Teaching Artificial Intelligence and Law in Spain (position paper)

Pompeu Casanovas
pompeu.casanovas@uab.es
pcasanovas@uoc.edu

UAB Institute of Law and Technology
Department of Political Science
UAB Law School
Autonomous University of Barcelona
Open University of Catalonia (UOC) Consultant

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Introduction

Technology is changing the nature of contemporary law and the way in which law relates to other forms of governance. This is the starting point of the courses on AI, Law and the Semantic web that I have been teaching consistently at the Open University of Catalonia (UOC) since 2001.

The Open University of Catalonia (UOC) started in Barcelona (1995) as a mixed foundation between the Catalan Government and a business consortium. Therefore, its rules and internal government are not the same of the other 7 Catalan public universities (UB, UAB, UG, UPF, UPC, ULL,URV) as it follows private standards. Compared to the other Universities, the UOC has a small permanent staff to run the different studies, but a large number of consultants (professors) belonging to the other Catalan universities to monitor virtual courses and write teaching materials.[1] The UOC is entirely a virtual university (http://www.uoc.edu) in which all the learning, teaching and complementary activities are offered through computer-based communication. Courses are offered mainly in Catalan and Spanish (reaching Latin American countries and the USA) in the so-called Catalan Campus and Ibero-American Campus.

The AI and Law program started in 2001 with an introductory course on the subject-matter for the Law Degree and a more specialized course on Globalization, Legal Pluralism and the Semantic Web for the UOC PhD Program on Information Society (directed by Manuel Castells). To my knowledge, this is the first AI and Law program in Spain.[2]

Some contextual information

Unlike other attempts to set up virtual universities,[3] the growing number of students (about 35.000, out of 225.559 students in Catalonia)[4] shows that the UOC has been a successful experience among the Spanish universities [See Fig. 1 and 2].

The reasons for such a success are multiple. For instance, it has been argued that it offers a personalized attention to the student. Furthermore, most of the materials are available online. In a more contextual way, I would like to highlight a particular feature of the virtual Spanish market as well.

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[1] The original agreement was signed in October 6th 1994. At present, the UOC has 132 professional educators, 1551 consultants and 283 technicians and administrative people.

[2] This is not so for Latino America, as there are many AI and Law programs in Argentina, Venezuela, Chile, Colombia, Brazil and Mexico (R. Cantú, 1999). This is also true that they are much more Informatics and Law than AI and Law programs.

[3] See Bork (2001) on general conditions of tutorial learning and other experiences in virtual education, e.g. the failure of the Virtual University of California.

[4] Data from the Catalonia Statistics Institute AEC/04. There are 8 main Law Schools in Catalonia, and 12.726 Law students (2003).

Spain ranks 19th in the general index of access to the Internet [Fig. 4]. It lags behind leading countries with cheaper and faster connections. Significantly enough, the evolution of the computer market and the general use of the Internet rely on PCs at home. As a result, more than 60% of connections take place as a personal and private affair [Fig. 3]. People hardly use Internet resources at work nor at institutional places (including public education facilities and public universities). This lack of incentives is counterbalanced by personal motivation. Most of the UOC students are young middle-rank professionals looking for a suitable method to combine their work with higher education, or students from other universities applying for a second degree.

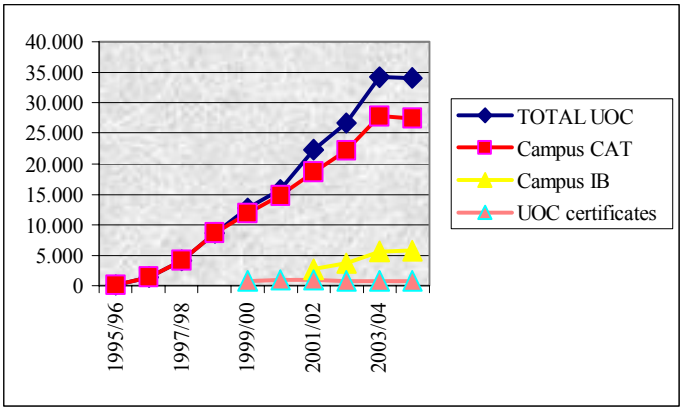

Fig. 1. Source: UOC. Number of students (1995-2005)

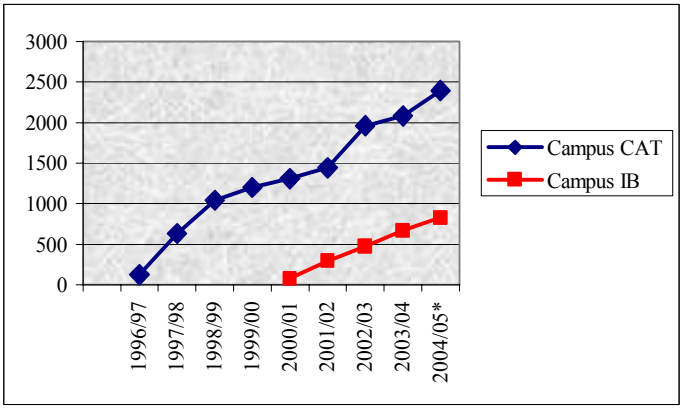

Fig.2. Source: UOC. Number of students in the UOC Law School (1996-2005)

