EU-IST Project IST-2003-506826 SEKT
SEKT: Semantically Enabled Knowledge Technologies

D 10.4.1 After Analysis

Implementation of Iuriservice at the Spanish Judicial School

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Abstract

The aim of this deliverable is to describe the current status of Legal Case Study. During Y3, the implementation process of Iuriservice at the Spanish Judicial School has started. Besides, the following tasks have been performed (i) refinement of the Iuriservice prototype; (ii) development of 6 sub-domains within the Ontology of Professional Judicial Knowledge (OPJK) and preliminary studies for inconsistency repair, (iii) completion and refinement of the two topic ontologies: the Question Topic Ontology (QTO) and the Judgment Topic Ontology (JTO) (iv) development of a Judgment Ontology for massive annotation, (v) establishment of the definite architectural design and improvement of effectiveness and efficiency measurements of the current version of Iuriservice (vi) work on the refinement of the practical content of judicial knowledge; (vi) usability tests; (vii) field tests.

Keyword list: Iuriservice, legal ontology, prototype implementation, TextToOnto, OntoGen, temporal logic, ontology repair, multiversion logic, ontology methodology,

WP10: Case study: decision support for legal professionals.

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Executive Summary

During Y3, the implementation process of Iuriservice at the Spanish Judicial School has started and extensive work has been done within the institutional framework. The IDT-UAB team arrived to preliminary conclusions for the implementation of the application into the Spanish Judicial System. The application will be, at first, implemented among the trainee-judges (*jueces en prácticas*) of the Spanish School of the Judiciary. At a second stage, the system would be available to all judges in their first appointment through the intranet of the Spanish Council of the Judiciary (CGPJ). Iuriservice is thus expected to be used both as a training tool and as an expert support system.

This final year of the SEKT Project has been aimed at the improvement, final development and integration, and refinement of the Iuriservice prototype. Main tasks have been related to interface adaptation and interface and functionalities extension.
The main requirements about interface adaptation and consequently its extension have been obtained from the usability tests carried out during this year. In this deliverable we describe the main results obtained from these usability tests (heuristic evaluation, cognitive walkthrough, field tests), together with the modifications generated by them and the functionalities extension. Moreover, the work developed during this year has been focused in improving the average response time of the iFAQ system. Finally regarding the legal case study application, the Search & Browse component over 16500 legal documents has been integrated.

Besides, the following tasks have been performed (i) development of 6 sub-domains within the Ontology of Professional Judicial Knowledge (OPJK) and research towards inconsistency repair and semi-automatic extraction of ontologies (Text2Onto), (ii) completion and refinement of the two topic ontologies: the Question Topic Ontology (QTO) and the Judgment Topic Ontology (JTO) (iii) development of a Judgment Ontology for massive annotation, (iv) work on the refinement of the practical content of judicial knowledge; (v) field tests.

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1 Introduction

Iuriservice is an iFAQ to provide assistance to young judges at their first appointment. We described in previous deliverables (D101.1. *Before Analysis* and D10.2.1. *Legal Scenario*) the state-of-the-art of legal ontology building, and the judicial scenario in which the system had to be implemented. In this final deliverable we will describe the technical improvements of the system, the four ontologies built up using SEKT methodology and some preliminary results obtained from the field tests with real users.

Section 2.1 describes the legal framework (agreements with the Judicial School and the Spanish Judicial General Council) and the user corpora. It is worth saying that incoming judges at the School have significantly improved their computer skills and Internet knowledge use since the beginning of the SEKT project (2004). Therefore, the formal presentation of the Iuriservice to them (along with the CGPJ) was very well received and this facilitated the performance of the user validation plan.

Section 2.2 describes the progress in legal ontology building within the Legal Case Study. First, the development and completion of 6 OPJK sub-domains is explained. Second, the completion and construction of QTO and JTO with the use of OntoGen v 2.0 is detailed, followed by the description of the Judgment Ontology for massive annotation.

Section 3 explains methods, timing and results of the Legal Case Study usability. We show some results of the usability tests, cognitive walkthrough and field tests evaluation.

Section 4 describes the improvement, final development and integration, and refinement of the Iuriservice prototype, especially interface adaptation and interface and functionalities extension. Reference is made to the improvement of the average response time of the iFAQ system. Finally, the integration of the Search & Browse component over 16500 legal documents is explained.

2 User Corpora

During 2006, extended work has been carried out within the Spanish Judicial School to prepare the implementation of Iuriservice. First, we had to follow up closely the internal development of the School regarding technological issues (training of judges, programs etc…). Second, we worked with the judicial team of magistrates in order to answer the practical questions gathered in the SEKT field research in Spanish Courts (2004-2005). Third, we had to check the prototype with the magistrates and had to get in touch for the first time with the final users of the system (trainee judges of the Judicial School). As a result the CGPJ School Commission —the governing board of the School— decided to allow the tests and to implement Iuriservice at the School during 2007. As this process goes beyond the SEKT timetable, additional funds were

obtained in public competition from the MEC (Spanish Ministry of Science and Technology).[1]

2.1 Contextual issues and legal situation

2.1.1 Legal Agreements

Legal issues matter in judicial research. On December 15th 2005 the Plenary of the Spanish Judicial Council (CGPJ) issued an Order approving the extension until 2007 of the agreement on research between the CGPJ and the Autonomous University of Barcelona (January 31st 2001). The original agreement is contained in two separated documents, (i) a framework agreement for general cooperation, (ii) a specific agreement concerning the constitution of the Observatory of Judicial Culture in the Spanish Judicial School. The SEKT project (2003-2006) is specifically covered by the addenda approved on December 15th 2005. The Order states explicitly that researchers are under the restrictions on sensitive data established by the Spanish legislation (and the art. 6 of the original agreement, concerning the confidentiality of judicial data).

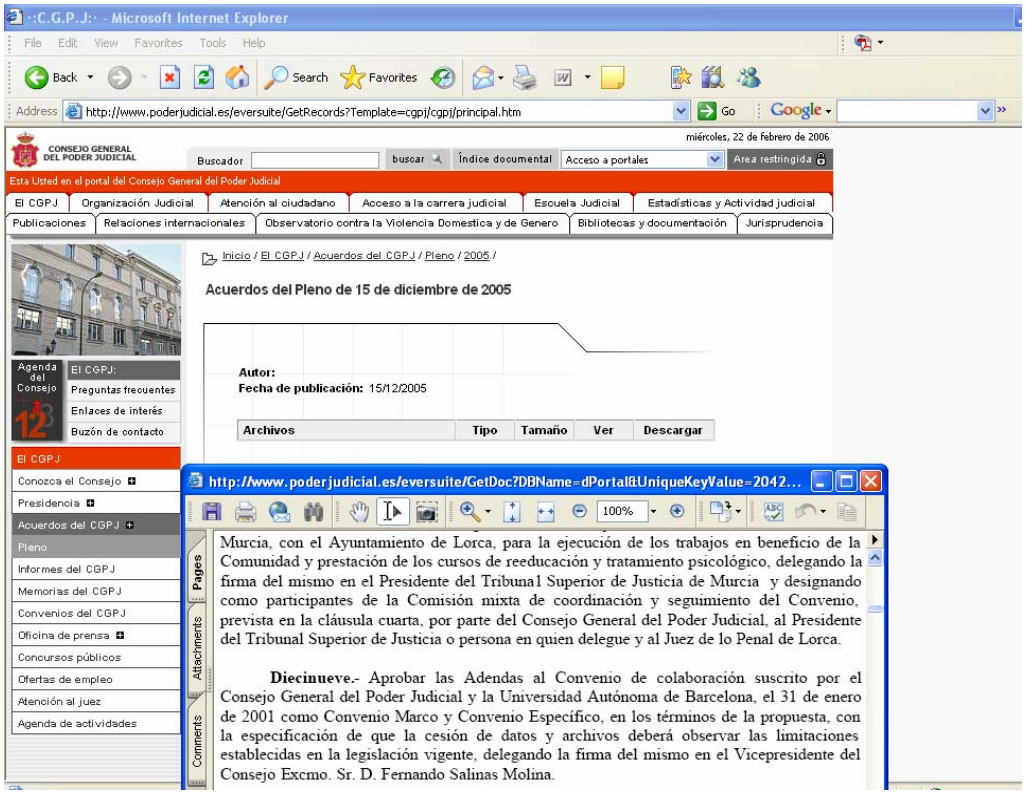


Figure 2.1 : Order n. 19, CGPJ, 15th December 2005 approving the addenda concerning SEKT and the extension of the agreement between the UAB and the Judicial School (31st January 2001) until the 31st December 2007. CGPJ Official Website, **http://www.poderjudicial.es**

[1] MEC Project: "Implementación de Iuriservice, FAQ inteligente de soporte para la Escuela Judicial Española" (2006-2007). *Implementation of IURISERVICE, an i-FAQ supporting the Spanish Judicial School.* MEC (Spain), 2006-2007. SEJ2006-10695.

In addition, there is an agreement of research signed by the UAB, iSOCO and La Ley-Actualidad S.A. (Wolters Kluwer) (2004). In virtue of this agreement SEKT researchers have had access to the 450.000 judgments contained in La Ley legal database.

2.1.2 Contextual issues: the Internet and judges' technological skills

Judges entering into the Judicial School have improved significantly their technological skills since the beginning of the SEKT project three years ago. As shown in the tables below on the accumulated data from classes 51st to 58th (1999-2006), there has been a consistent growth of judges' declared computer skills, declared use of the Internet, and number of people possessing a personal computer. Compared to the 52 class members, new judges of the 58 class have more computer skills (47% vs. 73.2% of affirmative answers) and a personal computer at home (35% vs. 82%) However, on their arrival, only half of the students had to worked with legal databases (See Fig. 2.5.).

This could be a bit surprising, but in fact, as we will show later, is highly consistent with the general growth and particular way of developing the Internet in Spain. One of the most striking features of this development is that the Internet access is related since the beginning to the accessibility from personal computers at home, rather than at the work places or at schools, universities or centers of study. Young judges do not constitute an exception to this collective pattern.

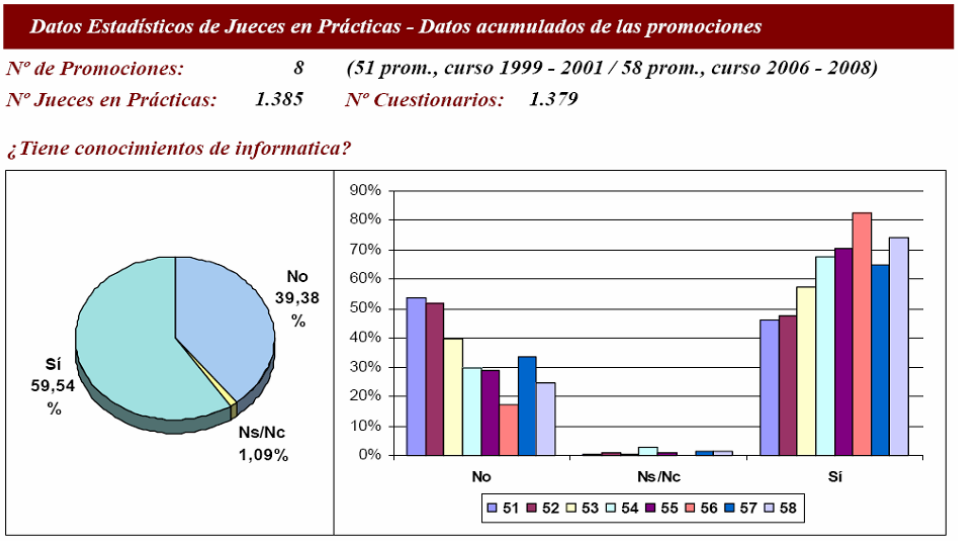


Figure 2.2: From class 51st to 58th (1999-2006). Source: **(Escuela Judicial Española, 2006a)** Declared computer skills.

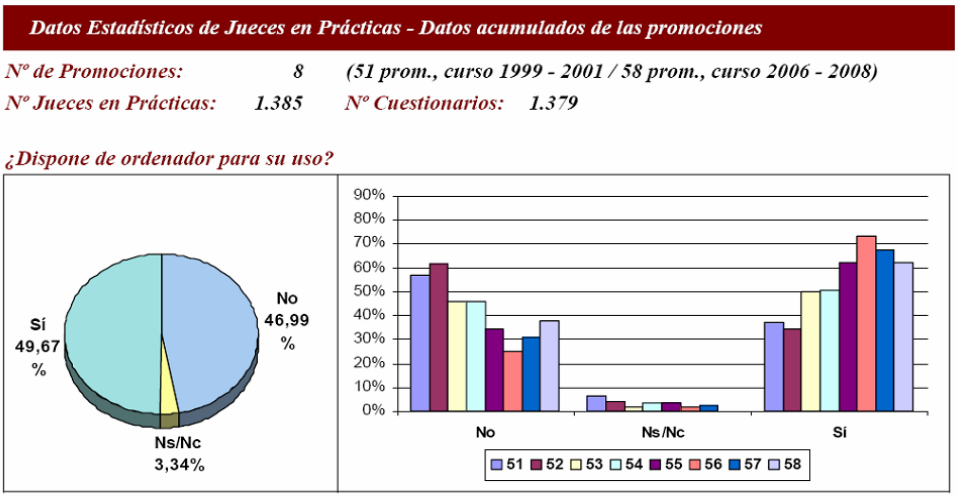


Figure 2.3: From class 51st to 58th (1999-2006). Source: **(Escuela Judicial Española, 2006a)** Personal computer disposition.

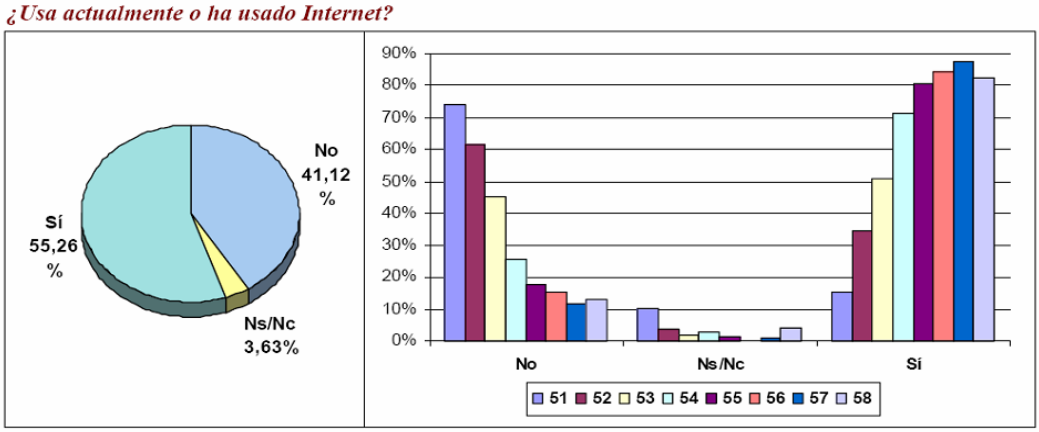


Figure 2.4: From class 51st to 58th (1999-2006). Source: Escuela Judicial Española J (2006a) Use of the Internet.

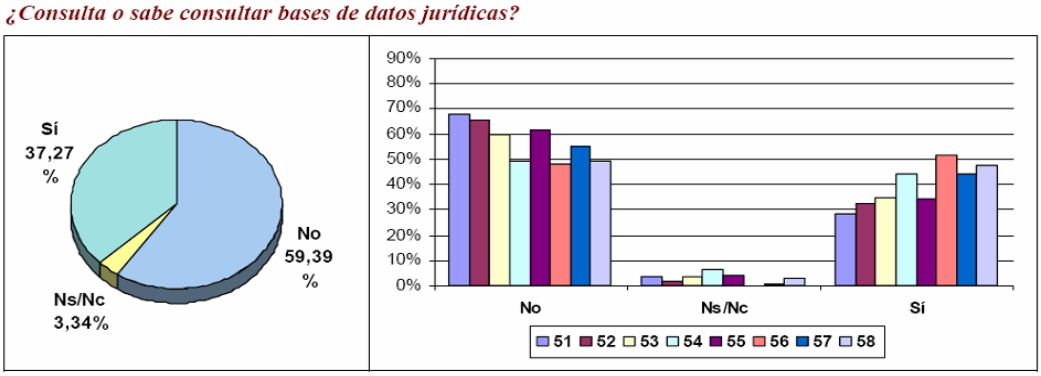
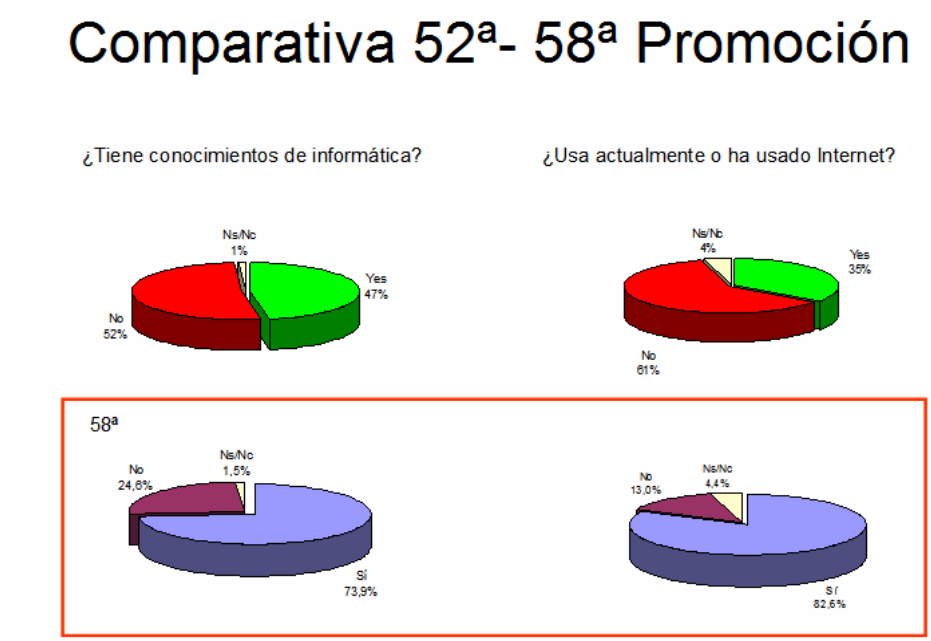


Figure 2.5: From class 51th to 58th (1999-2006). Source: **(Escuela Judicial Española, 2006a)**. Access to legal databases.



Fuente: Escuela Judicial (2006)

Figure 2.6: Comparative answers (classes 52-58) on computer skills and the use of the Internet. Source: **(Escuela Judicial Española 2006b)**.

Therefore, to interpret the results shown by the accumulated data of the tables (above), they should be compared with the general growth of the Internet use in Spain. The accumulated statistical results on the eight last classes at the Judicial School show a profile of judge in which females are prominent (63.71% vs. 36.29% of males), mostly situated in a segment of age between 26 and 30 years old (70,77%).

Even for this segment between 24 and 35 years old corresponding to a working age, the Spanish access to the Internet is mostly home (50.2%), instead of work place (47,3%) or the university (14,2%).

Nº Jueces en Prácticas: ***1.769***

Distribución por edades

Edad promedio: 29 años

Número de Jueces en prácticas

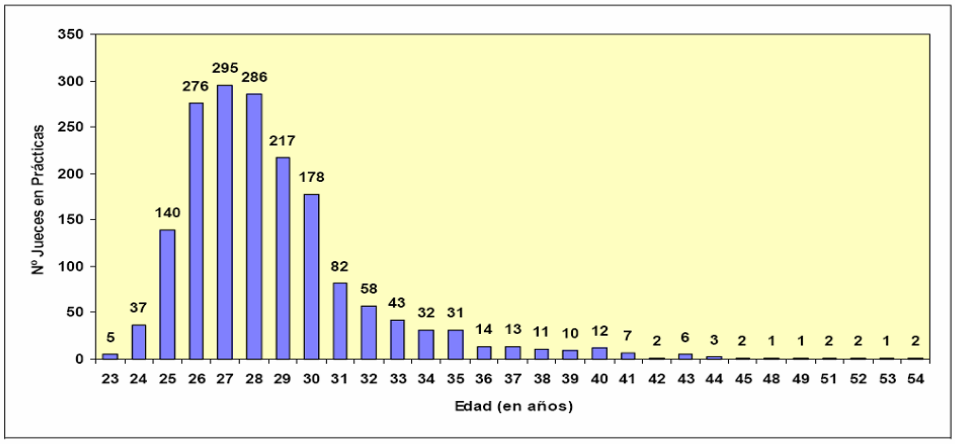


Figure 2.7: Age of the trainee judges at the Judicial School. Source: **(Escuela Judicial Española, 2006a)**.

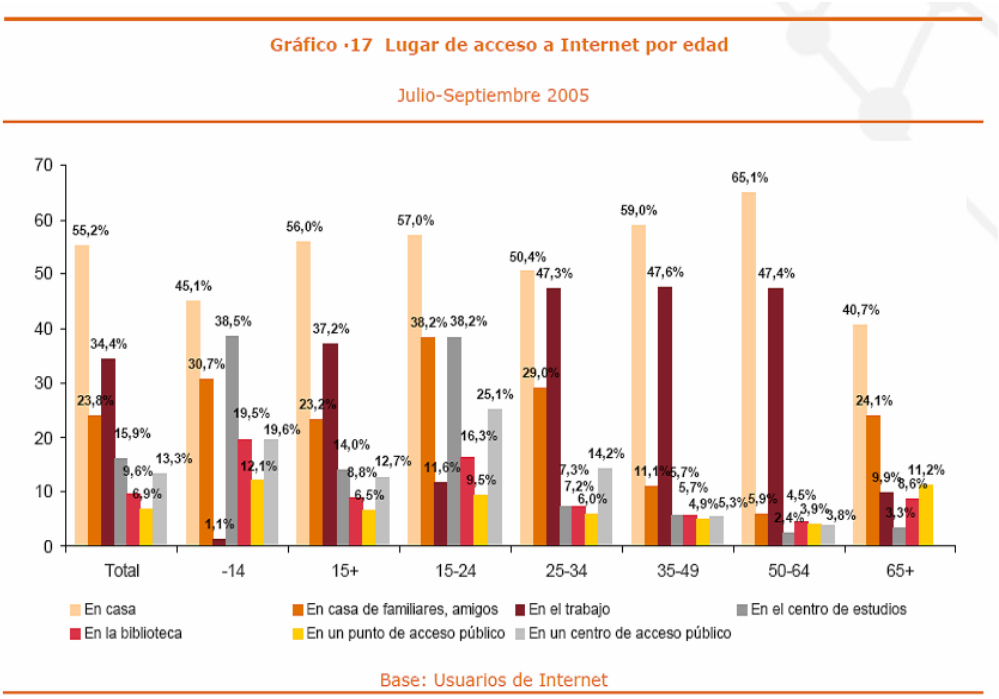


Figure 2.8: Place of access to the Internet (per age) 2003-2005. Source: Ministerio de Industria, Turismo y Comercio (2006b)

Other studies indicate that there is a high rate of Internet penetration (43% per 100 inhabitants) and a high rate of broadband penetration (11,7 % per 100 inhabitants) in Spain.[2] The growth is very fast: for the first three months of 2006 the home connection rate was 33,9%, 1,4 million more (in absolute numbers) than a year before (Ministerio de Industria, Turismo y Comercio 2006a).

The important issues to interpret correctly the initial judges' computer skills declared by young judges are:

- The Internet access takes place mostly from personal computers
- The Internet main functional utilities are limited to: (i) search and browse (72%); (ii) e-mail (68%) and (iii) e-news (53%) (Ministerio de Industria, Turismo y Comercio 2006a) (Ministerio de Industria, Turismo y Comercio 2006b)
- Judges have not received a specific computer training as law students at the Law School
- During the 4 years (average) of memoirist preparation of the official examination (*concurso-oposición*) to become judge, they did not need any computer skill either.

[2] See (Internet World Statistics, 2006) (International Telecommunication Union 2006)

The data may help to understand the low rate of legal databases use among those who access at the beginning of the semester. But do notice at the same time that they are increasingly becoming more familiar with technology and prone to learn and use new computer tools. This means that a significant change has been produced since our last report on judicial recruitment in Spain (Poblet and Casanovas 2005).

2.1.3 Contextual issues: professional models and the Judicial School curricula

During the last year (2006) the CGPJ and the Judicial School Governing Board have taken some initiatives to ideally define a professional relational model for the Spanish Judge and to provide assistance, help and technical skills to the trainee judges. Among others:

- A specific Competence Working Group started to define five clusters of 17 specific competencies for a judicial professional model : (i) relational competence (conflict management, active hearing, empathy, team working, leadership); (ii) personal competence (trust worth, flexibility, permanent learning, social understanding, social integration); (iii) functional competence (working organization and planning, decision making, information management); (iv) analytic competence (analytic reasoning, synthetic reasoning, verbal reasoning); (v) technical or professional competence (technical, legal and procedural ability, oral and written expression) (Escuela Judicial Española 2006e). This is a promising work line to explore further in the next future.
- The time table of external professional *estancias* "settings" out of the School (in Spanish court offices, prisons, European courts, Prosecutor offices and law firms) has been expanded up to 200 hours (one third of the total credits).
- Among the School activities (*formación de formadores*) the 2006-2008 curricula for the 58th class includes specific training concerning the judge in his first destination: "***El juez en su primer destino***. *Superada la oposición y el curso teórico-práctico de formación inicial en la Escuela Judicial el juez, ante la inminencia de su primera toma de posesión en su primer destino, se enfrenta ante los interrogantes y dudas propias del comienzo del desempeño de la función jurisdiccional en sus múltiples facetas. A título meramente ejemplificativo, y sin ánimo exhaustivo, la relación con los demás compañeros de la Carrera Judicial, con los integrantes de la oficina judicial, con profesionales del derecho, con la policía, con instituciones o con los medios de comunicación. O la dirección de la oficina judicial y la organización de la agenda de trabajo, compatibilizando la guardia con los juicios rápidos o la optimización del tiempo de trabajo con la gestión de eventuales retrasos con la tramitación de nuevos asuntos. La actividad pretende ofrecer unas orientaciones y permitir la reflexión sobre los citados temas en el marco d un seminario como actividad docente en la fase de formación inicial en la Escuela Judicial.*"[3] (Escuela Judicial Española,

[3] "**The judge at his first destination**. Once approved the public examination and the initial theoretic-practical course in the School, the judge is facing all the aspects of the doubts and complexities of his first jurisdictional work. E.g. he has to tackle the relationship with his peers in the Judicial Career, the relationship with the members of the clerk office, with lawyers, with institutions, with the police, with the press. He has to tackle the management of the Judicial Office and the organization of his working agenda; he has to combine the on-duty periods with fast judgments, or the optimization of the work time with the management of eventual delays and the proceedings of new incoming cases. This activity

2006c). This inclusion may be viewed too as one of the immediate results of the SEKT project, and actually Dr. Pompeu Casanovas was invited to lecture at the School on the SEKT statistic and ethnographic findings in February and May 2006. These are sessions for the magistrates who were monitoring the open training of newly appointed judges (*jueces en prácticas*).

Figure 2.9: Relational orientation of the School professional model. Source: **(Escuela Judicial Española, 2006f)** Andreu Estela.

aims at offering some guidelines and allowing the common reflection on these subjects within the framework of a pedagogic activity in the initial formation period at the School".

Estancias

Actividades Plan Docente 57ª Promoción

Docencia ordinaria		175 h
Área de Instrucción:	75 h	
Área de Primera Instancia:	75 h	
Área de Constitucional y Comunitario:	75 h	
Materias complementarias		36 h
Medicina legal: 9 sesiones de 1:30 h		
Economía y contabilidad: 9 sesiones de 1:30 h		
Derecho Orgánico: 6 sesiones de 1:30 h		
Materias instrumentales		60 h
Informática:	21 h	
Otras sesiones (Bases de Datos, Idiomas Voluntarios):	39 h	
Actividades de área (14 actividades de 4 horas)		56 h
Seminarios (3 obligatorios de 3 horas cada uno)		9 h
Práctica Judicial (Simulación)		4 h
Cursos Especiales y Monográficos (9 cursos de 8 horas cada uno)		72 h
Actividades abiertas		54 h
Estancias (8 semanas de estancias x 25 horas cada una)		200 h
TOTAL DE HORAS		606 h

Figure 2.10: 8 weeks of external professional settings (x 25 hours). Source: **(Escuela Judicial Española, 2006f)** Andreu Estela.

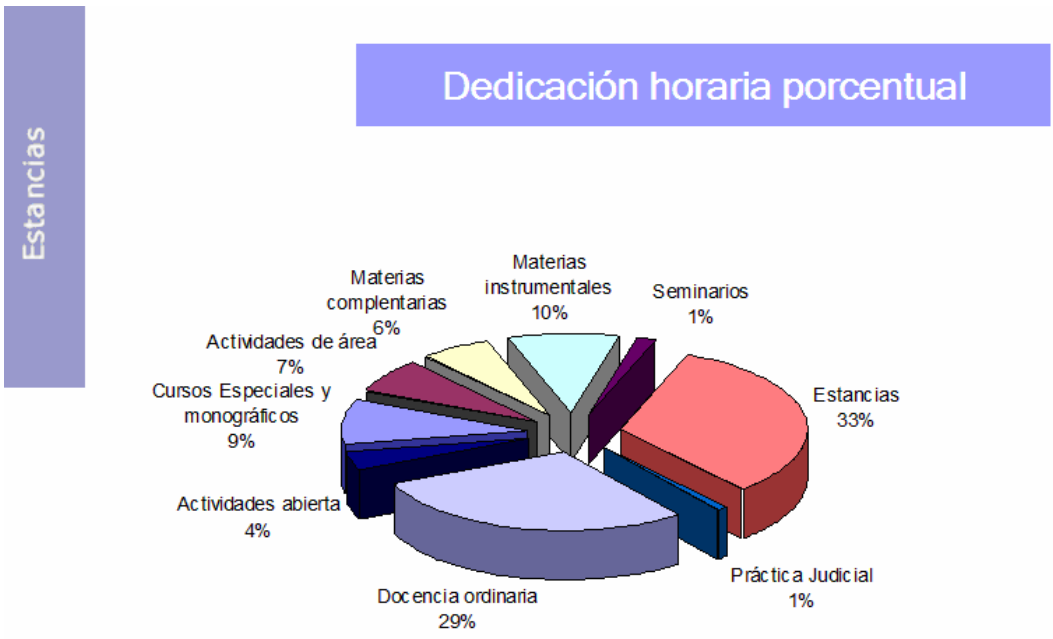


Figure 2.11: Professional external "Settings"(*Estancias*) out of the School within the Spanish Judge Curricula (33%). Source: **(Escuela Judicial Española, 2006f)**. Andreu Estela.

2.2 Working on professional judicial knowledge (PJK)

2.2.1 The team of School Magistrates and question/answer pairs

During 2006 a team of School Magistrates has been working on the answers to the practical questions issued from the SEKT field work in the Spanish courts. The questions were distributed according the experience and technical competence of Magistrates:

- Manuel Bellido (clerk office, problems during the on-duty period, institutional relations)
- Pascual Ortuño (gender violence, immigration, minors, divorce, family conflicts)
- Gonzalo Ferrer (criminal issues)
- Francisco Segura (civil issues)
- Javier Marca (criminal instruction period, crime investigation)

An example of question/answer pair (in length and expression) is the following:

Pregunta: Me han venido unas señoras al Juzgado diciendo que la vecina de arriba es una señora viejecita que vive sola, que tiene Alzheimer, y que tienen miedo de que un día se deje la espita del gas abierta. ¿Qué puedo hacer?

Respuesta: De acuerdo con lo dispuesto en los arts. 757.3 y 762.1 LEC, el juez, al tener conocimiento de la concurrencia de una posible causa de incapacitación en la anciana, deberá ponerlo en conocimiento del Ministerio Fiscal para que promueva la declaración de incapacidad. Al mismo tiempo, si es juez competente territorialmente para conocer del procedimiento de incapacitación adoptará de oficio las medidas que estime necesarias para la adecuada protección del presunto incapaz o de su patrimonio.
En este caso, a la hora de adoptar las medidas procedentes –que tendrán naturaleza extraprocesal, ya que el procedimiento de incapacitación todavía no ha comenzado-, el juez deberá dar audiencia a las personas afectadas y proceder con la mayor celeridad, realizando las averiguaciones que considere convenientes. Estas medidas quedan al arbitrio judicial, con el límite del interés —personal y patrimonial— de la presunta incapaz y de las personas que pudieran verse afectadas por su actuación.
También puede resultar de gran utilidad poner el hecho en conocimiento de los servicios públicos de asistencia social, al objeto de que puedan adoptar medidas asistenciales a favor de la presunta incapaz.

Question: Some ladies come to my office and told me that a neighbor of theirs is an old lady living alone, with Alzheimer, and they are afraid that

one day she leaves the gas open. What can I do with this?

Answer: According to the arts. 757.3 and 762.1 LEC when the judge acknowledges a possible reason for the legal disability of an old person, he must let it know to the Public Ministry [Prosecution] to start the procedure of legal Conservatorship. At the same time, if the judge is jurisdictionally entitled to do so, he may give by his own the appropriate orders to protect the disabled person and his belongings.
In this case, when taking the appropriate decisions –which are extra-procedural in nature, because they are taken before the hearing- the judge must hear all the implicated persons in the case, and quickly react ordering the inquiries that he may require. These measures lie entirely on the judge's criteria, with the boundaries of the protection of personal and real state interests of the implicated people.
It may be very useful as well to alert the Social Services assistance of the community, facilitating the disabled person to be helped.

Figure 2.12: Example and translation of question/answer pair.

As highlighted in the example, the answer is not contained in any legal act or document, but it has been extracted from the Magistrates' experience on this subject.

At present the system contains 120 question/answer pairs, but over 350 questions (out of 800) have been already solved. During the working sessions several problems have been identified:

- Harmonization of answers (content)
- Harmonization of expression (obscurities, ambiguity, counter-factuality…)
- Updating of answers (changes in the law or/and in criminal policy)
- Coordination of the judicial team (School agenda, composition, in/out the school, traveling…)

The most obvious problem encountered is the need to maintain "alive" the proposed solutions. This is especially required when a new statute is enacted. For instance, the Spanish Act against the Gender Violence[4] affects some of the answers introduced into the system some time ago. An updating process is required, and at present the Magistrates' team is working on that.

One example of harmonization of expression may be the following:

- **Pregunta**: ¿Qué debe entenderse por víctima de violencia de género? [What do you mean by "victime of gender violence"?]
- **Respuesta**: Para ser víctima de violencia de género no se requiere que se haya dictado orden de protección o emitido informe el Ministerio Fiscal. [To be qualified as a victim of gender violence the existence of a previous injunction of protection or a report by the Public Ministry (Prosecutor) are not required]

[4] BOE núm. 313. 21760 LEY ORGÁNICA 1/2004, de 28 de diciembre, de Medidas de Protección Integral contra la Violencia de Género.

Obviously a negative answer to a clear question can be converted into a more substantive or positive one. What it is meant by the answer is the natural tendency of judges to require a legal qualification to recognize a victim as a victim (or a person as a person). E.g. under the Spanish civil law a "person" is not a human being, but a human being who has been able to live more than 24 hours after the birth.
This "normative" effect needs to be overcome in the answers, as their aim is to convey practical knowledge regarding experience in real life situations.

2.2.2 Official presentation of Iuriservice

It is worth mentioning that on November 27th, Iuriservice has been officially introduced in a formal session to the CGPJ representatives, the CENDOJ (Centro de Documentación Judicial) representatives, judges of the 58th class and Directors of the Latino-American Judicial Schools (who were present at that time at the Spanish School).

Doing this, the SEKT Consortium complies with the acquired responsibilities before the Judicial Council, but it is also important to notice that this is a way to facilitate the implementation of the system into the Spanish School during 2007.

Figure 2.13: John Davies (speaking), Richard Benjamins, and Pompeu Casanovas, presenting SEKT and Iuriservice at the Spanish Judicial School (November 27th 2006)

2.3 Legal Case Study Ontologies: Progress

In this section, we will analyze first the improvements of OPJK, the Ontology of Professional Judicial Knowledge, constructed by legal experts from a corpus of questions concerning on-duty problems provided by the judges in an ethnographic field-work study (Casanovas et al, 2004) (Casanovas et al, 2005b). These improvements are the addition of new concepts and instances and the possibilities given by MORE's versioning management (Huang et al, 2006) and semi-automatic extraction of concepts using Text2Onto (Völker et. al, 2005). Second, we will show the improvements made in the two topic ontologies used by this case study: QTO and JTO. Third, we will discuss their manual integration and, finally, the Judgment Ontology for massive annotation will be outlined.

2.3.1 OPJK

In our last deliverable, the Ontology of Professional Judicial Knowledge had progressed as far as 50 concepts, 100 relations and approximately 300 instances. During Y3, the concepts and instances of the ontology have been refined and 6 sub-domains (on-duty, gender violence, minors, marital issues, immigration and property) have been completed.

Figure 2.14: Screenshot of current OPJK

Currently the ontology has 104 concepts and a total of 561 instances.

