility whatsoever, the vast majority of the Swiss online legislation databases lets the user download PDF versions of legal acts. In most cases this is perfectly satisfactory when reading or printing. The only drawback is that PDF files are not optimized for copying and pasting of the actual text of an act, for example to include it in a scientific work. From this point of view, DOC or RTF file formats are more suitable, but are only provided by one canton. This situation is probably due to the fact that PDF files offer more protection from unauthorized modifying or copying of the document.
An interesting improvement would be to allow the user to create his own customizable download files. For example, when using a database supporting an appropriate structured document format and offering an appropriate interface, the user could choose one or more desired time versions as well as one or more desired language versions, and then download the entire act or only a given fragment. The choice of available download formats could also be expanded, including for example plain XML files or EPUB files for mobile book readers.

Federal and cantonal comparison
The first thing to note is that the federal online legislation database is surely the biggest one. It has the biggest number of documents to manage and to introduce to the database. The cantonal databases, on the other hand, are much smaller, which makes it easier to manage, to update and to innovate. It is probably for this reason that some cantonal databases have already introduced the possibility to access different time versions of the same act, whereas the federal database still does not offer this possibility.

The differences in size and in complexity are also accompanied by a difference in financial possibilities. Not all the cantons have the financial means necessary to update and develop their legislation databases. Other cantons, on the contrary, can support the investment necessary to offer the users more complex functionalities. In the long run, this might contribute to significant differences in the quality level offered by different Swiss online legislation databases.

General conclusions

Overall satisfactory level
Despite the lack of advanced futures, the overall level of fulfillment of the users' needs by the Swiss online legislation databases can be described as satisfactory. The databases provide actual and complete information about the laws in force, in real time and at no cost. However, there is still a lot of potential for improvement and innovation. As for now, the databases provide simply a passive access to the digital versions of printed documents, accompanied by a limited number of metadata. A new, higher level could be achieved, allowing the user to interact more with the service, to create and to download personalized language and time versions of documents and to be automatically informed about upcoming legislation changes. This shift would be in accordance with the general Web development and the evolution from the static Web 1.0 to the interactive Web 2.0 (as described in [Meier / Stormer 2008, p. 13] and [Meier 2009, p. 27]).

Need for structured texts
To achieve this new level of service, the online legislation databases have to undergo appropriate technical and structural changes. The most crucial of them is without any doubt the adoption of a data storage format that would support heavily structured documents with different language and
time versions and complex metadata. Given these requirements, XML data format seems practically inevitable. Storing legal acts in XML files would make it much easier to transform and manipulate them on the fly to suit the different users’ requirements. XML data format allows as well to transform the texts to many other formats, such as PDF, HTML or EPUB. These characteristics would enable the implementation of many advanced features, such as displaying and downloading custom language and time versions of the same act.

**Need for harmonization**

According to [Mehlich 2002, p. 151], the standardization of data and services is the central condition of a successful and effective e-Government. The introduction of a new data format would be a good occasion to try to improve the harmonization and the standardization of data between all the Swiss online legislation databases. A common data standard would allow to create search tools or display tools common to all databases, allowing the user to simultaneously search, compare and display documents from different databases.

However, the improvement conditions in this domain reach beyond the technical questions. In fact, a political decision is required to enable a harmonization in the legislation domain. As a matter of a fact, each canton is politically and legally independent as far as the cantonal legislation is concerned. For this reason, a solution common to all the cantons and the confederation should be freely accepted by all the parties concerned. This requires a political consensus which might not be easy to achieve. Some cantons might defend its sovereignty and its proper legislation traditions, whereas others might fear the overwhelming influence of the confederation.

It is thus not easy to predict whether a formal common solution will ever be found. Another possibility is that a precise data format will informally be imposed in practice, adopted by more and more databases and viewed by all as a de facto standard.

**Backward compatibility problems**

The legislation of the modern federal Swiss state dates back as far as 1848. Some legal acts are in force more than a century and have undergone tens of important modifications. New legal acts, other documents and modifications appear practically each day. On the other hand, the technical improvements and the political decisions necessary to improve the Swiss online legislation databases might require a significant amount of time. To make the databases complete, it is thus necessary to foresee a module to properly import all the legal acts and documents created before the adoption of the new data standard. This, in turn, requires scanning, treating with OCR software and correcting tens of thousands of documents, many of which can have hundreds of pages. This all implies extremely important time, work and financial investments.
**Public or private investment**

The financial investments necessary might indeed be very significant: they have to cover the modification and adaptation of the database and file structure, the conception and implementation of a new user interface and finally the importation of all the previous and actual documents. Given the very high probable cost, it is legitimate to ask who should bear this financial burden.