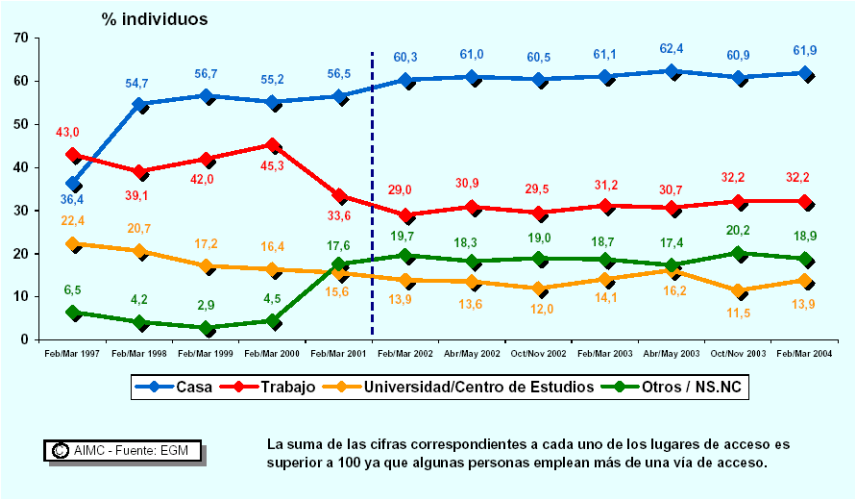

Fig.3. Source: AIMC-EGM (2004). Spanish individual access to the Internet (home, work, universities)

ACCESO MÁS FÁCIL		ACCESO FÁCIL		ACCESO MEDIO		ACCESO DIFÍCIL	
Suecia	0,85	Irlanda	0,69	Belarús	0,49	Zimbabwe	0,29
Dinamarca	0,83	Chipre	0,68	Líbano	0,48	Honduras	0,29
Islandia	0,82	Estonia	0,67	Tailandia	0,48	Siria	0,28
Corea (Rep. de)	0,82	España	0,67	Rumania	0,48	Papua Nueva Guinea	0,26
Noruega	0,79	Malta	0,67	Turquía	0,48	Vanuatu	0,24
Países Bajos	0,79	República Checa	0,66	Ex Rep. Yug. de Macedonia	0,48	Pakistán	0,24
Hong Kong, China	0,79	Grecia	0,66	Panamá	0,47	Azerbaiyán	0,24
Finlandia	0,79	Portugal	0,65	Venezuela	0,47	S. Tomé y Príncipe	0,23
Taiwán, China	0,79	Emiratos Árabes Unidos	0,64	Belice	0,47	Tayikistán	0,21
Canadá	0,78	Macao, China	0,64	San Vincente	0,46	Guinea Ecuatorial	0,20
Estados Unidos	0,78	Hungría	0,63	Bosnia	0,46	Kenya	0,19
Reino Unido	0,77	Bahamas	0,62	Suriname	0,46	Nicaragua	0,19
Suiza	0,76	St. Kitts y Nevis	0,60	Rep. Sudafricana	0,45	Lesotho	0,19
Singapur	0,75	Polonia	0,59	Colombia	0,45	Nepal	0,19
Japón	0,75	República Eslovaca	0,59	Jordania	0,45	Bangladesh	0,18
Luxemburgo	0,75	Croacia	0,59	Serbia y Montenegro	0,45	Yemen	0,18
Austria	0,75	Bahrein	0,58	Arabia Saudita	0,44	Togo	0,18
Alemania	0,74	Chile	0,58	Perú	0,44	Islas Salomón	0,17
Australia	0,74	Antigua y Barbuda	0,57	China	0,43	Uganda	0,17
Bélgica	0,74	Barbados	0,57	Fiji	0,43	Zambia	0,17
Nueva Zelandia	0,72	Malasia	0,57	Botswana	0,43	Myanmar	0,17
Italia	0,72	Lituania	0,56	Irán (Rep. Islámica del)	0,43	Congo	0,17
Francia	0,72	Qatar	0,55	Ucrania	0,43	Camerún	0,16
Eslovenia	0,72	Brunei Darussalam	0,55	Guyana	0,43	Camboya	0,16
Israel	0,70	Letonia	0,54	Filipinas	0,43	Lao (R.D.P.)	0,15
		Uruguay	0,54	Omán	0,43	Ghana	0,15
		Seychelles	0,54	Maldivas	0,43	Malawi	0,15
		Dominica	0,54	Libia	0,42	Tanzania	0,15
		Argentina	0,53	Rep. Dominicana	0,42	Haití	0,15
		Trinidad y Tabago	0,53	Túnez	0,41	Nigeria	0,15
		Bulgaria	0,53	Ecuador	0,41	Djibouti	0,15
		Jamaica	0,53	Kazajstán	0,41	Rwanda	0,15
		Costa Rica	0,52	Egipto	0,40	Madagascar	0,15
		Santa Lucía	0,52	Cabo Verde	0,39	Mauritania	0,14
		Kuwait	0,51	Albania	0,39	Senegal	0,14
		Granada	0,51	Paraguay	0,39	Gambia	0,13
		Mauricio	0,50	Namibia	0,39	Bhután	0,13
		Rusia	0,50	Guatemala	0,38	Sudán	0,13
		México	0,50	El Salvador	0,38	Comoras	0,13
		Brasil	0,50	Palestina	0,38	Côte d'Ivoire	0,13
				Sri Lanka	0,38	Eritrea	0,13
				Bolivia	0,38	Congo (Rep. de)	0,12
				Cuba	0,38	Benín	0,12
				Samoa	0,37	Mozambique	0,12
				Argelia	0,37	Angola	0,11
				Turkmenistán	0,37	Burundi	0,10
				Georgia	0,37	Guinea	0,10
				Swazilandia	0,37	Sierra Leona	0,10
				Moldova	0,37	Centroafricana (Rep.)	0,10
				Mongolia	0,35	Etiopía	0,10
				Indonesia	0,34	Guinea-Bissau	0,10
				Gabón	0,34	Chad	0,10
				Marruecos	0,33	Malí	0,09
				India	0,32	Burkina Faso	0,08
				Kirguistán	0,32	Níger	0,04
				Uzbekistán	0,31		
				Viet Nam	0,31		
				Armenia	0,30		