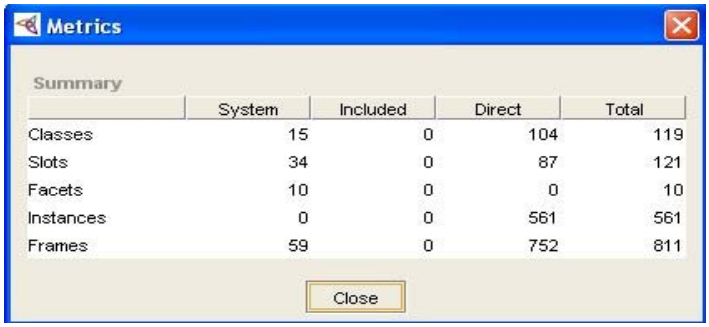


Figure 2.15: OPJK current metrics in Protégé 3.2 (July, 2006)

The process domain and the judicial professional domain have yet to be completed and also the ontology now in RDF, should be converted into OWL and DIG[5], and disjoint statements should be identified. The DION tool[6] is used to create disjoint axioms on sibling concepts on OPJK automatically, by which we obtain 26 disjoint axioms. The following are some of those disjoint axioms in DIG:

```
<disjoint>
        <catom name="Objeto"/>
        <catom name="Suceso"/>
      <catom name="Abstraccion"/>
</disjoint>

<disjoint>
        <catom name="Mayoria_de_Edad"/>
        <catom name="Minoria_de_Edad"/>
</disjoint>
```

Adding those disjoint axioms on OPJK, we obtain an inconsistent OPJK ontology in which there exist, for example, two unsatisfiable concepts: *Minoria_de_Edad* and *Mayoria_de_Edad*. We examined those automatically created disjoint axioms of OPJK, and classified them into three classes: 11 identified disjoint axioms, 12 perhaps disjoint axioms, and 3 unacceptable disjoint axioms. Moreover, we added the following three new disjoint axioms in the list of identified disjoint axioms.

```
<disjoint>
  <catom name="Situacion"/>
  <catom name="Evento"/>
  <catom name="Acto"/>
</disjoint>

<disjoint>
  <catom name="Proceso_Penal"/>
   <catom name="Proceso_Civil"/>
```

[5] DIG is an ontology language and interface which is developed by the Description logic Implementation Group.(http:// dl.kr.org/dig/).
[6] DION is a debugger of inconsistent ontologies, which is developed in SEKT WP3.6.

```
</disjoint>

<disjoint>
  <catom name="Ley_Ordinaria"/>
  <catom name="Ley_Organica"/>
</disjoint>
```

Thus, there are 14 disjoint axioms in the list of identified disjoint axioms. The original OPJK ontology with these 14 identified disjoint axioms provides a new OPJK ontology which is more expressive than the original one because it is enhanced with disjoint axioms. Fortunately, this enhanced OPJK ontology is consistent.

The OWL/DIG conversion and disjoint axiom enhancement could improve ontology versioning evaluation and management, a task initiated with the collaboration of the team from the Vrije Universiteit of Amsterdam. In deliverable D.3.5.2 (Huang et al, 2006), OPJK was used as test data to evaluate the system for ontology versioning[7] and management (MORE). As the concepts and instances of the ontology are being added taking into account the appearances in each frequently asked question, a new version of the ontology is created when the analysis of a question is completed.

Thus, the OPJK versioning space was built to reflect on this structured construction system; a linear space with usually one new version per FAQ. The findings and conclusions of those tests are shown in (Huang et al, 2006) and are summarized as follows: OPJK showed more stability with time, the addition of new individuals occurred more often than the addition of new concepts, the data also showed that most of the changes so far were are small and, finally, that if the amount of instability inflicted by the addition or modification of subclasses could be assessed, different modelling options could be sought to promote stability.

For the Legal Case Study team it is very interesting to observe how the discussions of the knowledge experts on the addition or modification of classes are mirrored in the stability measures. For example, “Acto” and “Hecho” were not included in the list of most stable concepts (30) in OPJK. These two concepts are part of the ontology from the very beginning; however the measurements show that these two concepts have been part of an ongoing discussion within the modeling team. Thus, in order to further study the possibilities of this versioning control (such as inconsistencies) it is necessary to introduce some disjoint statements in OPJK.

Nevertheless, not only the versioning management could improve the construction of OPJK, but also the use of semiautomatic extraction tools for ontology construction would improve and speed the construction the ontology. At the same time, the ontology constructed manually and the semiautomatic extracted version could be compared for evaluation.

[7] MORE versioning system. The MORE tool was developed in Amsterdam within SEKT, and described in detail in SEKT deliverable 3.5.1. (Huang et al, 2005). It offers semantic versioning support for ontology development based on a combination of change detection and Linear Temporal Logic.

At the beginning of the SEKT project, TextToOnto was available for the automatic (and semiautomatic) extraction of ontologies for texts in English, Italian and German. Due to the similarities between roman languages (Italian-Spanish), this tool was used to give an insight into possible concepts or relations that the manual construction of OPJK might have overlooked (Casanovas et al, 2004) and in order to extract significant concepts from the corpus of questions containing judicial problems to construct the judicial professional ontology.

The available algorithms for the extraction of concepts by this application were the entropy algorithm and the TFIDF[8] algorithm, together with the possibility to establish a frequency threshold and a maximum of words in the term. As Spanish was not an available language, the extraction was carried out using the Italian (and also the English) options. Relevant concepts such as "trabajo" [job/work], "policía" [police/policeman], "embargo" [seizure of property] or "instrucción" [examination] were extracted, however, TextToOnto also extracted terms which were not concepts: articles, pronouns, conjunctions, verbs, adverbs and adjectives. For example, "su" [his/her], "dice" [says], "cómo" [how], "no", "pero" [but] etc.

It was observed that one of the main problems encountered during the utilization of TextToOnto regarding the Spanish language referred to the process of word reduction (i.e. just before the process of concept identification). Terms such as "pueden" [they can], "puedo" [I can], "puede" [he/she/it can] This problem could be partially solved by the use of to an open source Spanish lemmatizer,[9] which enables applying a lemmatization process to the corpus before being processed by the tool (Vallbé et al, 2005). Thus, in order to improve the first results, the corpus of questions was lemmatized (stopwords were also removed) and processed again.

[8] TFIDF: Term Frequency Inverse Document Frequency.
[9] http://garraf.epsevg.upc.es/freeling/

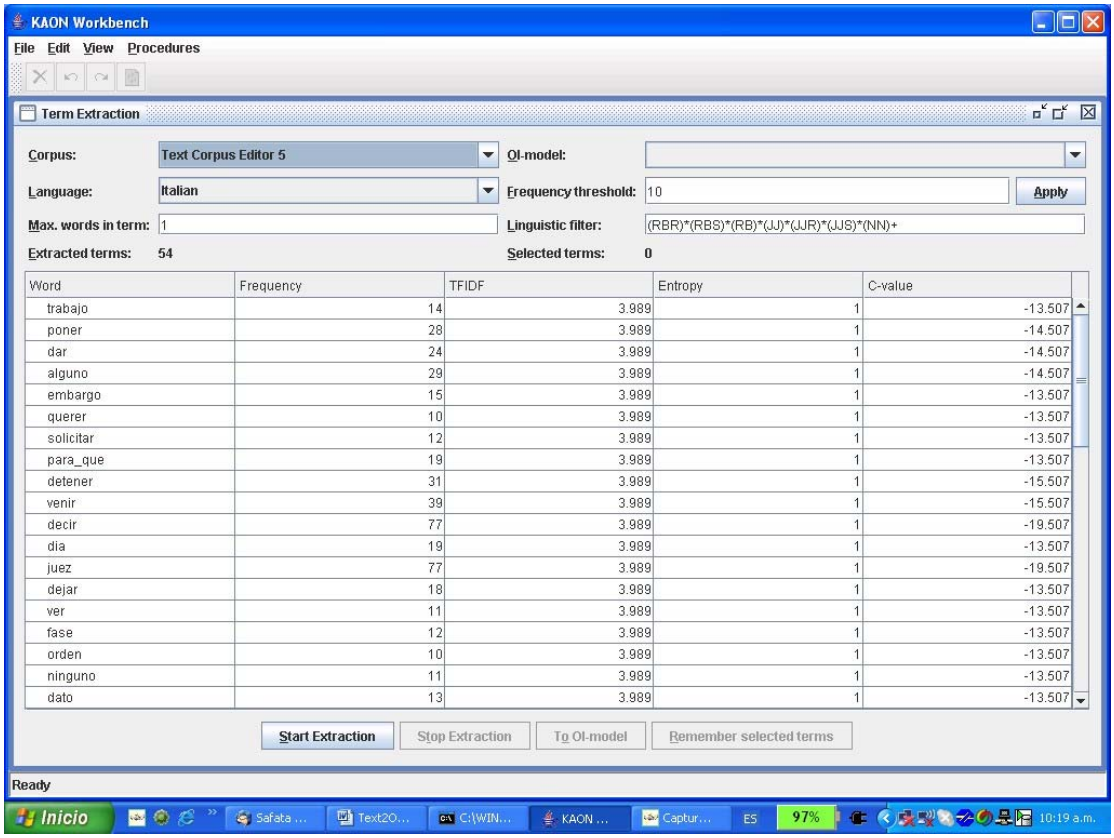


Figure 2.16: Screenshot of the lemmatized corpus processed by TextToOnto.

In this case, “trabajo” [job/work] and “embargo” [seizure of property] continue to appear, although “policía” does not. At the same time, more relevant legal concepts such as “juez” [judge] and “orden” [injunction] appear. Although the performance is better regarding word reduction, most of the extracted terms (31) are, in fact, relations (infitinive verbal tenses): “poner” [to put], “solicitar” [to ask for], “detener” [to detein], “mandar” [to command], “decir” [to say], “venir” [to come], etc.

It is clear from these results that lemmatization was necessary in order to improve the performance of the extraction algorithms of TextToOnto on the text for word reduction; however, it was not sufficient to improve the sole extraction concepts (nouns) and avoid the extraction of possible relations (verbs, adverbs and adjectives) at this first stage (the term extraction phase). As a consequence, the relation extraction feature could not perform properly.

The integration of a newer version of TextToOnto with the GATE platform and other linguistic support to solve these language limitations (Haase et al, 2004) was forseen within the SEKT project. Text2Onto, a framework for ontology learning from textual resources, has been recently released and this paper is concerned with the evaluation of the performance of Text2Onto for the extraction of ontologies from legal Spanish documents.

With the release of the new version of TextToOnto, Text2Onto, integrated with the GATE platform and other resources such as WordNet, the corpus of questions was used again in order to extract terms and perform a comparison with the previous results. At first, the pre-lemmatization step was not performed and the same

algorithms were used: entropy algorithm and the TFIDF algorithm. With the improved version of Text2Onto which supports Spanish, verbs do not appear in the concept extraction; it extracts only nouns: "caso" [case], "juicio" [trial], "parte" [party], "juez" [judge], "persona" [person], "orden" [injunction], "vista" [trial], "policia" [police/policeman], "guardia" [on-duty], "prueba" [evidence], "procedimiento" [process], "funcionario" [civil servant], "juicio rápido" [fast trial], etc. However there are still some features which need improvement such as the appearance of "¿Cómo" [how], "¿Cuál" [which], "¿es" [is].

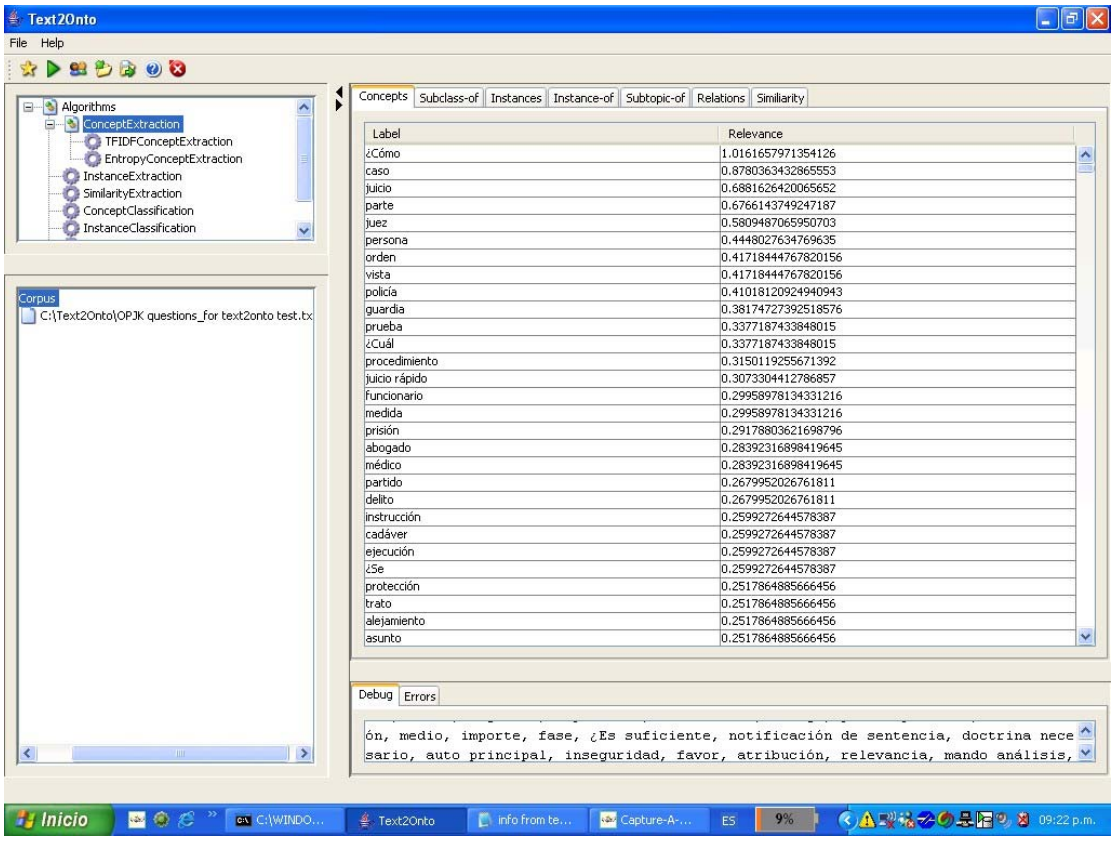


Figure 2.17: Screenshot of term extraction for the corpus of questions using Text2Onto.

As opposed to TextToOnto, the improved version is able to extract subclass relations between concepts from the corpus of questions. Moreover, this tool offers several possibilities for the extraction of concept relations in Spanish language: pattern concept classification, Spanish vertical relations concept classification, Spanish WordNet concept classification, vertical relations concept classification and WordNet concept classification. The following tests were carried out on the concepts extracted using the entropy and TFIDF algorithms from a non pre-lemmatized corpus.

By the use of the Spanish Wordnet algorithm 195 relations were retrieved. This algorithm takes into account the complexity of the legal process, where there may exist at the same time relations such as "juicio" [trial] is a type of "proceso" [process] and "juicio" [trial] is a type of "acto" [act] or "vista" [trial] is a type of "proceso" [process], "vista" [trial] is a type of "cosa" [thing] or "prueba" [evidence] is a type of "proceso" [process] and "prueba" [evidence] is a type of "acto" [act].

Text2Onto produces better numbers regarding concept extraction and relation extraction. The improvement is significant. However the integrated linguistic filter proves to be insufficient for the Spanish language as terms such as "¿cuál", "pero", "no" or "es" are retrived. In conclusion, Text2Onto's performance on the corpus of questions using the entropy and TFDIF algorithms in order to extract concepts and the Spanish WordNet algorithm offers the best performance in comparison to other relation extraction algorithms from the same tool and in comparison to the performance of TextToOnto.

For the improvement of OPJK, a further comparison between the extracted concepts and relations and the concepts and relations contained in OPJK will be executed. Not only the results from the extraction could lead to modifications on OPJK but also the Legal Case Study team could explore the relation between the knowledge provided by the semi-automatic extraction and the knowledge contained in the manual extraction by legal experts.

2.3.2 QTO

We have used OntoGen to develop a topic ontology from the pre-lemmatized corpus of questions as described in deliverable D 10.3.1 (Blázquez et al, 2005) and also in Casellas et al, 2006). In that deliverable we described the creation of the Question Topic Ontology. The identified topics at the time were: "Oficina Judicial" [court office] with two subtopics (trial videotaping and prosecution), "Defunciones" [deaths] with two subtopics (corpse removing and autopsy), and "Violencia Doméstica" [gender violence] which has also two topics (protection orders and restraining orders).

It is important to note that the topic Guardia [on-duty] was considered to be the root of all the identified topics; on-duty was not considered anymore a topic but the moment in time were all the judicial questions raised. Also the topics "Extranjería" [immigration], "Proceso" [process], "Internamientos" [internments] and "Familia (menores)" [family (minors)] but were not developed further at the time.

For the development of QTO, the topic "Proceso" had to be subdivided due to its importance (quantity of questions contained). Also, it was important to be able to differentiate and decide the boundaries of the topic "Familia". In that development several sub-topics of "Proceso" were identified and also it was decided that Minors was a sub-topic of "Familia" that also contained the "Defunciones" sub-topic (usually related with inheritance issues). For these new changes a new version of OntoGen (2.0) was used, a version that included more features.

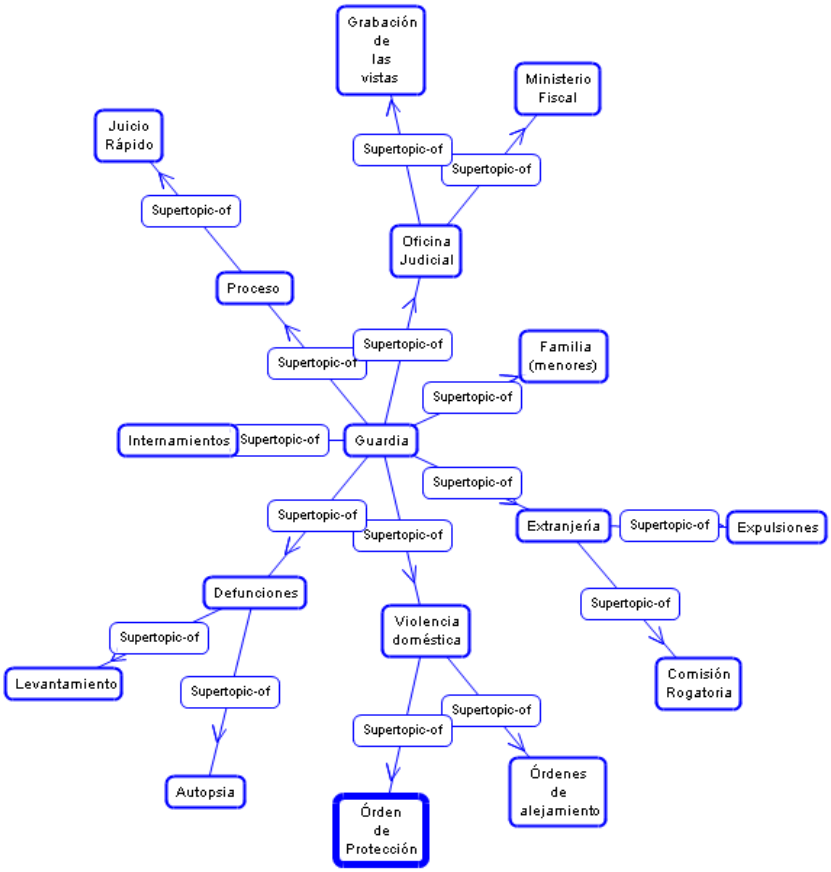


Figure 2.18: Screenshot of the development of the main QTO topics into sub-topics.

OntoGen is a "semi-automatic" and "data-driven" system for the construction of topic ontologies.[10] Topic ontologies consist of a set of topics (or concepts) and a set of relations between the topics which best describe the corpus. Ontogen discovers possible concepts and relations form the corpus. An improved version of this tool has been released recently, OntoGen v 2.0. This version of the tool is based on a novel ontology learning framework constructed especially for data-driven learning systems. The framework gives a basic ontology definition and defines concept and relation learning processes specially adjusted to include machine learning algorithms and takes into account the feedback received from the users from the SEKT Legal and BT Digital Library case studies regarding OntoGen v 1.0. These new features are related to: 1) concept learning (the new version has a more extended list of keywords describing the suggested concepts and the user can also suggest concepts), 2) concept management (simplification of concept movements and pruning features), 3) ontology management (supports the addition of new documents into the already built ontology),

[10] "**Semi-Automatic:** The system is an interactive tool that aids the user during the ontology construction process. The system suggests concepts, relations and their names, automatically assigns instances to concepts and provides a good overview of the ontology to the user trough concept browsing and visualization. At the same time the user can fully adjust all the properties of the ontology by manually adding or deleting concepts, relations and reassigning instances. **Data-Driven:** Most of the aid provided by the system (concept, relation suggestion, etc.) is based on some underlying data provided by the user at the beginning of the ontology construction. The data reflects the domain for which the user is building ontology. Instance and instance co-occurrences are extracted from the data together with their profiles. Representation of profiles will be discussed later" (Fortuna et al, 2006).

4) extended list of supported ontology formats (RDFS & OWL) and 5) an improved user interface (Fortuna et al, 2006).

The changes made to QTO are summarized as follows:

QTO D 10.3.1	QTO D 10.4.1
Guardia - Internamientos - Proceso - Juicio Rápido - Oficina Judicial - Grabación de las vistas - Ministerio Fiscal - Familia (menores) - Extranjería - Explulsiones - Comisión Rogatoria - Violencia doméstica - Ordenes de alejamiento - Ordenes de protección - Defunciones - Autopsia - Levantamiento	Guardia - Extranjería - Expulsiones y extradiciones - Violencia doméstica - Medidas de alejamiento y proteccion - Proceso -comisión rogatoria - juicio rapido - ejecución - conflictos competenciales o de jurisdicción - Oficina judicial - Grabación de las vistas - Ministerio Fiscal - Familia - defunciones - Levantamientos y autopsia - Menores

Table 2.1: QTO's modifications in red.

The Question Topic Ontology has been sufficiently developed and refined and the prototype will use this topic ontology first for topic detection and secondly for the Search and Browse feature.

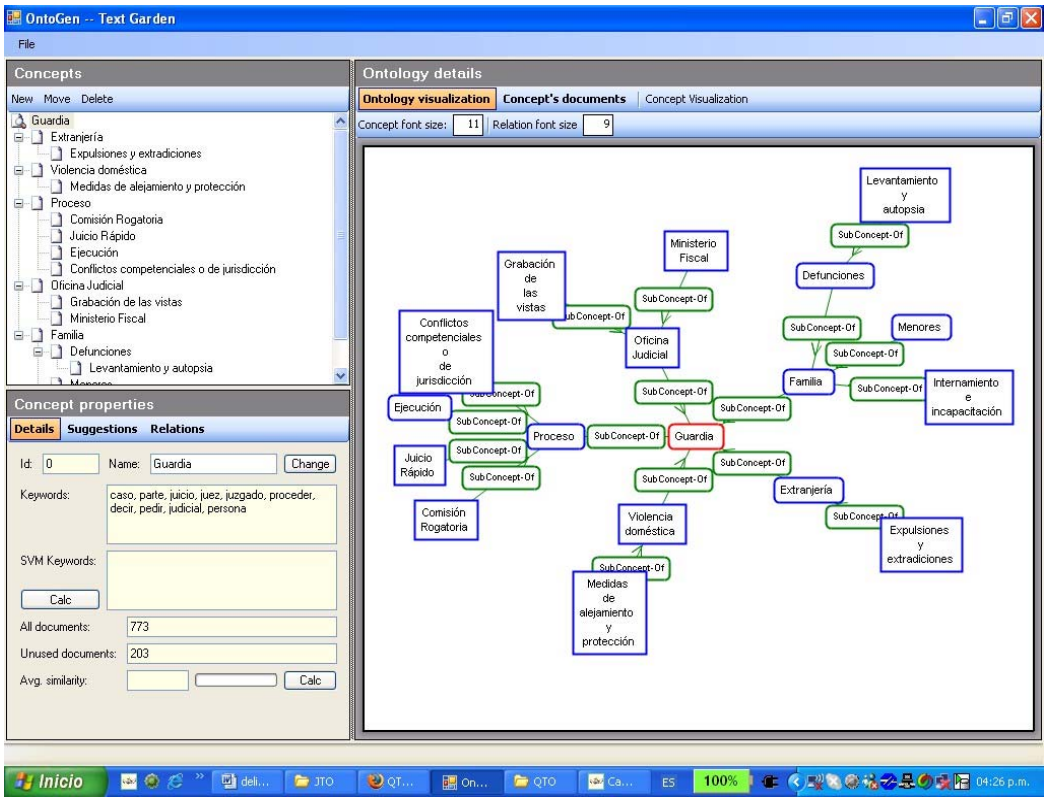
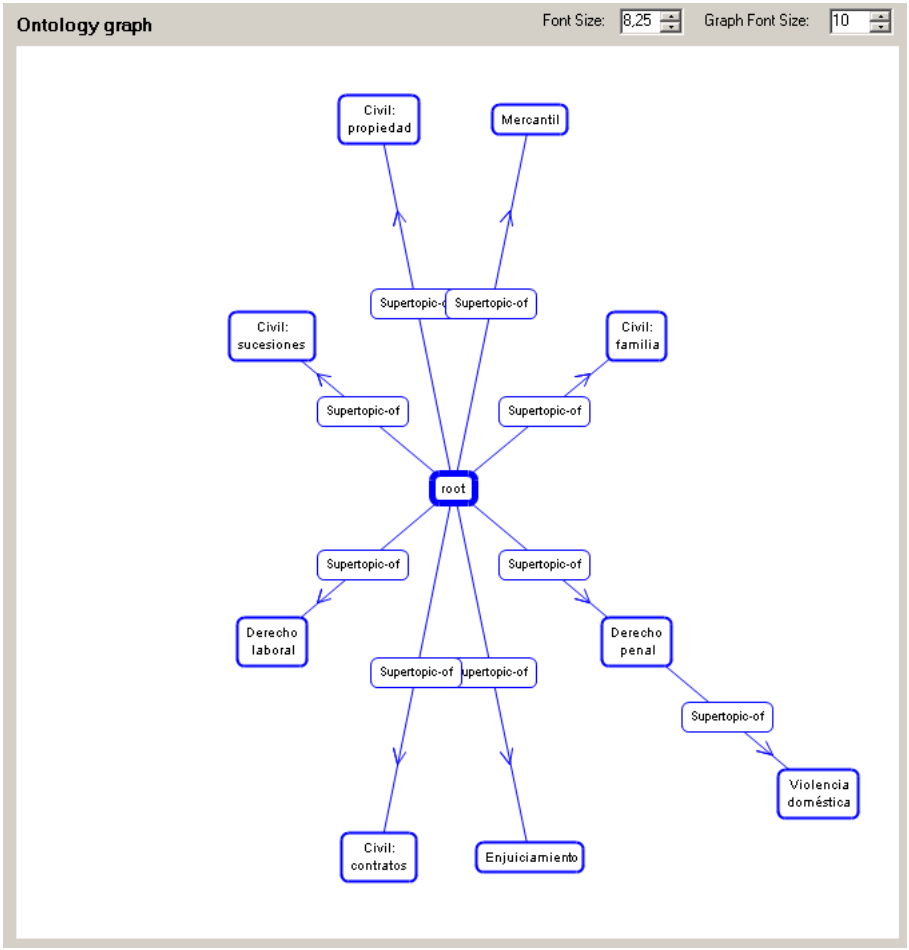


Figure 2.19: Screenshot of current QTO.

2.3.3 JTO

Two topic ontologies have been created using OntoGen. The second topic ontology, the Judgment Topic Ontology (JTO), was described but not explored in depth for deliverable 10.3.1 (Blázquez et al, 2005) and Casellas et al, 2006). This ontology classifies in topics a concatenation of all the summaries that correspond to a particular primary topic. The database of 350.000 judgments could not be used directly and this operation allowed quick and responsive operation of OntoGen on the standard PCs, as working with 350.000 judgments would be time-consuming.

A complete explanation of the methodology followed in order to collect and prepare the data for the construction of the topic ontology for the judgments is detailed in D.10.3.1. As a summary, 350.000 judgments were extracted from La Ley database (with their permission).[11] Due to the vast amount of data it was time-consuming to work directly on the whole document. Finally, after several analyses, it was decided that in order to produce the topic ontology for judgments the summary of the judgments was the best part of the structure to be explored.



[11] Official agreement: UAB-La Ley Actualidad, SA (Wolters Kluwer): *Convenio marco de colaboración entre La Ley Actualidad, Universitat Autònoma de Barcelona y Intelligent Software Components (ISOCO).* Madrid, December 21st 2004.

Figure 2.20: Screenshot of JTO's in deliverable D.10.3.1.

The hand-made summary of a judgment provided several information of that judgment. Although those summaries had some mistakes (misspelling, etc.), they contained "topics" regarding what was the judgment about. Generally, they contained a "primary topic" which identified the major "topic" of the judgment and a "secondary topic" that made the summary more specific or to refine the "primary topic". For that reason, only the primary topic was extracted. Also, generally, given that a number of summaries should belong to the same topic for that topic to be well-defined, we could only afford to extract frequently occurring topics. Thus, the Judgment Topic Ontology has been constructed from the document containing frequently occurring primary topics within the 350.000 judgments.

For deliverable D.10.3.1 a preliminary version of the Judgment Topic Ontology was constructed using OntoGen and we planned its refinements for the second part of the prototype Iuriservice. Some topics have been identified. However, the corpus used in JTO is significantly different (in size and preparation) and results regarding QTO and the management presented some difficulties. The version of OntoGen did not support at that moment the movement of a sub-topic from a topic to another topic (with all the instances – judgments – with it). The current version of OntoGen v 2.0 does support that feature.

For the construction of the topic ontology it was decided that the initial division that produced a more relevant group of topics was the division of the summaries in 5 initial subtopics. Each of these 5 initial sub-topics would then be divided in 3, 4, 5, 6, 7, 8, 9 and 10 subtopics in order to extract relevant subgroups within that topic.

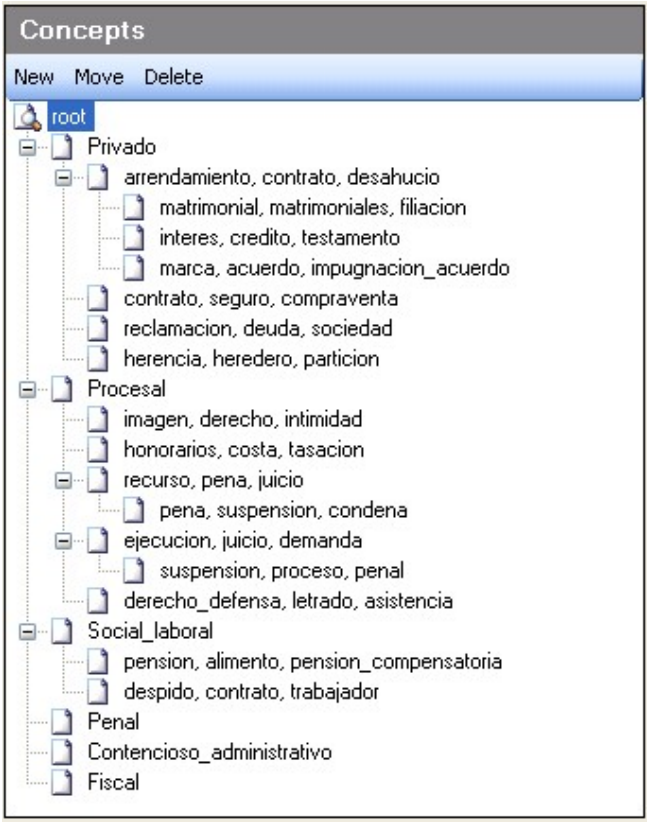


Figure 2.21: JTO at initial stages of development.

Using that methodology it was possible to:

- Use all the subgroups that appeared or incorporate just one or some of them (and more divisions could be done with the documents that were not used, i.e. the topics "Procesal" [procedural], "Penal" [criminal] and "Social_laboral" [social-labour] were cleaned using that methodology).
- Extract subgroups that belong to other topics and then merge them (i.e. the topic "Privado" [private] was created using that methodology).
- Extract subgroups that were considered to be a main topic and move them as root sub-topics (i.e. "Contencioso_administrativo" [administrative or public] appeared first as a subgroup within "Social_laboral" [social-labour]. Also "Fiscal" [tax] appeared initially a sub-topic of another main topic and was later converted to a main topic).

Due to all these methodologies, there resulted 6 main topics instead of 5:

- Privado [Private]
- Procesal [Procedural]
- Fiscal [Tax]
- Social-Laboral [Social-labour]
- Contencioso-Administrativo [Administrative or Public]
- Penal [Criminal]

Furthermore, these main topics were themselves subdivided and unwanted contents were moved. As an example, we will describe the methodology followed when deciding the contents of the topic "Privado". As initial subtopics, the following groups were found:

- Arrendamiento, contrato, deshaucio (Property)
- Contrato, seguro, compraventa (Contracts and Tort)
- Reclamación, deuda, sociedad (Commercial/Business)
- Herencia, heredero, partición (Successions)

However, within the first group related to Property, there were some subgroups that were thought to have no relation with the subtopic Property (or more relation with other topics and subtopics) and were moved:

- *matrimonial, matrimoniales, filiacion, separacion, gananciales, conyugal, regimenes, paternidad, liquidacion, economico_matrimoniales.* (Family: divorce, marital issues, etc.)
- *interes, credito, testamento, liquidacion, donacion, pago, liquidacion_interes, subasta, anotacion, bien.* (Commercial/Business)
- *marca, acuerdo, impugnacion_acuerdo, impugnacion, comunidad, propietario, asociacion, junta, comunidad_propietario, licencia.* (Commercial/Business)

The groups related to Commercial issues were moved to that topic. The group related to marital issues was extracted and made a subtopic of "Privado", called "Familia"

[Family]. This same methodology was used to construct and clean the rest of topics and subtopics. The current JTO contains the following structure:

JTO
Root
Privado
Sucesiones
Herencia y testamento
Familia
Regimen matrimonial
Menores
Pension compensatoria o alimenticia
Sociedades
Contratos
Procesal
Tutela de derechos y libertades
Costas y honorarios
Conflicto de competencias
Procedimiento
Ejecución
Delitos y penas
Social-laboral
Seguridad social
Prestaciones
Personal y convenios
Penal
Delitos
Contencioso-administrativo
Faltas y sanciones
Personal
Responsabilidad
Contratos administrativos
Fiscal
Impuestos y liquidación

Table 2.2: JTO's current composition

In order to complete the task for the Search & Browse application of the Iuriservice prototype, QTO and JTO were aligned using OntoMap (Weiten et al, 2005). Not all their topics could be related, however, most were. The alignment decisions were based on the need to provide relevant judgments to related questions and, towards that end, the root from JTO was aligned with QTO's root (Guardia).Some subtopics were very straightforward to align such as: "Familia" [Family], "Menores" [Minors], "Proceso" [Process] and "Defunciones" [Deaths]. Also, some subtopics were aligned to more than one other subtopic to allow better searches: "Violencia doméstica" [Gender violence] in QTO was aligned with JTO's "Familia" [Family] and "Delitos y penas" [Crimes and puhishments], while it's subtopic "Medidas de alejamiento y protección" [Protection and restraining orders] was also aligned with JTO's "Procedimiento" [Procedure] and "Ejecución" [Execution].

In the following table the final relations are shown.

QTO	JTO
Guardia	Root

	Privado
Defunciones	Sucesiones Herencia y testamento
Familia Violencia doméstica Internamientos e incapacitaciones	Familia
	Regimen matrimonial
Menores	Menores
	Pension compensatoria o alimenticia
	Sociedades
	Contratos
Proceso	Procesal Tutela de derechos y libertades Costas y honorarios
Conflictos competenciales o de jurisdicción Oficina judicial	Conflicto de competencies
Juicio Rápido Medidas de alejamiento y protección Extranjería	Procedimiento
Ejecución Medidas de alejamiento y protección	Ejecución
Violencia doméstica Extranjería	Delitos y penas
	Social-laboral
	Seguridad social
	Prestaciones
	Personal y convenios
	Penal
Violencia doméstica	Delitos
	Contencioso-administrativo
	Faltas y sanciones
	Personal
	Responsabilidad
	Contratos administrativos
	Fiscal
	Impuestos y liquidación

Table 2.3:JTO and QTO's alignment.

2.3.4 Judgment Ontology

As a result of the process of the integration of the judgments sources and the incorporation of Search & Browse, we have identified the need for a new ontology that allows the description of the types of judicial rulings (judicial order, interlocutory decision and judgment) (Casanovas et al, 2004); the structure of judicial rulings, (title, date, location of decision, court, the docket number, the history of the case, the findings of fact or the grounds of decision, etc.) (Casanovas et al, 2004).

This ontology takes OPJK as a reference and it has also integrated in PROTON.[12] Currently, it is composed by 45 classes and 17 properties. Some of the instances are generated automatically using the massive annotation tool.