Should all the Swiss online legislation databases be updated and maintained separately, each database would be entirely financed by the responsible administrational organization (canton or confederation). In this case, the financial means available can differ from one database to another, which can have a negative impact on a common quality policy. Should, on the other hand, all the cantons and the confederation collaborate in the creation of only one, common database structure and interface, the overall cost would sink, as only one software product (instead of 27 different ones) would be developed. Moreover, this lower cost could be appropriately divided between all the participating parties.

Secondly, should all the costs be carried by the public administration or can a part of the costs be transferred to the final users? Several different solutions are imaginable, some of them having been already discussed years ago by [Holenstein 2001] and [Kummer / Kern 2004]. As for now, the access to all features of all the legislation databases is granted at no cost, mainly to promote the public access to official information. In the second option possible, only the basic features (i.e. the actual features) could be left freely available. The advanced, professional, yet to be implemented functionalities (for example the multiple time and language versions support) could only be available to registered professionals paying a monthly fee. Finally, even another model could also be proposed: the public legislation databases could offer only a simple interface without advanced features, but the entire database of raw XML document data could be made accessible to private companies. In this model, it would be the task of private companies to offer commercial legislation databases with advanced features. Even though this solution would also have to be financed by subscribing fees, it would surely foster competition and innovation for the benefit of the end users.

Of course, the actual cost and fees model should be decided in accordance with the technical and political solution retained.

**CHAPTER FOUR**

The conclusions presented in chapter three show that the overall level of the fulfillment of the users’ needs by the Swiss online legislation databases is rather satisfactory. On the other hand, there is still a lot potential for improvement, but several improvement conditions would yet have to be fulfilled. One such condition is to provide a new structured document format to store legal acts.
It would also be preferable that the new data format be harmonized with all the Swiss legislation databases available.

As a matter of fact, these two improvement conditions have already been identified and addressed in practice. The scope of this last chapter is to provide a brief description and evaluation of the CHLexML XML data schema, as well as to propose some improvements.

**Presentation of CHLexML**

With the rise in popularity of the XML data format, many XML based standards have been proposed. According to [Mehlich 2002, p. 154], this trend was also noticeable in the eGovernment domain: for example, several projects concerning XML based standards of legal information were launched in many countries. In Switzerland, the SVRI has launched the CHLexML project to create a common data model for all Swiss legislation acts. According to the project's website and to [SVRI 2008, p. 4], different official participants were involved in the creation process, namely the offices of the federal administration as well as several Swiss cantons. After a Swiss wide consultation procedure and a practical test in the canton of Uri, the 1.0 version of the CHLexML schema is now available and can be freely used at no cost.

**Advantages**

First of all, the sole creation of a common XML schema for legal acts in Switzerland is very positive. It proves that the need for structured legal texts has been recognized and properly addressed. The existence of CHLexML paves the way for a new generation of online legislation databases based on structured XML documents.

Secondly, it is very important that the CHLexML project has received a Swiss wide support from many different authorities. This means that the idea of a data structure common to all Swiss legislation databases is already familiar to the federal and cantonal administrations. Therefore, the actual implementation of CHLexML by all legislation databases might be expected in a reasonable future.

Finally, the CHLexML schema implements most of the technical features required to offer the users new, advanced features. The most important technical aspect is the implementation of the time aspect: CHLexML data file can contain two types of changes, new editions and new versions, depending on how important the change was. It is however not yet clear how this possibility will be used in practice to offer new time related functionalities.
Disadvantages

Even though the CHLexML project seem to be successful, it is nevertheless possible to point out some minor issues that remain to be solved. Firstly, no official declaration exists on the future practical use of CHLexML. An official statement (even a non binding declaration of interest of all the concerned administrations) would definitely be welcome, as it would give a strong signal and help impose CHLexML as a valid standard.

Moreover, no information is provided whether the CHLexML data schema is already in use or whether it is in the process of implementation in a legal IT project. Such information might be helpful, as it could prove its functionality or provide useful suggestions on the future improvements.