Fig. 4 Source: UIT-ITU (2003). Index of accessibility to the Internet.

AI and Law courses are optional subjects within the UOC Law Degree, and since 2001, 99 out of the 2157 students of the Law School have chosen it. This means that AI is not a primary concern for lawyers. Around 10 students enroll to AI and Law each term. However, when the UOC offered AI and Law as an intercampus course to all the Catalan Universities (2002-2003), the enrolment rate raised up to 25 students, mainly from other Law Schools and Computer Science Departments.

Teaching Artificial Intelligence and Law

The course is divided into four modules, which have been published separately as a syllabus, readings (course materials), and as a text book. D. Bourcier (2003) wrote in French the first version of the modules. I translated them into Spanish and added some notes and examples to adapt it to the Spanish law and cases. D. Bourcier, along with another computer scientist, Pablo Noriega (IIIA-CSIC), would participate later on in the Doctorate courses as well.

The four modules contain a description of the AI field: (i) concepts, models and techniques (historical view); (ii) languages and expert systems in law; (iii) logical, symbolic and dynamic models; (iv) artificial decision making.

The issue is adapting AI contents to the legal background of law students while conveying the necessary technical aspects and thus preserving the outstanding place that AI and Law is acquiring in the transformation of contemporary law. XML standards, NLP techniques, legal data mining and legal

knowledge management are fundamental tools in getting feasible solutions to organize legislation, contracting and ruling outcomes. On-line business transactions, ODR, e-Government and e-Court are the new frameworks in which legal professionals –attorneys or judges- are going to deal with (Benjamins et al., 2005).

It is important to make the students understand that either in the technological legal landscape (the Semantic Web use) or in the European legal context there is an increasing convergence between American, Common Law and Civil Law standards and practices. This is affecting legal reasoning as well because argumentation and negotiation are more important now than in the immediate past (Walton, 1998). Principles and values matter (Bork, 2001; Broekman, 2001). And this is related to the fact that legal subjects must be represented by intelligent agents that might be considered as having rights and duties as well (Bourcier, 2001; Petrina et al. 2004,; Soskis, 2005).

However, this technological transformation takes place within a liberalized legal market that has experienced already many changes between 1960 and 1990. In the USA, the population of lawyers risedraised from the 0'10% to the 0'33% of the total population. But in Civil Law countries the so-called "big bang" of lawyers increased also doubled or tripled it's previous size, e.g. in Belgium (from 0'04% to 0'07%), in Germany (from 0,04 to 0,09%) (Hau and Thum, 2000: 249-250).

In Spain, the effects of the market liberalization occurred a bit later, but faster and deeper.[5] In 2004, the ratio of lawyers was the 0'34% of the total population (345/100.000 inhabitants) (Fig.5). The ratio of practicing lawyers was 0'25% (254/100.000). The ratio of judges was nearly 10/100.000 inhabitants (Fig.6). In some areas of Barcelona and Madrid the ratio of practicing lawyers is even higher. This is a constraining situation, in which lawyers have to cope with a saturated and highly competitive market, and judges have increasingly heavier caseloads. Young solo practitioners tend to organize themselves into cooperative networks, trying to save money by an extended use of legal databases and the Internet (Casanovas and Poblet, 1999). Thus, acquiring technological skills is one of the main strategies to survive in such an environment.