[12] http://proton.semanticweb.org/

As we have described before, the ontology models different kinds of information such as: types of judicial rulings or the structure of the judgment. Now we will describe how this integration has been completed. Judicial rulings are types of documents, but in the legal context we can find other types of documents such as: judicial communications, judicial decisions etc. In order to distinguish between judicial rulings and other kind of legal documents, we have defined a new class named [*Procesal Document*] as subclass of the PROTON class [*Document*]. The [*Procesal Document*] class has a subclass named [*Judicial Decision*] which models the types of judgments, so we have defined three subclasses of [*Judicial Decision*] [*Judicial Order*], [*Interlocutory Decision*], [*Judgment*] (See Figure 2.22)

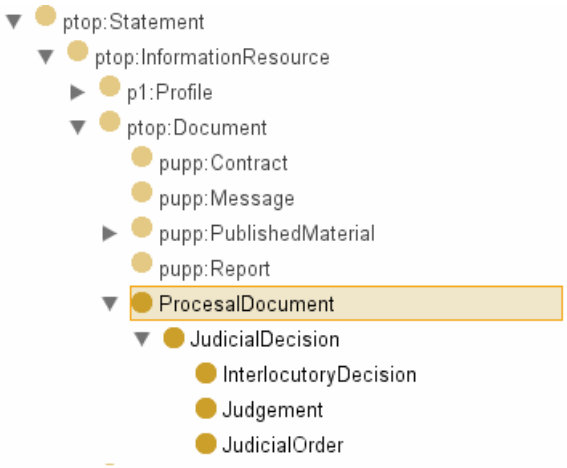


Figure 2.22: Typology of Judicial Rulings

All these documents have two identification numbers in the court records, the judgment number and the appeal number, depending on the type of judicial rulings. These numbers have been modeled as subclasses of the PROTON class Number (See Figure 2.23). Also, the judgment is characterized by jurisdiction[13]. To model it, we have defined a new subclass of PROTON class [*Abstraction*] named [*LegalAbstraction*] for organizational purposes (Casellas et al, 2005). This new class will contain a new subclass to model *Jurisdiction*.

The role that an agent might play during a judicial procedure and that appears in a judgment is modeled in a class named [*ProceduralRole*] as a subclass of PROTON class [*Role*].

[13] Other distinctive features of the Spanish judicial system are centralization—unitary jurisdictions, excluding ad hoc or special courts—and hierarchy—judges and magistrates are independent, but courts are organized in different levels and decisions in lower courts may be appealed in higher courts, the Supreme Court being the apex of the system (Casanovas et al, 2004).

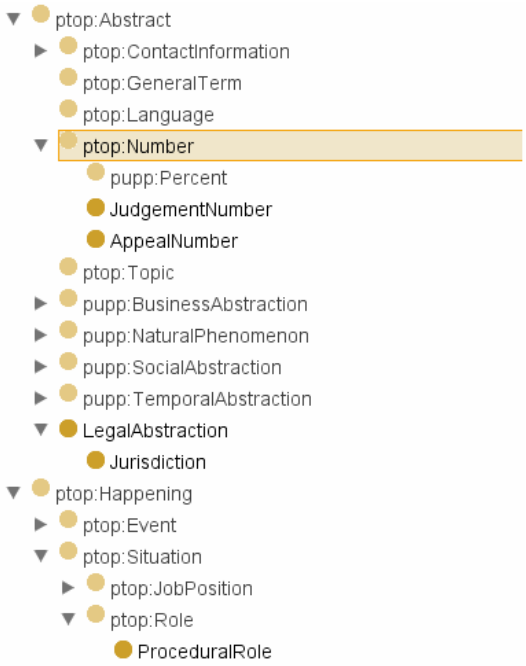


Figure 2.23: Number, Jurisdiction and Procedural Role modelling.

Besides, this ontology also models the different Legal Organizations that we can find at the Spanish Court System (Casanovas et al, 2004). In order to define them in this ontology we have defined a new class named [*LegalOrganization*] that has as subclasses the different types of Judicial Organizations of the Spanish Court System (see Figure 2.24 on the left hand side). Also depending on the type of the Judicial Organization it has a Geographic Scope (Casanovas et al, 2004). To model this kind of Judicial Location, we have defined a new class [*JudicialRegion*] as a subclass of PROTON class [*Location*] (see Figure 2.24 on the right hand side).

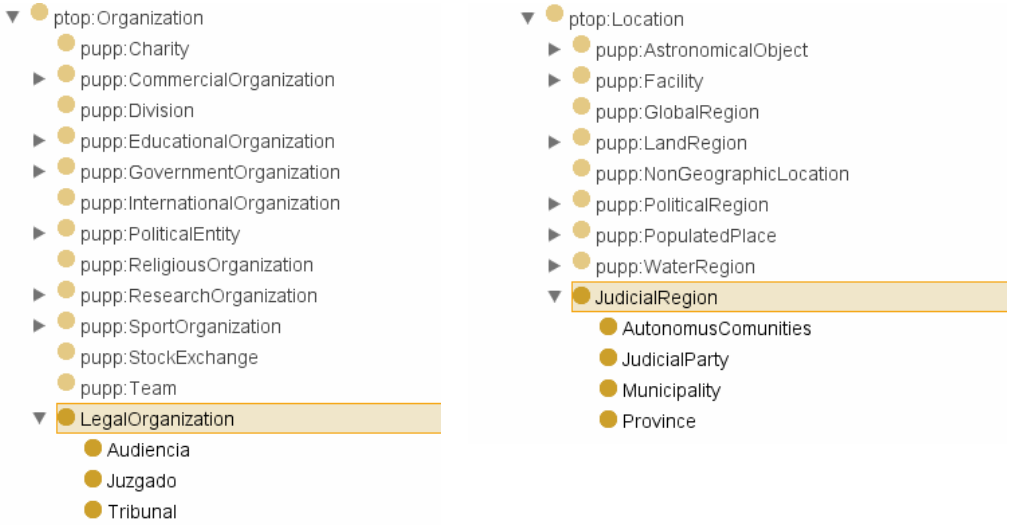


Figure 2.24: Spanish Court System and Geographic Scope of the Judicial Organizations.

Finally, judgment modeling requires specific relations between concepts. However, some of PROTON existing relations can be used for modeling dates, judgment title,

etc. Some of these specific relations contain information about the topic, subtopic and supertopic of a document, obtained with the clustering of the judgments with OntoGen. The result of this clustering is the ontology JTO (see section 2.3.3). These relations are: *hasTopic*, *broaderTerm* and *narrowTerm*. Also this ontology has other object properties such as: *hasAppealNumber*, *hasDeponent*, *hasGeneratedInCourt*, *hasLocation*, *hasJurisdiction*, etc.

3 Usability Tests

3.1 Introduction

Herein we describe methods, timing and results of the Legal Case Study usability inspection of the Iuriservice prototype. According to D8.1.2 from WP 8 (Bösser et al, 2005), "the scope of inspection is to identify severe defects in application design and usability problems, to detect the nature of these problems and to suggest recommendations for possible solutions".

Firstly we will describe the different methods used; secondly the results of different tests will be presented; finally, the functionalities extension and the interface adaptation and extension will be outlined.

3.2 Usability Tests: description

3.2.1 Heuristic Evaluation

According to what was agreed in the Barcelona meeting with all the case studies representatives (September 2005), the general process for the Heuristic Evaluation test was the following:

Recruitment of usability experts

As said above, the team of usability testers was not selected from the target final users of the software. The team of usability testers would be recruited from the group of experienced judges and lecturers from the Judicial School in Barcelona, which perfectly understood the needs of the final users as they teach them during 9 months before the judges are firstly appointed to a court. This team had already been formed, and its members were experienced judges from the Judicial School.

Pre-evaluation training to familiarize the experts with the objectives of the inspection

On the 19th of December 2005, the group of experts was trained and familiarized with the objectives of the inspection. Pompeu Casanovas, Núria Casellas and Joan-Josep Vallbé showed them the main characteristics of the SEKT project, its objectives, and the result as regards to them: Iuriservice (the prototype). They would also be introduced the methods and principles of the usability inspection: Heuristic Evaluation. (As long as the availability of these professionals was very limited, the same meeting was used to explain briefly the other usability method to apply: Cognitive Walkthrough. We also showed them the next steps to be performed until

the end of the project.) A day within the first fortnight of March 2006 was proposed to perform the Heuristic Evaluation.

Several experts inspect the mock-up or prototype, simulate the performance of tasks, and record defects and usability problems

On the 10th of March, every expert would inspect the prototype during 1-2 hours and would make the comments on every single question according to the principles of the heuristic evaluation and a checklist that had been given to them.[14] To do so, the evaluators would give all the results (comments, doubts, etc.) they have found to the UAB team in a debriefing session (the very same day).

After the inspection the collected data are elaborated and the severity of usability problems may be rated

The UAB team elaborated a report with all the rated usability problems and defects according to:

a) The severity of the usability problem
b) Frequency with which a defect or problem occurs
c) Impact of the defect or problem if it occurs

The template used was the one proposed in the Barcelona meeting, in Excel format.

Finally the results and recommendations for improvement are communicated to the development team.

The UAB team would finally give the results and recommendations to the iSOCO team for the improvement of the prototype. The period between the recommendations were presented in a report and the update of the prototype lasted 45 days, as planned.

Heuristic Evaluation principles

According to (Nielsen, 1994) and D8.1.2 (Bösser et al, 2005), heuristic evaluation is founded upon 10 usability heuristics. We had to present them to the usability experts translated in Spanish in order to make them useful and helpful (the prototype is in Spanish language as well):

1. *El sistema debería mantener siempre informados a los usuarios sobre lo que está ocurriendo en todo momento, a través de información apropiada en un tiempo razonable.* [The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.]
2. *El sistema debería hablar el idioma de los usuarios, con palabras, frases y conceptos conocidos por el usuario, más que términos propios del sistema. Hay que seguir convenciones del mundo real, haciendo que la información aparezca en orden natural y lógico.* [The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than

[14] See the original checklist from which the Spanish version was extracted in Appendix 1.

system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.]

3. *Los usuarios a menudo escogen funciones del sistema por error y van a necesitar una "salida de emergencia" claramente marcada para abandonar el estado no deseado sin tener que habérselas con un diálogo extenso. Hay que facilitar las funciones de deshacer y rehacer.* [Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.]
4. *Los usuarios no deberían tener que preguntarse si palabras, situaciones o acciones significan lo mismo. Hay que seguir las convenciones de las plataformas.* [Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.]
5. *Incluso mejor que buenos mensajes de error es un diseño cuidadoso que previene en primer lugar que un problema ocurra.* [Even better than good error messages is a careful design which prevents a problem from occurring in the first place.]
6. *Hay que hacer los objetos, las acciones y las opciones visibles. El usuario no debería tener que recordar información desde una parte del diálogo a otra. Las instrucciones para la utilización del sistema deberían estar visibles o fácilmente disponibles cuando sea necesario.* [Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.]
7. *Los aceleradores —invisibles para el usuario novato— a menudo pueden dar rapidez a la interacción para el usuario experto hasta el punto que el sistema puede abastecer tanto al usuario inexperimentado como al experimentado. Hay que permitir a los usuarios adaptar acciones frecuentes.* [Accelerators — unseen by the novice user— may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.]
8. *Los diálogos no deberían contener información que sea irrelevante o raramente necesitada. Cada unidad extra de información en un diálogo compite con las unidades relevantes de información y disminuye su visibilidad.* [Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.]
9. *Los mensajes de error deberían expresarse en lenguaje sencillo (sin códigos), indicar de forma precisa el problema y sugerir de forma constructiva una solución.* [Help users recognize, diagnose, & recover from errors. Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.]
10. *Aunque es mejor si el sistema puede ser usado sin documentación, puede ser necesario ofrecer ayuda y documentación. Cualquier información de este tipo debería ser fácil de buscar, focalizada a la tarea del usuario, enlistar los pasos concretos que hay que llevar a cabo y no ser demasiado larga.* [Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.]

Figure 3.1: SEKT Heuristic Evaluation Session. Joan-Josep Vallbé, Manuel Bellido, Francisco Segura, Pascual Ortuño, Gonzalo Ferrer, Marta Poblet.

Figure 3.2: SEKT Heuristic Evaluation Session. Escuela Judicial Española. Pompeu Casanovas, Gonzalo Ferrer, Raúl Peña, Pascual Ortuño, Jesús Contreras, Manuel Bellido.

3.2.2 Cognitive Walkthrough

In the second part of the Usability Test Phase for the prototype Iuriservice, a Cognitive Walkthrough test was planned and executed in the Spanish Judicial School. This test was performed in two different days, for the usability of two different parts of the application was tested.

Firstly, on October 18th 2006, the Cognitive Walkthrough test was performed for the main part of Iuriservice, the question/answer application. The second test, this time on the Search & Browse application of Iuriservice, was performed on November 7th. The same four expert judges from the Spanish Judicial School executed both tests.

The final users of the system, as it has been already stated, would be newly recruited Spanish judges. Judicial experts perform the test.

In both question/answer and Search&Browse applications, the tasks selected were fully representative of the tasks the system will be able to perform when it is completed. These tests are referred to a couple of sub-domains (Gender Violence and Minors).

A completely detailed description of each task and of the sequence of actions executed had been elaborated before the test.[15] We attach them to this report in Spanish, which is the language in which the test was done.

3.3 Usability Tests: results (cover sheets)

3.3.1 Cognitive Walkthrough for Iuriservice Cover Sheet: Question Answer application

Date: October 18th
Analysts: Mercedes Blázquez & Joan-Josep Vallbé
Users: Expert judges from the Spanish Judicial School
Interface: Question/Answer interface from Iuriservice
Tasks:

(1) Pose a question to the system and see the answers
(2) Pose a question to the system, see the answers and express your level of satisfaction
(3) Pose a question to the system and see other related questions
(4) Pose a question to the system and see the related Case law
(5) Execute a direct search in the system's question-answer database (FAQ base)

[15] See the complete description of different scenarios/tasks (in Spanish language) in Appendix 2: Task description for Cognitive Walkthrough test..

Action sequence: As specified in the documentation, plus our explanations before the test. The usability experts are rather familiar with the system as they have been following and being informed all along the process.

Cognitive Walkthrough for Iuriservice. Task 1

Story (X) Success ( ) Failure
Date: October 18th
Analyst: Mercedes Blázquez & Joan-Josep Vallbé
Task: 1
Step: Pose a question and ask for an answer

Walkthrough

1. **Will the users try to achieve the intended effect?** Yes, explicit instruction.

2. **Will the users notice that the correct action is available?** Yes, this is the main task the system will require to the final user and why it is made for.

    a. **Documentation:** It plainly explains the procedure.

    b. **Interface:** It is clear enough.

3. **Will the users associate the correct action with the effect trying to be achieved?** Yes.

4. **If the correct action is performed, will the users see that progress is being made toward solution of the task?** Yes.

Observations

1. **Are experience or training needed?**

    If so,

    a. **Is this kind of step common or rare?** Common
    b. **Will training be easy or difficult?** Easy

2. **Are particular errors likely?** No.
3. **Design suggestions.** (1) One of the users suggests that the fact that some words in the answers are presented in bold format may cause confusion to the user.
4. **Other comments** (1) The users do not use the "Back" button of the application; they directly use the "Back" button of the browser. (2) The "Back" button of the application should be more visible. (3) The kind of search the system is performing (semantic distanced, word-matching, etc.) appears in the interface but it causes general confusion to the users.

Cognitive Walkthrough for Iuriservice. Task 2

Story (X) Success ( ) Failure
Date: October 18th
Analyst: Mercedes Blázquez & Joan-Josep Vallbé
Task: 2
Step: Pose a question to the system, see the answers and express your level of satisfaction

Walkthrough

1. **Will the users try to achieve the intended effect?** Yes, explicit instruction.

2. **Will the users notice that the correct action is available?** Yes.

    a. **Documentation:** It plainly explains the procedure.

    b. **Interface:** It is clear enough.

3. **Will the users associate the correct action with the effect trying to be achieved?** Yes.

4. **If the correct action is performed, will the users see that progress is being made toward solution of the task?** Yes, and in the end the system will thank them for having expressed their satisfaction level.

Observations

1. **Are experience or training needed?**

    If so,

    a. **Is this kind of step common or rare?** Common
    b. **Will training be easy or difficult?** Easy

2. **Are particular errors likely?** No
3. **Design suggestions.** 3 of the 4 experts say they don't agree with the design of the satisfaction level application because it hasn't enough levels. One of them says a numeric form would be better.
4. **Other comments** The main problem all the users have experienced is to know to what should they express satisfaction, to the similarity of the question the system offers, or to the correctness of the answer associated with that question? This may be an important issue.

Cognitive Walkthrough for Iuriservice. Task 3

Story (X) Success ( ) Failure
Date: October 18th
Analyst: Mercedes Blázquez & Joan-Josep Vallbé

Task: 3
Step: Pose a question to the system and see other related questions

Walkthrough

1. **Will the users try to achieve the intended effect?** Yes, explicit instruction.

2. **Will the users notice that the correct action is available?** Yes.

    a. **Documentation:** It plainly explains the procedure.

    b. **Interface:** It is clear enough: the button "See related question" is visible in the interface.

3. **Will the users associate the correct action with the effect trying to be achieved?** Yes.

4. **If the correct action is performed, will the users see that progress is being made toward solution of the task?** Yes.

Observations

1. **Are experience or training needed?**

    If so,

    a. **Is this kind of step common or rare?** Common
    b. **Will training be easy or difficult?** Easy

2. **Are particular errors likely?** No.
3. **Design suggestions.**
4. **Other comments.** Some explanations have to be made what does the order of the questions mean in the interface. They do not understand at the first glance that the group of 5 yellow stars express the "similarity level" of that related question with the one they posed to the system.

Cognitive Walkthrough for Iuriservice. Task 4

Story (X) Success ( ) Failure
Date: October 18th
Analyst: Mercedes Blázquez & Joan-Josep Vallbé
Task: 4
Step: Pose a question to the system and see the related Case law.

Walkthrough

1. **Will the users try to achieve the intended effect?** Yes, explicit instruction.

2. **Will the users notice that the correct action is available?** Yes.

a. **Documentation:** It plainly explains the procedure.

b. **Interface:** It is clear enough.

3. **Will the users associate the correct action with the effect trying to be achieved?** Yes.

4. **If the correct action is performed, will the users see that progress is being made toward solution of the task?** Yes.

Observations

1. **Are experience or training needed?**

   If so,

   a. **Is this kind of step common or rare?** Common
   b. **Will training be easy or difficult?** Easy

2. **Are particular errors likely?** No.
3. **Design suggestions.** Generally no.
4. **Other comments** Very important: for the system to be useful and really helpful —which in this case means to be really used by the users—, an abstract of each judgment should appear below its title. They say that if not they have to waste too much time searching, and they don't have this amount of free time. That's been a general observation among the experts.

Cognitive Walkthrough for Iuriservice. Task 5

Story ( ) Success (X) Failure
Date: October 18th
Analyst: Mercedes Blázquez & Joan-Josep Vallbé
Task: 5
Step: Execute a direct search in the system's question-answer database

Walkthrough

1. **Will the users try to achieve the intended effect?** No.

2. **Will the users notice that the correct action is available?** No.

   a. **Documentation:** It could be found but they may have problems.

   b. **Interface:** It is not clear enough.

3. **Will the users associate the correct action with the effect trying to be achieved?** No.

4. **If the correct action is performed, will the users see that progress is being made toward solution of the task?** Yes, if they had found the right path.

Observations

1. **Are experience or training needed?**

   If so,

   a. **Is this kind of step common or rare?** Common
   b. **Will training be easy or difficult?** Easy

2. **Are particular errors likely?** Yes. The interface contains a button called "See FAQ's", but neither the experts nor the users may know what FAQ stands for.
3. **Design suggestions.** Linguistic clearance.
4. **Other comments**. All the experts have had problems with this. Make the FAQ expression disappear. They don't know what it stands for, as it does not stand for any Spanish idiom. It should be substituted for a normal expression like "See the Frequent Questions Base".

3.3.2 Cognitive Walkthrough for Iuriservice Cover Sheet: Search & Browse application

Date: November 7th
Analysts: Joan-Josep Vallbé & Mercedes Blázquez
Users: Expert judges from the Spanish Judicial School
Interface: Search & Browse interface of Iuriservice
Tasks:

(1) Find all the judgments related to nullity of adoption.
(2) Find documents related to "parental visiting regulation" within the "Minors" topic
(3) Find judgments related to fatherhood investigation
(4) Browse the different documents obtained when the user has searched documents related to "Adoption"

Action sequence: As specified in the documentation, plus our explanations before the test. The usability experts are less familiar with this application than with the Question/Answer application, as it is newer and less developed.

Cognitive Walkthrough for Iuriservice. Task 1

Story (X) Success ( ) Failure
Date: November 7th
Analyst: Mercedes Blázquez & Joan-Josep Vallbé
Task: 1
Step: Find all the judgments related to 'nullity of adoption'

Walkthrough

1. **Will the users try to achieve the intended effect?** Yes, explicit instruction.

2. **Will the users notice that the correct action is available?** Yes.

    a. **Documentation:** It plainly explains the procedure.

    b. **Interface:** It seems clear.

3. **Will the users associate the correct action with the effect trying to be achieved?** Yes.

4. **If the correct action is performed, will the users see that progress is being made toward solution of the task?** Yes.

Observations

1. **Are experience or training needed?**

    If so,

    a. **Is this kind of step common or rare?** Common
    b. **Will training be easy or difficult?** Easy

2. **Are particular errors likely?** No.
3. **Design suggestions.**
4. **Other comments and conclusions:** (1) They don't have a clear idea whether they have to use Boolean marks (as & or other) in order to perform their searches; (2) The topics hierarchy causes some confusion; (3) The option "search refine" does not seem to be very visible as none of the experts have used it; (4) The classification of the types of documents that appears in the interface is not familiar to the users; it has to be changed: *Jurisprudencia del Tribunal Supremo o Resolución judicial del Tribunal Supremo, Resolución de Audiencias Provinciales, Otros organismos judiciales*; (5) The words in bold within the judgment may cause confusion; (6) Most of the hyperlinks within the judgment are useless for the judicial expert; (7) The possibility to make a search using numbers instead of words (this is because it may be useful to search judgments that contain interpretation of certain articles of a particular law); (8) The abstracts of the judgments are really needed before the user opens the whole judgment.

Cognitive Walkthrough for Iuriservice. Task 2

Story (X) Success ( ) Failure
Date: November 7th
Analyst: Mercedes Blázquez & Joan-Josep Vallbé
Task: 2
Step: Find documents related to "parental visiting regulation" within the "Minors" topic

Walkthrough

1. **Will the users try to achieve the intended effect?** Yes, explicit instruction.

2. **Will the users notice that the correct action is available?** Yes, although the topic tree does not seem very familiar to them.

    a. **Documentation:** It plainly explains the procedure.

    b. **Interface:** It may be not clear enough.

3. **Will the users associate the correct action with the effect trying to be achieved?** Yes.

4. **If the correct action is performed, will the users see that progress is being made toward solution of the task?** Yes.

Observations

1. **Are experience or training needed?**

    If so,

    a. **Is this kind of step common or rare?** Common
    b. **Will training be easy or difficult?** Easy

2. **Are particular errors likely?** Yes. They may search wrongly in the topic tree, although they may find the right path in a essay/error sequence.
3. **Design suggestions.** (1) The interface is too schematic; it's not informative enough in itself; (2) The text box in which the concepts or words have to be put in should be wider.
4. **Other comments and conclusions** (1) None of the experts have had problems to find the right path; (2) We should put links (annotated words) to particular laws that appear in the judgments; (3) Put links to other judgments cited in the judgment; (4) Put references to the *Pleno Jurisdiccional* [no translation available], which is important; (5) It is important to clearly separate criminal law to civil law in the topic tree; (6) Erase the "Knowledge base" option from the search field: it does not add any information and may cause confusion; (7) Some tool to "refine the search" should be introduced.

Cognitive Walkthrough for Iuriservice. Task 3

Story (X) Success ( ) Failure
Date: November 7th
Analyst: Mercedes Blázquez & Joan-Josep Vallbé
Task: 3
Step: Find judgments related to fatherhood investigation

Walkthrough

1. **Will the users try to achieve the intended effect?** Yes, explicit instruction.

2. **Will the users notice that the correct action is available?** Yes.

    a. **Documentation:** It plainly explains the procedure.

    b. **Interface:** It is clear enough.

3. **Will the users associate the correct action with the effect trying to be achieved?** Yes.

4. **If the correct action is performed, will the users see that progress is being made toward solution of the task?** Yes.

Observations

1. **Are experience or training needed?**

    If so,

    a. **Is this kind of step common or rare?** Common
    b. **Will training be easy or difficult?** Easy

2. **Are particular errors likely?** No.
3. **Design suggestions.**
4. **Other comments and conclusions** (1) The documents may appear in order of jurisdiction: 1st Constitutional Court/International Courts. 2nd Supreme Court. 3rd Provincial Courts and others; (2) The date of the judgments may be critical information; (3) Annotated words are useless and may cause confusion, although not all of them.

Cognitive Walkthrough for Iuriservice. Task 4

Story (X) Success ( ) Failure
Date: November 7th
Analyst: Mercedes Blázquez & Joan-Josep Vallbé
Task: 4
Step: Browse the different documents obtained when the user has searched documents related to "Adoption"

Walkthrough

1. **Will the users try to achieve the intended effect?** Yes, explicit instruction.

2. **Will the users notice that the correct action is available?** Yes.

    a. **Documentation:** It plainly explains the procedure.

    b. **Interface:** It is clear enough.

3. **Will the users associate the correct action with the effect trying to be achieved?** Yes.

4. **If the correct action is performed, will the users see that progress is being made toward solution of the task?** Yes.

Observations

1. **Are experience or training needed?**

   If so,

   a. **Is this kind of step common or rare?** Common
   b. **Will training be easy or difficult?** Easy

2. **Are particular errors likely?** No.
3. **Design suggestions.** (1) In order to give a better impression, the system may be more aesthetically similar to the databases judges usually use during their work. Perhaps it should seem more traditional.
4. **Other comments and conclusions:** No problems encountered.

3.4 Phase 3: Field Tests

3.4.1 Introduction

Several tests have been carried out so far. As we will explain later on, both the SEKT judicial team and the governing board of the School proved to be very helpful at this aim.

The Legal Case Study team considered that (i) the expert judges who were then testing both the Question/Answer and the Search & Browse applications were able to provide very valuable information and feedback (ii) further field tests could be carried out with some judges and legal experts during the last week of January with the help of the Judicial School.

Providers of answers for the FAQ system (magistrates) and final users (judges at their first appointment) were considered to be representative enough. The subjects of the first planned "field test" are therefore not real users but expert magistrates from the Spanish Judicial School, the basis for the test being a stable ontological subdomain (minors) of the Search & Browse application of the prototype. These tests are ready, but they must still be carried out. In contrast, field tests with finals users have already taken place. In addition, these field tests have been given to another group of possible users too. Young associate professors at the UAB Law School are answering them and testing the system as well. We will describe first the planned Search & Browse tasks. And we will offer afterwords some preliminary obtained results.

3.4.2 Method

Once the session of Cognitive Walkthrough tests finished in November, our team informed the experts (from the Spanish Judicial School) that some further feedback was required regarding the assembled application.

To fulfill this requirement, the expert judges were given a complete explanation of the functionalities of the Question/Answer application and the Search & Browse application of the prototype *Iuriservice*, and were also shown the actions to be taken to perform the different functionalities.

Once the directions and explanations had been given, we asked the users to perform several tasks (user scenarios) and give feedback regarding that performance using a questionnaire designed by the Legal Case Study team.

We can show here one of the main difficulties of the field work. At this time, we understood that it would be easier to carry out the field tests with final users than with the regular team of magistrates in the School because Francisco Segura was appointed as President of the Lleida Superior Court (150 km away from Barcelona), and Gonzalo Ferrer was very busy travelling all over Spain to visit the trainee judges on place during January. This happens all the time in the workplace dynamics (e.g. Pascual Ortuño has been just appointed as General Director at the Justice Department of the new Catalan Government). Therefore, we are keeping a virtual communication, but to perform the tests we thought it was better to gather people on a face-to-face basis. We decided to carry out the tests in the reverse order: first the answer/question tests (user satisfaction) and second (later on in March) the Search & Browse application.

3.4.3 Tasks

To perform the test of the Search & Browse application, SEKT researchers have prepared a brief presentation of the functionalities of the application. To gain more valuable information, tasks has been established so that the user may experience what added value the SEKT technology can offer. SEKT researchers will explain one of the tasks as follows (in Spanish):

> La base de datos contiene un número de sentencias judiciales relacionadas con el tópico "familia", en concreto con el tópico "menores". Tómate el tiempo que necesites (no hay un límite) para encontrar el conjunto de documentos que son relevantes para este tópico. El conjunto de documentos debería proporcionar una visión razonable del estado del desarrollo tecnológico en este dominio. La lista debería ser lo más concisa posible, cubriendo de manera razonable el área de búsqueda (por ejemplo encontrar una lista de aproximadamente unos 10 documentos que consideras como los más relevantes).
>
> [*The database contains a number of judgments related to the 'family' topic, specifically to the topic of 'minors'. You may take all the time you need (there is no limited time) to find the set of judgments that are most relevant to this topic. The set of documents retrieved should give a reasonable insight of the technological state of the art regarding searches within this domain. You should provide a list as precise as possible, covering in a reasonable way the whole searching area (for instance, to find a list of more or less 10 documents which you may consider the most relevant).*]

The expert judges will be then asked to fill in the questionnaire with key information regarding their search performance. The questionnaire is intended to capture two different types of metrics:

- *Information quality*: the perception of the quality of the results in the point of the search.
- *Progress of the search*: what does the user think about how far they have progressed with their search.

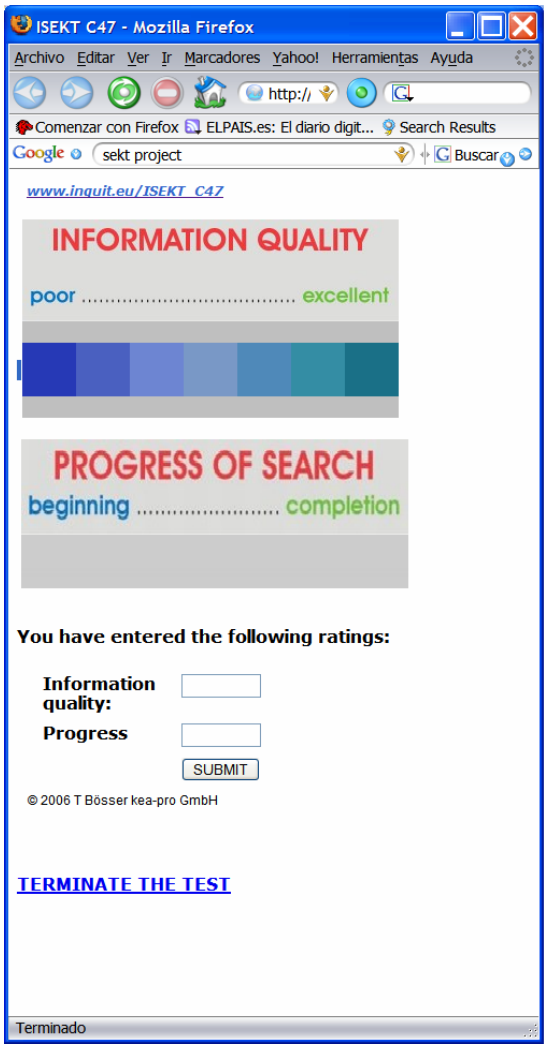


Figure 3.3: Feedback form.

The different tasks (scenarios) the users shall carry out during the test are described below.

Search & Browse application functionalities

Task 1: The database contains a number of judgments related to the topic 'Minors', which are documents from 2004 and 2005. We are particularly interested in judgments related to "fatherhood investigation". Please, take all the time you need to find the subset of documents that are relevant in this context. The set of documents

should offer a reasonable insight of the existing judgments about this particular field. The list should be as precise as possible, and be representative (in a reasonable way) of the searching scope.

Task 2: There are judicial decisions in the database from 2004 and 2005 that are related to the topic 'Minors'. We are especially interested in those documents that specifically talk about 'custody issues'.

Task 3: We are interested in those judgments and other judicial documents from 2004 and 2005 that are related to the nullity of adoption procedures (Minors). Take all the time you need to find them.

Specific functionality: topic hierarchy

Once the searching tasks is finished, the Legal Case Study team will present an additional task to test a critical functionality of the search and browse application: the topic hierarchy. The developers will give a brief explanation of the topic hierarchy and then will expose a particular task to be performed by the users.

Task 4: Make a general search about 'Adoption' and browse all thedocuments you find:

a) Using the topic hierarchy on the left part of the screen
b) Using the links at the end of the results page that brings you to other topics

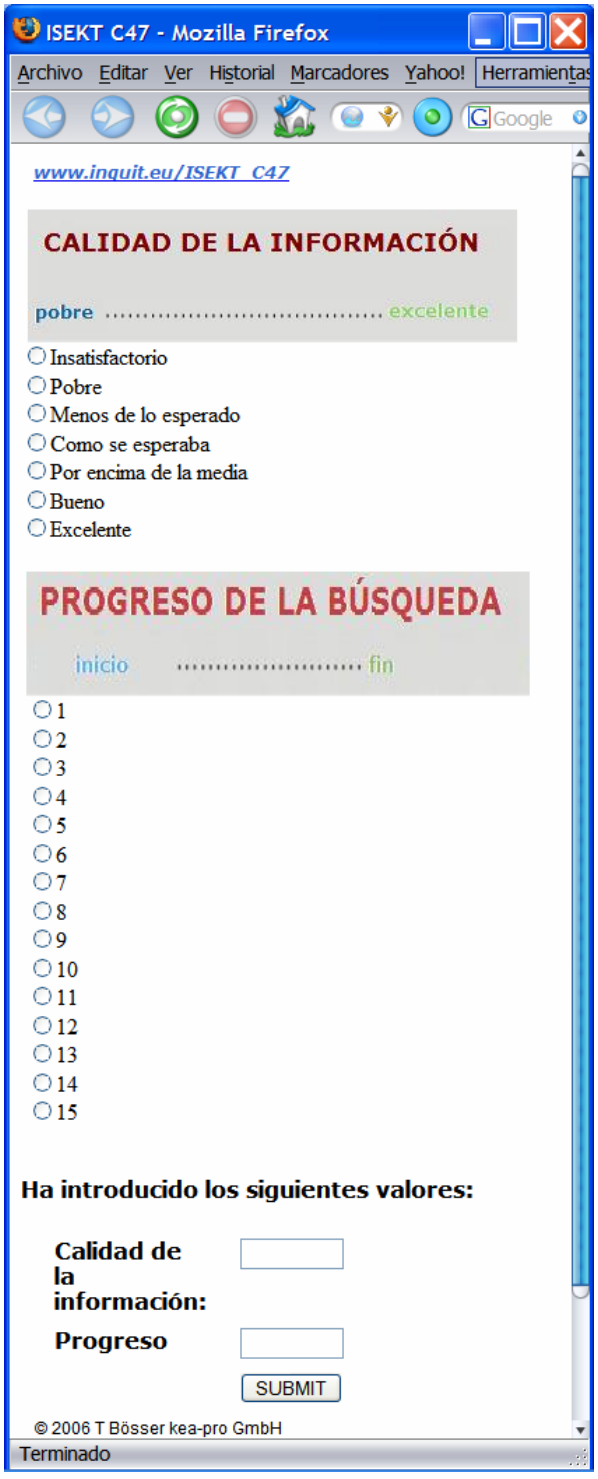


Figure 3.4: Feedback form for the legal case study

Question/Answer application functionalities

Task 1: Ask the system a question about domestic violence where the issue is that the applicant wants the judge to withdraw one injunction of protection after its notification.

Task 2: Search for a question inside the whole question-answer pairs similar to the question: *"I have given an injunction of protection and the woman is asking me to take back the measure. What can I do?"*

Task 3: Ask the system, in your own words, a question about the topics of "Minors" where the police arrest a boy and the prosecutor does not want to see him because he does not consider that the boy has made an offence.

Task 4: We are now interested in finding all the judgments related to a question about domestic violence.

Task 5: Supply the system with the satisfaction degree about the result obtained with the previous question.

3.4.4 User validation of the Iuriservice application

Tests with final users were made possible by the helpful intervention of the Magistrates from the School. The Director of Studies Jordi Obach, sent an internal letter to all the members of the 58th class, and the Tutor of Trainee Judges (*Jueces en práticas*) Gonzalo Ferrer asked for test completion to the 20 judges actually at their first appointment in Catalonian Trial Courts (2 were out of service for different reasons). Javier Marca and Andreu Estela supervised the process and provided all the necessary means to carry out the tests at the Judicial School (computer room, students' accessibility etc). In this way, 10 trainee judges —9 the first day— (plus 1 School student) went to the School from the Courts of Rubí, Santa Coloma, Terrassa, Arenys de Mar, Tarragona and Barcelona to test the system. It is worthwhile to note that all of them made a real effort to come after their work journey.

The objective of the SEKT case studies is to demonstrate that semantic technology provides benefits for users and organisations which operate information services for knowledge workers. As stated, users were involved in the entire development cycle of the Iuriservice application. In the early phases the needs of users were investigated, and the results were fed into the development process. During the actual development different approaches were used during the development phases, including the inspection of the prototypes by experts with standardised methods, and cognitive walkthroughs with early prototypes. In this way it was assured that the prototypes delivered to users are free of defects and correspond to the needs and requirements of users.

The completed prototype of the Iuriservice application was used to develop a knowledge base with information covering several legal domains. These systems were then used to carry out tests with a sample of end users.

A full analysis of the data is presented in D8.3.1, where the results of all user validation procedures carried out in the final phase of the SEKT project are reported. We give here a brief summary of the main results obtained in the evaluation of Iuriservice.

The field tests of the Iuriservice application was designed to provide a test as realistic as possible of the application by judges and legal experts. The user group of main interest for the study is young judges in their first position. These judges have a high workload, and they often require urgent support outside normal hours of work. They have access to legal information services (such as La Ley, Aranzadi and El Derecho), but would benefit greatly from more efficient support.

