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## The “Legal and Economic Aspects of the Corruption” Doctoral Program web in the Faculty of Law at University of Salamanca. A case study of a well-engineered web portal

M<sup>a</sup> Á. Cambroner<sup>1</sup>, Eduardo Á. Fabián<sup>2</sup>, F. J. García<sup>\*1</sup> and Nicolás Rodríguez<sup>3 †</sup>

<sup>1</sup> Department of Computer Science, University of Salamanca, Spain

<sup>2</sup> Department of General Public Law, University of Salamanca, Spain

<sup>3</sup> Department of Administrative, Financial and Procedural Law, University of Salamanca, Spain

This paper presents the new educational web portal for the Legal and Economic Aspects of the Corruption Doctoral Program in the Faculty of Law at University of Salamanca, which has received the “Quality Mention” of the Spanish Education, Culture and Sports Ministry. In past editions of this Doctoral Program the usage of information and communication techniques was only presented by a static web page where the schedule and the syllabus of the subjects were announced. However, for the current edition a new web portal has been designed and implemented looking for this web portal will be firstly the catalytic for all the activities of both teachers and students related to this program. For the design of this web portal conceptual modelling techniques have been used based on the OOWS (Object-Oriented Web Solutions) web engineering method under the auspices of the general framework offered by the Unified Process. For the implementation issues we chose WebObjects, a very powerful environment for web development from Apple Inc.

**Keywords** web portal; corruption; web engineering method; OOWS; unified process; WebObjects

Este artículo presenta el nuevo portal educativo del Programa de Doctorado “Aspectos Legales y Económicos de la Corrupción” que se imparte en la Facultad de Derecho de la Universidad de Salamanca, programa que ha recibido la Mención de Calidad del Ministerio de Educación, Cultura y Deportes. En las pasadas ediciones de este programa el uso de las llamadas nuevas tecnologías estaba sólo presente por el uso de una página web estática en la que se recogía la información relativa al programa y a los horarios de este Programa de Doctorado. Sin embargo, para la edición actual, se ha diseñado e implementado un nuevo portal, buscando en que éste se convierte en el catalizador de todas las actividades de los profesores y de los alumnos de este Programa. Para el diseño de este portal se han empleado técnicas de modelado conceptual basadas en el método de ingeniería web OOWS (*Object-Oriented Web Solutions*) bajo las directrices del Proceso Unificado. Para la implementación del mismo se ha utilizado WebObjects, un entorno extremadamente potente para el desarrollo de aplicaciones web de Apple Inc.

**Palabras clave** portal web; corrupción; método de ingeniería web; OOWS; proceso unificado; WebObjects

### 1. Introduction

This paper presents a case study of a dynamic educational web portal for the Salamanca University Study Group against the Corruption. The aim of this web site is to channel its teaching and research activities, specially its Doctoral Program about the Legal and Economic Aspects of the Corruption, in both public and private contexts. Nevertheless, this web portal has the future vision of becoming the meeting point for the world-wide research community in this area.

<sup>\*</sup> Corresponding author: e-mail: fgarcia@usal.es, Phone: +34 923294400

<sup>†</sup> The authors are alphabetically ordered

1 For the conception, design and development of this educational web portal a set of different of web  
2 engineering and software engineering methods, techniques and tools has been used, organized all of them  
3 inside the framework process defined by the Unified Process [1].

4 Conceptual modelling techniques have been used from the early stages in order to model the typical  
5 aspects of an information system, such as the information, functional and behaviour aspects, but also  
6 taking into account the navigational and the presentation issues of the web application. The chosen web  
7 engineering method was OOWS (Object-Oriented Web Solutions) [2, 3], a UML [4, 5] compliant nota-  
8 tion that extends the classical models with the needed conceptual tools in order to cover the navigation  
9 and presentation of a web system.

10 For the implementation of the web portal WebObjects [6] was chosen, a very powerful environment  
11 for web development from Apple Inc. that includes a mature set of frameworks and tools in order to  
12 allow the design, development and deployment of the Java application in an easy and flexible way.