Lastly, the CHLexML section concerning the metadata of a legal act could definitely be expanded to include more useful information. As for the version 1.0, CHLexML does not include any metadata providing information about the entire creation process of a legal act. This is a serious drawback, as it does not allow to store all the data from the creation procedure of an act in a single place. Without this feature, it would be for example very difficult to integrate the available data from different publication databases on the federal level. Moreover, with no such metadata it would be impossible to provide a complete overview of the whole creation procedure of a legal act.

Improvement proposition

From the three identified disadvantages, the first two ones are strongly related to the political will and depend solely on the administrations concerned. The last one, however, is purely technical and can easily be overcome. It is only necessary to expand the 1.0 version of CHLexML to include the relevant metadata.

Of course, the actual improvement process should be left to the SVRI. The next CHLexML version supporting metadata on the creation procedure should be realized with a broad support of different Swiss administrations and contain data that would suit the needs of all the federal and cantonal databases. Moreover, [Rhinow / Schefer 2009, p. 528] show that the legislation process can actually be quite complex, the actual sequence of actions depending on many different factors. A complete improvement proposal is thus out of the scope of this paper.

Therefore, only a limited improvement proposition will be made, simply to raise the awareness of this improvement possibility. For this purpose, a simplified creation process of the new Swiss code of penal procedure will be presented. This legal act was chosen for two reasons. Firstly, it is an actual legal topic, as this act will enter into force on 1 January 2011. Secondly, it is a very complex legal act, with a very long and complex creation history, which will allow to briefly mention all the
important steps involved in the creation of a legal act. Firstly, the textual description of the creation process will be provided, followed by a graphical representation. Finally, a sample XML data fragment and a corresponding XML schema fragment will also be proposed.

Textual description of the creation process

The creation process of the Swiss code of penal procedure begins in 1994 when the EJPD asks a commission of experts to prepare a scientific report. The report was ready in 1997. In 2001, the next step was the creation of the first draft of the new act by a chosen expert. A consultation procedure was then ordered by the BR. In 2003 the consultation procedure was terminated and the BR demanded to adapt the first draft accordingly. The final version of the draft was finished in 2005 and the official project of the act and the accompanying explanatory message were officially published.

As the Swiss Parliament accepted to discuss the project, the project was then discussed and modified several times in the both chambers of the Parliament. The final version of the project was adopted in 2007. After the adoption, the final version of the project was officially published. At the same time, the delay in which a facultative referendum may be demanded began to run. The delay ended in 2008 with no referendum demand. That meant that the act would now enter into force at the date chosen by the BR. In 2010 the BR has finally chosen that the new Swiss code of penal procedure would enter into force at 1 January 2011.

It can easily be seen that the creation process can be divided into many distinct parts. While [Auer et al. 2006, p. 532] propose as much as 5 phases, it is sufficient for the needs of this paper to name only two phases: the draft phase, when the draft of the act is prepared under the auspices of the BR and the parliamentary phase, when the final version of the act is decided and afterwards submitted to the facultative referendum. In each phase, many documents are produced and eventually published online. However, these documents are published in different databases and on different websites. The documents from the draft part are published on the website of EJPD, whereas the documents from the parliamentary phase are published in the online database AB containing the minutes of the Swiss Parliament. In addition, some documents are as well published in the online database of the publication journal BBl. In contrast, none of these documents can be directly accessed from the online database of the federal legislation.

Graphical presentation of the creation process

The creation process described above can also be presented graphically. The graphical presentation will be done using two diagrams proposed by the UML 2.0 modeling language. Firstly, the activity diagram will present the successive actions and decisions that appear in the process as
well as the main actors responsible for them. Secondly, the state diagram will present the different states of the future legislation act during the creation procedure.

The activity diagram is presented in the appendix C. The diagram contains activities of five actors, namely the expert commission and the expert(s) in charge of the preparation of the draft (Experts), the EJPD, the BR, the Swiss Parliament, both chambers included (Parliament) and the Swiss voters who can decide whether they desire a facultative referendum and can then vote in the referendum (Voters). Seven documents are also depicted in the diagram: these documents will later be used by the XML and XML schema proposals. Finally, the diagram describes three possibilities where the legislation act could have been rejected: before the parliamentary debates, as the Parliament refuses to discuss the project proposed by the BR; after the parliamentary debates, as the Parliament rejects the final version of the project; in the facultative referendum, as the voters reject the final version of the project.