Comunidad	En ejercicio	No en ejercicio	Total
Andalucia	16.225	3.705	19.930
Aragón	2.375	463	2.838
Asturias (Principado)	2.446	1.333	3.779
Ballears (Illes)	2.077	576	2.653
Canarias	3.884	1.805	5.689
Cantabria	1.047	452	1.499
Castilla la Mancha	2.766	959	3.725
Castilla León	4.216	1.294	5.510
Cataluña	16.256	4.427	20.683
Comunidad Valenciana	10.358	3.391	13.749
Extremadura	1.513	597	2.110
Galicia	4.962	1.264	6.226
Madrid	27.065	14.836	41.901
Murcia	2.177	628	2.805
Navarra	1.203	362	1.565
Pais Vasco	5.085	1.315	6.400
Rioja (La)	507	78	585
Total	**104.162**	**37.485**	**141.647**

Fig.5. Source: CGPJ. Number of lawyers per Autonomous Spanish Communities

[5] On the global trend toward consolidation of law firms across borders in Europe and Spain, see Contreras and Poblet (2005: 219-225).

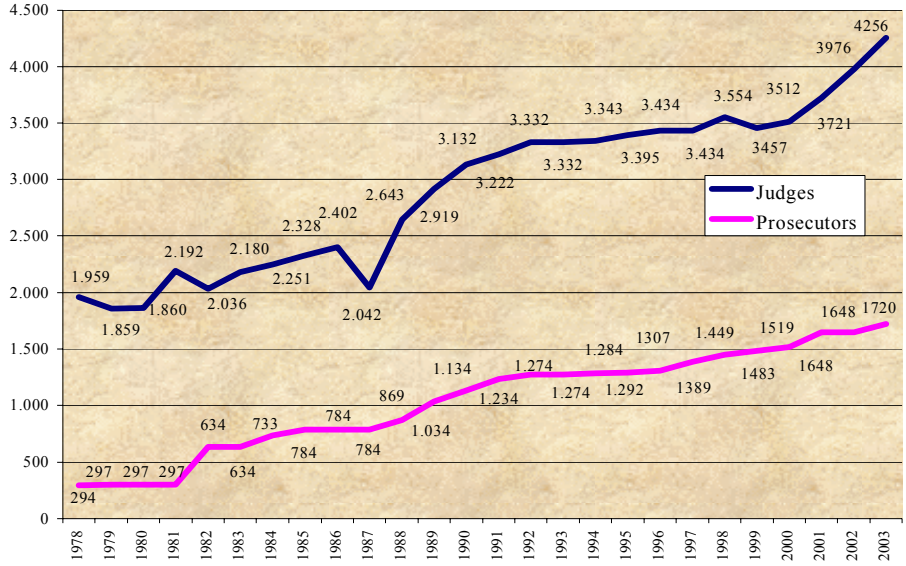

Fig. 6. Source: M. Poblet, P. Casanovas (2005:191). Number of judges and prosecutors in Spain (1978-2003). Annual Reports of the CGPJ, FGE, and Official Journal of the State.

The representation of context and AI

Students have access to courses through an internal Java environment and a user-friendly interface. They have on-line materials, 7 x 24 assistance, tutorials and library free access (Fig. 7; Fig. 8).

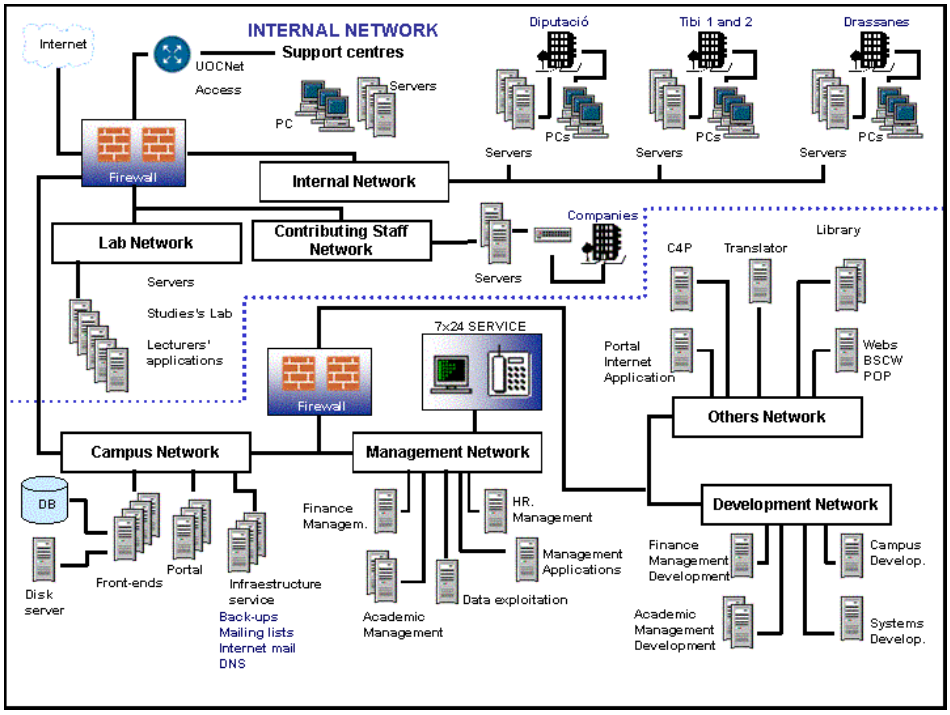

Fig.7. Source: UOC. UOC internal network structure.