Tests were prepared for a group of judges, who participated in a test lasting for two days, and a group of legal experts. On the first day a number of typical cases were presented to the judges, and they were asked to solve the cases in a randomized order, using their usual tools, and their normal working procedures. These data served as a baseline for the tests on the second day: Firstly an introduction to Iuriservice was given, and then some exercises were carried out by all participants to familiarize them with Iuriservice. The subjects had all tools which they use in their work, and in addition Iuriservice available on their PC. After that the participants solved a number of cases from the same sample as those used on the first day, in randomized order again (such that each person solved all cases, half with and half without the use of Iuriservice).

The cases the users were asked to solve are listed below:

Caso 1: ¿Cómo debe actuar el juez cuando es requerido en una guardia y no tiene forense para practicar el levantamiento de cadáver? [Case 1: How to proceed when the judge is called on-duty and there is no coroner to perform the removal of the corpse?]

Caso 2: Ante la conducta violenta de una persona con trastorno mental grave, ¿puede el juez acordar el internamiento en un centro psiquiátrico sin la asistencia del médico forense ni del fiscal? [Case 2: When a person with a serious mental disorder becomes violent, ¿may the judge decide the confinement in a mental health centre without the prosecutor's or the coroner's attendance?]

Caso 3: He dictado una medida de alejamiento a favor de una señora y al cabo de unos días vienen a pedirme que la revoque o la retire. ¿Qué hago? ¿Tengo que revocarla siempre? ¿Qué consejos puedo darle a esta señora? [Case 3: I have given a restraining order to a woman and a few days after she wants me to withdraw the order. What should I do? Should I always withdraw it? What advice may I give to this woman?]

Caso 4: La policía me pide una orden de entrada y registro para entrar en un piso y desatascar el desagüe de un inmueble porque el propietario del piso se niega a dejarlos entrar. ¿Tengo que otorgar esa orden de entrada y registro? [Case 4: Police is asking for an entry and search order in order to be able to unblock the drainpipes of a flat because the owner does not let them in. ¿Do I have to issue that order?]

Caso 5: Es un viernes por la tarde y la policía me dice que me trae un detenido. He hablado con el fiscal y me pide que lo pasemos mañana sábado por la mañana. ¿Tengo que acceder? [Case 5: It's Friday evening and the Police wants to bring in a detainee. The prosecutor wants to see him on Saturday morning. ¿Should I accede?]

Caso 6: En un caso de separación tengo que fijar una pensión de alimentos, el señor vive con una pensión muy pequeña, la madre no trabaja y vive con los hijos de la

ayuda familiar. ¿Qué puedo hacer? [Case 6: In a separation of marriage, there is the need to fix alimony and child support. However, the man lives with a small allowance and the woman does not work and receives family help. ¿What should I decide?]

The following data were recorded: The time taken to solve the task and the number of queries executed were recorded by the subjects. The decisions made were noted (and will be assessed by independent experts). After the completion of all test cases, the subjects were asked to rate Iuriservice, and to complete the SUMI questionnaire.

The same procedure was carried out with legal experts, but with a smaller number of cases.

The results are reported in full detail in D8.3.1, only some main results and conclusions are given here.

Time taken to solve cases by judges: The comparison of the time taken for the same tasks either with or without the use of Iuriservice shows a significant difference. All tasks are solved in a much shorter time with the use of Iuriservice. This result may not be fully generalizable in quantitative terms because the limited number of judges available for the test did not allow the introduction of a further control group. However, as we discuss elsewhere, the results indicate strongly that Iuriservice provides an extra information service, complementing the existing databases, which allows the users to find the required information quickly and easily in many situations.

All subjects rate the Iuriservice application as positive and helpful, and see it as a desirable system. A more detailed analysis is available elsewhere, together with further analysis.

The summary of results of the SUMI questionnaire (Software Usability Measurement Inventory) shows that subjects assess the Iuriservice application as highly positive.

The measures are scaled to a mean of 50, and a standard deviation of 10. The five measures are defined as follows:

- Efficiency refers to the user's feeling that the software enables them to perform the task(s) in a quick, effective and economical manner.
- Affect is a psychological term for emotions. It refers to the positive user feeling of the user being mentally stimulated and pleased as a result of interacting with the software.
- Helpfulness refers to the user's perceptions that the software communicates in a helpful way and assists in the resolution of operational problems.
- Control refers to the feeling that the software is responding in an expected and consistent way to input and commands.
- Learnability refers to the feeling that the user has that it is relatively straightforward to become familiar with the software.

In summary the results demonstrate that the subjects were able to use Iuriservice without any apparent problems. It was easy to learn, and the application was rated as

highly positive. The users expect considerable gains in the efficiency of their work, and reduction of their workload from an introduction of Iuriservice into their working environment.

Time to perform tasks with the IURISERVICE Application
N=10 persons (judges)

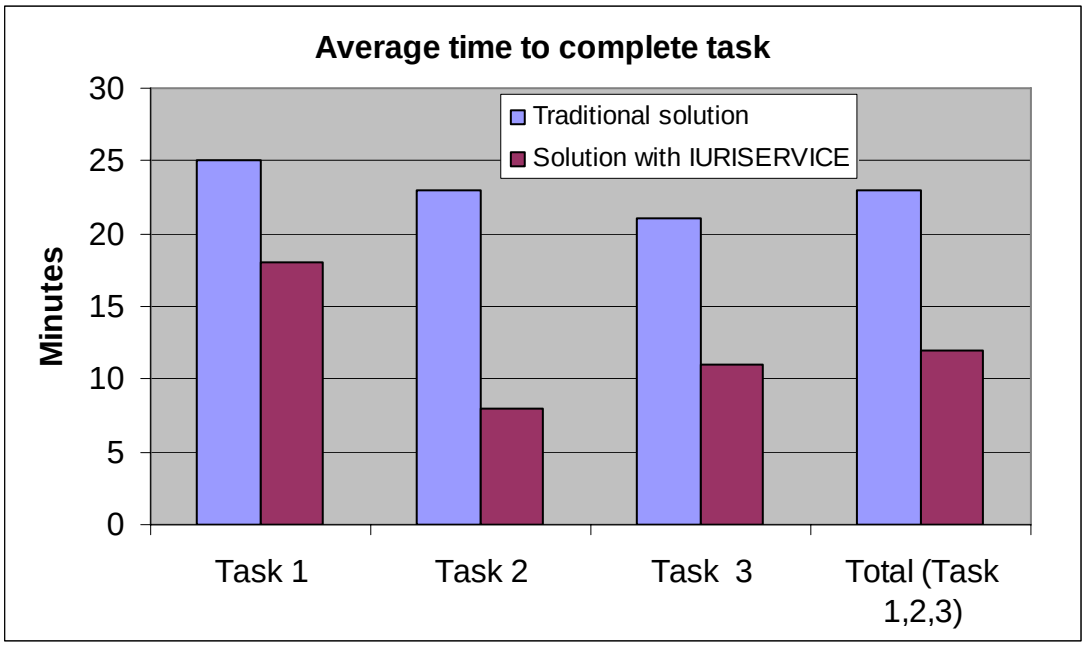


Table 3.1.: Field tests preliminary results (time).

Average time to complete task (each task was solved by each subject either with their traditional tools, or with their traditional tools plus IURISERVICE)

Task	Traditional tools only	Solution with IURISERVICE
Task 1	25	18
Task 2	23	8
Task 3	21	11
Total (Task 1, 2, 3)	**23**	**12**

Table 3.2.: Field tests preliminary results (time).

SUMI: **Analysis of data from 9 judges**

The results for the group of judges are summarized in the following graph. The data presented in the graph are shown in the table below the graph.

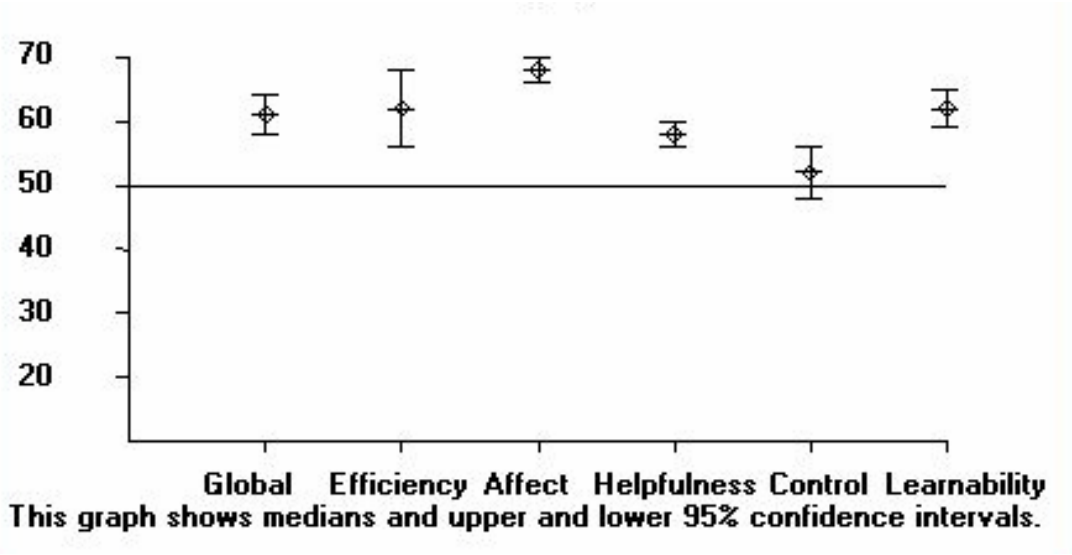


Figure 3.5: Iuriservice-SUMI Profile Analysis (9 judges)

SUMI: **Analysis of data from 6 law experts**

Six law experts completed the SUMI questionnaire and the SUMI analysis was carried out on the basis of these questionnaires.

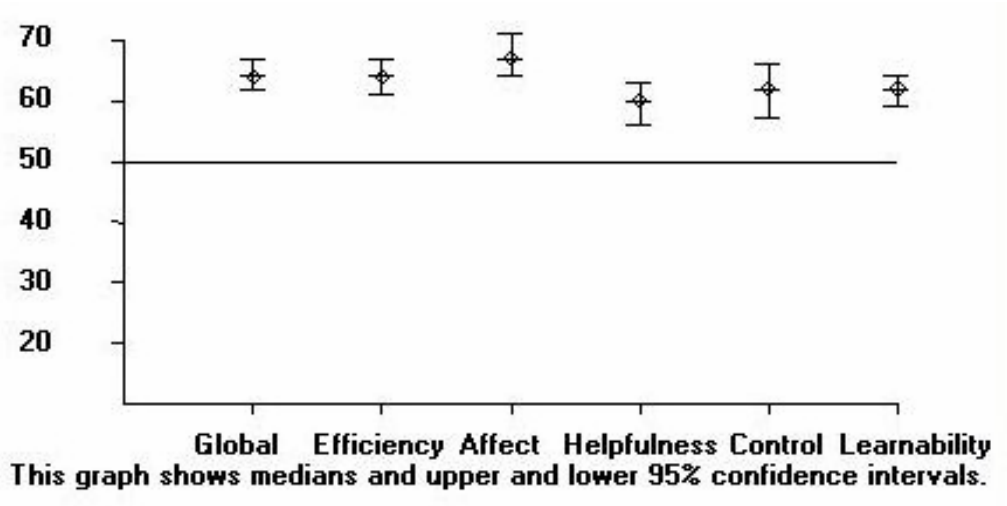


Figure 3.6: Iuriservice-SUMI Profile Analysis (6 law experts)

3.4.5 Conclusions

These preliminary results are promising and give us additional reasons to be positive about the system performance. Both young judges and young lawyers liked the system. Judges were interviewed twice after they carried out the tests, and they

confirmed separately that this way of sharing professional judicial knowledge is going to be very useful at their daily workplace. Actually, some of them stated that they had already faced in court one or two (out of three) of the practical cases they were asked to solve. More tests will be performed during 2007.

Figure 3.7: Iuriservice field tests at the Judicial School with trainee judges from the province of Barcelona (January 29th 2007).

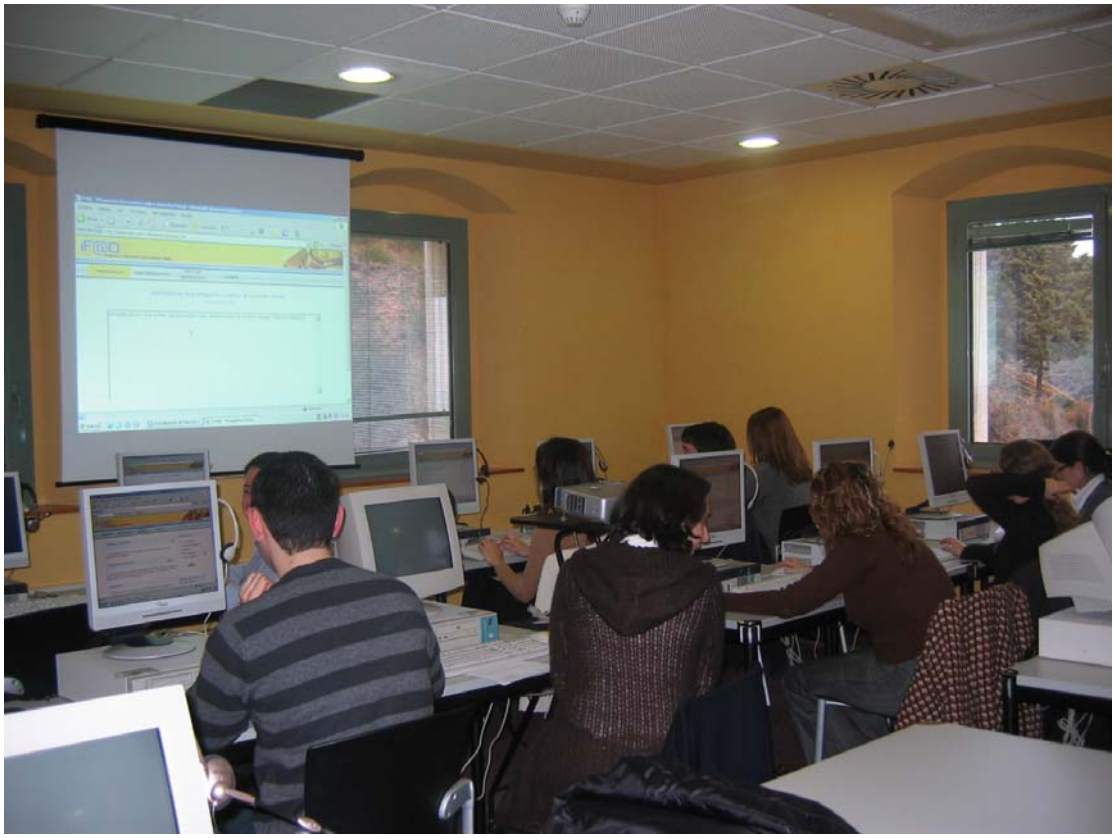


Figure 3.8: Iuriservice field tests at the Judicial School with trainee judges from the province of Barcelona (January 30th 2007).

4 Evaluation and Application Refinement

4.1 Introduction

The aim of SEKT is to develop and exploit semantically-based knowledge technologies in order to support document management, content management, and knowledge management in knowledge intensive workplaces. Specifically, SEKT aims at designing appropriate utilities for users in three main areas—digital libraries, the engineering industry, and the legal domain—providing them with quick access to the right pieces of information at the right time.

As regards the legal case study, the tasks accomplished so far provide both the quantitative and qualitative data necessary to assess both the context of users—newly recruited Spanish judges—and their specific needs with regard to the technology under development. In particular, the data gives an insight on institutional, organizational, and individual constraints that could either facilitate or block the introduction of SEKT technologies in judicial units.

In particular, in the legal case study application we can distinguish two main applications with different purposes. One of these applications is the Expert System or FAQ search system, qhere the main purpose is to provide to the final user, a young judge, expertise from a senior judge in daily tasks and, in particular, in a special one-week period called "*Guardia"* (on-duty) when the judge has to make quick decisions. On the other side, the legal case study provides an application to search in the large

databases of case law. This application is twofold, even though the main purpose of the case law extension is to provide answer explanation and to complete the result of Expert Knowledge System with related judgments; we foresaw that the current usage of case law databases would continue been used in the system. Judges would also have the opportunity to search for case law without the need to formulate an explicit question in a FAQ form. For this reason, we have integrated the BT search and browse component (Duke et al, 05) into the case law system.

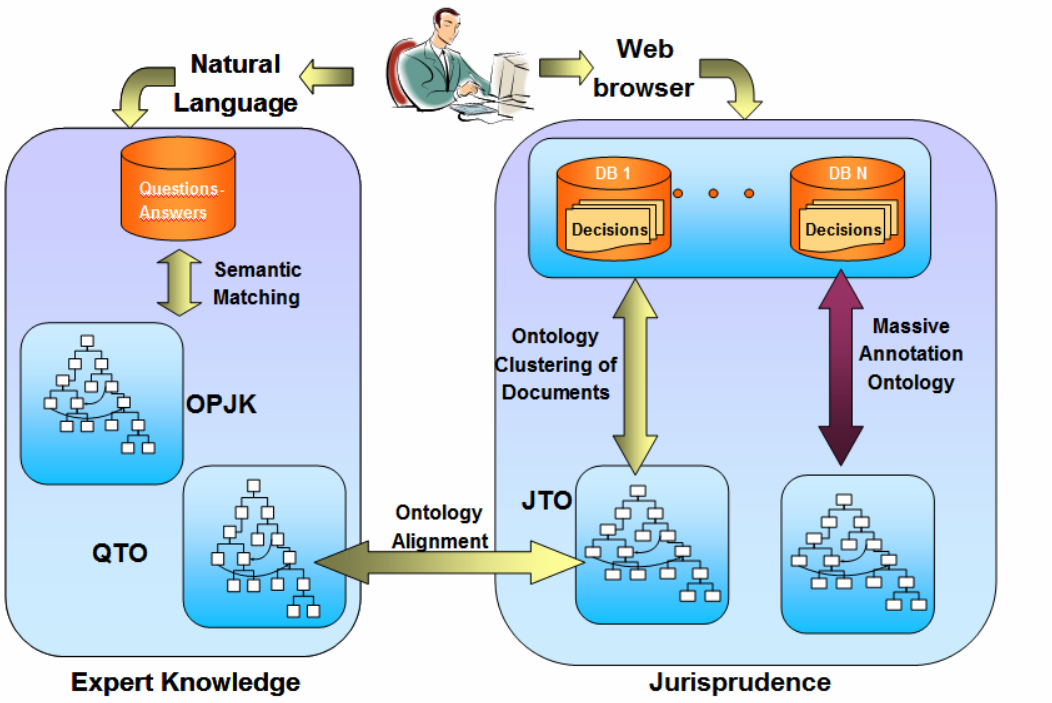


Figure 4.1: Legal Case Study subsystems.

4.2 Expert System Improvements

4.2.1 Introduction

We can distinguish two main improvements in the Expert System, improvements related with the results obtained from the Usability Tests and other improvements related to the efficiency. In this section first, we will describe the improvements carried out as a result of the application of the Usability tests in the Expert System, then we will describe some issues related with the measurements described in deliverable D15.1.1 (Warren, 2004).

4.2.2 Usability Test Improvements.

As described in section 3 we have applied different usability tests over the legal case study. Some of these improvements are related with the Expert System or iFAQ system and others are related to the Search & Browse facility. In this section we will describe the improvements identified in iFAQ system as a result of the application of the two firsts phases of the Usability Plan, heuristic evaluation and cognitive walkthrough.

Heuristic Evaluation

The main issues related with the iFAQ system are concerned with:

1. Visibility and System Status

   The improvements regarding the visibility and system status are directed to inform the users about the status of by the system, through appropriate feedback within reasonable time. To avoid this lack of visibility the Expert System application underwent several changes in its user interface, introducing new screens in order to inform the user that for example a question is being processed. An example of bug identified as a result of the Heuristic Evaluation tests is: "*The user is not informed of the system's progress when the system performs the task of finding the question that best matches with the question posed by the user. This process is sometimes over 1sec.*"

2. Error prevention

   A carefully designed system should prevent the user from experiencing system error messages, which would be preferred to a system that just provides good error messages. The main problem or bug identified as a result of the heuristic evaluation is related to the position of the options that are used less frequently. To this regard, the menu options have been shortened, for example the menu option *"Buscar Sentencias" (Search Judgments)* is now visible in all screens of the application. Before this change was made, this option was only available when the system provided a question-answer pair related to the user's input question.

3. Help and Documentation

   Although the system provides some help and documentation, it is not sufficient. The only documentation that the system provides is a menu option named "Ayuda" or "Help" that explains only the main target of the system, but not the functionalities that the system provides (the system help was improved, enabling the user to find the list of steps to be carried out).

Cognitive Walkthrough

In section 3.3.1 there is a complete description of each task and the sequence of observations and comments performed by the users. As a result of this test the main improvements made in the iFAQ system were related to the user interface:

- Sometimes, the user does not use the specified button back on the application, but uses the "Back" button of the browser (due to the poor visibility of this button at the bottom of the web page). In order to facilitate the use of this function, the visibility of the button was changed (another button on the top of the web page was introduced).
- On the home interface of the Expert System, the final user can select different types of search (ontology domain detection, semantic distance, word-matching, etc.) but these options can confuse the final user. So, in order to avoid this confusion, these options have been deleted.

- One of the problems detected with most of the users is related with the label of a menu option, "See FAQ's". The users don't know what it stands for, as it does not stand for any Spanish idiom. It has been substituted for a normal expression like *"Ver Todas las Preguntas Respuestas"* (See All the Question-Answers).

4.2.3 Improvements related with the scalability and effectiveness of search..

In D15.1.1 (Warren, 2004), some measurements were defined for the legal case study and they can be summarized at Table 4.1

Measure	Definition	Target	Reported
Search-engine usage	Number of queries per day	Continuing growth	At the end of the project
Average Response time	Average time to respond to a user's query	Not target at this stage	At the end of the project
Effectiveness of search	User selection of Ranked answers (precision and recall)	Not applicable	At the end of the project

Table 4.1: Measurements (Warren, 2004).

The measures applied in the case studies will reflect the usage of the SEKT technology as implemented in the 3 case studies. These measures have been evaluated at the end of the project, i.e. during the last quarter of year 3. So the updated Measurement table regarding the target of the measure can be summarized at Table 4.2

Measure	Definition	Target	Reported
Search-engine usage	Number of queries per day	Continuing growth	At the end of the project
Average Response time	Average time to respond to a user's query	<1sg	At the end of the project
Effectiveness of search	User selection of Ranked answers (precision and recall)	60%	At the end of the project

Table 4.2: Updated Measurements.

These measurements have been applied over the Expert System. In D10.3.1 (Blázquez et al, 2005) it is described a first approach to measure the improvement of semantic distance. The results described in this deliverable have been performed to measure the effectiveness of search and the average response time.

Efectiveness of Search

In D10.3.1 (Blázquez et al, 2005), we obtained first results about the effectiveness of search (Table 4.3):

	Keywords	Keywords & Semantic Distance
Success	28,57 %	45,71 %
Failure	71,43 %	54,29 %

Table 4.3: Effectiveness tests results (Blázquez et al, 2005).

As a result of the application of these measurements over the Expert system in order to validate the concept of semantic distance and the architecture of the Expert System based on the combination of different pipes, we are working on the improvement of these measurements.

As we can see in Table 4.3, the combination of the strategy of Keyword search and semantic distance provides better results than the application of typical keyword search. Despite, the successful results regarding effectiveness that were obtained in the first measurements and described in D10.3.1 (Blázquez et al, 2005), this measurement was quite low. In order to improve this, the ontologies and thesaurus used by semantic distance have been improved, and also the heuristic used to find the best match. With these new improvements the results obtained over a corpus of 119 FAQs (gender violence and children) with 155 tests are:

	Keyword	Keywords & Semantic Distance
Success	31,25%	63, 23 %
Failure	68,75%	36,77 %

Table 4.4: Effectiveness of Search.

As we can see, the effectiveness of search has been increased with improvements related to the ontology and the associated thesaurus.

Efficiency

In D10.3.1, there is a first measurement regarding the efficiency (Table 4.5). As we can see in these results, the most time consuming operation took place in the Keyword pipeline even though it is using a caching system. In order to reduce this time, and to achieve a response time less than 1 second, we have improved the keyword pipeline with an indexer, Lucene[16].

	Average Response Time	Average Keyword Time(ms)	Average Semantic Distance (ms)
Without caching	6652	3747	2905
With catching	2925	2852	73

Table 4.5: Efficiency with and without caching (Blázquez et al, 2005).

[16] http://lucene.apache.org/java/docs/

With the integration of the Lucene as index (in the Keyword pipeline) we have obtained an average response time of 1760ms (a reduction of 40% in the average response time).

4.3 Judgment System

4.3.1 Introduction

As we described in the overall case study, judges not only need a highly precise answer to their query but also an attached case law explanation of the offered recommendation. For that reason this case study offers functionalities that enhance the retrieved answer with existing case law form known legal databases.

The challenge is to retrieve relevant judgments with the retrieved answer, in order to help the judge to support any decision to take. Judgments or judicial rulings can be considered as containers of legal arguments useful in the decision support. It is crucial for judges to be able to browse through arguments and judgments in order to reuse the case law.

For that reason, the legal case study provides two main functionalities related with the judgments or judicial rulings retrieval, answer explanation of question retrieved by the Expert System (described in section 4.3.2) and search into legal databases for a specific judgment (described in section 4.3.3).

Finally, we have to consider the scalability of this solution, currently this solution is over five domains (family, minors, marital regime, procedure and offence) with 16500 documents approximately, but we plan to include the rest of the judgments documents, approximately 350.000 documents.

4.3.2 FAQ vs. Judgment Semantic Matching

The aim of this functionality is to provide a link between the question-answer pairs and the judgments. As a result of the different Usability sessions, we can conclude that this functionality is one of the most interesting for the final users of the legal case study, the judges. The judges in their daily work have lot problems about the information overload when they search in the legal databases. This functionality can provide to the judge, a hint of what he/she has to search in the legal database whereas a subset of judgments related with a specific question-answer pair.

Next, we will describe the main issues of this functionality. One of the features of the topic ontologies built in the legal case study, QTO (*Question Topic Ontology)* and JTO (*Judgment Topic Ontology*). These ontologies classify respectively the corpus of question-answer and the corpus of judgments in different topics; with the characteristic that the topics from QTO have a relation with the topics from the JTO and vice versa (these relations are described in section 2.3.3 in Table 2.3). The alignment between these ontologies has been done using OntoMap (Weiten et al, 2005). With this alignment we have obtained a first subset of judgments related with the question-answer pair. However, this mapping is coarse-grained and produces not very detailed information. For that reason, we have collected different concepts (appearing both in sentences and in the pair question-answer), synonyms and terms

related that appear in the question and its answer and we have depicted them into a tag-cloud. In that cloud, those terms in the pair question-answer that appears in more sentences will appear in a bigger font-size than others whose frequency in the corpora are lesser. Taking into account the huge size of the corpora, a normalization algorithm has been processed in order to show a representation of the importance of the term without a linear relationship which might have been improper. Once you select one or more terms in the tag-cloud, the system will show those sentences that belongs to the topic identified by the question and also contains those terms that have been chosen.

4.3.3 Search & Browse of Case law

Even though the main purpose of the case law extension is to provide answer explanation and to complete the result of Expert Knowledge System with related judgments, it is important to provide the final users with an access to case law sources without the needed to formulate an explicit question in a FAQ form. In order to achieve this target, we have integrated the Search & Browse component D5.5.2 (Duke et al, 05) in the legal case study. In the next sections we will describe the main issues regarding the integration of this component in the legal case study.

The Search & Browse component integrates several components such as: SEKT Integration Platform, KAON2, User Profile Construction, Natural Language Generation, DIWAF[17], Ontology Generation, Massive Semantic Annotation and Text2Onto. These components have been integrated as shown in the architecture in Figure 4.2.

[17] SEKT Device Independence Web Application Framework.

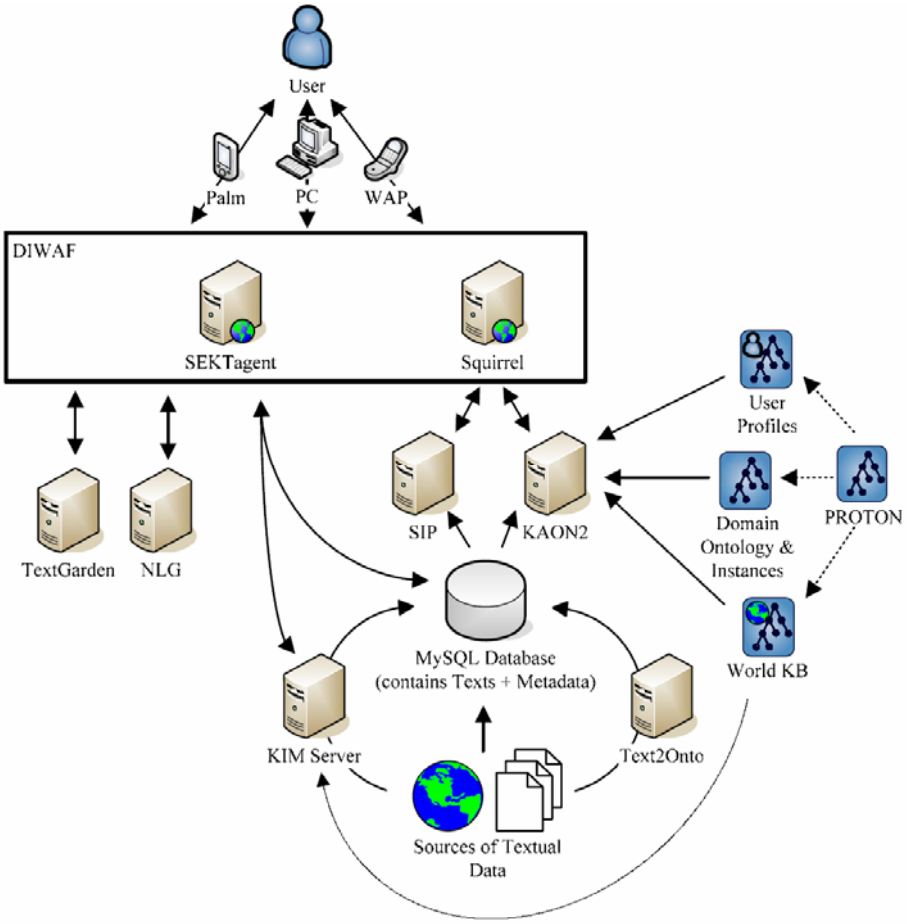


Figure 4.2: Search & Browse Architecture (Duke et al, 05).

In the case of the legal case study, some of these components have not been integrated in the final architecture, because there are not user scenarios for its use, for example, the user profiling.

Next we will describe the main tasks in order to prepare the data for the integration of the Search & Browse in the legal case study.

Judgment Massive Annotation

The Search & Browse application uses some sources of textual data that are stored together with their associated metadata in a database. The sources are web pages of case law that have been augmented by one or more entity extraction or classification components. SEKT information extraction technology from WP2 identifies "name entities" (Manov et al, 2005) that are present in the full-text of the judgments sources. Name entities that are identified include names of people with deponent role, the court, the jurisdiction of the judgment, places, dates, identifier of the judgment or the appeal. Discovered entities are stored as learned instances in the legal knowledge base. This enables the user to view supplementary information about the entity when the entity is identified in the document it is linked to the knowledge base.

In order to achieve the massive annotation of legal sources different tasks have been performed. The first task has been related with the extension of KIM platform with the purpose of working with Spanish Texts and identifying the specific 'name entities'

that we can find in judgments. The KIM platform extension to cover a new domain consists of the following:

- Extend the KIM ontology with a domain specific model, defining classes and relationships. The extension of this ontology is the Judgment ontology described in section 2.3.4.
- Extend the instance base with pre-populated entities that are important in the new domain. The information extraction can be enhanced by modeling a set of predefined entities in the knowledge base. In the case of the legal case study, these predefined entities are the judicial organizations or courts and the jurisdiction.
- Change or extend the Information Extraction module. The Default Information Module has been changed for another one related with the legal sources and Spanish text (Figure 4.3). The main change is related with the Semantic Gazetteer. The purpose of this KIM component is to keep entities with their aliases and descriptions, as well as the lexical resources (such as possible male person first names) and generates a temporal annotation with a link to a class in the ontology (Manov et al, 2005), in the case of the legal case study to the Judgment Ontology (see section 2.3.4). The main changes are related with the JAPE[18] grammars used by the Semantic Gazetteer, the grammars has been extended with another ones to allow the identification of the courts, jurisdiction or judgment identifier number.

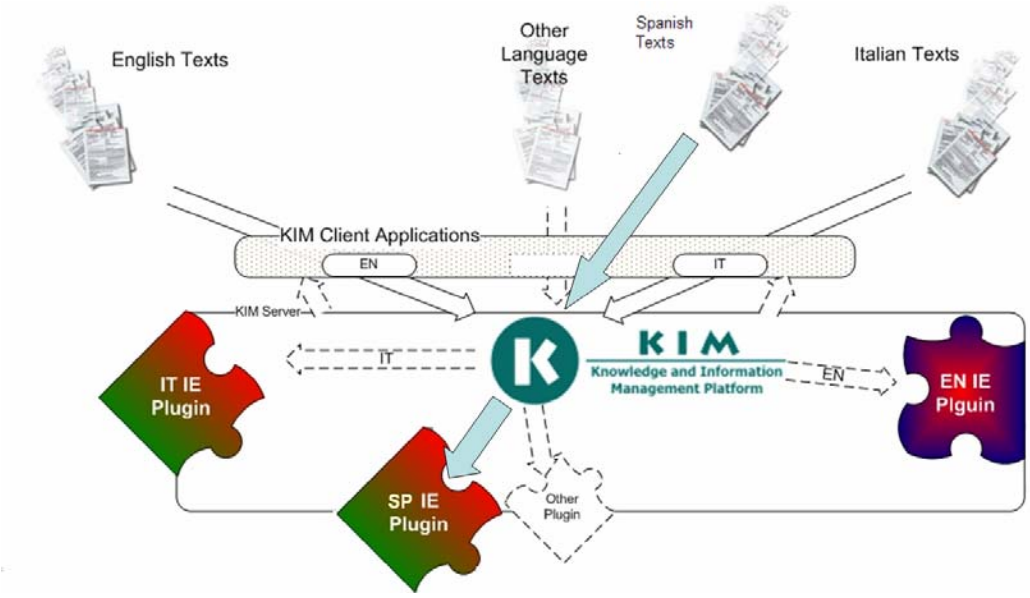


Figure 4.3: Extending KIM Platform.

In Figure 4.4 there is an example of the name entities identified with the Massive Annotation Tool.

[18] Java Annotation Patterns Engine

Texto En la ciudad de Barcelona, a 29 de octubre de 2004 AUDIENCIA PROVINCIAL DE BARCELONA SECCIÓN TERCERA ROLLO Nº 174/2004-B EXPEDIENTE DE FISCALÍA Nº 767/2002 JUZGADO DE MENORES Nº 1 DE LOS DE BARCELONA S E N T E N C I A N ú m. Ilmos. Sres. D. GUILLERMO CASTELLÓ GUILABERT Dª. ANA INGELMO FERNÁNDEZ Dª. MARÍA DEL PILAR PÉREZ DE RUEDA VISTO, en grado de apelación, ante la Sección Tercera de esta Audiencia Provincial, el presente rollo de apelación nº 174/2004-B, dimanante del Expediente de Fiscalía nº 767/2002, procedente del Juzgado de Menores nº 1 de los de Barcelona, seguido por una falta de DAÑOS, contra los menores

Figure 4.4: Example of Name Entities identified in a judgment.

Ontology Generation

One of the main components of the Search & Browse is the Ontology Generation (TextGarden) that is used by Squirrel to generate clusters of documents at query-time. These hierarchical clusters that are generated allow the user to refine their search base on key themes that have been found in the result (Duke et al, 05). In the case of the legal caser study, we have identified 30 clusters or topics. These topics are the result of the application of OntoGen over the judgment sources as we described in section 2.3.3 and the final user can use these topics to refine the search results obtained as a result of a query.

Enhanced Searching and Browsing

With the search & browse application the user is able to specify information they seek semantically, enabling them to express their queries not using a typical keyword search, on the contrary it provides search based on a simple text string that allow to express the query in free-text in combination with several search related topics such as: types of judgments, judicial organizations, topic classification, etc (see Figure 4.4).