13 The rest of the paper is organized as follow. Section 2 presents the Doctoral Program about the Legal  
14 and Economic Aspects of the Corruption. Section 3 is devoted to introduce briefly the main characteris-  
15 tics of the technological context. Section 4 introduces the developed educational web portal. Finally,  
16 section 5 closes the paper with the conclusions of the work.

## 17 **2. Legal and Economic Aspects of the Corruption Doctoral Program**

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20 One of the greatest problems of our Society is the public and private corruption, which is a social phe-  
21 nomenon that causes serious legitimacy crisis in the contemporary states. The Law has to react to this  
22 blight, giving solutions with a global and realistic treatment of the politician, administrative, business  
23 and judicial corruption.

24 For the reasons above the Legal and Economic Aspects of the Corruption Doctoral Program was cre-  
25 ated in 2000-2001 academic course at the University of Salamanca (Spain) in its Law Faculty, dealing  
26 with the main questions about the normative treatment of the public and private deviant behaviours with  
27 an interdisciplinary point of view. This Doctoral Program has received the “Quality Mention” of the  
28 Spanish Education, Culture and Sports Ministry.

29 The usage of information and communication techniques in this educational event was only presented  
30 by a static web page where the schedule and the syllabus of the subjects were announced. However for  
31 the 2004-2005 edition of this Doctoral Program a new web portal has been designed and implemented  
32 looking for this web portal will be firstly the catalytic for all the activities of both teachers and students  
33 related to this program. But also the heads of this Doctoral program want the web portal will be the  
34 meeting point for all the researches about corruption issues of all the Latin American community.

35 The main goal of this Doctoral Program is to contribute to the analysis of corruption practices, both in  
36 public and private sectors, which affect to the stability and security of the nowadays societies.

37 The specific objectives are:

- 38 • Studying the position of the different Public Administrations when faced the postulates of  
39 the new way of govern, taking into account its organizational evolution and crystallization.
  - 40 • Identifying the corruption practices.
  - 41 • Analyzing the normative of preventive and repressive kind against the public and private  
42 corruption.
  - 43 • Proposing new steps of normative reform that will be considered suitable in order to com-  
44 bat the illicit and fraudulent practices efficacy.
  - 45 • Continuing the consolidation of the research group in order to achieve a long place actua-  
46 tion.
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### 3. Technological context

#### 3.1 OOWS

OOWS (Object-Oriented Web Solutions) [2, 3] is a UML compliant web engineering method that enables to specify a web application in an integrated framework. This method must capture the web applications requirements by means of conceptual models. To achieve this purpose, OOWS extends an existent object oriented method, called OO-Method [7]. OOWS has improved this method by introducing new models to represent navigational and presentational characteristics of web applications. These specifications (with hypermedia characteristics) are a high level information repository of the system.

According to the OOWS approach, there exist two main steps: conceptual modelling and solution development. In the conceptual modelling step we obtain the system specification using conceptual models. It is divided into three sub-steps:

1. Functional requirements elicitation. Techniques based on use cases and scenarios are applied to build a conceptual schema
2. Conceptual modelling. Using Structural, Functional and Dynamic models, the system structure and behaviour is captured.
3. Navigation and presentation modelling. A navigational model is built in order to model navigational requirements from the class diagram. Once the navigational model is built, presentation requirements are specified using a presentation model which is strongly based on the navigational model.

Steps 1 and 2 are common in classical object-oriented software engineering methods. The main contribution of OOWS to our process proposal is the step 3, i.e., the navigation and presentation conceptual model of the educational web portal.

The navigational model is used to capture the navigational requirements of web applications by defining a “navigational view” (navigational map) for each kind of relevant users of the system. This view provides an accessibility structure (defining all possible navigational paths) that personalizes the system depending on the user type. To build this model, the method introduces two tasks:

1. User identification and categorization. In order to model navigation, first this approach provides a user diagram where the system kind of users and how they are inter-related are specified.
2. Navigational diagram specification. For each kind of user, its navigational view (navigational map) of the system should be specified. This navigational diagram defines the basic interaction units with the user, so called navigational contexts, describing which information is available user and how this information can be navigated.

Once the navigational model is built, the presentational requirements of web applications should be specified. For this purpose, a Presentation Model is introduced. This model uses the navigational contexts as basic entities to define the presentation properties. Presentation requirements are specified by means of simple presentation patterns, which can be associated to the elements of the navigational context.

