

# An integrated solution for teletraining of intern resident specialists

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## Abstract

The Intern Resident Specialists portal (PortalEIR) is the reference web platform for training, communication and collaboration between the resident specialists of Andalusia and all the professionals involved in specialized training. This project started in 2006 and is part of the Training Strategic Plan of the Andalusian Public Health System. The main feature of this platform is that it integrates different web solutions such as a teletraining system, a document management system and a learning management system, adapting them to the specialized training environment in Andalusia. Besides the technological challenges, the development of this project poses important challenges regarding communication, level of use, compliance with requirements, usability and process automation that will be analyzed in this paper. From 2006 until today more than 8.000 users had registered in the portal, 5.000 of them are residents, 1.500 tutors and the rest is staff in charge of learning management. It is expected that by 2013 the number of active users will be more than 30.000, mainly due to the incorporation of teaching collaborators.

**Key words:** Human Resources Formation; Distance Education; Internship and Residency; Preceptorship; Information Services; Information Systems; Social Network.

## Resumen

### Una solución integrada para la teleformación de especialistas internos residentes

El portal de Especialistas Internos Residentes (PortalEIR) es la plataforma web de referencia para la formación, comunicación y colaboración entre los especialistas internos residentes de Andalucía y todos los profesionales implicados en la formación especializada. Es un proyecto nacido en 2006 que se enmarca dentro del Plan Estratégico de Formación del Sistema Sanitario Público Andaluz. Esta plataforma se caracteriza por integrar diferentes soluciones web, entre las que se encuentran un sistema de teleformación, un sistema de gestión documental y un sistema de gestión de la formación, y adaptarlos al entorno de la formación especializada en Andalucía. Al margen de los retos tecnológicos, el desarrollo de este proyecto plantea continuamente importantes desafíos en lo que se refiere a la comunicación, grado de utilización, recolección de requisitos, usabilidad y automatización de procesos que se analizarán en este artículo. Desde 2006 hasta la actualidad se han registrado en el portal más de 8.000 usuarios, de los cuales más de 5.000 son residentes, 1.500 tutores y el resto es personal responsable de la gestión de la formación. Se espera que antes de 2013 el número de usuarios activos supere los 30.000 debido principalmente a la incorporación de colaboradores docentes.

**Palabras clave:** Formación de Recursos Humanos; Educación a Distancia; Internado y Residencia; Tutoría; Servicios de Información; Sistemas de Información; Telemedicina; Red Social.

## Resumo

### Uma solução integrada para a teleformação de especialistas internos residentes

O portal de Especialistas Internos Residentes (PortalEIR) é a plataforma web de referência para a formação, comunicação e colaboração entre os especialistas internos residentes de Andalusia e todos os profissionais envolvidos na formação especializada. O projeto teve início em 2006 dentro do Plano Estratégico de Formação do Sistema Público de Saúde de Andalusia. Essa plataforma tem como característica principal a integração de diferentes soluções web, entre elas está um sistema de teleformação, um sistema de gestão documental e um sistema de gestão da formação, adaptando-os ao entorno da formação especializada em Andalusia. Além dos desafios tecnológicos, o desenvolvimento deste projeto coloca, continuamente, importantes desafios no que diz respeito a comunicação, grau de utilização, coleta de requisitos, usabilidade e automação de processos que serão analisados neste trabalho. De 2006 até hoje mais de 8.000 usuários se registraram no portal, sendo 5.000 residentes, 1.500 tutores e os demais pessoal responsável pela gestão da formação. A expectativa é que até 2013 o número de usuários ativos supere os 30.000, principalmente devido à incorporação de colaboradores docentes.

**Palavras-chave:** Formação de Recursos Humanos; Educação a Distância; Internato e Residência; Tutoria; Serviços de Informação; Sistemas de Informação; Telemedicina; Rede Social.

## INTRODUCTION

The EIRPortal is the reference web platform for training, communication and collaboration between the intern resident specialists of Andalusia and all the professionals involved in specialized training. The project started in 2006 and together with other projects is included in the Training Strategic Plan of the Andalusian Public Health System<sup>1</sup> promoted by the Health Department of Andalusia. In this Plan the EIRPortal is defined as a knowledge management tool and a training platform for the development of complementary transversal competences of the training programs of the different specialties. The portal welcomes the design and implementation of teaching methodologies, evaluation methodologies, electronic portfolios, collaboration group, etc.