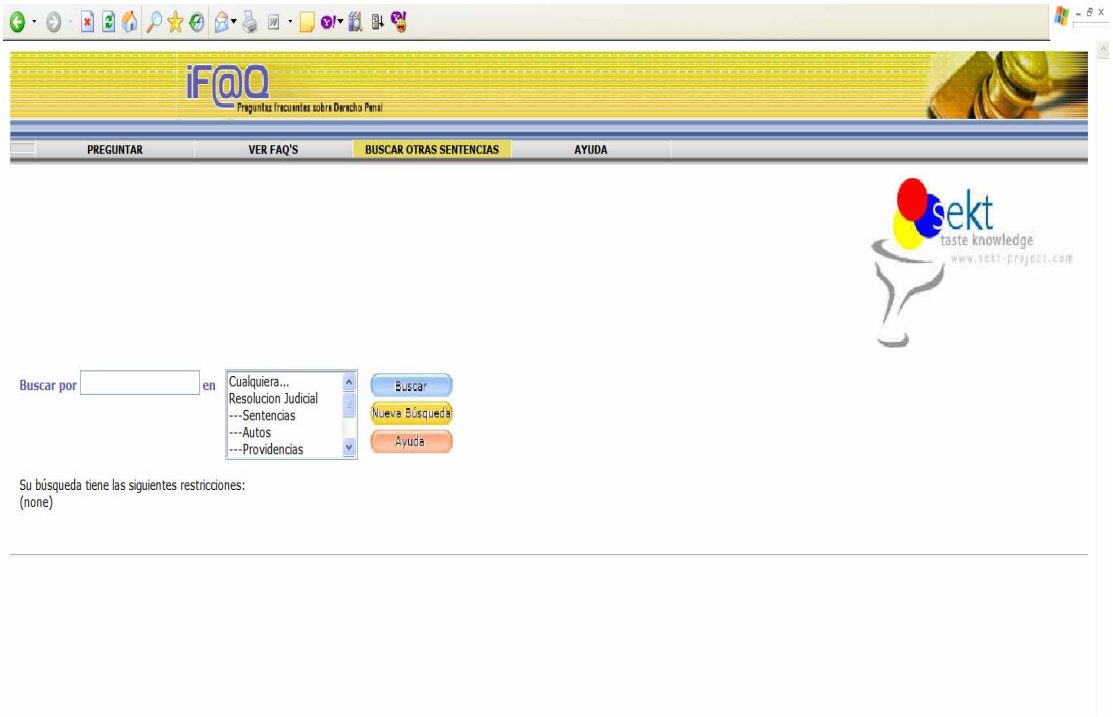


Figure 4.5: Example of Screenshot of the search & Browse application

In addition to the approach of searching against the metadata that describes the information entities, the user can also browse the topic hierarchy to find relevant

documents. The user is able to navigate up or down the topic hierarchy expanding or refining their search. For example the user can expand or restrict the number of results using the topic hierarchy (see Figure 4.6).

Figure 4.6: Example of Screenshot of the search & Browse application

Finally the search and browse application allows the navigation between the documents using the characteristics of the document, for example, the document related with a supertopic or subtopic, or all the documents related with a Judge that appears in the judgment (see Figure 4.7).

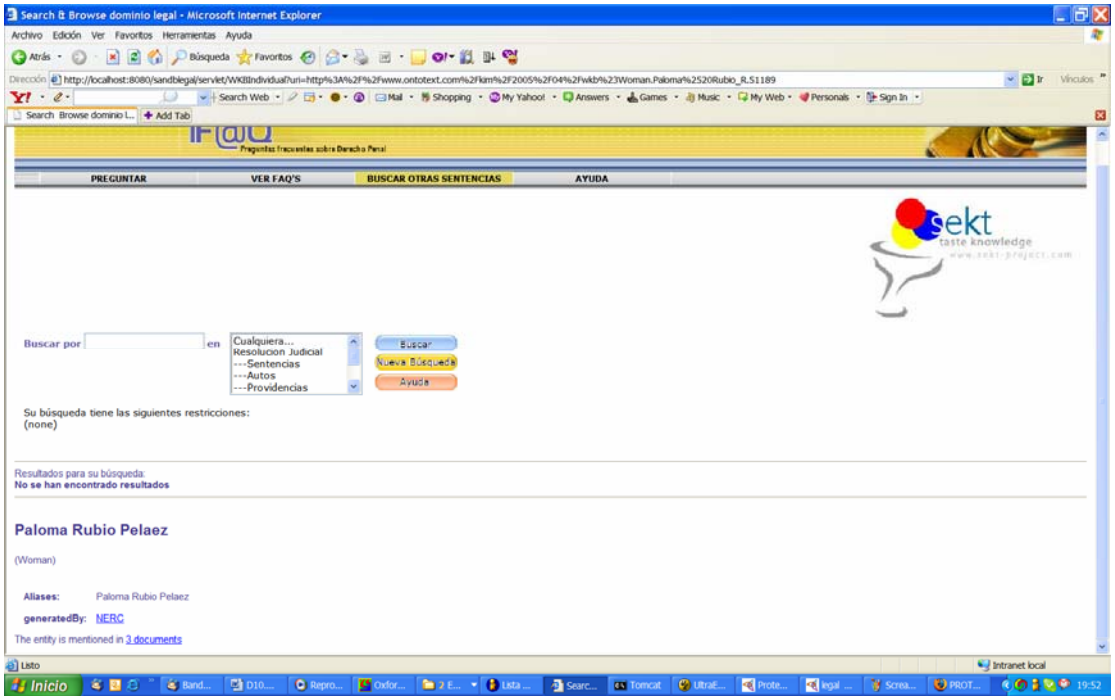


Figure 4.7: Example of Screenshot of the navigation inside documents.

4.3.4 Improvements related with the Usability Tests.

As a result of the Cognitive Walkthrough and the Heuristic Evaluation of the application of Search & Browse, the main changes are concrned the user interface of the Search & Browse application. The judges used in their daily work other legal databases such as *La Ley* (Wolters-Kluwer www.laley.net), *Derecho* (www.derecho.com) or *Aranzadi* (www.aranzadi.es), however some of the results of the Search & Browse application are better than the ones obtained with the other commercial applications, the judges feel more confident with the interfaces they are used to; these are based on keyword search and the definition of some filters such as judicial organizations, judges, etc.
Therefore, these results imply the redefinition of the interfaces of the application of Search & Browse and also the information annotated and extracted automatically.

4.4 Conclusions

The main improvements concerned with the legal case study application have been related to, in the case of the Expert System application, the improvements of the ontology and the heuristic to find the best match between a user input question and the questions stored. Also, as a result of the usability tests, the Expert System application or iFAQ has been modified to consider different aspects identified in these tests.

Other work related with the Expert System was focused on improving the average response time (an indexing compoment was introduced).

Besides, one of the main tasks developed in the legal case study application has been to integrate the Search & Browse component from WP5. As we describe before, this component uses several components from other workpackages to provide an application to search and browse in judicial documents such as judicial rulings. The Search & Browse component provides a user interface that might need to be redesigned to a more familiar interface for the judges similar to their known databases.

Finally, we can summarize the technologies used in the legal case study in the following table (Table 4.6)

Legal Case Study		**SEKT Technology**					
Application	Subsystem	WP1	WP2	WP3	WP4	WP5	WP7
Expert System	Administration Subsystem					*Visualiza-tion*	
	Search Subsystem	*Domain Detection (OntoGen-TextGarden)*					
	Ontology Subsystem			*KAON 2*			
	Ontology Generation	*OntoGen-TextGarden (QTO)*					

	NLP Subsystem		*GATE (OBIE)*				*DILIG ENT*
Case law System	Ontology Subsystem	*Case law Topic Ontology (OntoGen - TextGarden*		*KAON 2*			
	Ontology Generation	*OntoGen- TextGarden (JTO)*					*DILIG ENT*
	NLP Subsystem		*GATE*				
	Alignment Subsystem				*Ontology Alignment*		
	Search & Browse Engine					*Search & Browse*	
	Judgments Search		*Name Entity Extraction, KIM(Massive Annotation)*	*KAON2*			

Table 4.6: SEKT Technology in Legal Case Study

5 Conclusions

We may draw several conclusions from the work performed in the case study. In the first place, Iuriservice is now at the first stages of implementation at the Spanish Judicial School, therefore user needs compliance and positive attitude and feedback are of high importance. The agreements with the General Council of the Judiciary and the collaboration of the Spanish Judicial School demonstrate their interests in the development and implementation of Iuriservice. The formal presentation was quite successful.

Secondly, both the architecture and the ontologies were significantly improved. OPJK represents, now, 6 sub-domains and QTO and JTO have been completed. Also, a Judgment Ontology for massive annotation has been developed.

In the third place, several usability tests have been carried out (heuristic evaluation cognitive walkthrough) and their results have improved and changed the interface and some of the functionalities of the prototype. Also the effectiveness and efficiency measurements have improved, as the preliminary results of the field tests with final users show.

SEKT provides several technologies that have allowed achieving different functionalities of the legal case study; these technologies apply in the two main subsystems (see Table 4.6.) All SEKT technologies have really helped to achieve case study functionalities, although, one of the main problems that we have had during the project is related with language. Data sources are written in Spanish. An example of one technology that really helps is the Search & Browse component. With the use of this component we have been able to develop one of the main functionalities of the case study, the judgments' system.

Therefore, there are reasons to be optimistic about the final implementation of Iuriservice into the Spanish judicial system.

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7 Appendix

7.1 Appendix 1: Checklist for Heuristic Evaluation (in Spanish)

Heuristic Evaluation for Future Computer Interfaces:
A System Checklist

This is a heuristic checklist for evaluating user interfaces for non-traditional future computing environments. It was created by extensively modifying the document by Deniese Pierotti of Xerox Corporation titled "Usability Techniques: Heuristic Evaluation - A System Checklist", which is a heuristic evaluation checklist for standard GUI development.

Modifications by Stephen Intille and Chuck Kukla.

General Categories:

1. Visibility of System Status

The system should always keep user informed about what is going on, through appropriate feedback within reasonable time. The interface should strive to be a "glass box" that helps the user understand what is happening, not a black box that leads to confusion when expectations break down.

#	Review Checklist	Yes ... No / N/A	Comments
1.1	*At every time during the interaction* can the user easily determine where he/she is in the interaction	O O O / O	

	process?		
1.2	*At every time during the interaction* can the user easily determine what options are available?	O O O / O	
1.3	During a sub-task while using the interface (e.g. data entry), can the user always tell how much more/longer there is to go?	O O O / O	
1.4	Is there an obvious visual distinction made between "choose one" options and "choose many" options?	O O O / O	
1.5	If modes are used, is there a clear indication of which one the user is in?	O O O / O	
1.6	Do error/advisory warnings allow the user to see/remember the thing in error?	O O O / O	
1.7	Is there some form of system feedback for every user action?	O O O / O	
1.8	The user can always ascertain if the UI is experiencing problems because of a broken sensor and is given options	O O O / O	
1.9	Can the user always easily tell which of the interface's special sensors are working and which are not?	O O O / O	
1.10	If multiple options can be selected simultaneously, is there feedback about which options are already selected?	O O O / O	
1.11	Is there feedback when objects are selected or moved?	O O O / O	
1.12	If there are observable delays (> 1 second) in the system□s response time, is the user kept informed of the system's progress?	O O O / O	
1.13	Whenever a user makes a selection, is it obvious whether deselection is possible?	O O O / O	
1.14	For any input request, does the system make explicit to the user what options are available?	O O O / O	
1.15	Is activation always clear? (that is, can the user tell when the system will actually take action?)	O O O / O	

2. Match Between System and the Real World

The system should speak the user's language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. It should derive its structure and interaction model from the real world and the ways that people accomplish and think about tasks. Information should appear in ways that exploit the user's mental model of tasks. It should also be designed based on the shape of the human body and human hand. Does the user understand what each component of the interface (i.e. text, graphic, physical part, etc.) will do before they activate it? Are real-world concepts and activities "chunked" in the UI's interaction model? Are tasks unnaturally grouped together or not grouped together? Where possible, simplify your interface by using progressive levels of detail that map naturally onto your domain.

#	Review Checklist	Yes ... No / N/A	Comments
2.1	Application anticipates the user's expectations at each step?	O O O / O	
2.2	The user is not slowed down by technical issues related to the UI design	O O O / O	
2.3	When different media are involved in a task, the UI simplifies, not complicates tasks tasks that depend on flow of information	O O O / O	
2.4	Is sound avoided as a way to signal a message in crowded environments so that other people won't be annoyed?	O O O / O	
2.5	The interface works well even if users can only attend to it for quick bursts of time interspersed with everyday activity	O O O / O	
2.6	The interface works well with the social structure associated with the domain	O O O / O	
2.7	The interface uses advanced technologies in innovative ways that simplify user tasks	O O O / O	
2.8	All GUI conventions are questioned before use: still make sense?	O O O / O	
2.9	Is the terminology consistent with the user's task domain and not the computer's domain ... with absolutely no computer buzzwords?	O O O / O	
2.10	Are icons easy to identify and needed?	O O O / O	
2.11	Are tasks ordered in the most logical way, based on	O O O /	

	natural sequences?	O	
2.12	Is related and interdependent information grouped not based on the computer's model but based on the real-world model and the user's mental model?	O O O / O	
2.13	When prompts imply a necessary action, are the words in the message consistent with that action?	O O O / O	
2.14	For question and answer interfaces, are questions stated in clear, simple language?	O O O / O	
2.15	Do choices fit logically into categories that have readily understood meanings?	O O O / O	
2.16	Are titles parallel grammatically?	O O O / O	
2.15	Are command names specific rather than general?	O O O / O	
2.17	Are required inputs meaningful?	O O O / O	
2.18	Can the user be interrupted for several hours at any time while using the interface, use the same device for other tasks, and return and have the interface respond appropriately?	O O O / O	
2.19	When there is some unavoidable latency in the system, can the user multi-task in a natural way within the application?	O O O / O	
2.20	Has each display screen and button layout been designed based on the shape of the human hand and not based upon the arbitrary rectilinear nature of computer display screens?	O O O / O	

3. User Control and Freedom

Allow for multiple ways of doing the same thing when people use different strategies in the real world. When users make a "mistake" or change their minds, the system must allow for "emergency exits" and backtracking.

#	Review Checklist	Yes ... No / N/A	Comments
3.1	If setting up the app is a low-frequency task, is it particularly easy to remember?	O O O / O	

3.2	Fitt's Law has been considered	O O O / O	
3.3	Do absolutely no user commands have drastic, destructive consequences?	O O O / O	
3.4	Is there an "undo" function at the level of a single action, a data entry, and a complete group of actions?	O O O / O	
3.5	Can users cancel out of operations in progress?	O O O / O	
3.6	When users cancel out of operations in progress, is it clear to the user what happened to the data?	O O O / O	
3.7	Can users reduce data entry time by copying and modifying existing data?	O O O / O	
3.8	If there is more than one way to perform a task in real life, is there more than one way to perform the task in the interface?	O O O / O	
3.9	When users backtrack, can they change their earlier choices?	O O O / O	
3.10	Can users move forward and backward between options?	O O O / O	
3.11	Is data obtained without user input whenever possible (e.g. by exploiting new sensors)?	O O O / O	

4. Consistency and Standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow real-world conventions when they exist, and pay attention to consistency of format. Carefully select each word to maximize clarity.

#	Review Checklist	Yes ... No / N/A	Comments
4.1	The "look and feel" of the interface is consistent over time	O O O / O	
4.2	Have formatting standards been followed consistently within a system?	O O O / O	
4.3	Has a heavy use of all uppercase letters been avoided?	O O O / O	
4.4	Do abbreviations include punctuation?	O O O /	

		O	
4.5	Are integers right-justified and real numbers decimal-aligned?	O O O / O	
4.6	Are field labels close to fields, but separated by at least one space?	O O O / O	
4.7	Are optional data entry fields clearly marked?	O O O / O	
4.8	If humorous messages are used, are they appropriate and inoffensive to the user population?	O O O / O	
4.9	Are messages grammatically correct?	O O O / O	
4.10	Do messages avoid the use of exclamation points?	O O O / O	
4.11	Do messages avoid the use of violent or hostile words?	O O O / O	
4.12	Have standards been established for interaction design, and are they applied consistently in the system?	O O O / O	
4.13	Do on-line instructions appear in a consistent location or at a consistent time throughout the interaction?	O O O / O	
4.14	Are field labels and fields distinguished typographically?	O O O / O	
4.15	Are field labels consistent from one data entry screen to another?	O O O / O	
4.16	Are attention-getting techniques used with extreme care ... only for exceptional conditions or for time-dependent information?	O O O / O	
4.17	Intensity: two levels only	O O O / O	
4.18	Size: up to four sizes	O O O / O	
4.19	Font: up to three	O O O / O	
4.20	Blink: two to four hertz	O O O / O	

4.21	Is there a consistent design scheme and stylistic treatment across the system?	O O O / O	
4.22	Do options/prompts/icons/error messages appear in the same place or same way across the system?	O O O / O	
4.23	Color: up to four (additional colors for occasional use only)	O O O / O	
4.24	Sound: soft tones for regular positive feedback, harsh for rare critical conditions	O O O / O	
4.25	Are there no more than four to seven colors, and are they far apart along the visible spectrum?	O O O / O	
4.26	Is a legend provided if color codes are numerous or not obvious in meaning?	O O O / O	
4.27	Have pairings of high-chroma, spectrally extreme colors been avoided?	O O O / O	
4.28	Is the most important information placed at the beginning of the prompt?	O O O / O	
4.29	Are user actions named consistently across all prompts in the system?	O O O / O	
4.30	Are system objects named consistently across all prompts in the system?	O O O / O	
4.31	Are menu choice names consistent, both within each menu and across the system, in grammatical style and terminology?	O O O / O	
4.32	Are commands used the same way, and do they mean the same thing, in all parts of the system?	O O O / O	
4.33	Does the command language have a consistent, natural, and mnemonic syntax?	O O O / O	
4.34	Do abbreviations follow a simple primary rule and, if necessary, a simple secondary rule for abbreviations that otherwise would be duplicates?	O O O / O	
4.35	If shape is used as a visual cue, does it match cultural conventions?	O O O / O	
4.36	Do the selected colors correspond to common expectations about color codes?	O O O / O	
4.37	Does the system automatically enter leading or trailing spaces to align decimal points?	O O O / O	

4.38	Does the system automatically enter a dollar sign and decimal for monetary entries?	O O O / O	
4.39	Does the system automatically enter commas in numeric values greater than 9999?	O O O / O	
4.40	Has the system been designed so that inputs with similar names do not perform opposite (and potentially dangerous) actions?	O O O / O	

5. Help Users Recognize, Diagnose, and Recover From "Errors"

Users don't make "errors" ... the UI should guide users in helpful ways using cues and messages expressed in plain language or using imagery/icons.

#	Review Checklist	Yes ... No / N/A	Comments
5.1	Are prompts stated constructively, without overt or implied criticism of the user?	O O O / O	
5.2	Do prompts imply that the user is in control?	O O O / O	
5.3	Are prompts brief and unambiguous?	O O O / O	
5.4	Are error messages worded so that the system, not the user, takes the blame?	O O O / O	
5.5	Do messages avoid an anthropomorphic tone?	O O O / O	
5.6	If an error is detected in a data entry field, does the system place the cursor in that field or highlight the error?	O O O / O	
5.7	Do error messages inform the user of the error's severity?	O O O / O	
5.8	Do error messages suggest the cause of the problem?	O O O / O	
5.9	Do error messages indicate what action the user needs to take to correct the error?	O O O / O	
5.10	If the system supports both novice and expert users, are multiple levels of error-message detail available?	O O O / O	

6. Error Prevention

A careful design which prevents the user from experiencing a UI-related problem. Never mislead the user.

#	Review Checklist	Yes ... No / N/A	Comments
6.1	The user is not stuck if a sensor breaks	O O O / O	
6.2	Are menu choices logical, distinctive, and mutually exclusive?	O O O / O	
6.3	Are data inputs case-blind whenever possible?	O O O / O	
6.4	If the system displays multiple windows, is navigation between windows simple and visible?	O O O / O	
6.5	Are the options that are used less frequently in the less-convenient positions?	O O O / O	
6.6	Are the function keys that can cause the most serious consequences located far away from low-consequence and high-use keys?	O O O / O	
6.7	Is the system designed so that it is impossible for a user to make a potentially serious error?	O O O / O	
6.8	Does the system intelligently interpret variations in user commands?	O O O / O	
6.9	Do fields in data entry screens and dialog boxes contain default values when appropriate?	O O O / O	

7. Recognition Rather Than Recall

Make objects, actions, and options visible so they can be used to remind the user. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate. Use images and other cues that exploit the human knack for recognition versus recall.

#	Review Checklist	Yes ... No / N/A	Comments
7.1	Are prompts, cues, and messages placed where the eye is likely to be looking on the screen?	O O O / O	

7.2	Have prompts been formatted using white space, justification, and visual cues for easy scanning?	O O O / O	
7.3	Do text areas have "breathing space" around them?	O O O / O	
7.4	Have spatial relationships between soft function keys (on-screen cues) and real-world spatial relationships been maintained?	O O O / O	
7.5	Does the system avoid showing inactive soft function keys instead of using "graying out"?	O O O / O	
7.6	Is white space used to create symmetry and lead the eye in the appropriate direction?	O O O / O	
7.7	Have items been grouped into logical zones, and have headings been used to distinguish between zones?	O O O / O	
7.8	Have zones been separated by spaces, lines, color, letters, bold titles, rules lines, or shaded areas?	O O O / O	
7.9	Are symbols used to break long input strings into "chunks"?	O O O / O	
7.10	Are size, boldface, underlining, color, shading, or typography used to show relative quantity or importance of different screen items?	O O O / O	
7.11	Has the same color been used to group related elements?	O O O / O	
7.12	Is color coding consistent throughout the system?	O O O / O	
7.13	Have light, bright, saturated colors been used to emphasize data and have darker, duller, and desaturated colors been used to de-emphasize data?	O O O / O	
7.14	Is the first word of each menu choice the most important?	O O O / O	
7.15	Have frequently confused data pairs been eliminated whenever possible?	O O O / O	
7.16	If the system has many menu levels or complex menu levels, do users have access to a spatial menu map?	O O O / O	

8. Flexibility and Minimalist Design

Design the interface to be flexible so that it is appropriate for novices and experts; a minimalist design will help. Accelerators-unseen by the novice user-can often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

#	Review Checklist	Yes ... No / N/A	Comments
8.1	If the system supports both novice and expert users, are multiple levels of detail available?	O O O / O	
8.2	Hide latency by allowing multi-tasking (within the application not between applications)	O O O / O	
8.3	Does the system provide options for high-frequency commands?	O O O / O	
8.4	Can users be interrupted at any time and have the system do something reasonable in the future?	O O O / O	

9. Aesthetic and Minimalist Design

Interfaces should not contain information which is irrelevant or rarely needed. Every extra unit of information in an interface competes with the relevant units of information and diminishes their relative visibility.

#	Review Checklist	Yes ... No / N/A	Comments
9.1	Is only (and all) information essential to decision making conveyed to the user?	O O O / O	
9.2	Does each icon stand out from its background?	O O O / O	
9.3	Are meaningful groups of items separated by white space?	O O O / O	
9.4	Does each screen have a short, simple, clear, distinctive title?	O O O / O	
9.5	Are field labels brief, familiar, and descriptive?	O O O / O	
9.6	Are prompts expressed in the affirmative, and do they use the active voice?	O O O / O	
9.7	Are titles brief, yet long enough to communicate?	O O O / O	

10. Help and Documentation

The system should not require traditional "help" documentation. "Help" should be accomplished through good interface design and context-sensitive information.

#	Review Checklist	Yes ... No / N/A	Comments
10.1	Are on-line instructions visually distinct?	O O O / O	
10.2	Do the instructions follow the sequence of user actions not computer system design?	O O O / O	
10.3	Does the system avoid ambiguity in user choices?	O O O / O	
10.4	Does the system avoid ambiguity in system responses?	O O O / O	
10.5	Are there memory aids for commands?	O O O / O	
10.6	Is it clear how to get unstuck?	O O O / O	
10.7	Is the help system interface consistent with the rest of the interface and integrated into the interface?	O O O / O	
10.8	Is information easy to find?	O O O / O	
10.9	Presentation: Is the visual layout well designed?	O O O / O	

11. Skills

The system should support, extend, supplement, or enhance the user's skills, background knowledge, and expertise ----not replace them.

#	Review Checklist	Yes ... No / N/A	Comments
11.1	If users are novices, usage is infrequent, or the system has a fast response time, are there more screens (less information per screen)?	O O O / O	
11.2	Are users usually the initiators of actions rather than the responders?	O O O / O	

11.3	Does the system perform data translations for users?	O O O / O	
11.4	Is the method for moving the cursor to the next or previous field both simple and visible?	O O O / O	
11.5	Has auto-tabbing been avoided except when fields have fixed lengths or users are experienced?	O O O / O	
11.6	Do the selected input device(s) match user capabilities?	O O O / O	
11.7	Are cursor keys arranged in either an inverted T (best for experts) or a cross configuration (best for novices)?	O O O / O	
11.8	Are important keys larger or easier to access than other keys?	O O O / O	
11.9	Does the system correctly anticipate and prompt for the user's probable next activity?	O O O / O	

12. Pleasurable and Respectful Interaction with the User

The user's interactions with the system should enhance the quality of his or her work-life. The user should be treated with respect. The design should be aesthetically pleasing- with artistic as well as functional value.

#	Review Checklist	Yes ... No / N/A	Comments
12.1	Is each individual icon a harmonious member of a family of icons?	O O O / O	
12.2	Has excessive detail in icon design been avoided?	O O O / O	
12.3	Has color been used with discretion?	O O O / O	
12.4	Is no window housekeeping required?	O O O / O	
12.5	If users are working from hard copy, does the screen layout match the paper form?	O O O / O	
12.6	Does the interface avoid requiring the user to use Graffiti or some other unnatural PDA text entry system?	O O O / O	
12.7	Do the selected input device(s) match	O O O /	

	environmental constraints?	O	
12.8	If the system uses multiple input devices, has hand and eye movement between input devices been minimized?	O O O / O	
12.9	Are the most frequently used keys/functions in the most accessible positions or easiest to use?	O O O / O	
12.10	Does the system complete unambiguous partial input whenever possible?	O O O / O	

13. Privacy

The system should help the user to protect personal or private information- belonging to the user or his/her clients**.**

#	Review Checklist	Yes ... No / N/A	Comments
13.1	Is security provided but also instant access to the functionality of the device?	O O O / O	
13.2	Does the interface avoid leading to the user to infer security/privacy?	O O O / O	
13.3	Does the design avoid non-obvious privacy/security loopholes?	O O O / O	

14. Design for People (esp. the elderly)

Design for people ... especially the elderly.

#	Review Checklist	Yes ... No / N/A	Comments
14.1	Does the interface avoid deep hierarchies? [Older adults have more trouble remembering interface structure]	O O O / O	
14.2	Have you assumed users will read all text, slowing performance? [Older adults will tend to do so]	O O O / O	
14.3	Is the status of the interface always apparent to the user (provided using large, clear visual or auditory headings)?	O O O / O	
14.4	Does all text/background have very high contrast?	O O O /	

		O	
14.5	Are you using dark text on a light background instead of light text on a dark background?	O O O / O	
14.6	Is all text 14 point or larger?	O O O / O	
14.7	Are all buttons designed for someone with unsteady hands?	O O O / O	
14.8	Have scroll bars been replaced with clickable widgets? [Older adults find them difficult to use]	O O O / O	
14.9	Small, light typefaces have been avoided?	O O O / O	
14.10	San serif fonts have been used when possible?	O O O / O	
14.11	Is text indented to help with navigation?	O O O / O	
14.12	Have images or icons been used to replace text whenever possible?	O O O / O	
14.13	A small stylus device is not required?	O O O / O	
14.14	High frequency sounds have been avoided?	O O O / O	
14.15	User not required to make subtle distinctions in pitch?	O O O / O	
14.16	User not required to make subtle distinctions in register, pitch, or chords?	O O O / O	
14.17	Do edges use both brightness and color changes?	O O O / O	
14.18	Have detection in changes of reds, purples, and greens been avoided?	O O O / O	
14.19	Has blue been avoided for text, lines, and small shapes?	O O O / O	
14.19	The interface is designed for the human body, not the arbitrary dimensions of computer displays or using GUI conventions for upright displays	O O O / O	
14.20	The interface is entertaining to use	O O O / O	

14.21	Are response times appropriate to the task?	O O O / O	
14.22	Typing, cursor motion, mouse selection: 50-150 milliseconds	O O O / O	
14.23	Simple, frequent tasks: less than 1 second	O O O / O	
14.24	Common tasks: 2-4 seconds	O O O / O	
14.25	Complex tasks: 8-12 seconds	O O O / O	
14.26	Are response times appropriate to the user's cognitive processing?	O O O / O	
14.27	Continuity of thinking is required and information must be remembered throughout several responses: less than two seconds.	O O O / O	
14.28	High levels of concentration aren't necessary and remembering information is not required: two to fifteen seconds.	O O O / O	
14.29	If users must remember information in their heads during an interaction, does the interface help them remember the important information?	O O O / O	
14.30	Is color used in conjunction with some other redundant cue?	O O O / O	
14.31	Is there good color and brightness contrast between image and background colors?	O O O / O	

15. Future Technology

Use advanced technology but abiding by realistic limitations.

#	Review Checklist	Yes ... No / N/A	Comments
15.1	Have advanced sensors/technologies been used to create a unique, new interface that aids real-world tasks?	O O O / O	
15.2	Does your interface not assume the existence of any sensors other than those on the list from class?	O O O / O	
15.3	The interface responds appropriately to the	O O O /	

	range/precision limitations of the sensor technology?	O	

System Title:_____ Release #: _____

Evaluator: _____ Date: _____

http://web.media.mit.edu/~intille/teaching/fall01/heuristic-evaluation-checklist.htm

7.2 Appendix 2: Task description for Cognitive Walkthrough test.

7.2.1 Iuriservice Congnitve Walkthrough

Introducción

Iuriservice es una nueva herramienta (accesible como página web en http://iuriservices.isoco.net *usuario:iuri password: iurisekt*) para ayudar a la resolución de casos, ofreciendo soporte en la toma de decisiones cuando la consulta a otros jueces es complicada (horarios de guardia, días festivos,…).

Las principales funcionalidades que ofrece son:

- Permite efectuar consultas *en lenguaje común* ofreciendo preguntas similares que han sido respondidas por jueces expertos de la Escuela Judicial.
- Búsquedas directas sobre la base de datos de las preguntas respondidas por los jueces expertos.
- Búsqueda de Jurisprudencia asociada a las preguntas.
- Búsqueda de Jurisprudencia.

El objetivo de estas pruebas es validar la utilidad de la aplicación para el usuario de la misma, y **NO evaluar al usuario** que participa en las pruebas.

Escenarios

Acceso a la herramienta Iuriservice.

Los pasos para acceder a la aplicación de Iuriservice son:

1. Abrir un navegador web, como Internet Explorer, Mozilla, etc.
2. Acceder a la dirección de la página web de la herramienta Iuriservice http://iuriservices.isoco.net (introducir el usuario: iuriservices password iuri2006)

Consultar Experto:

En la demo se ve cómo utilizar esta herramienta. Tenemos un espacio en el cual podemos escribir la pregunta que queremos hacer (ver la figura X).

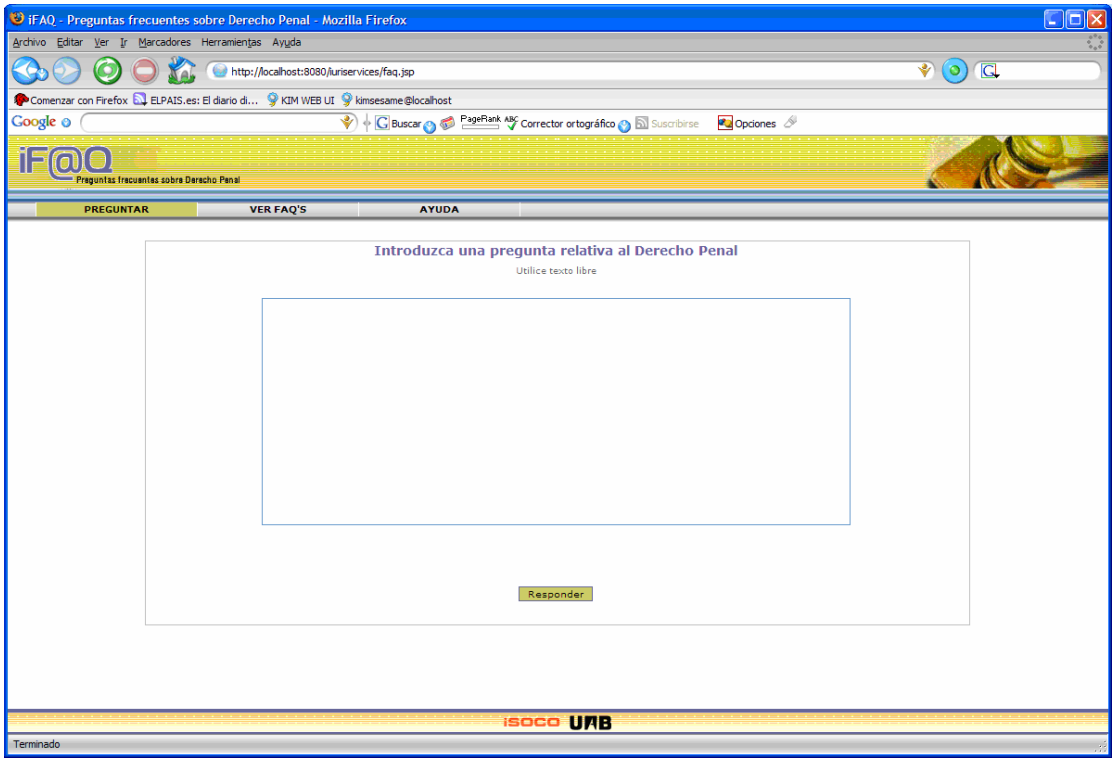

Figura 7.1: Pantalla de inicio y de introducción de la pregunta del usuario.

Como se puede ver es una pregunta con los mismos términos que utilizaríamos si consultáramos a otro Juez (Figura 7.2). Por ejemplo tecleamos una de las siguientes preguntas:

El mismo día de presentar una orden de protección, me piden que la retire. ¿Qué hago?
¿Debe la policía detener a un marido que presuntamente viola una orden de alejamiento si hay serias dudas de esta violación?
¿Qué carácter tiene una orden de alejamiento en una pareja que continua viviendo junta?

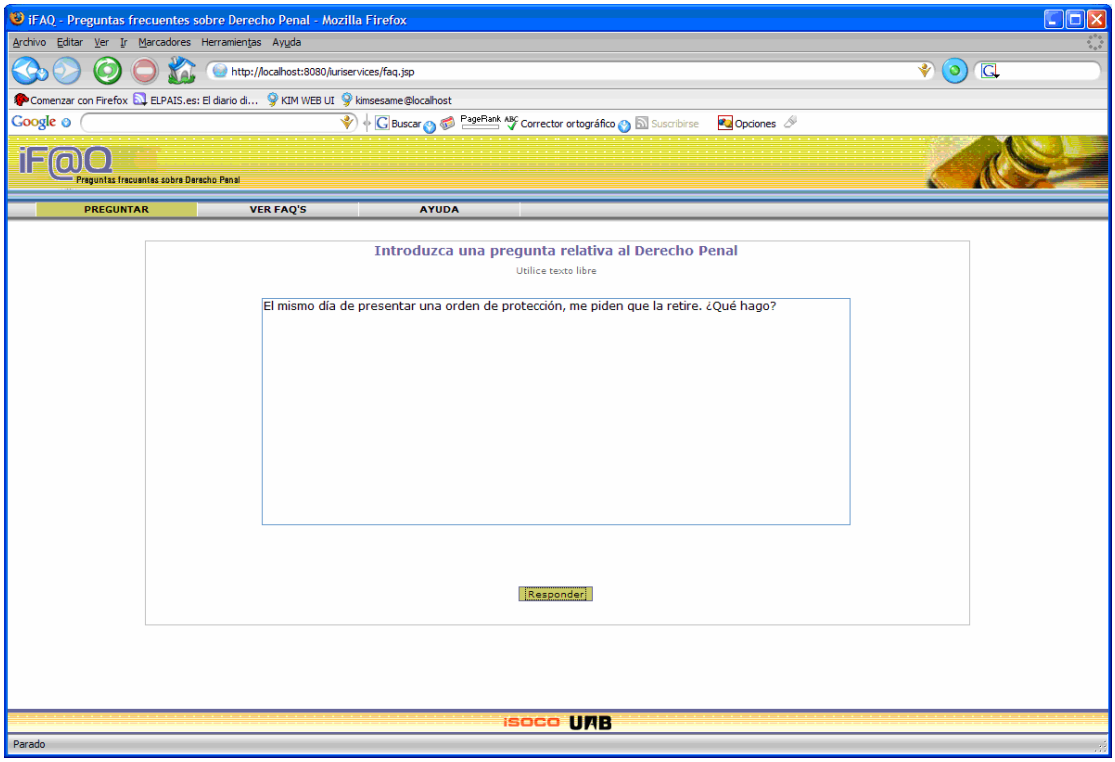

Figura 7.2: Formulación de una pregunta

Una vez hemos escrito la pregunta, pulsamos sobre el botón "**RESPONDER**" y la herramienta proporcionará la pregunta respondida por el Juez experto que más se asemeje a la pregunta formulada. Durante la búsqueda de la pregunta que más se asemeje a la formulada por el usuario mostrará un mensaje indicando que "*su pregunta se está procesando*" (Figura 7.3) y mostrará el resultado final de dicho procesamiento en una nueva ventana (Figura 7.4)

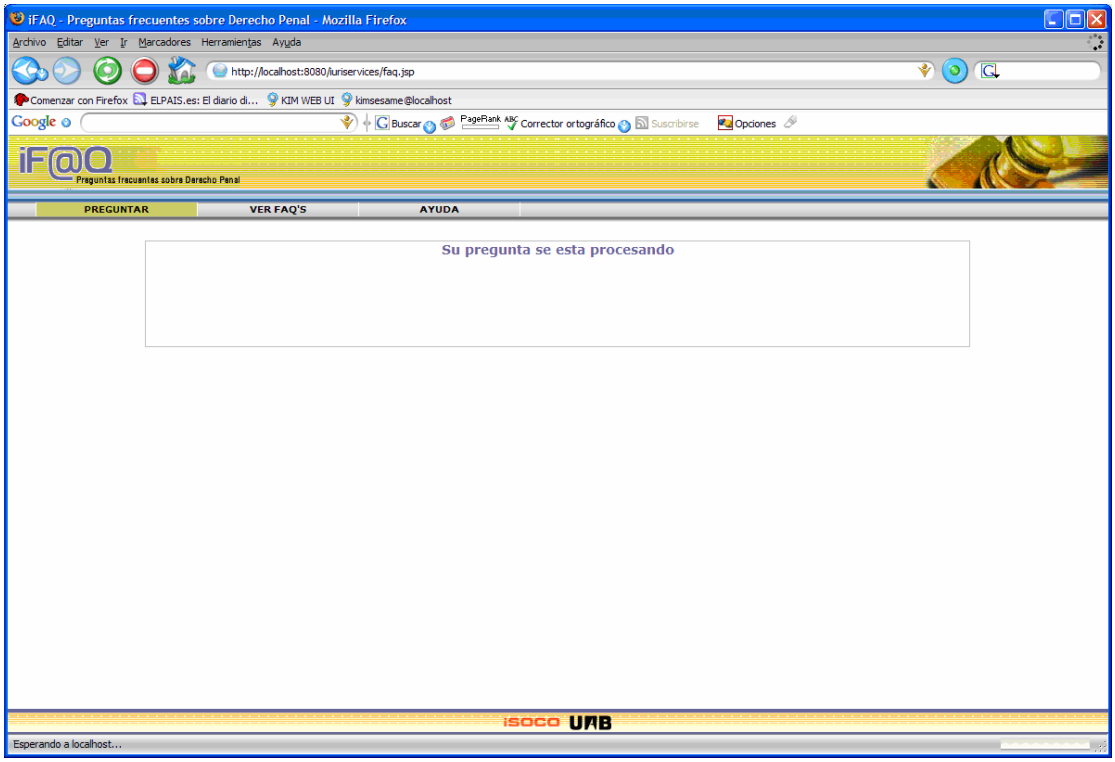

Figura 7.3: Pantalla de su pregunta se está procesando.