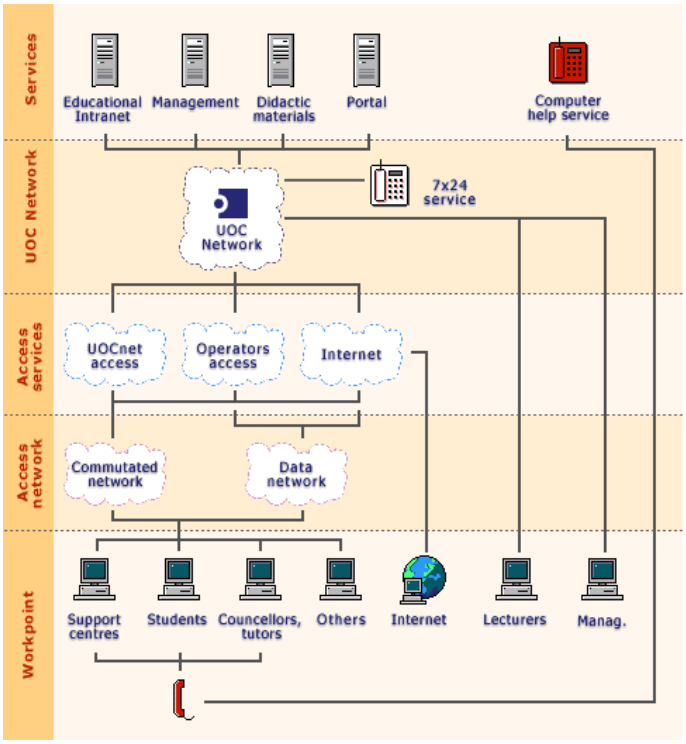

Fig. 8. Source: UOC. UOC external network structure.

In my courses, I follow the classical H.A. Simon's model of bounded rationality and its difference between inner and outer environment (Simon, 2001). Therefore, I like the students to be very aware of the competitive and transnational context where they will be bound to operate if they want to become law practitioners.

The main consequence of such an approach is that they are obliged to think within the new legal frameworks I have been describing above, including themselves in the legal operations that they perform. Legal case-based reasoning, normative qualifications and judgment information retrieval have to be approached through the values and principles they may have been applying. Compared to a more traditional learning, they must make those values and principles explicit, to be able to discuss their groundings publicly with other students and myself and with experts invited to the courses. In the courses there are some virtual spaces to perform these kinds of interactive discussions (dialogue and forum spaces). See Fig. 10 and 11.

I will provide an example of such an embedded reasoning. One of the exercises that students have to perform is to model art. 17.1 of the Spanish Civil Code (on nationality).[6] Law students represent this article under the form of rules. Computer science students represent in PROLOG the semantic content of the article, in a more formal way. They have as *analogon* the work done by Marek Sergot (et al.) on the

[6] "Son españoles de origen:
1. Los nacidos de padre o madre españoles.
2. Los nacidos en España de padres extranjeros si, al menos uno de ellos hubiera nacido también en España. Se exceptúan los hijos de funcionario diplomático o consular acreditado en España.
3. Los nacidos en España de padres extranjeros, si ambos carecieran de nacionalidad o si la legislación de ninguno de ellos atribuye al hijo una nacionalidad.
4. Los nacidos en España cuya filiación no resulte determinada. A estos efectos se presumen nacidos en territorio español los menores de edad cuyo primer lugar conocido de estancia sea territorio español."

British Nationality Act (1981). Fig. 9 shows the flux diagram using PROLOG that represents the following rules [operators AND (SI), OR (O) and IF (SI)]:

Regla 1: **X** es ciudadano español
SI X tiene un padre **Z**
Y Z es ciudadano español
O X tiene una madre **W**
Y W es ciudadano español

Regla 2: **X** ha nacido en España
Y X tiene un padre **Z**
Y X tiene una madre **W**
Y Z es extranjero **Y Z** ha nacido en España
Y Z no es diplomático **O** consular acreditado en España
O W es extranjera **Y W** ha nacido en España
Y W no es diplomático **O** consular acreditado en España