The state diagram is presented in the appendix D. It contains all the states a legal act can have in the creation procedure, from the very beginning of it (the creation of the scientific report) till the very end (entry into force). The state diagram is very linear. Just as the activity diagram, it does include, however, the three possible states applicable when the act could have been rejected.

**New XML elements**

In order to easily integrate the documents from the creation procedure to the online database of the federal legislation, the XML file of the legal act should contain the description of these documents as well as the links to the electronic version of the documents available on the Internet. Even though an actual XML file of the new Swiss code of penal procedure in CHLexML format does not exist, a hypothetic metadata section of the file is proposed in the appendix E. This XML fragment contains an organized selection of important documents from the creation procedure. The documents represented in the XML fragment are the documents which are mentioned in the activity diagram. As far as the minutes from the parliamentary deliberations are concerned, only a small representative selection of these is included.

The documents are divided in two groups. The first one includes documents that were published electronically on the Internet but were not published in an official publication journal. The second group contains documents that were published in the publication journal BBl or in the official publication journal of the Swiss Parliament AB.

Each document entry contains three obligatory elements: title, link and publication date. In the publication date, however, only the year of publication is obligatory, the day and the month are optional. Moreover, entries concerning the documents published in the official publication journals
also contain the name of the journal (full name and short name, in German and in French) and the designation of the journal issue. The designation of the issue contains the year of publication and the beginning page, both elements being obligatory.

New XML schema elements

In order to transform new XML data elements into a new XML data standard, these elements have to be technically described in a formal manner. This is the task of the XML schema language, discussed in detail by [Geroimenko 2004, p. 205], [Harold / Means 2002, p. 254], [Meier 2007, p. 134], [Michard 2001, p. 111] and [van der Vlist 2002]. The final step is thus to formalize the new XML elements proposed above with the XML schema specification. An according XML schema fragment is proposed in appendix F. This schema consists of a separate XML schema file, but is basically intended to be included in the CHLexML schema discussed in this chapter.

The new XML schema describes formally not only the XML elements, but also its structure and other validity conditions. The elements which were previously described as obligatory have therefore to be included at least once, whereas the elements which have been described as optional can be omitted. Further conditions are imposed on integer values of date elements. Month and day elements are delimited accordingly, while the minimum year is set to 1848 (the beginning of the modern Swiss federal state). Finally, the number of documents in each of the two categories has no upper limit, but can also be equal to zero.

Concluding comments

The improvement proposed in this chapter aims at expanding the CHLexML data format to include information about documents from the creation procedure of legal acts. These metadata would allow to easily display the timeline of the creation procedure and to easily access different documents from the whole creation procedure, even if they are stored in separate databases or on separate websites.

Of course, the proposed improvement is based on a simplified creation procedure and is thus very limited. However, its main goal is simply to raise awareness of this possibility and to show its utility. In practice, another connected issue would also have to be solved. It is the question of appropriate organizational measures that would need to be taken in order to import the desired information from different databases and websites into the new XML data files.
CONCLUSIONS

Main findings

The aim of this paper was to assess the level of fulfillment of the users' needs by the online legislation databases in Switzerland. To achieve this objective, a common evaluation grid has been proposed using use cases according to UML 2.0 to express the users’ needs. This collection of use cases detailing the needs of lawyers using online legislation databases is the first interesting point of the paper. It shows that use cases can be used to assess web services and, moreover, it describes in a detailed manner the needs of lawyers concerning the legislation access.

As far as the evaluation results are concerned, two types of conclusions have been presented. Specific conclusions deal with each of the use cases included in the evaluation grid. The most interesting specific conclusions reveal that there is almost no harmonization between the different Swiss databases; that the creation history of federal legal acts is scattered through several separate databases and web pages; and that the vast majority of databases does not support a dynamic access to different time and language versions of legal acts.