Figure 01 - Conceptual scheme of the teaching approach and knowledge management of the EIRPortal.

From the technological point of view the main feature of the EIRPortal is to integrate different web solutions such as a teletraining system, a document management system and a learning management system, adapting them to the specific environment of the specialized training in Andalusia. Besides the technological challenges the development of this project poses important challenges all the time regarding communication, level of use, usability, compliance with requirements, process automation and standardization and business intelligence that will be analyzed in this paper.

Since 2006 until today the portal has more than 8000 users, 5.000 of them are residents, 1.500 tutors and the rest is people responsible for learning management. By 2013 it is expected that the number of active users will be more than 30.000, mainly due to the incorporation of the

teaching staff who collaborate with tutors in teaching the residents. Several outcomes of the portal show a positive development over the last 12 months, such as the number of monthly visits shown in the figure below, reaching more than 15.000 per month, showing a clear upward trend.

## Architecture

From an innovative standpoint, the EIRPortal contributes to unification in order to achieve a global solution of different integrated tools which are analyzed below and that can be summarized as follows:

- Learning management: It is the component where the training of residents is managed and the integration of the rest of components is coordinated. This component is made up of a software application developed according to the needs of the teaching commissions. It is developed through Django<sup>2</sup> development frame based on Python<sup>3</sup> programming language;
- Teletraining: It is the system where courses are taught. It is based on Moodle<sup>4</sup> and it is integrated with the application of learning management to automate the student enrollment, the creation of courses and the access to them;
- Collaborative System (or Social Network): It is a system that integrates social network solutions applied to specialized training and professional's collaboration. This system is also integrated with the learning management and its goal is to welcome the intellectual capital of the Andalusian specialized training system;
- Document Management: It is the system that enables to store all required documents for training and its management. This system is based on Nuxeo 5<sup>5</sup> and it is completely integrated with the learning management system and the social network. From a functional point of view, the non advanced user does not intervene directly in this system but in an indirect way through the rest of the systems;
- Business Intelligence System: This system is mainly applied for extracting information that enables the Health Department to detect and determine the status of the specialized training system. It is based on an integration of Eclipse BIRT<sup>6</sup> with the learning management system and it incorporates aspects that facilitate the data analysis as trend detectors. At the moment work is being done on an OnLine Analytical Process (OLAP) model and in the definition of data mining processes.