Regla 3: **X** ha nacido en España
Y X tiene un padre **Z**
Y X tiene una madre **W**
Y Z no tiene nacionalidad **O** la legislación de su país no le atribuye una nacionalidad
Y W no tiene nacionalidad **O** la legislación de su país no le atribuye una nacionalidad

Regla 4: **X** es menor de edad
Y X no tiene una filiación determinada
Y X no ha tenido estancia conocida en ningún otro país

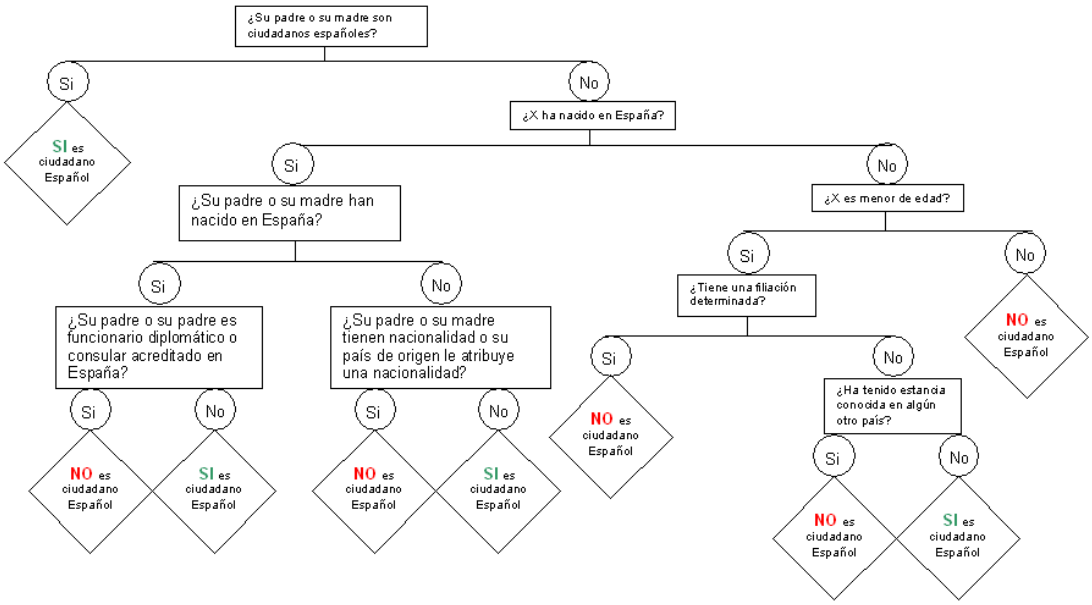

Fig. 9. Source: Student's exercise on modeling the content of art. 17.1. of the Spanish Civil Code (on nationality). Course 2003, UOC.

This is a classical example of working on the semantic content of legal texts. There is nothing new on that. But this is effective: students have to go through an interactive process in which they describe their work and discuss the issues at stake. They have to think of the legal grounds of their work and about all the contextual aspects that –in a real nationality case- would affect the social implementation of law. Thus, they are provided with the legal and political documents that apply in these situations.[7] They discover the significance of African and Latin-American immigration in Europe and specifically in Spain, and they learn about the different administrative procedures to effectively perform the rights settled in art. 17.1. CC and in the Spanish Constitution (1978).

Implementation policies may be very diverse, and actually they are. Therefore, it is necessary to carefully analyze the local, autonomous (regional), national and international policies and practices to understand nationality attribution rules may change over time and goes through a social process in which the relevant items can be ontologically identified. This has been already noticed by Artificial Intelligence researchers and it is an important starting point to build up ontologies. Classifications in conflict domains where social problems arise –as national and country classifications show- are contingent and political in nature and so are their ontologies. In this sense, there are no neutral task ontologies (Bench-Capon, 2001). Therefore, students, using all the virtual materials and going through the interactive process within the forum and dialogue areas, have to make explicit and clarify their own values and principles about this subject-matter. They usually discover that stereotypes are difficult to eradicate from their own minds, and that they normally use them in the modeling process without being aware of it. (See Fig. 10 and 11).