The general conclusions are based on the specific ones. The main general conclusion is that the overall level of fulfillment of users’ needs is satisfactory, but there is still a huge potential for improvement. In order to offer more advanced functionalities, online legislation databases would have to store legal acts as heavily structured documents with as much metadata as possible. An XML based solution seems both realistic and reasonable. The new XML data format should also be harmonized between all the Swiss online legislation databases to allow more interaction between different databases. Moreover, the XML data format would allow to create, merge and modify documents in real time, allowing the users for much more interaction and letting them create personalized versions of documents to best suit their needs. This would mark a shift from the static Web 1.0, where only electronic versions of documents can simply be viewed or downloaded, to the interactive Web 2.0, where the users can choose and create personalized content. However, in order to achieve these improvements, significant time, work and money investments are needed. It would therefore be necessary to find an appropriate solution to finance the improvements equitably. Besides, a political decision would have to be taken to coordinate the improvements and to guarantee the same level of service in all databases.

Whereas the political and the financial solutions are yet to be found, one technical solution for the improvement of the online legislation databases in Switzerland has already been proposed. The CHLexML project of the SVRI has elaborated an XML schema that could be used to store Swiss legal acts. The CHLexML project is very positive because it promotes the idea of a single,
harmonized data standard for all Swiss legislation databases. Moreover, it allows to structure the data appropriately and supports different time versions of documents. However, it does not include enough metadata, for example concerning the creation procedure of legal acts. Finally, it is not known whether CHLexML has already been used in practice or whether it is being implemented in a current project.

**Critical assessment**

This paper focuses on the assessment of the fulfillment of the users’ needs by the online legislation databases in Switzerland. This problem, however, is only a part of a wider issue known as the quality of web services. The view presented in this paper is thus just one dimensional. In order to fully assess the quality of the Swiss online legislation databases, a much more comprehensive evaluation tool should be used, taking into account not only the users’ needs, but also other elements such as user friendliness or availability of service.

Furthermore, the actual assessment proposed in this paper is based on the empirical findings of only one person. In order to make the data more reliable and more objective, a full scale survey would have to be organized, involving a representative sample of the whole population of the users of the Swiss online legislation databases.

As far as the CHLexML project improvement proposition is concerned, the proposition is based on a simplified creation procedure and is thus only very limited in its scope. A more advanced improvement proposition should take into account a complete creation procedure of all types of legal acts. In this way an exhaustive set of metadata for the CHLexML schema could be proposed.

**Outlook**

The future papers in this domain should address the issues recognized in the previous part. A full scale, comprehensive study of the quality of the Swiss online legislation databases should be conducted. A detailed, thorough evaluation grid should be prepared, embracing all aspects of the quality of web services. On this basis, a survey should be conducted on a representative sample appropriately chosen from the whole population of the users of the online legislation databases.

Another issue for a future paper in this domain would be a fully comprehensive CHLexML metadata improvement proposition. As already stated above, this advanced proposition should take into account the complete creation process of all types of Swiss legal acts. Moreover, this proposition should try to suit the needs of all the different existing cantonal and federal databases.
REFERENCES


APPENDIX A

Use case diagram containing all the use cases listed in the paper

Online legislation database

- Search for an act
- Search in multiple databases
- Display current version
- Display different languages
- Consult the lifecycle
- Display different versions
- Compare different versions
- Display all versions
- Download an act
APPENDIX B

List of all relevant URL addresses. Accessed 14 December 2010

Federal databases

AB
http://www.parlament.ch/ab/frameset/d/index.htm

BBl
http://www.admin.ch/ch/d/ff/index.html

SS
http://www.admin.ch/ch/d/sr/sr.html

Cantonal databases

AG
http://www.ag.ch/gesetzessammlungen/de/pub/

AR
http://www.bgs.ar.ch/

AI
http://www.ai.ch/de/politik/gesetzessammlung/

BL
http://www.baselland.ch/Gesetzessammlung.273510.0.html

BS
http://www.gesetzessammlung.bs.ch/sgmain/default.html

BE
http://www.sta.be.ch/belex/d/default.asp

FR
http://www2.fr.ch/sleg_bdlf/simple.aspx
TG
http://www.rechtsbuch.tg.ch/default.cfm?