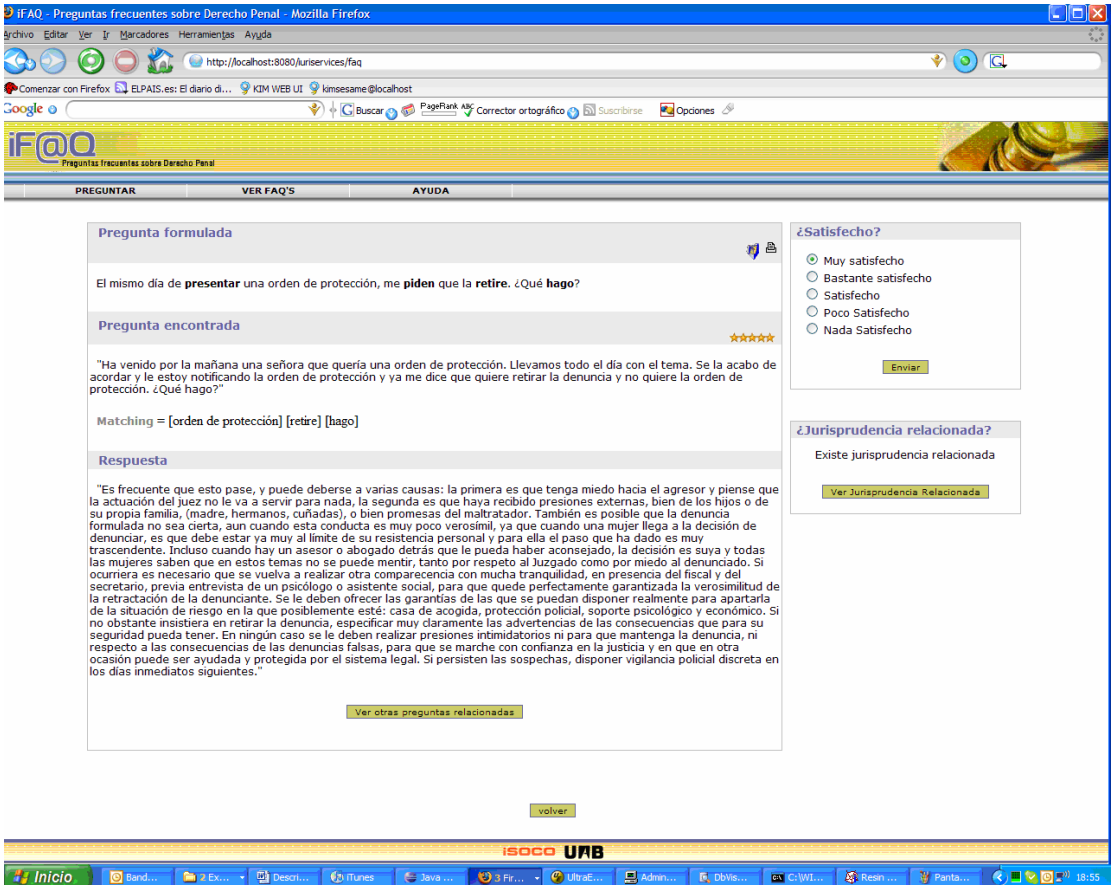

Figura 7.4: Pantalla con la respuesta.

La pantalla con el resultado de la pregunta que se ha realizado a la herramienta, está dividida en varias secciones Figura 7.5:

a) En primer lugar podemos ver la pregunta que hemos escrito.
b) En segundo lugar vemos la pregunta que la herramienta nos ofrece como la más parecida a la que hemos formulado, con un porcentaje de similaridad y las palabras que ha utilizado para obtener ese resultado.
c) En tercer lugar, podemos ver la respuesta que ha dado un Juez de la Escuela Judicial a esa pregunta.

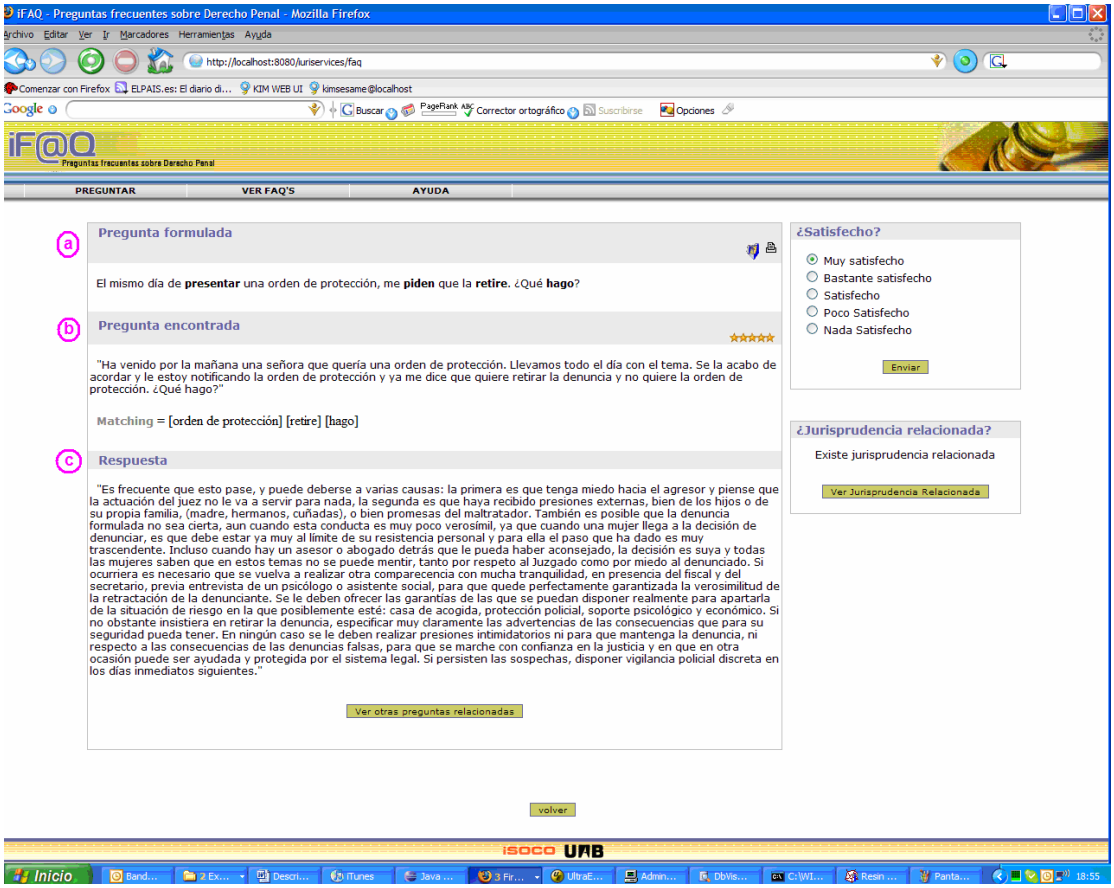

Figura 7.5: Secciones de la respuesta

Si queremos volver a preguntar podemos pulsar sobre el botón del menú superior "**PREGUNTAR**" e iremos a la página anterior donde formulamos la pregunta (Figura 7.6).

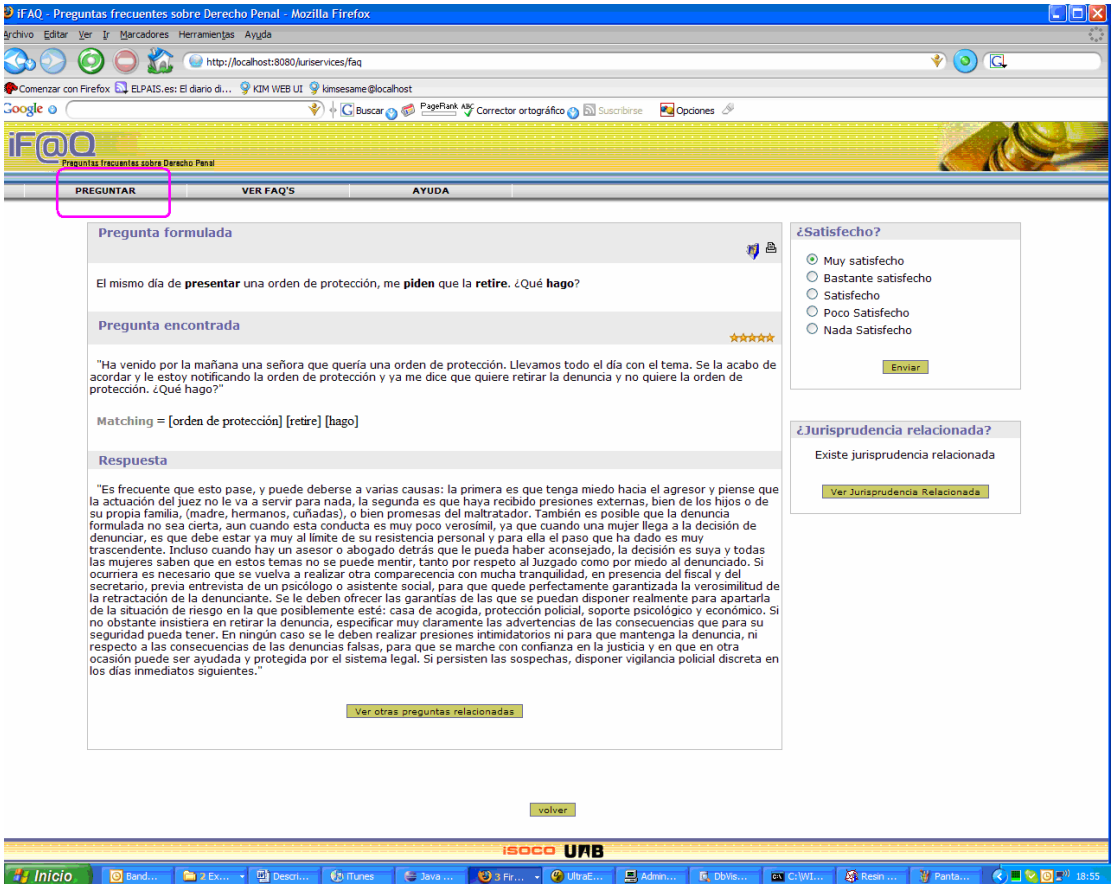

Figura 7.6: Realizar una nueva pregunta.

Si queremos reformular nuestra pregunta, pulsaremos sobre el botón "**VOLVER**", e iremos a la misma página anterior pero con los datos de la pregunta anteriormente formulada (Figura 7.7).

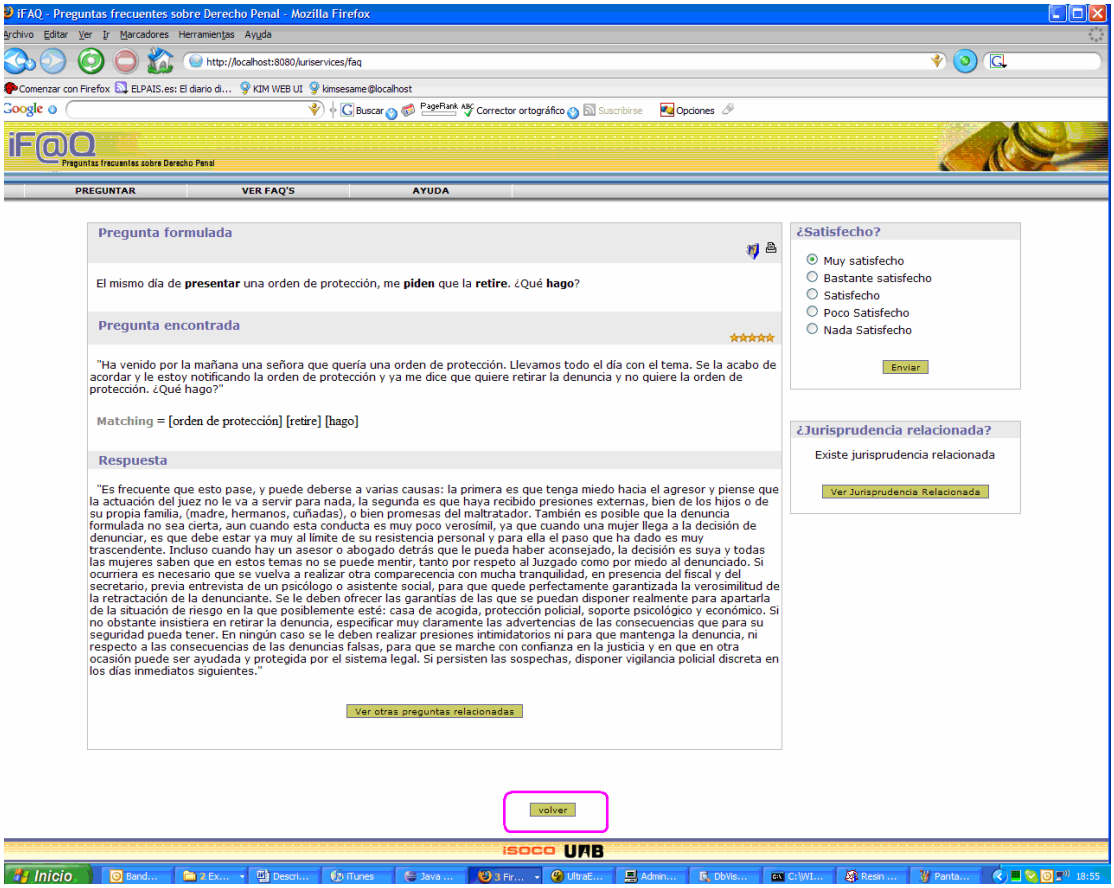

Figura 7.7: Volver a reformular una pregunta

Consultar al Experto y Proporcionar grado de satisfacción.

Este escenario consiste en lo siguiente. El usuario escribe en un espacio a tal efecto la pregunta que desea realizar al sistema (Figura 7.1 y Figura 7.2). La pregunta se formula en los términos que utilizaríamos si consultáramos a otro Juez. Una vez hemos escrito la pregunta, pulsamos sobre el botón "**RESPONDER**" y la herramienta proporcionará la pregunta respondida por el Juez experto que más se asemeje a la pregunta formulada.

La pantalla con el resultado de la pregunta que se ha realizado a la herramienta, está dividida en varias secciones:

a) En primer lugar podemos ver la pregunta que hemos escrito.
b) En segundo lugar vemos la pregunta que la herramienta nos ofrece como la más parecida a la que hemos formulado, con un porcentaje de similaridad y las palabras que ha utilizado para obtener ese resultado.
c) En tercer lugar, podemos ver la respuesta que ha dado un Juez de la Escuela Judicial a esa pregunta.
d) En cuarto lugar podemos ver un conjunto de opciones en las que el usuario pueda establecer el **GRADO DE SATISFACCION** (**Figura 7.8**) respecto a la pregunta. Los valores que puede seleccionar el usuario son los siguientes:
    1. Muy satisfecho
    2. Bastante satisfecho
    3. Satisfecho
    4. Poco Satisfecho

5. Nada Satisfecho

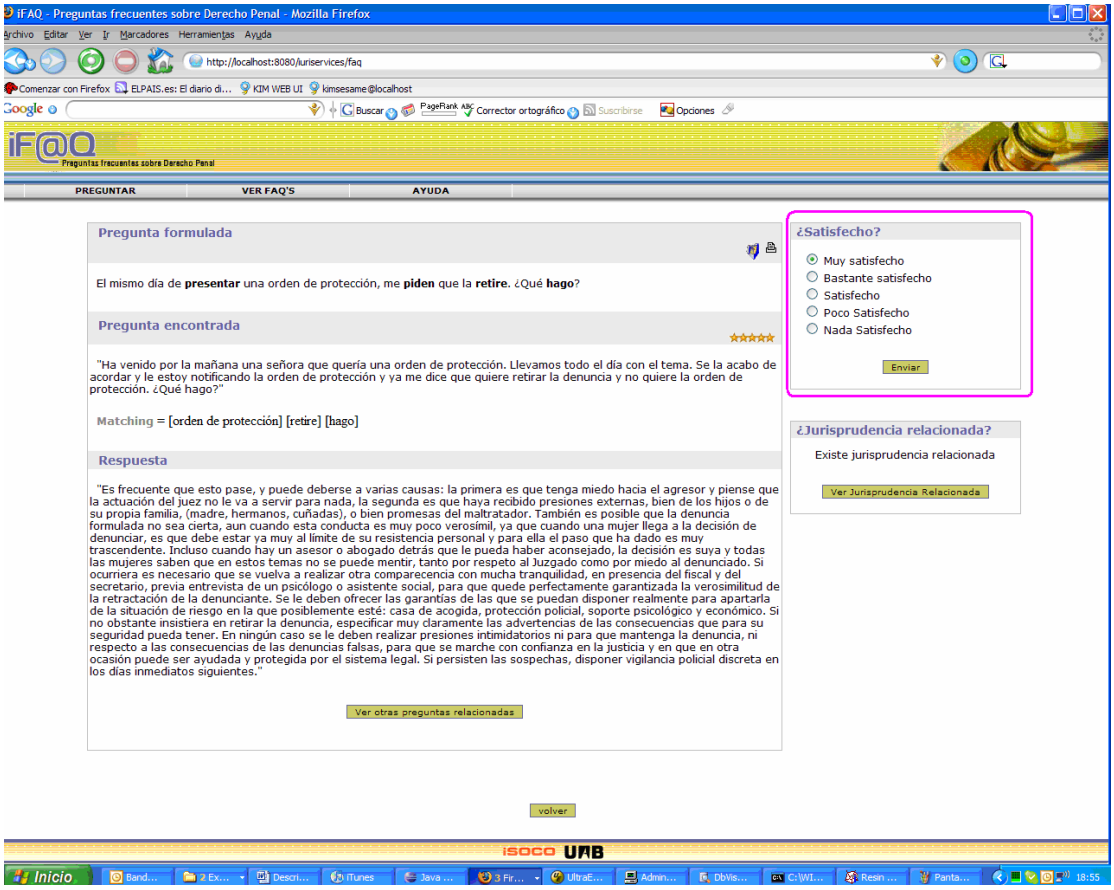

Figura 7.8: Pantalla con la respuesta

Consultar al Experto y ver las Preguntas Relacionadas.

Este escenario consiste en lo siguiente: El usuario escribe en un espacio a tal efecto la pregunta que desea realizar al sistema (Figura 7.1 y Figura 7.2). La pregunta se formula en los términos que utilizaríamos si consultáramos a otro Juez. Una vez hemos escrito la pregunta, pulsamos sobre el botón "RESPONDER" y la herramienta proporcionará la pregunta respondida por el Juez experto que más se asemeje a la pregunta formulada.

La pantalla con el resultado de la pregunta que se ha realizado a la herramienta, está dividida en varias secciones:

a) En primer lugar podemos ver la pregunta que hemos escrito.
b) En segundo lugar vemos la pregunta que la herramienta nos ofrece como la más parecida a la que hemos formulado, con un porcentaje de similaridad y las palabras que ha utilizado para obtener ese resultado.
c) En tercer lugar, podemos ver la respuesta que ha dado un Juez de la Escuela Judicial a esa pregunta.
d) En cuarto lugar podemos ver otras preguntas relacionadas con la pregunta frecuente, seleccionando el botón **VER OTRAS PREGUNTAS RELACIONADAS**. (**Figura 7.9**) iremos a la pantalla de Jurisprudencia relacionada con dicha pregunta/respuesta (**Figura 7.10**).

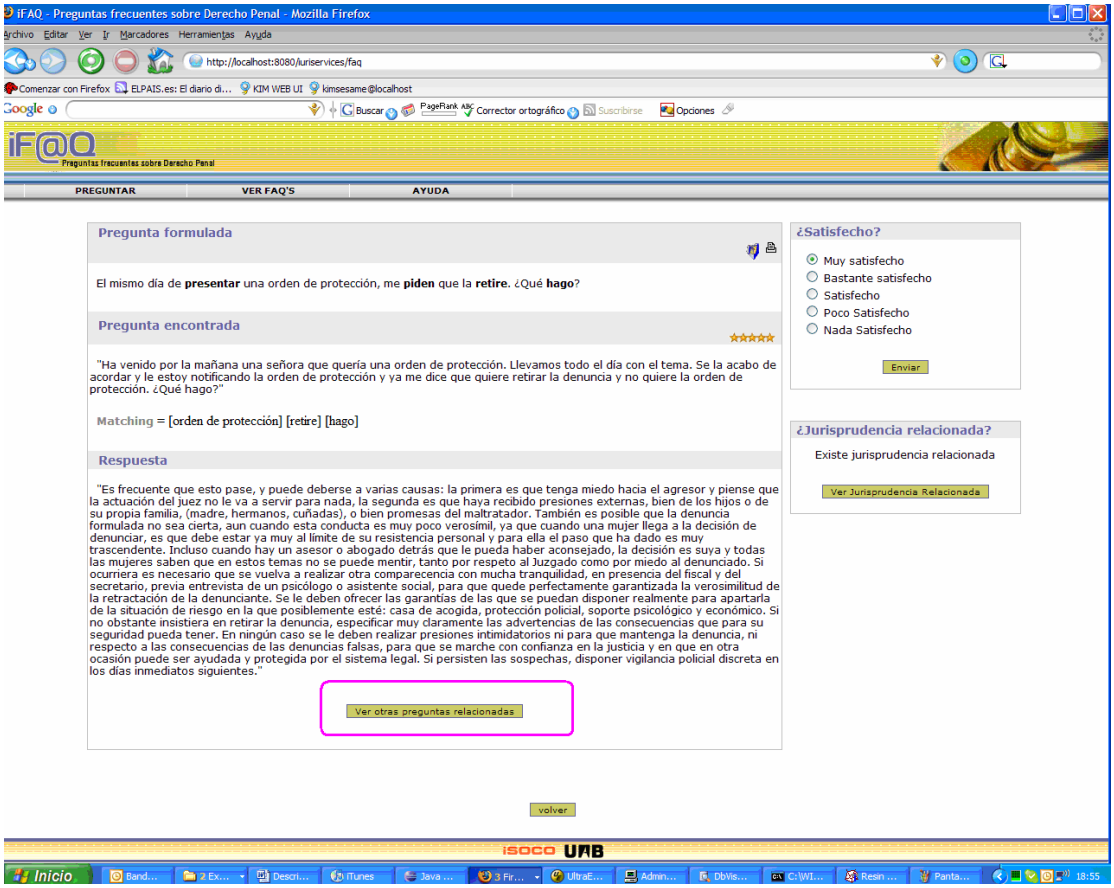

Figura 7.9: Pantalla con la respuesta

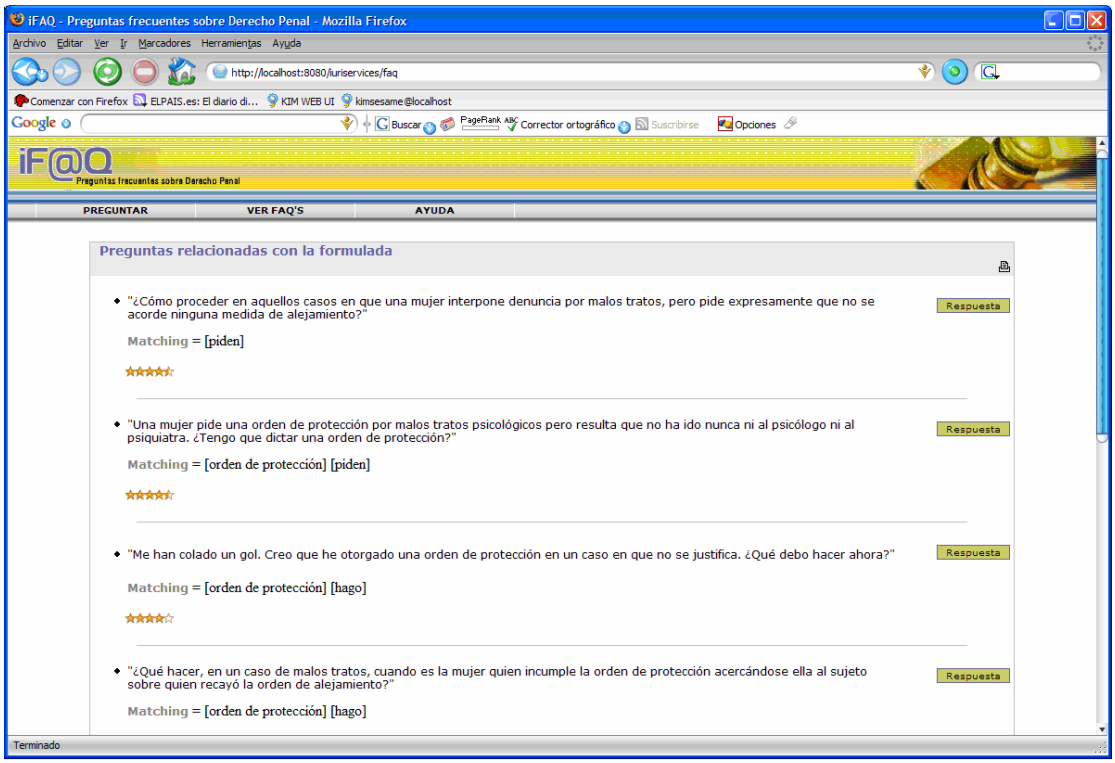

Figura 7.10: Pantalla con la respuesta

Consultar al Experto y ver la Jurisprudencia Relacionada.

Este escenario consiste en lo siguiente: El usuario escribe en un espacio a tal efecto la pregunta que desea realizar al sistema (Figura 7.1 y Figura 7.2). La pregunta se formula en los términos que utilizaríamos si consultáramos a otro Juez. Una vez hemos escrito la pregunta, pulsamos sobre el botón "RESPONDER" y la herramienta proporcionará la pregunta respondida por el Juez experto que más se asemeje a la pregunta formulada.

La pantalla con el resultado de la pregunta que se ha realizado a la herramienta, está dividida en varias secciones:

a) En primer lugar podemos ver la pregunta que hemos escrito.
b) En segundo lugar vemos la pregunta que la herramienta nos ofrece como la más parecida a la que hemos formulado, con un porcentaje de similaridad y las palabras que ha utilizado para obtener ese resultado.
c) En tercer lugar, podemos ver la respuesta que ha dado un Juez de la Escuela Judicial a esa pregunta.
d) En cuarto lugar podemos buscar la jurisprudencia relacionada con la pregunta frecuente, seleccionando el botón **VER JURISPRUDENCIA RELACIONADA**. (**Figura 7.11**) iremos a la pantalla de Jurisprudencia relacionada con dicha pregunta/respuesta (**Figura 7.12**)

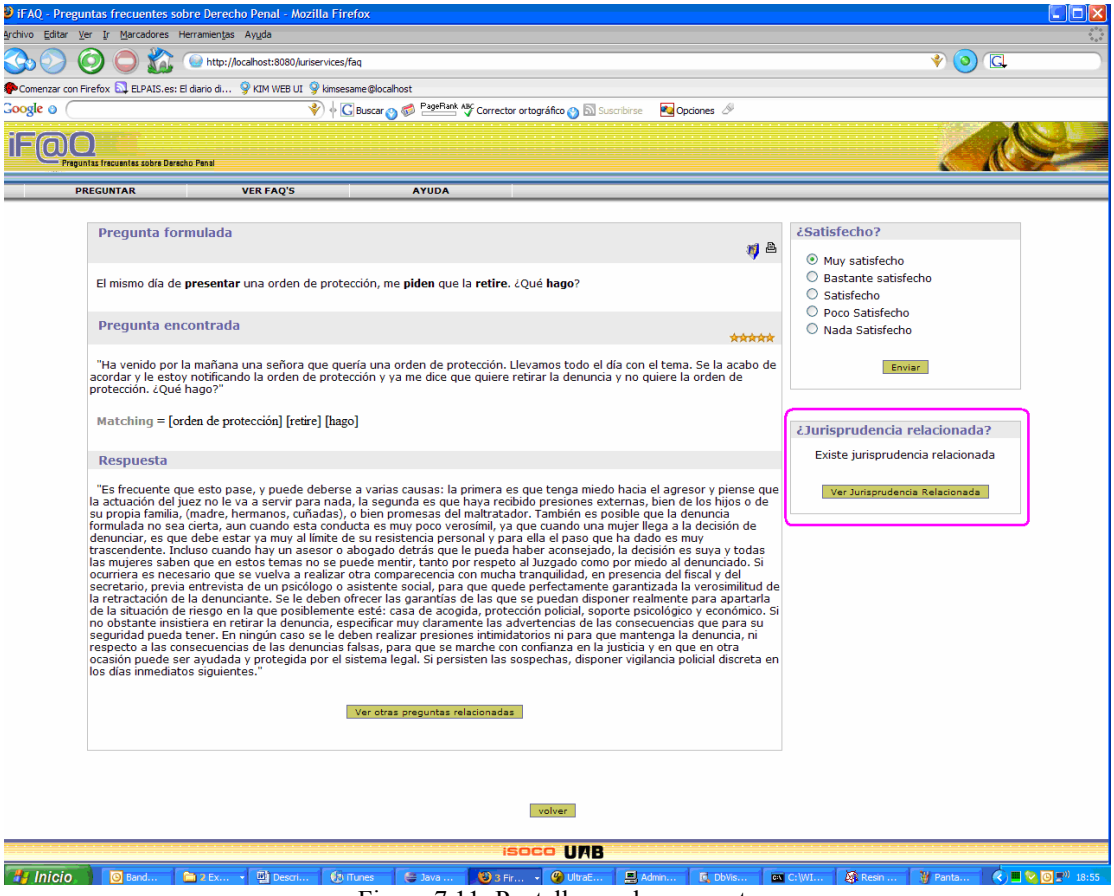

Figura 7.11: Pantalla con la respuesta

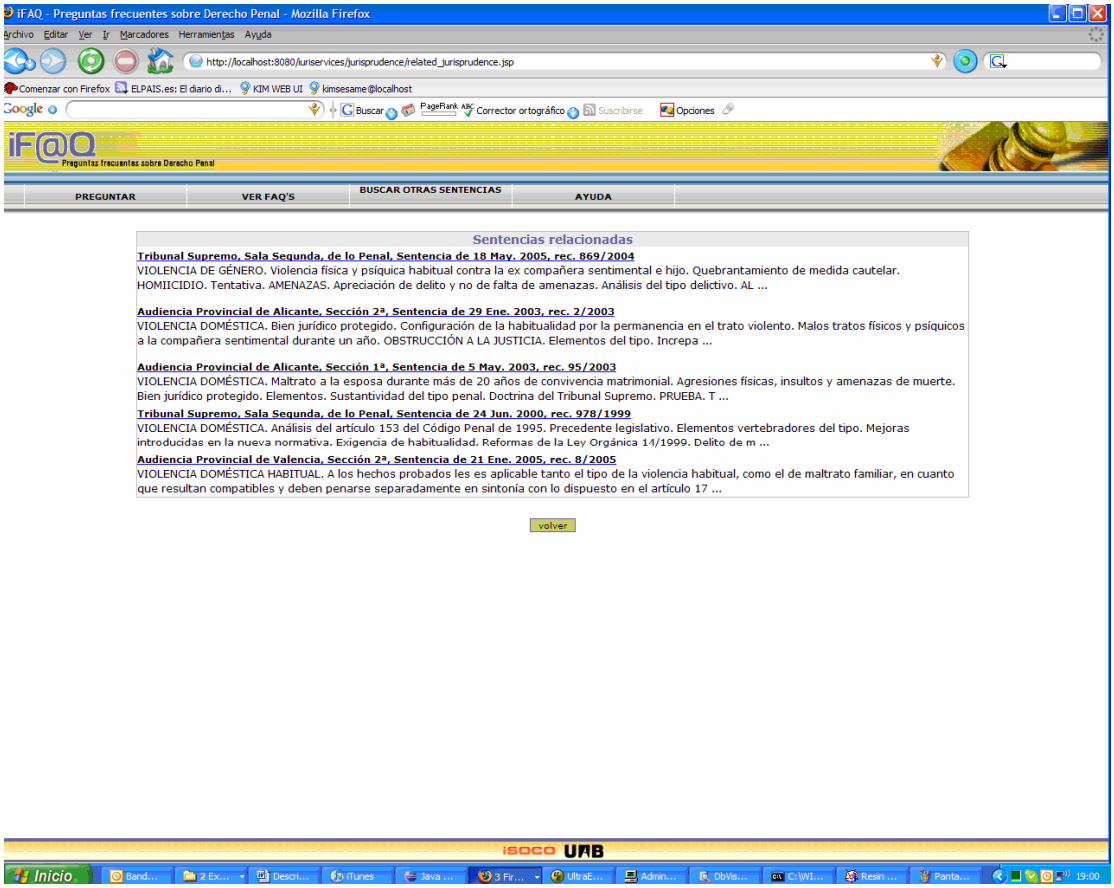

Figura 7.12: Pantalla con la Jurisprudencia Relacionada

Búsquedas directas sobre la base de datos de preguntas-respuestas.

El usuario puede seleccionar la opción de menú **VER FAQ's** tanto en la pantalla inicial como cuando recibe una respuesta del sistema (**Figura 7.13** y **Figura 7.14**).