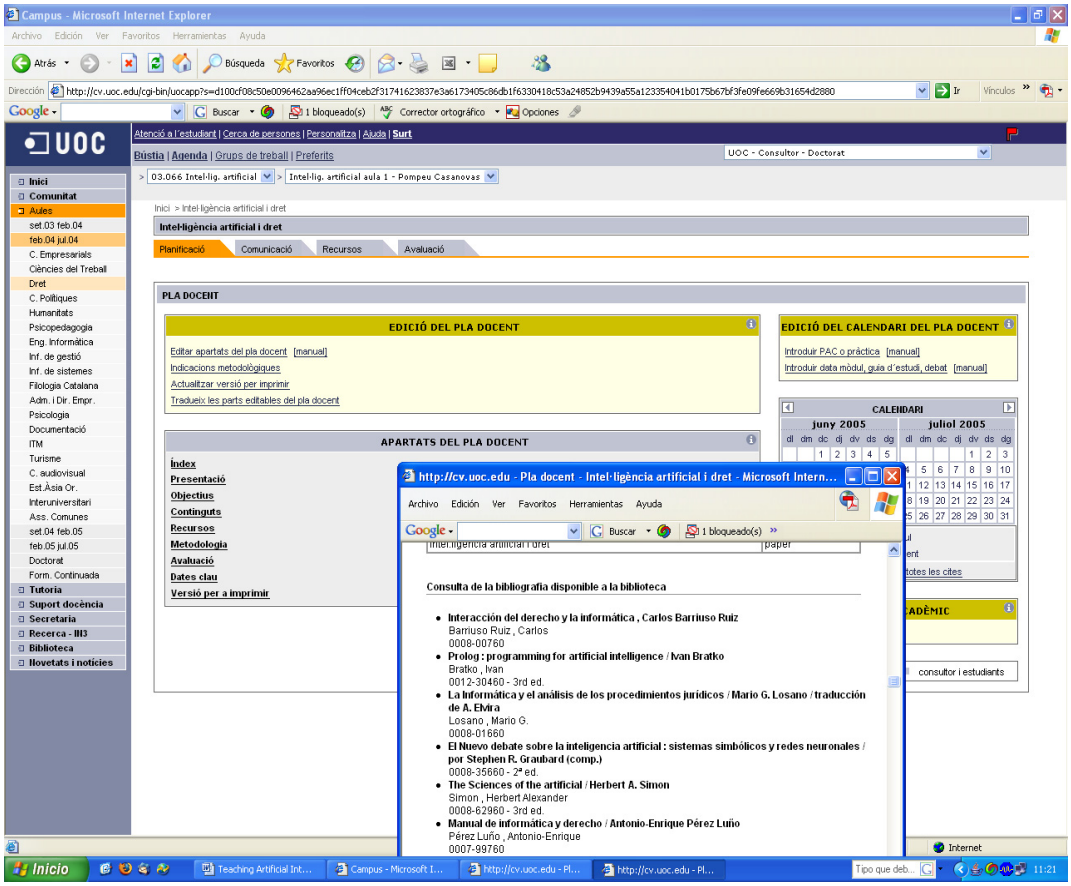

Fig. 10. Course on AI and Law. P.Casanovas, UOC, Open University of Catalonia Law Degree (2003), http://www.uoc.edu

[7] Ley Orgánica 4/2000, de 11 de enero, sobre derechos y libertades de los extranjeros en España y su integración social; Ley Orgánica 8/2000, de 22 de diciembre, de reforma de la Ley Orgánica 4/2000. Art.1.1.: "Se considera extranjero, a los efectos de la presente ley, a los que carezcan de la nacionalidad española". These highly restrictive statutes have been overruled by the more permissive legislation and immigration policies of the Socialist Party after the past elections of March 2005.