UR
http://ur.lexspider.com/

VD
http://www.rsv.vd.ch/dire-cocoon/rsv_site/index.xsp

VS
http://www.vs.ch/Navig/departement.asp?MenuID=4486

ZG
http://www.zug.ch/boerden/staatskanzlei/kanzlei/bgs

ZH
http://www.zhlex.zh.ch/internet/zhlex/de/home.html

**Third party databases**

Legifrance
http://www.legifrance.gouv.fr/

LexFind
http://www.lexfind.ch/

Lawsearch
http://www.lawsearch.ch/

**CHLexML**

CHLexML
http://www.chlexml.ch/

SVRI
http://www.svri.ch/
Other addresses

EJPD website concerning the new Swiss code of penal procedure
http://www.ejpd.admin.ch/content/ejpd/de/home/themen/sicherheit/ref_gesetzgebung/ref_strafprozess.html
APPENDIX C

Activity diagram of a simplified legislation procedure
APPENDIX D

State diagram of a legal act in a simplified legislation procedure
APPENDIX E

New XML elements for a hypothetical XML data file based on the CHLexML schema

<legislationProcedure>
  <docOnline>
    <title>Aus 29 mach 1. Bericht der Expertenkommission</title>
    <urlAddress>http://www.ejpd.admin.ch/content/dam/data/sicherheit/gesetzgebung/strafprozess/a29m1-d.pdf</urlAddress>
    <documentDate>
      <year>1997</year>
      <month>12</month>
    </documentDate>
  </docOnline>
  <docOnline>
    <title>Vorentwurf für eine Schweizerische Strafprozessordnung</title>
    <urlAddress>http://www.ejpd.admin.ch/content/dam/data/sicherheit/gesetzgebung/strafprozess/vn-ve-1-d.pdf</urlAddress>
    <documentDate>
      <year>2001</year>
      <month>6</month>
    </documentDate>
  </docOnline>
  <docOnline>
    <title>Begleitbericht zum Vorentwurf für eine Schweizerische Strafprozessordnung</title>
    <urlAddress>http://www.ejpd.admin.ch/content/dam/data/sicherheit/gesetzgebung/strafprozess/vn-ber-1-d.pdf</urlAddress>
    <documentDate>
      <year>2001</year>
      <month>6</month>
    </documentDate>
  </docOnline>
  <docOnline>
    <title>Zusammenfassung der Ergebnisse des Vernehmlassungsverfahrens</title>
    <urlAddress>http://www.ejpd.admin.ch/content/dam/data/sicherheit/gesetzgebung/strafprozess/ve-ber-d.pdf</urlAddress>
  </docOnline>
</legislationProcedure>
APPENDIX F

New XML schema elements proposed to enhance the CHLexML schema

```xml
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <xs:element name="title" type="xs:string"/>
    <xs:element name="urlAdress" type="xs:string"/>
    <xs:element name="fullNameDe" type="xs:string"/>
    <xs:element name="fullNameFr" type="xs:string"/>
    <xs:element name="shortNameDe" type="xs:string"/>
    <xs:element name="shortNameFr" type="xs:string"/>
    <xs:simpleType name="year">
        <xs:restriction base="xs:integer">
            <xs:minInclusive value="1848"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="month">
        <xs:restriction base="xs:integer">
            <xs:minInclusive value="1"/>
            <xs:maxInclusive value="12"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="day">
        <xs:restriction base="xs:integer">
            <xs:minInclusive value="1"/>
            <xs:maxInclusive value="31"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="publicationYear">
        <xs:restriction base="xs:integer">
            <xs:minInclusive value="1848"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="startPage">
        <xs:restriction base="xs:integer">
            <xs:minInclusive value="1"/>
        </xs:restriction>
    </xs:simpleType>
</xs:schema>
```
<xs:element name="documentDate">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="year" minOccurs="1"/>
      <xs:element ref="month" minOccurs="0"/>
      <xs:element ref="day" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="journalInfo">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="fullNameDe" minOccurs="1"/>
      <xs:element ref="fullNameFr" minOccurs="1"/>
      <xs:element ref="shortNameDe" minOccurs="0"/>
      <xs:element ref="shortNameFr" minOccurs="0"/>
      <xs:element ref="publicationYear" minOccurs="1"/>
      <xs:element ref="startPage" minOccurs="1"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="docOnline">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="title" minOccurs="1"/>
      <xs:element ref="urlAddress" minOccurs="1"/>
      <xs:element ref="documentDate" minOccurs="1"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="docPublished">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="title" minOccurs="1"/>
      <xs:element ref="urlAddress" minOccurs="1"/>
      <xs:element ref="documentDate" minOccurs="1"/>
      <xs:element ref="journalInfo" minOccurs="1"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:element name="legislationProcedure">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="docOnline" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element ref="docPublished" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
</xs:schema>