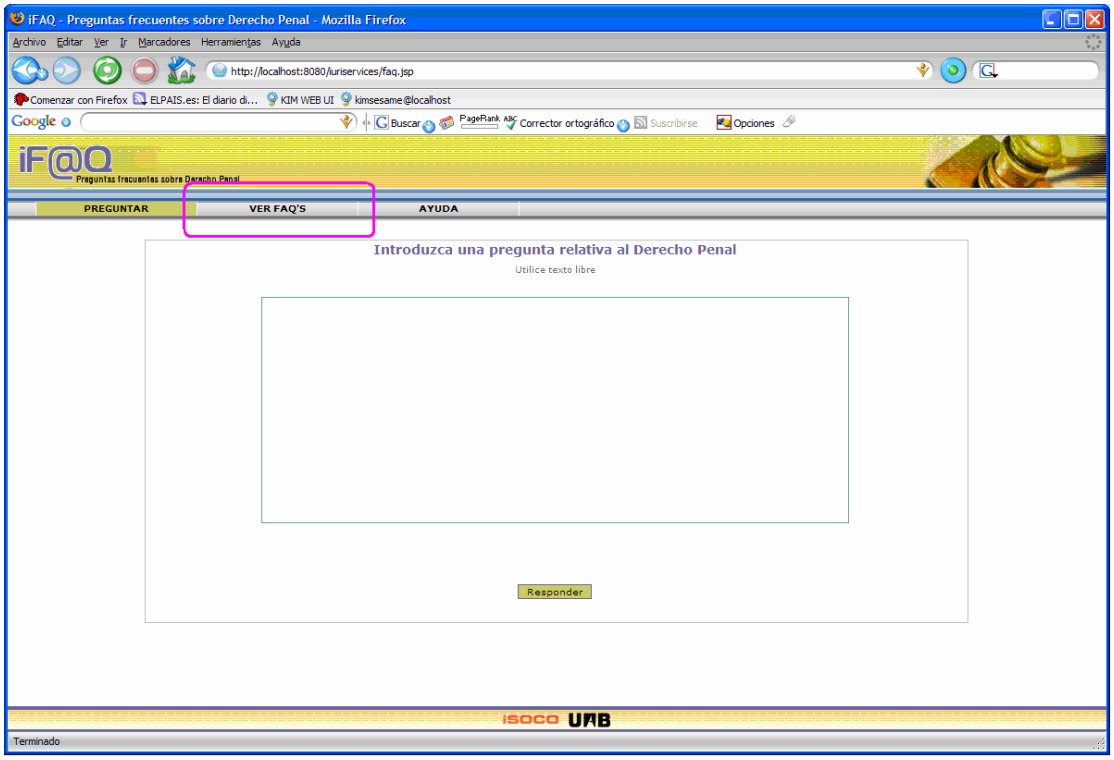

Figura 7.13: Selección Ver todas las Preguntas Frecuentes

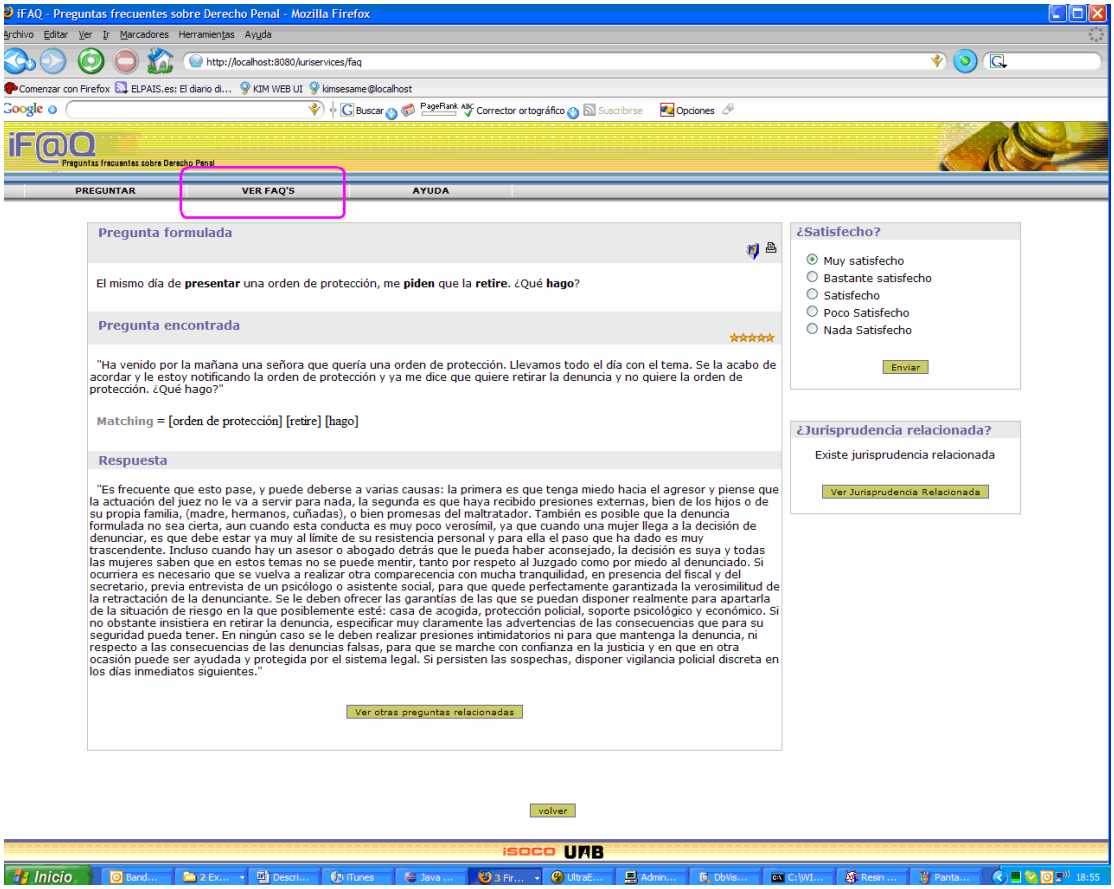

Figura 7.14: Selección Ver todas las Preguntas Frecuentes

Mediante esta opción podrá ver todas las preguntas – respuestas de la base de datos clasificadas según los temas o dominios de las mismas Figura 7.15.

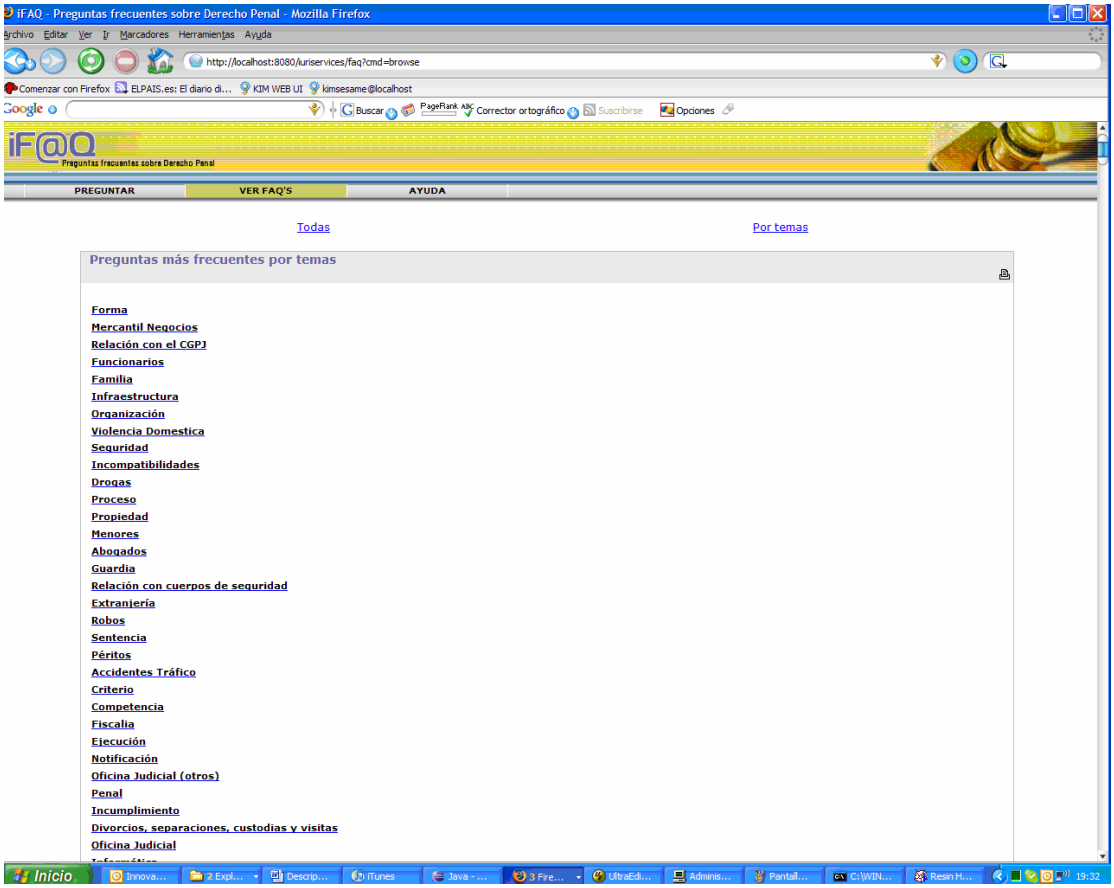

Figura 7.15: Ver FAQs clasificadas por dominios

Si selecciona por ejemplo el dominio “Violencia Doméstica” podrá acceder a todas las preguntas frecuentes referentes a violencia doméstica que se encuentran en la base de datos Figura 7.16.

Figura 7.16: Faqs de Violencia Doméstica

Si por ejemplo se encuentra interesado en una de las preguntas, pulsando el botón de "**RESPUESTA**" podrá acceder a la respuesta formulada por un juez de la escuela judicial a una nueva ventana, donde se podrá visualizar la pregunta seleccionada previamente y la respuesta (Figura 7.17).

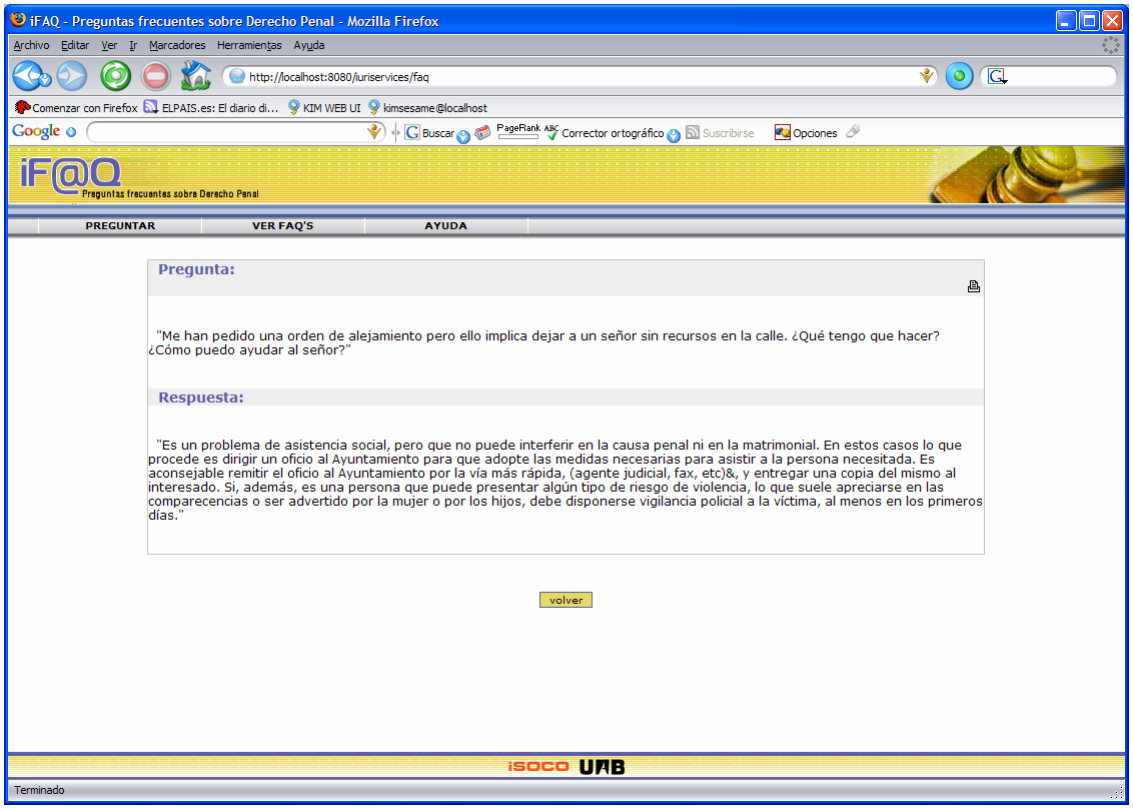

Figura 7.17: Pregunta-Respuesta seleccionada de Ver FAQs

Haciendo clic en el botón "**VOLVER**" podrá retornar a la pantalla anterior donde se veía las preguntas – respuestas del dominio seleccionado.

Además de la búsqueda por temas, el usuario puede seleccionar todas las preguntas frecuentes, pulsando en el link "**TODAS**" (**Figura 7.18**).

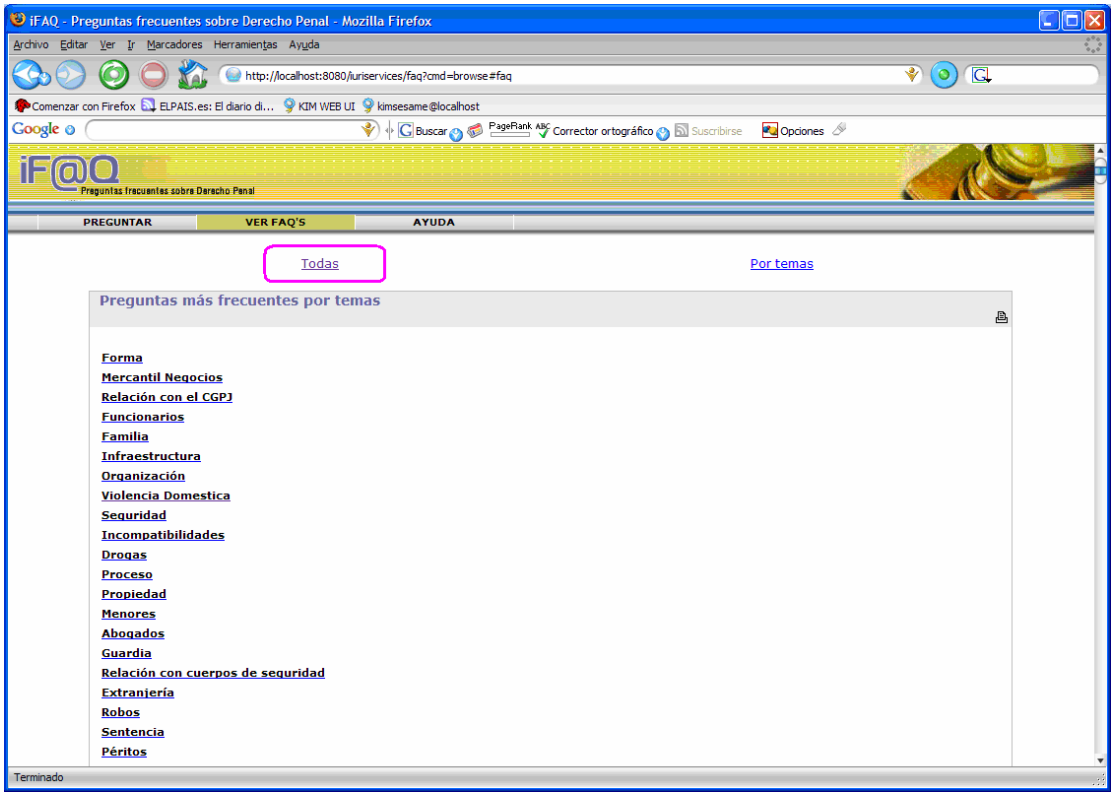

Figura 7.18: Seleccionar Ver todas las FAQs

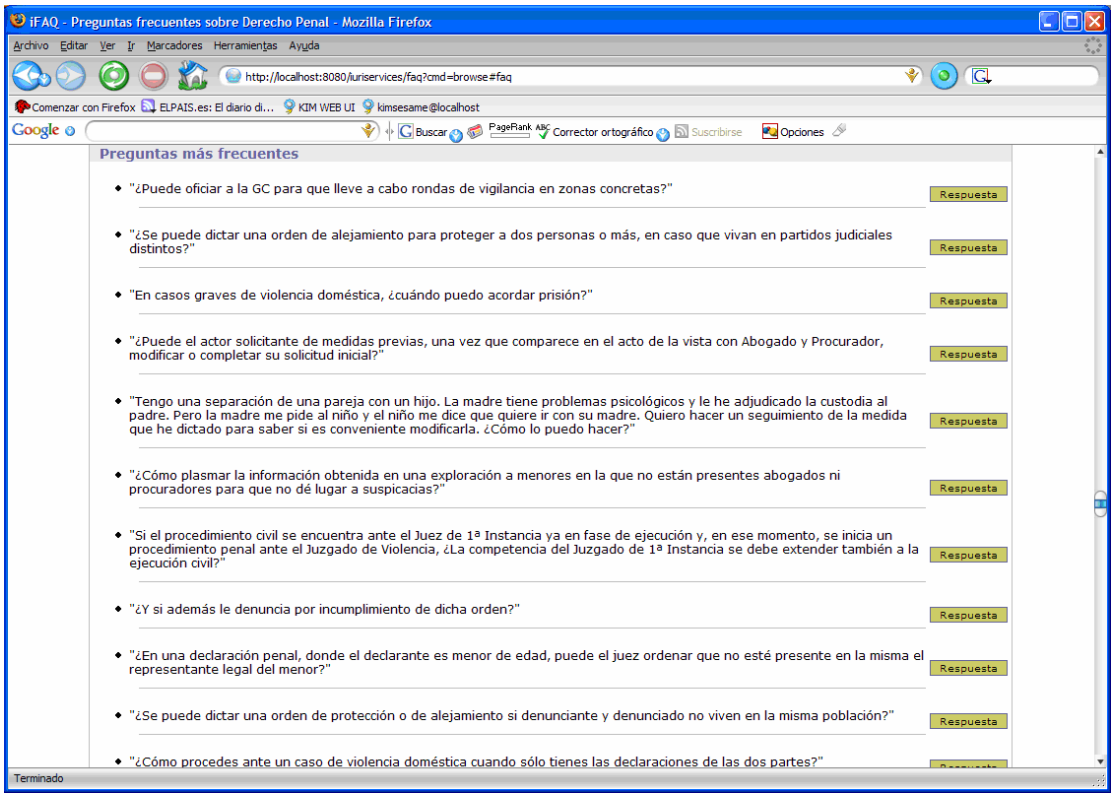

Figura 7.19: Ver todas las FAQ's sin clasificación

7.2.2 Search&Browse Congnitive Walkthrough

Introducción

Iuriservices es una nueva herramienta (accesible como página web en http://iuriservices.isoco.net usuario:iuri password: iurisekt) para ayudar a la resolución de casos, ofreciendo soporte en la toma de decisiones cuando la consulta a otros jueces es complicada (horarios de guardia, días festivos,…).

Las principales funcionalidades que ofrece son:

- Permite efectuar consultas en lenguaje común ofreciendo preguntas similares que han sido respondidas por jueces expertos de la Escuela Judicial.
- Búsquedas directas sobre la base de datos de las preguntas respondidas por los jueces expertos.
- Búsqueda de Jurisprudencia asociada a las preguntas.
- Búsqueda de Jurisprudencia.

El objetivo de estas pruebas es validar la utilidad de la aplicación, concretamente de la aplicación de búsqueda de jurisprudencia, para el usuario de la misma, y NO evaluar al usuario que participa en las pruebas.

Escenarios

Acceso a la herramienta de búsqueda de sentencias.

La aplicación de búsqueda de sentencias es accesible desde cualquier punto de la aplicación, existiendo para ello un menú en la aplicación denominado "Buscar sentencias" (Figura 7.20)

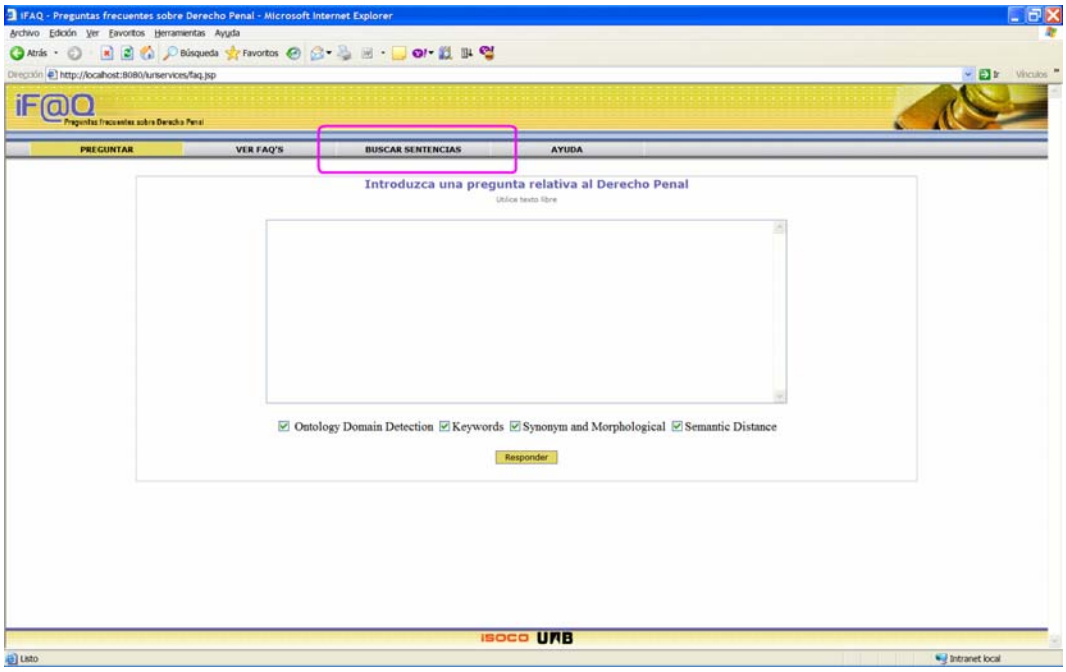

Figura 7.20: Menú Buscar Sentencias

Si hacemos clic en dicho menú abriremos la ventana principal de búsqueda de Sentencias (Figura 7.21).

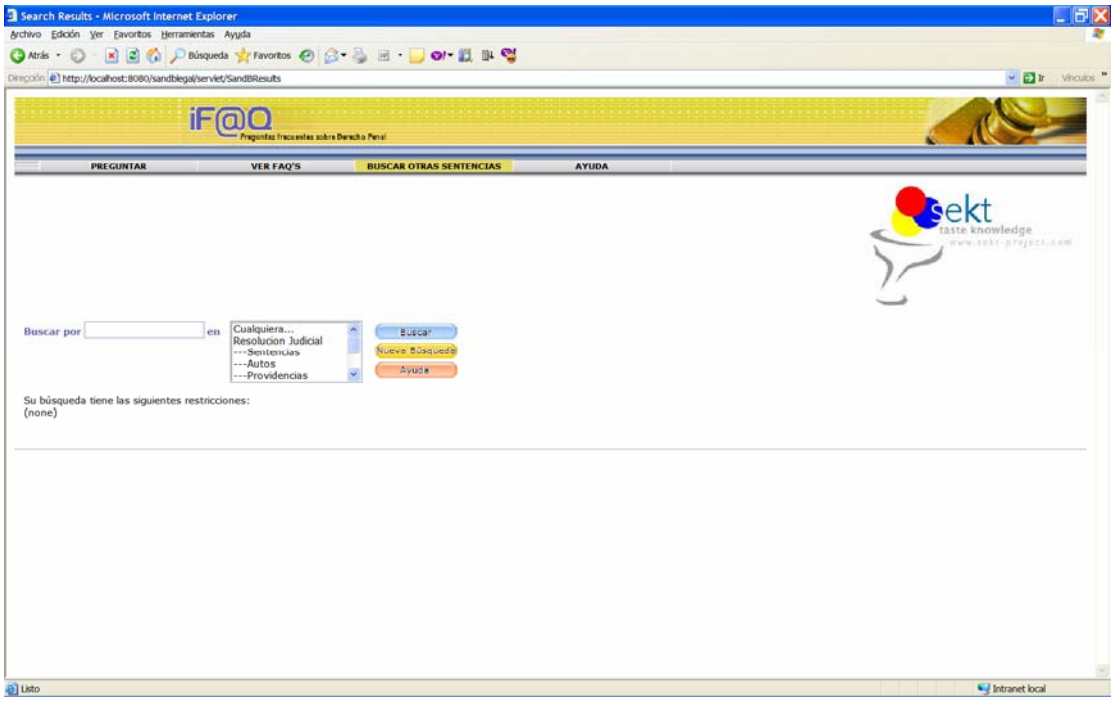

Figura 7.21: Menú Buscar Sentencias

Como se puede ver en la Figura 7.21 la interfaz de búsqueda consiste en una caja de texto, en el que el usuario introduce en texto libre lo que desea buscar y a la derecha se encuentra los distintos filtros de búsqueda que puede aplicar:

- Cualquier tipo de resultado
- Tipos de resoluciones judiciales
  - Sentencias
  - Autos
  - Providencias
- Ponentes
- Órganos Judiciales
- Tópicos
- Base de Conocimiento

Realizar una búsqueda

Para realizar una búsqueda, simplemente hay que introducir el término o términos de búsqueda en la caja de texto creada a tal efecto y seleccionar uno de los tipos de resultados que queremos obtener. En la Figura 7.22 se hace una búsqueda en cualquier tipo de resultado.

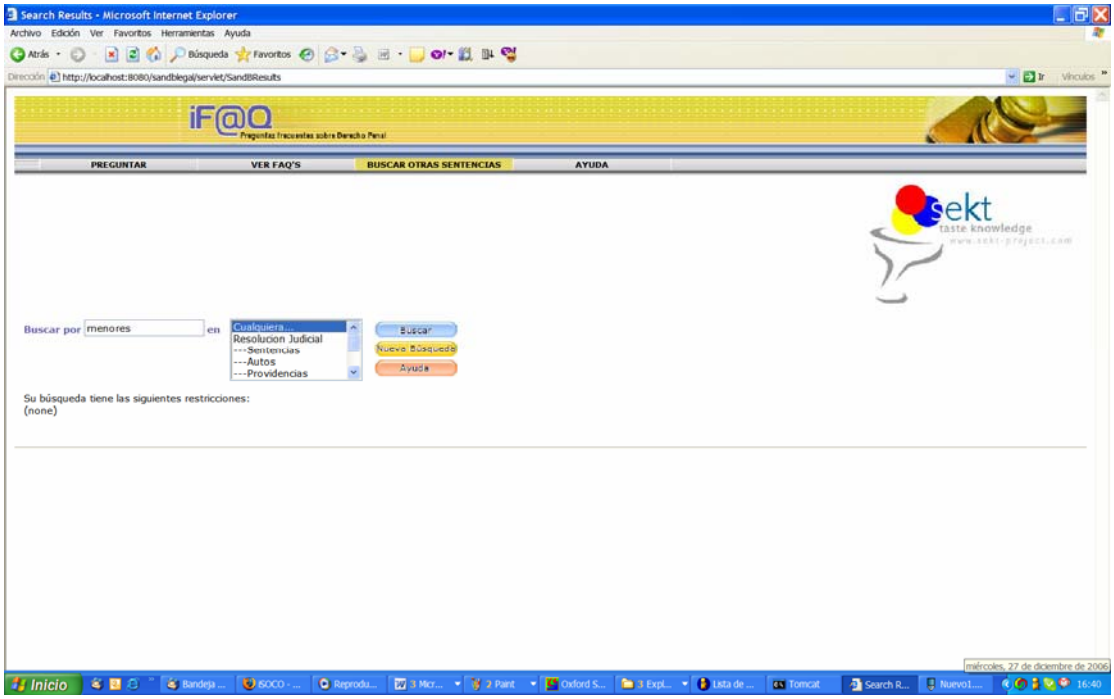

Figura 7.22: Buscar 'menores' en cualquier resultado.

Visualización de los resultados

Como se puede en la Figura 7.23, en la pantalla se muestra un resumen con los resultados de búsqueda. Según el tipo de resultado el sistema proporciona el número de documentos que se ajustan a la cadena de búsqueda. En la Figura 7.23 se puede ver que se corresponden a la cadena de búsqueda:

- 1048 sentencias
- 57 autos
- 1 Tópico incluye menores
- 1 elemento de la base de conocimiento incluye menores, en este caso "Juzgado de Menores".

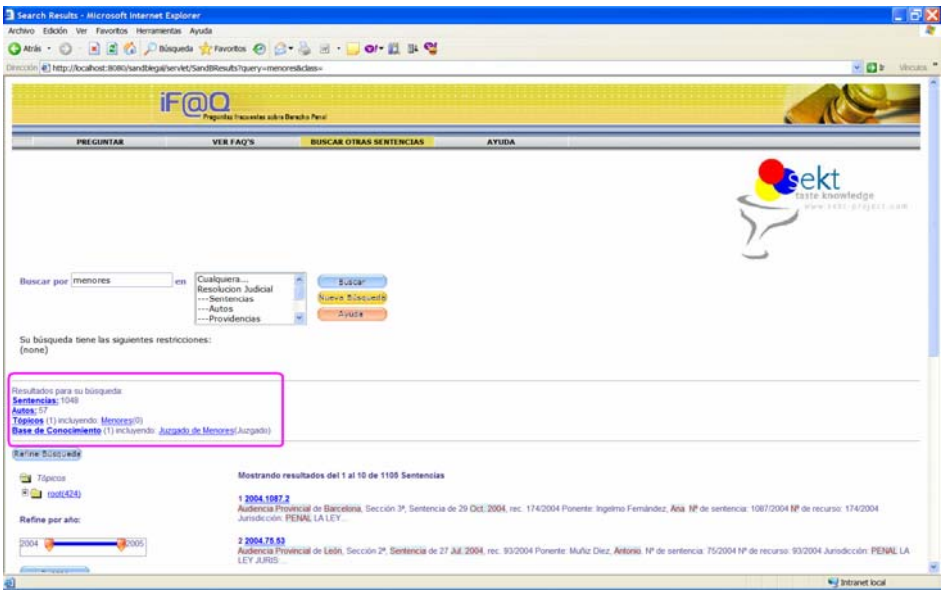

Figura 7.23: Resumen de resultados de Búsqueda

Seleccionando uno de estos resultados se filtrará por ese tipo de resultado. Por ejemplo seleccionando Autos, se reduce el número de documentos que se corresponden a la búsqueda a 57 (Figura 7.24)

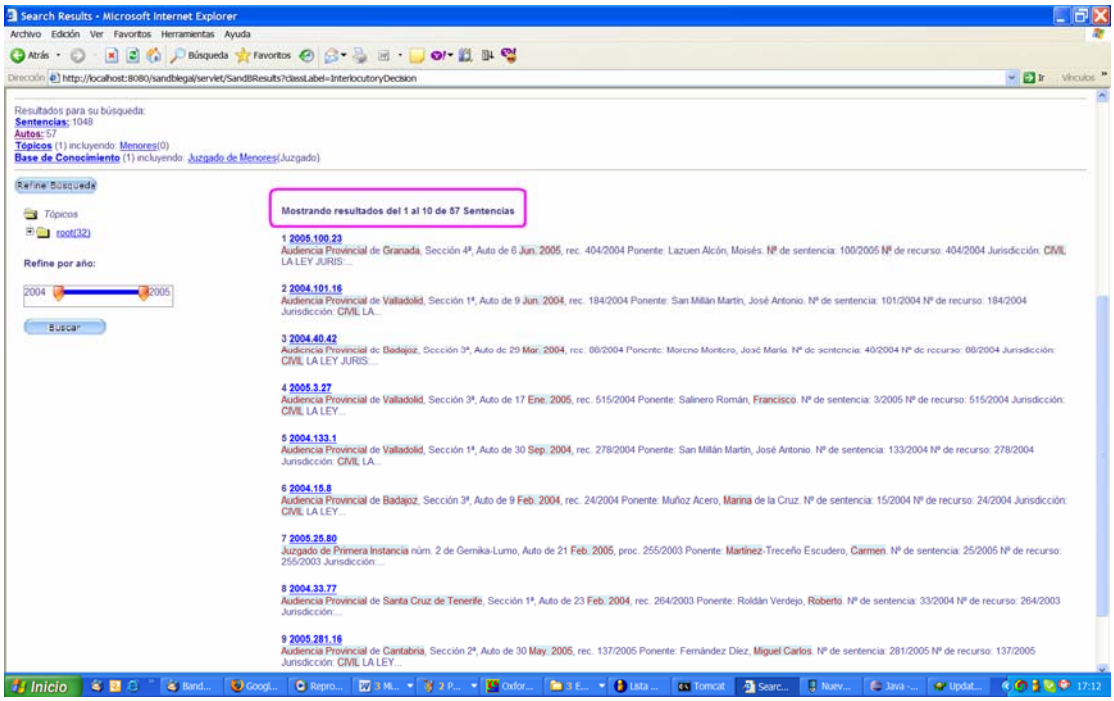

Figura 7.24: Refinamiento de Resultados

Refinamiento por Tópicos

En la Figura 7.23 se muestra un resumen de resultados, pero si el usuario está interesado en buscar en todos los tipos de resultados de búsqueda, puede filtrar por la jerarquía de tópicos (Figura 7.25). También se puede utilizar esta funcionalidad si ha seleccionado uno de los filtros de búsqueda del resumen de resultados.

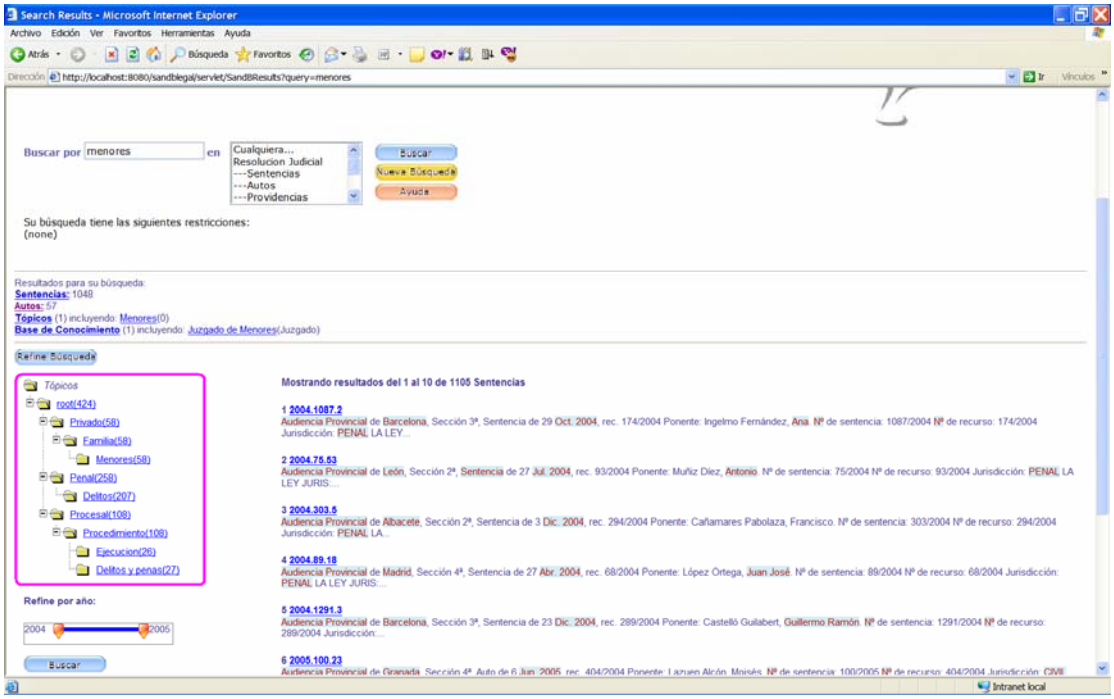

Figura 7.25: Jerarquía de Tópicos

Si por ejemplo seleccionamos uno de los tópicos, por ejemplo Menores, reducimos el número de resultados a 58 (Figura 7.26)

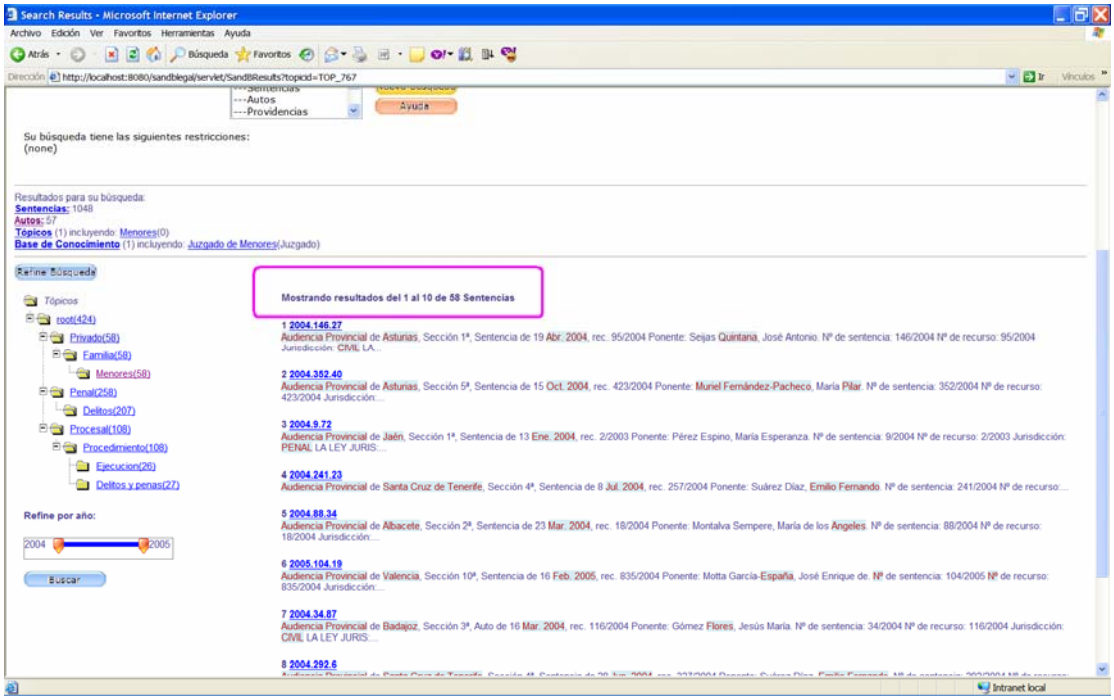

Figura 7.26: Filtrado resultante

Visualización de un documento

El usuario puede seleccionar un documento de los resultados, haciendo clic sobre uno de los links de los documentos (Figura 7.27).