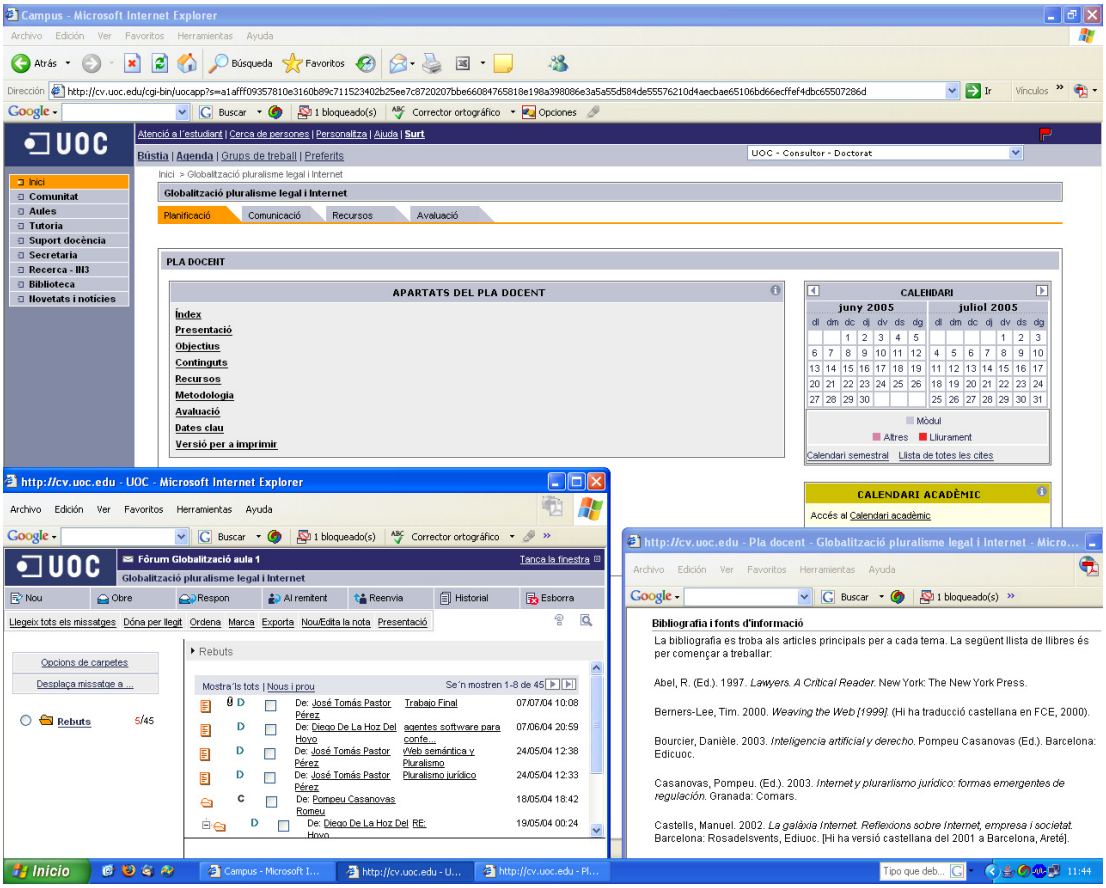

Fig. 11. PhD Course on Globalization, Law and the Internet. P. Casanovas, UOC, Open University of Catalonia (2004), http://www.uoc.edu

AI experts on Legal Education and Law have especially highlighted the need to take context into account to model computer tutorial tools for legal reasoning learning and teaching.

"Legal precedents are also embedded in a political context, where competing policies and values are balanced by the courts, and where legal doctrine evolve to accommodate new social and economic realities" (Hafner and Berman, 2001: 20).

HYPO, CABARET, GREBE, CATO, CATO-Dial, PROSA, CASE[8] and other case-based reasoning programs have shown impressive results in generating legal arguments. These successful experiences of "intelligent tutoring environment" (Ashley, 2000) are very encouraging for based-computer education. This is the way to follow up.

But, in the meanwhile, the aims of my introductory courses are not focused on specific legal arguments and, especially, they are not based on the coherence between past and present legal cases (the basis of the *stare decisis* system).

I have faced the context-modeling problem in a sociolegal way, trying to identify the relevant elements of the legal problem as they are defined by strategic actors –judges, politicians, rulers, NGOs…- that tend to represent their own positions as related to the calculated positions of their counter-parts. Many times in the contemporary forms of law the real case does not reach the case-based argumentation form of adversarial litigation, e.g., arbitration in international commercial conflicts in the new *lex mercatoria*,

[8] See Ashley (2000), Ashley et al. (2002), Aleven (2003), Muntjewerff and Groothuismink (1998), Muntjewerff et al. (2003).

either on common goods (environmental conflicts on water resources, wood, pollution…) or on corporate interests (oil and gas markets e.g).[9]

What it has been changing in the past thirty years is not only the substance or the content of legal rules or norms (more flexible and principle-valued legal environments), but its adversarial or judicial form as well. We are now addressing the challenge of legal rights that are negotiated, contested and fought outside the Courts of Justice, both in political and economic arenas. Some of them –as those dealing with the Internet, its governing procedures and its collective/individual dimensions- have to be still better defined.

"The promise of technological literacy, if it is to contradict a surrendering of responsibilities to elite decision makers, requires an informed citizenry. One extremely significant, albeit overlooked, component of technological literacy is knowledge of rights." (Petrina et al., 2004: 182)

Closing Remarks

To sum up, if I had to summarize the main axes of my teaching on AI and Law so far, I would draw the following guidelines:

1. *Historical background*. A clear picture of the main achievements of AI in practical contexts, from symbolic to interactive modeling (Simon, 1993, 2001; Goldin et al. 2002);
2. *AI languages and processing*. NLP and knowledge management technologies. From programming languages as PROLOG to the Semantic Web languages (OWL, DAML…).
3. *Situated cognition and situated contexts*. All the contextual elements leading to changes in contemporary law practicing and thinking. Most of them are well described in the sociolegal literature.
4. *Modeling and legal paradigms*. Neural networks, symbolic and interactive models and their relationship to legal knowledge acquisition and legal knowledge representation.
5. *Legal decision making*. Argumentation and legal reasoning in social contexts. The courses are not specifically on legal reasoning, but they provide updated information of the state of the art.
6. *New trends*. Semantic Web services and the practicing of law (Berners-Lee, 2001; Davies, 2004; Benjamins et al. 2005).

Technology is deeply changing the way in which people relate to the law. But technology by itself does not change the law, since it is nested in social and political complex environments As I showed above with some Spanish data, contemporary legal behavior, legal content and legal adjudication rely on a broader social and political transformation. The so-called crisis of the Westfalian model based on the nation-state took place long before the coming of the globalization process. To me, the main problem has been to explain how the AI approach models the law but, also how AI modeling has contributed to these transformations of the law.

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[9] See Dezalay and Garth (1997, 2002).

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