#### 3.2 WebObjects

WebObjects is an environment for web applications development based on Java technology. It is an application server, but also it has a very complete, powerful and mature set of frameworks that allows the design, development and deployment of the developed applications. Besides, this environment offers a set of graphics tools that accelerates the implementation process.

Due to the WebObjects applications are Java-compliant; they should be deployed in every platform that has a Java Virtual Machine. But, officially, this environment is only supported in **Mac OS X**, **MS Windows NT/2000/XP** and **SUN Solaris** operating systems.

One of the most important conceptual bases of the WebObjects is the separation between the business logic and the presentation logic. This separation has its roots in the Model-View-Controller (MVC) paradigm.

#### 4. Web portal description

In this section the web portal for the Doctoral Program is going to be presented from a conceptual point of view.

##### 4.1 User types

In a web site conceptualization is compulsory identifying the different user types that are involved in the system. These ones should be related through generalization/specialization relationships in order to reuse the commons views that they share.

Figure 1 shows the hierarchy of actors that expresses the different user types for this application. There exists a **Visitor** actor that represents the most generic kind of user, which has a limited access to the system. There are two actors that are Visitor's descendants: **Teacher** and **Student**. These ones have a more specific behaviour than Visitor has, but due to the substitution principle, these user types can make all the actions of the Visitor too. Finally, the **Coordinator** actor is a Teacher's specialization that has unlimited access to the system.

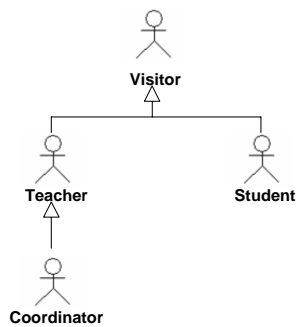


Fig. 1 Allowed user types.

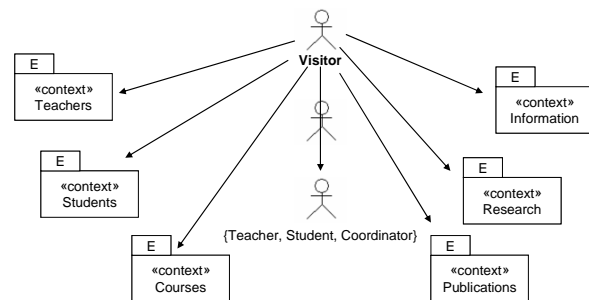


Fig. 2 Visitor's navigation map.

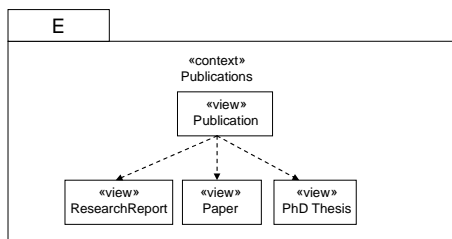


Fig. 3 Publications context.



Fig. 4 Publications node.

## 4.2 Navigational model

Once the user types have been identified, the next step is to design the navigation and the presentation for each kind of user. These issues are reflected in the OOWS Navigation Model and OOWS Presentation Model.

Due to space limitation is impossible presenting the complete models. As example, the navigation map of the **Visitor** actor is presented in Figure 2. The access to the system is using the classic authentication method through login and password. This way a visitor cannot entry to the system because it does not have a valid profile representation inside the system, but the others actors will access initially as visitors to the systems, but they will be able to authenticate themselves with their profile data.

## 4.3 Presentation model

In order to present this model and introduce the final product, Figure 3 presents the navigational context **Publications**, which is valid for the **Coordinator** actor, while Figure 4 presents the implemented node.

## 5. Conclusions

This paper has presented a case study about the development of an academic web portal for a Doctoral Program at University of Salamanca.

The work has reported interesting conclusions or learned lessons, and also an interdisciplinary collaboration line.

One of the main conclusions is the successfully process frame that has been used. The combination of OOWS web engineering method and the WebObjects implementation environment inside of the general framework offered by the Unified Process has allowed us becoming a web portal that successes the users' requirements and the software engineers' expectations because the final software product is easy to maintain and easy to evolve.

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