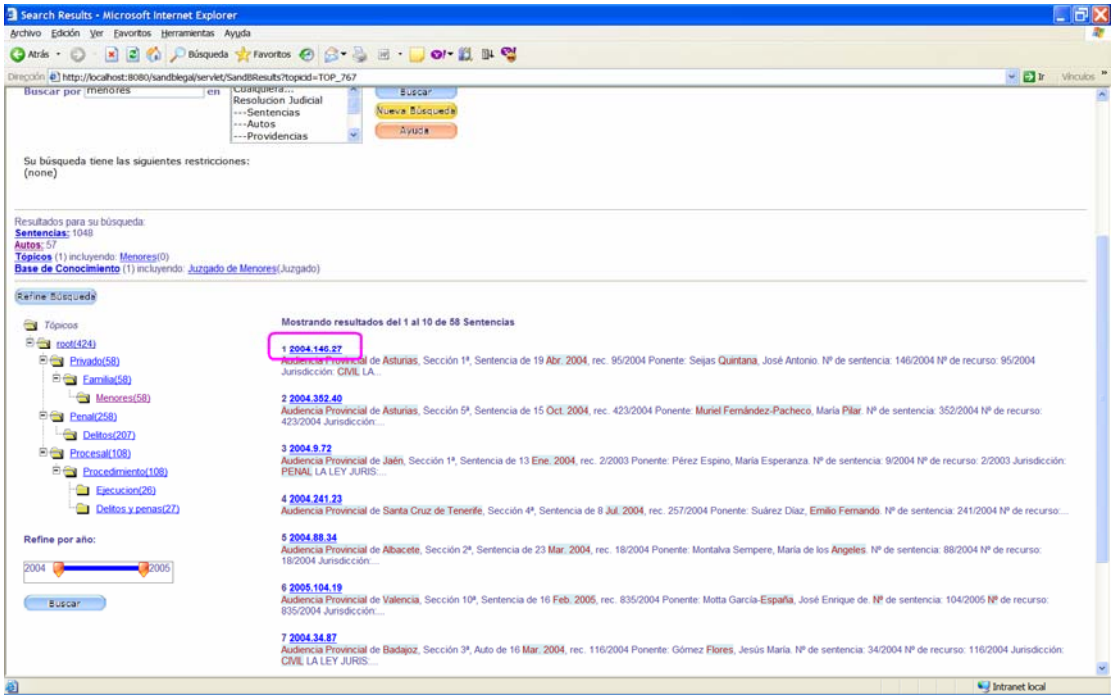

Figura 7.27: Selección de un documento.

Una vez seleccionado el documento obtenemos una pantalla como la siguiente (Figura 7.28)

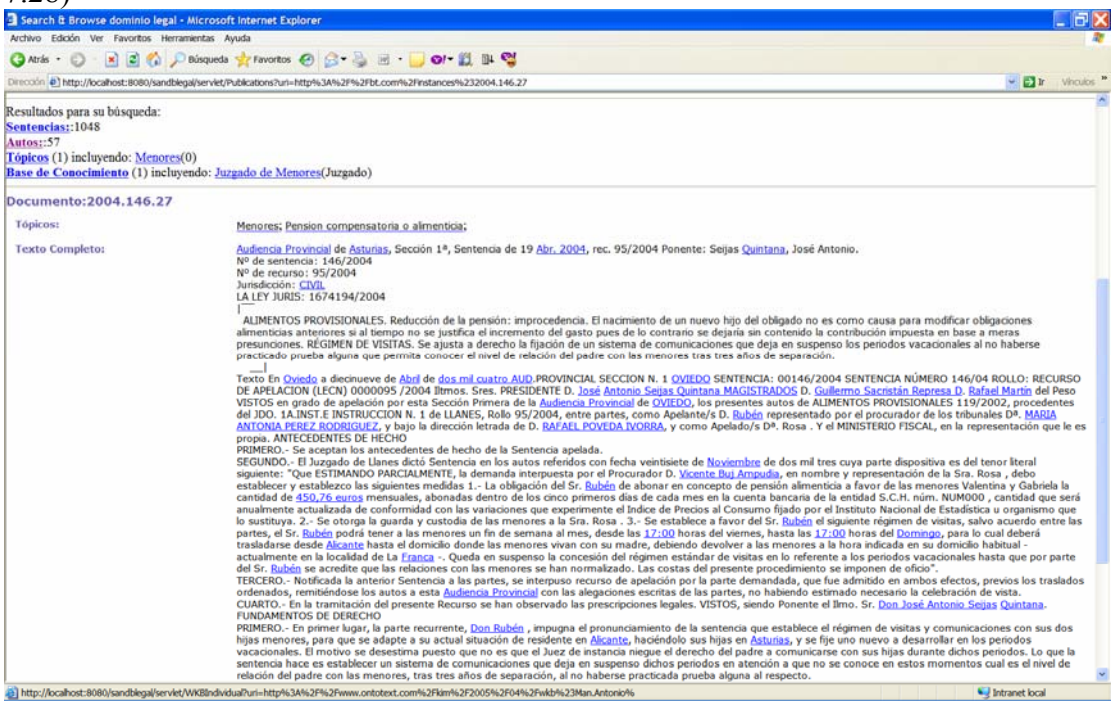

Figura 7.28: Documento Resultado.

Navegación dentro de un documento resultante

El usuario puede además navegar por los tópicos relacionados con el documento seleccionado (Figura 7.29). Un documento puede estar relacionado con más de un tópico.

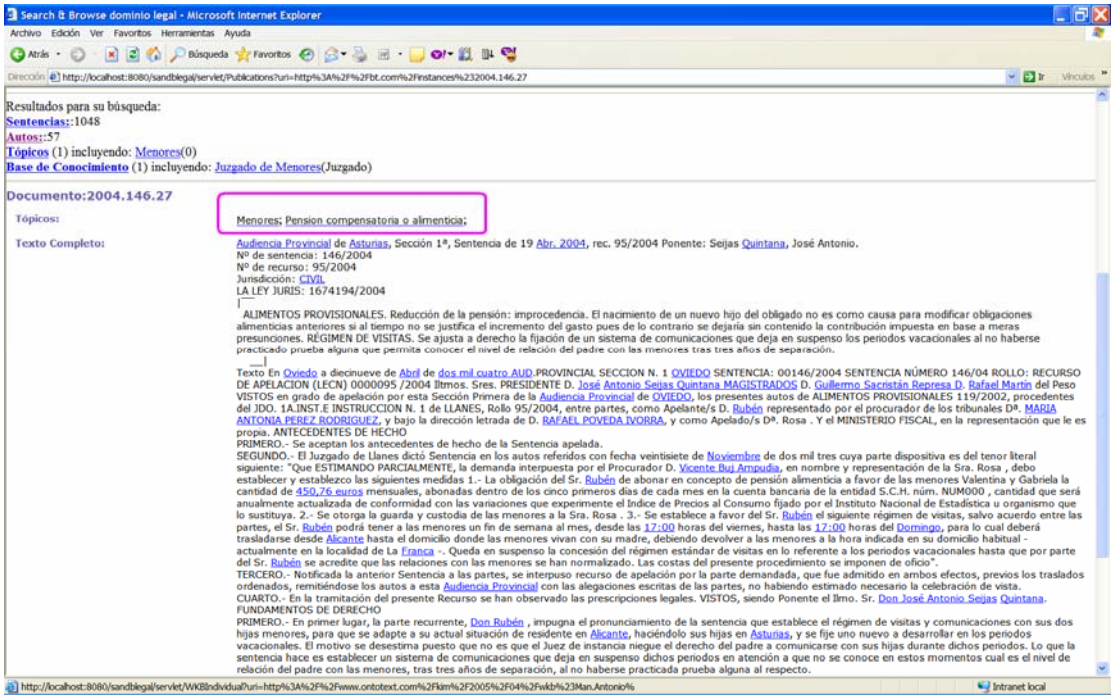

Figura 7.29: Tópicos relacionados con el documento.

Si el usuario selecciona por ejemplo "Pensión Compensatoria" visualiza una pantalla como la de la Figura 7.30. En esta pantalla se visualizan todos los documentos relacionados con el tópico seleccionado, además de proporcionarse más información sobre cuál es el tópico padre, qué topicos se encuentran relacionados o si tiene subtópicos.

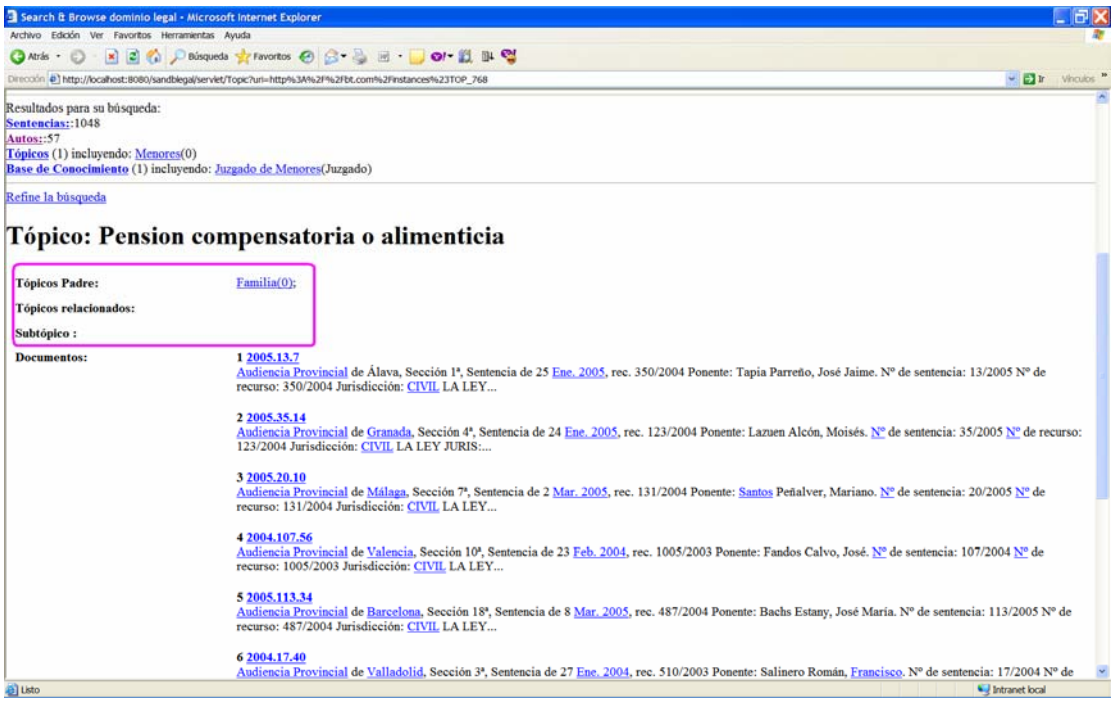

Figura 7.30: Navegación por tópicos asociados a un documento.

Si el usuario pasa el ratón sobre uno de los elementos subrayados en uno de los documentos resultado (Figura 7.28) el sistema le proporciona información adicional en formato de "Etiqueta" o "ToolTipText" Figura 7.31

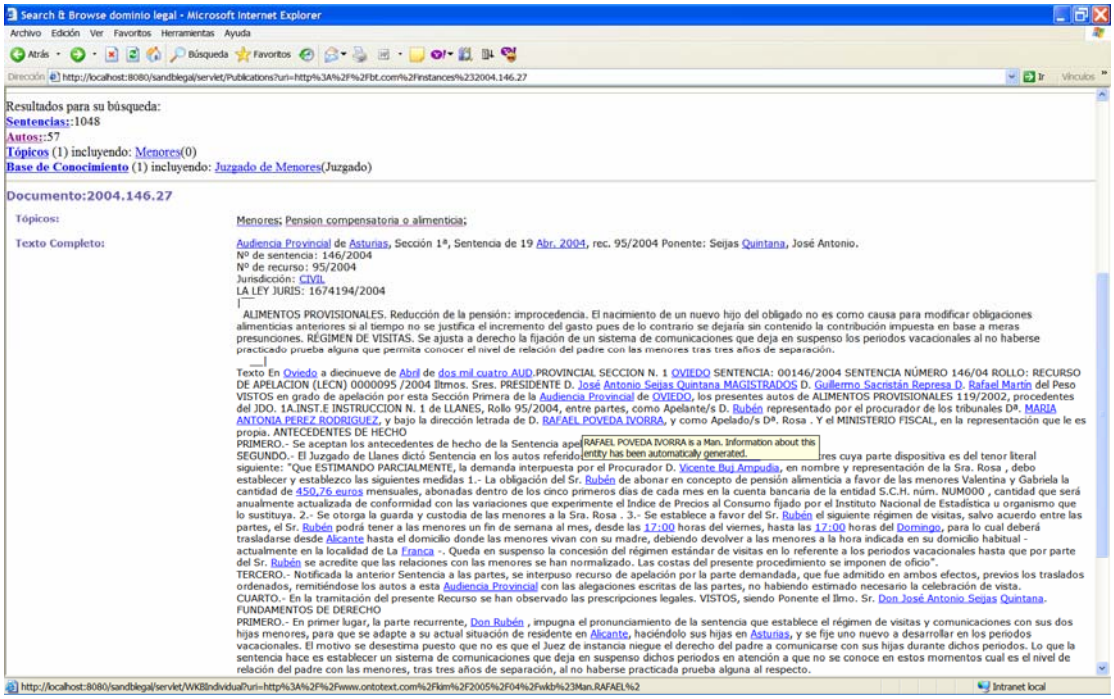

Figura 7.31: Información sobre una entidad identificada.

Si el usuario hace clic sobre uno de estos links la aplicación le mostrará información sobre dicha entidad, como por ejemplo el número de documentos donde aparece el un letrado Figura 7.32

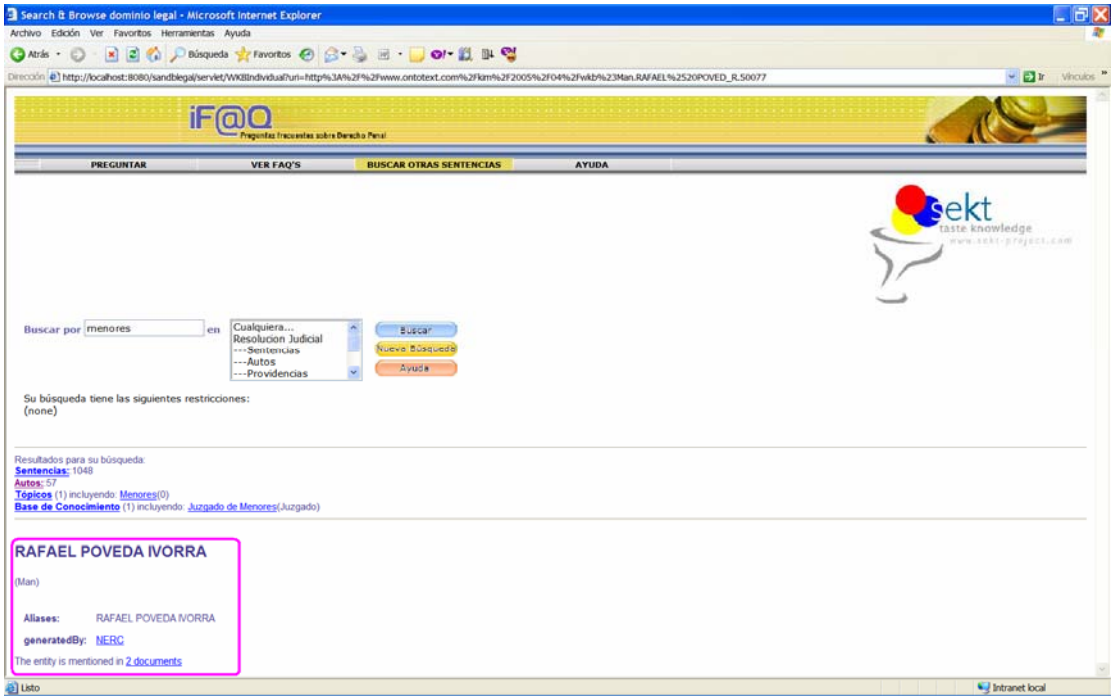

Figura 7.32: Información sobre una entidad identificada

Finalmente si hacemos clic en el link asociado a los dos documentos podremos ver cuales son los documentos relacionados con dicha persona (Figura 7.33) así como en la jerarquía de tópicos cuantos de los documentos que aparecen en la pantalla de resultados pertenece a cada uno de los tópicos.

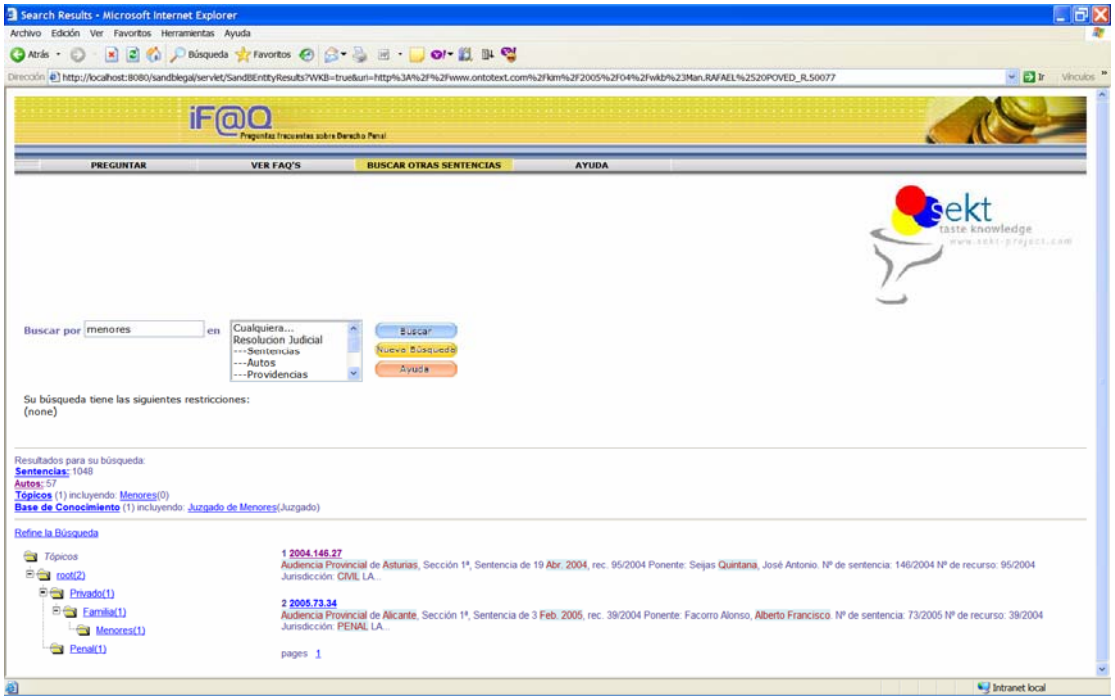

Figura 7.33: Información sobre una entidad identificada

7.3 Appendix 3: Judgment Ontology

```
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<rdf:RDF
    xmlns:psys="http://proton.semanticweb.org/2005/04/protons#"
    xmlns:pupp="http://proton.semanticweb.org/2005/04/protonu#"
    xmlns="http://users.bcn.isoco.net/~mercedes/SEKT/ontology/legal#"
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
    xmlns:protonkm="http://proton.semanticweb.org/2005/04/protokm#"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
    xmlns:owl="http://www.w3.org/2002/07/owl#"
    xmlns:daml="http://www.daml.org/2001/03/daml+oil#"
    xmlns:dc="http://purl.org/dc/elements/1.1/"
    xmlns:ptop="http://proton.semanticweb.org/2005/04/protont#"
  xml:base="http://users.bcn.isoco.net/~mercedes/SEKT/ontology/legal">
  <owl:Ontology rdf:about="">
    <owl:imports rdf:resource="http://proton.semanticweb.org/2005/04/protonkm"/>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Case law Legal Ontology</rdfs:comment>
    <owl:versionInfo rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
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    <owl:imports rdf:resource="http://proton.semanticweb.org/2005/04/protont"/>
    <owl:imports rdf:resource="http://proton.semanticweb.org/2005/04/protons"/>
  </owl:Ontology>
  <owl:Class rdf:ID="ProcesalDocument">
    <rdfs:subClassOf rdf:resource="http://proton.semanticweb.org/2005/04/protont#Document"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Procesal Document</rdfs:label>
  </owl:Class>
  <owl:Class rdf:ID="InterlocutoryDecision">
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Interlocutory Decision</rdfs:label>
    <rdfs:subClassOf>
      <owl:Class rdf:ID="JudicialDecision"/>
    </rdfs:subClassOf>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Auto:
An interlocutory decision is the typical form of a ruling that decides
(1) on appeals against judicial orders, (2) on prejudicial issues that may have been raised —for example, whether the victim and the injurer where married to apply specific provisions for domestic violence or not—, (3) procedural requirements —for example, whether the court has jurisdiction to hear the case, whether the case is /res judicata/, whether there is another case pending on the same issue (/lis pendes/), etc.—, (4) the invalidation of previous acts performed in violation of basic procedural requirements or fundamental rights, and (5) any other issue, when the law requires that the decision take this form.
</rdfs:comment>
  </owl:Class>
  <owl:Class rdf:ID="LegalOrganization">
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >A legal organization in Spain, court, etc </rdfs:comment>
    <rdfs:subClassOf rdf:resource="http://proton.semanticweb.org/2005/04/protont#Organization"/>
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  </owl:Class>
  <owl:Class rdf:ID="AutonomusComunities">
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    </rdfs:subClassOf>
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    >Autonomus Communities</rdfs:label>
  </owl:Class>
  <owl:Class rdf:ID="ProceduralRole">
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    >Procedural Role</rdfs:label>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Procedural roles that an agent might play during a judicial procedure</rdfs:comment>
    <rdfs:subClassOf rdf:resource="http://proton.semanticweb.org/2005/04/protont#Role"/>
  </owl:Class>
  <owl:Class rdf:ID="JudicialParty">
```

```
    <rdfs:subClassOf>
      <owl:Class rdf:about="#JudicialRegion"/>
    </rdfs:subClassOf>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Judicial Party</rdfs:label>
  </owl:Class>
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    <rdfs:subClassOf>
      <owl:Class rdf:about="#JudicialRegion"/>
    </rdfs:subClassOf>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Municipality</rdfs:label>
  </owl:Class>
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    <rdfs:subClassOf rdf:resource="#LegalAbstraction"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Jurisdiction</rdfs:label>
  </owl:Class>
  <owl:Class rdf:ID="JudicialOrder">
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Spanish: Providencia

A judicial order is the typical form of a decision that bears on the procedural management of a case: this is, it is the usual form of a decision regarding the procedures to be followed, acts to be performed and all motions as to how the case is to be handled.
</rdfs:comment>
    <rdfs:subClassOf>
      <owl:Class rdf:about="#JudicialDecision"/>
    </rdfs:subClassOf>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Judicial Order</rdfs:label>
  </owl:Class>
  <owl:Class rdf:ID="Judgment">
    <rdfs:subClassOf>
      <owl:Class rdf:about="#JudicialDecision"/>
    </rdfs:subClassOf>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Sentencia
A judgment is qualitatively the most important type of judicial decision. It is the usual form of a decision that puts an end to a case.
</rdfs:comment>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Judgment</rdfs:label>
  </owl:Class>
  <owl:Class rdf:ID="Tribunal">
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Tanto los tribunales como las audiencias tienen un tribunal formado por varios jueces
</rdfs:comment>
    <rdfs:subClassOf rdf:resource="#LegalOrganization"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Tribunal</rdfs:label>
  </owl:Class>
  <owl:Class rdf:about="#JudicialDecision">
    <rdfs:subClassOf rdf:resource="#ProcesalDocument"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Judicial Decision</rdfs:label>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >An essential part of the role of a court is to take decisions regarding cases in its docket. Those decisions are sometimes rendered orally, and then documented, but most of the time they are directly in writing.
</rdfs:comment>
  </owl:Class>
  <owl:Class rdf:ID="JudgmentNumber">
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    >Case law Number</rdfs:label>
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  </owl:Class>
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    <rdfs:subClassOf rdf:resource="http://proton.semanticweb.org/2005/04/protont#Number"/>
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    >Appeal Number</rdfs:label>
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    >Audiencia</rdfs:label>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Tanto los tribunales como las audiencias tienen un tribunal formado por varios jueces
```

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</rdfs:comment>
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  </owl:Class>
  <owl:Class rdf:ID="Juzgado">
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    >Juzgado</rdfs:label>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Solamente tiene un juez</rdfs:comment>
  </owl:Class>
  <owl:Class rdf:ID="Province">
    <rdfs:subClassOf>
      <owl:Class rdf:about="#JudicialRegion"/>
    </rdfs:subClassOf>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Province</rdfs:label>
  </owl:Class>
  <owl:Class rdf:about="#JudicialRegion">
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Judicial Region</rdfs:label>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >The Judicial organization of the state is composed by: municipality, judicial party, province, autonomus
communities.</rdfs:comment>
    <rdfs:subClassOf rdf:resource="http://proton.semanticweb.org/2005/04/protont#Location"/>
  </owl:Class>
  <owl:ObjectProperty rdf:ID="relatedTerm">
    <rdfs:domain rdf:resource="http://proton.semanticweb.org/2005/04/protont#Topic"/>
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    ></rdfs:label>
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  </owl:ObjectProperty>
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    >has procedural role</rdfs:label>
  </owl:ObjectProperty>
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    >has document</rdfs:label>
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    >has judgment number</rdfs:label>
    <rdfs:domain rdf:resource="#JudicialDecision"/>
    <rdfs:range rdf:resource="#JudgmentNumber"/>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >An identifier that has the next format: number/year</rdfs:comment>
  </owl:ObjectProperty>
  <owl:ObjectProperty rdf:ID="hasLocation">
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >has location</rdfs:label>
    <rdfs:range rdf:resource="http://proton.semanticweb.org/2005/04/protonu#PoliticalRegion"/>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >the judicial organization of the the State. Depending on the type of the legal organization it has a district that can be a town,
a city, a region, province, etc.
</rdfs:comment>
```

```
    <rdfs:domain rdf:resource="#LegalOrganization"/>
  </owl:ObjectProperty>
  <owl:ObjectProperty rdf:ID="hasTopic">
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    ></rdfs:label>
    <rdfs:range rdf:resource="http://proton.semanticweb.org/2005/04/protont#Topic"/>
    <rdfs:domain rdf:resource="#JudicialDecision"/>
  </owl:ObjectProperty>
  <owl:ObjectProperty rdf:ID="hasMagistrate">
    <rdfs:range rdf:resource="http://proton.semanticweb.org/2005/04/protont#Person"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >has magistrate</rdfs:label>
    <rdfs:domain rdf:resource="#JudicialDecision"/>
  </owl:ObjectProperty>
  <owl:ObjectProperty rdf:ID="hasDeponent">
    <rdfs:domain rdf:resource="#JudicialDecision"/>
    <rdfs:range rdf:resource="http://proton.semanticweb.org/2005/04/protont#Person"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    ></rdfs:label>
  </owl:ObjectProperty>
  <owl:ObjectProperty rdf:ID="broaderTerm">
    <rdfs:range rdf:resource="http://proton.semanticweb.org/2005/04/protont#Topic"/>
    <rdfs:domain rdf:resource="http://proton.semanticweb.org/2005/04/protont#Topic"/>
    <owl:inverseOf>
      <owl:ObjectProperty rdf:ID="narrowerTerm"/>
    </owl:inverseOf>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Broader Term</rdfs:label>
  </owl:ObjectProperty>
  <owl:ObjectProperty rdf:about="#narrowerTerm">
    <rdfs:range rdf:resource="http://proton.semanticweb.org/2005/04/protont#Topic"/>
    <rdfs:domain rdf:resource="http://proton.semanticweb.org/2005/04/protont#Topic"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >narrower Term</rdfs:label>
    <owl:inverseOf rdf:resource="#broaderTerm"/>
  </owl:ObjectProperty>
  <owl:ObjectProperty rdf:ID="hasAppealNumber">
    <rdfs:range rdf:resource="#AppealNumber"/>
    <rdfs:domain rdf:resource="#InterlocutoryDecision"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >appeal number</rdfs:label>
  </owl:ObjectProperty>
  <owl:ObjectProperty rdf:ID="hasJurisdiction">
    <rdfs:range rdf:resource="#Jurisdiction"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >has jurisdiction</rdfs:label>
    <rdfs:domain rdf:resource="#JudicialDecision"/>
  </owl:ObjectProperty>
  <owl:DatatypeProperty rdf:ID="documentFullText">
    <rdfs:domain rdf:resource="#JudicialDecision"/>
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >Full text</rdfs:label>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >the full text of a document</rdfs:comment>
  </owl:DatatypeProperty>
  <owl:DatatypeProperty rdf:ID="hasDocumentYear">
    <rdfs:label rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >year</rdfs:label>
    <rdfs:comment rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
    >the document has been written during a year
</rdfs:comment>
    <rdfs:domain rdf:resource="#JudicialDecision"/>
  </owl:DatatypeProperty>
  <owl:AnnotationProperty rdf:about="http://www.w3.org/2002/07/owl#versionInfo"/>
  <owl:AnnotationProperty rdf:about="http://www.w3.org/2000/01/rdf-schema#comment"/>
  <owl:AnnotationProperty rdf:about="http://www.w3.org/2000/01/rdf-schema#label"/>
</rdf:RDF>
```

7.4 Appendix 4: Judgment database schema.

Document		
Field	**Decsription**	**Type**
ID_DOCUMENT	Unique id for document.	varchar(100)
KIMIDabs	KIM assigned ID for document	varchar (12)
KIMIDtxt	KIM assigned ID for document (full-txt)	varchar (12)
Title	Title in the form: *Tribunal Superior de Justicia de Navarra, Sala de lo Social, Auto de 15 Abr. 2005, rec. 127/2005* *Ponente: Arnedo Díez, María del Carmen.* *Nº de sentencia: 1/2005* *Nº de recurso: 127/2005* *Jurisdicción: SOCIAL*	text
Summary	Summary of the Judgment *"IMPUESTO SOBRE SOCIEDADES. Aportaciones efectuadas por los socios a una Sociedad Agraria de TransformaciÃ³n. TributaciÃ³n como incremento de patrimonio a tÃtulo gratuito. No deducibilidad de las amortizaciones efectuadas por la entidad, al no haber acreditado suficientemente la entrada en funcionamiento del inmovilizado. INFRACCIONES TRIBUTARIAS. Procedencia de la sanciÃ³n impuesta por las amortizaciones practicadas incorrectamente. Concurrencia de culpabilidad en el sujeto infractor. Inexistencia de discrepancia razonable en las normas aplicables. InaplicaciÃ³n del rÃ©gimen sancionador contemplado en la LGT 2003, al ser menos favorable para la entidad interesada."*	text
Type	TextString: typology of judicial ruling Judgment, Interlocutory Decision and JudicialOrder	varchar (30)
Full text	Full text of the judgment. This field can be divided in several parts (the history of the case, findings of fact, grounds of the decision, the decision, appeals and signatures.)	text
Year	Year of the judgment	Varchar(4)
Date	Date of the judgment	Varchar(12)

Judgment		
Field	**Description**	**Type**
Id	Foreign key of Document table (accession number)	Varchar(100)
Reference	Reference Information (url of the document)	varchar(255)

JudicialOrder		
Field	**Decsription**	**Type**
Id	Foreign key of Document table (accession number)	Varchar(100)
Reference	Reference information	varchar(255)

InterlocutoryDecision		
Field	**Decsription**	**Type**
Id	Foreign key of Document table (accession number)	Varchar(100)
Reference	Reference information	varchar(255)

IsAbout		
Field	**Description**	**Type**
DocumentId	Foreign key of Document	Varchar(100)
TopicId	Foreign Key of Topic	varchar(100)

Topic		
Field	**Description**	**Type**
Id_Topic	Unique ID of topic. Auto generated	Varchar(100)
Name	Topic Name	varchar(255)

SubTopic		
Field	**Description**	**Type**
TopicId	Foreign Key of Topic	Varchar(100)
SubTopicId	Foreign key of Narrower Topic	Varchar(100)

RelatedTopic		
Field	**Description**	**Type**
TopicId	Foreign Key of Topic	Varchar(100)

RelatedTopicId	Foreign key of Topic	Varchar(100)

Person		
Field	**Decsription**	**Type**
Id_Person	Unique ID. Auto Generated	varchar(100)
Name	Name of person	varchar(255)

hasMagistrate		
Field	**Decsription**	**Type**
PersonId	Foreign key of Person table	varchar(100)
DocumentId	Foreign key of Document table	varchar(100)

hasPresident		
Field	**Decsription**	**Type**
PersonId	Foreign key of Person table	varchar(100)
DocumentId	Foreign key of Document table	varchar(100)

hasDeponent		
Field	**Description**	**Type**
PersonId	Foreign key of Person table	varchar(100)
DocumentId	Foreign key of Document table	varchar(100)

LegalOrganisation		
Field	**Description**	**Type**
Id_LegalOrg	Unique Organisation ID. AutoGenerated.	varchar(100)
type	Text string: typology of legal organisations: Juzgado, Audiencia and Tribunal	varchar(12)

Audiencia		
Field	**Description**	**Type**
Id_Audiencia	Foreign key of LegalOrganistation Table	varchar(100)
name	Audiencia Name	varchar(255)

Tribunal		
Field	**Description**	**Type**
Id_Tribunal	Foreign key of LegalOrganistation Table	varchar(100)
name	Tribunal name	varchar(255)

Juzgado		
Field	**Description**	**Type**
Id_Tribunal	Foreign key of LegalOrganistation Table	varchar(100)
name	Juzgado name	varchar(255)

Entities		
Field	**Description**	**Type**
Id	Foreign key of Document table (accession number)	Varchar(100)
Name	Entity text	varchar(255)
Annotations	Describes what entity is	Text
Type	Class of entity	Text
Offsets	Start and end points of entity in text	Text
URI	URI of entity in knowledge base	varchar(255)

JudgmentNumber		
Field	**Description**	**Type**
Id_JudNumber	Unique ID of judgment number. Auto generated	varchar(100)
judgmentNumber	A string with the next format: 23/2005	varchar(10)

AppealNumber		
Field	**Description**	**Type**
Id_Appeal	Unique ID of appeal number. Auto generated	varchar(100)
appealNumber	A string with the next format: 23/2005	varchar(10)

hasJudgmentNumber		
Field	**Description**	**Type**
JudgmentNumberId	Foreign key of JudgmentNumber Table	varchar(100)
DocumentId	Foreign key of Document Table	varchar(100)

hasAppealNumber		
Field	**Description**	**Type**
appealNubmerId	Foreign key of JudgmentNumber Table	varchar(100)
DocumentId	Foreign key of Document Table	varchar(100)

hasCourt		
Field	**Description**	**Type**
CourtId	Foreign key of LegalOrganiztion Table	varchar(100)
DocumentId	Foreign key of Document Table	varchar(100)

Location		
Field	**Description**	**Type**
Id_Location	Unique Location ID. AutoGenerated.	varchar(100)
type	Text string: typology of legal organisations: Municipality, Province, AutonomusComunities, JudicialParty and Province	varchar(12)

Municipality		
Field	**Description**	**Type**
Id_Municipality	Foreign key of Location Table	varchar(100)
name	Municipality Name	varchar(255)

Province		
Field	**Description**	**Type**
Id_Province	Foreign key of Location Table	varchar(100)
name	Province name	varchar(255)

AutonomusComunities		
Field	**Description**	**Type**
Id_AC	Foreign key of Location Table	varchar(100)
name	Autonomus Comunity name	varchar(255)

JudicialParty		
Field	**Description**	**Type**
Id_JudicialParty	Foreign key of Location Table	varchar(100)
name	JudicialParty name	varchar(255)

hasLocation		
Field	**Description**	**Type**
LocationId	Foreign key of Location Table	varchar(100)
DocumentId	Foreign key of Document Table	varchar(100)

Jurisdiction		
Field	**Description**	**Type**
Id_Jurisdiction	Unique Jurisdiction ID. AutoGenerated.	varchar(100)
name	Jurisdiction name	varchar(25)

hasLocation		
Field	**Description**	**Type**
JurisdictionId	Foreign key of Jurisdiction Table	varchar(100)
DocumentId	Foreign key of Document Table	varchar(100)

7.5 Appendix 5: Questionnaire once each case was completed

How difficult was it for you to solve the case which you have completed just now?	☐ Very difficult ☐ Difficult ☐ Moderate ☐ Easy ☐ Very easy

Did you use IURISERVICE to solve the case?	☐ Yes ☐ No
Does IURISERVICE make it easier to find the solution for the case?	☐ Much easier ☐ Easier ☐ No difference ☐ More difficult ☐ Much more difficult
Did you find the information which you were looking for faster with IURISERVICE?	☐ Much faster ☐ Faster ☐ No difference ☐ More slowly ☐ Much more slowly
Does IURISERVICE (when you use it in addition to other databases) help you to find better or more complete information?	☐ Much better ☐ Somewhat better ☐ No difference ☐ Somewhat worse ☐ Worse

7.6 Appendix 6: Questionnaire once all cases are finished

With IURISERVICE you can enter questions in natural language. How useful do you find the search facility in IURISERVICE?	☐ Very useful ☐ Useful ☐ No difference ☐ Distracting ☐ Very distracting
The results of the IURISERVICE search are ordered according to the "fit of a question and answer to the question you have posed" (5 – 1 stars). How helpful do you find this ordering?	☐ Very helpful ☐ Helpful ☐ No difference ☐ Distracting ☐ Very distracting
IURISERVICE categorizes search results according to themes, and presents the most frequently questions. How useful do you find this categorization?	☐ Very useful ☐ Useful ☐ No difference ☐ Distracting

	☐ Very distracting
IURISERVICE presents relevant concepts which you can use to refine your search (in a separate window). How useful do you find the suggestion of concepts?	☐ Very useful ☐ Useful ☐ No difference ☐ Distracting ☐ Very distracting