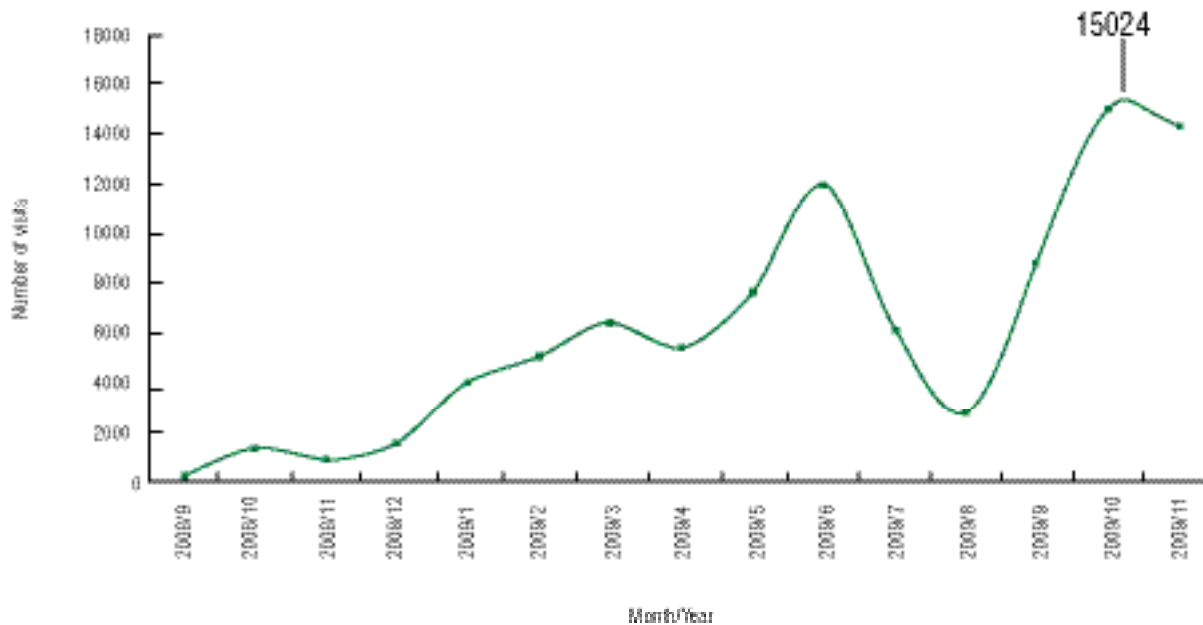


Figure 02 - Number of monthly visits over the last 12 months.

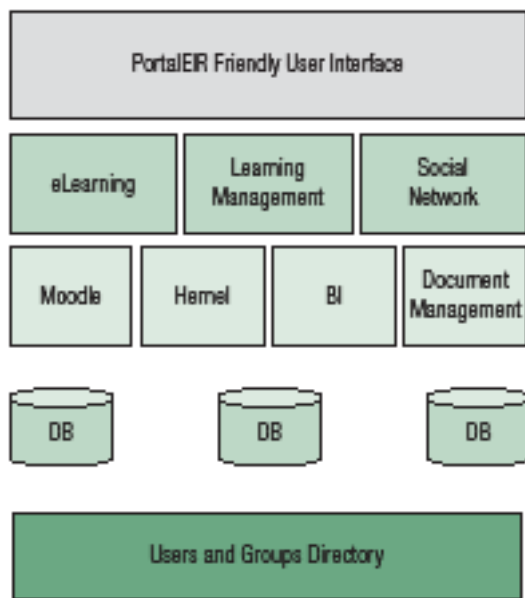


Figure 03 - Layered Architecture of the EIRPortal.

### Learning Management

The learning management system is run by the teaching commissions that find in the portal tools with a high impact on the processes involved in this management. Below there are some of the most important processes to which the portal has meant a significant progress.

In the past each teaching commission had its own individual and isolated database for managing residents and tutors, causing information coherence problems, delays in generating reports and, from a global point of view, it avoided having a globalized view of the resident's training status. On the other hand, the management of these databases used to be centralized in each teaching commission on one or two people, resulting in work overload preventing the staff from dedicating to its own learning processes. In order to solve this problem EIRPortal offered an Internet accessible web application where both managers and any other user could fill in the required data and participate in the management processes in a collaborative way. Thus, a typical web 2.0 philosophy had been followed, where users collaborate with the managers in order to keep the information. For example, residents participate in their own registration process on the platform and on the processes of training evaluation. Also, this participation is rewarded by some automated processes done by the portal, as for example, the system sends learning evaluation reminders through email in a complete automated manner. Users reply to these e-mails by web in order to obtain their grades in the courses taken.

From the learning management standpoint the portal is also a communication tool through which managers are able to use up to four different ways to send messages. Managers can send emails in a massive way; they can send SMS messages to mobile phones, publish interesting docu-

ments via web and post messages on a virtual notice board available in the personalized page of each user. Thus, each time they send something managers can select the target public applying different filters that take into account user's profile, specialty, class, etc. For example, a manager is able to send a SMS to cardiology tutors in Seville or to second year dermatology residents.

### Collaborative Spaces

EIRPortal has working spaces where any portal user can participate. These spaces are similar to the groups of social networks such as LinkedIn or Google Groups. The main difference between the working spaces of the EIRPortal and other social networks is not a technical aspect but a social one. The main challenge faced by the EIRPortal was to create the collaborative spirit of other networks at a professional environment that is not familiarized with this type of solutions. This is why the EIRPortal team has made a great effort especially on this idea, in order to take to the highest level typical web 2.0<sup>7</sup> processes, such as sending informative email on the groups activity, the implementation of an elaborate invitation process among users and carrying out a special effort on all the issues related to usability. Thanks to this effort today EIRPortal has more than 200 working groups with more than 2.000 professionals involved and thousands of documents shared. These results show a great improvement in implementing the social network in the specialized training system, although the team in charge of the portal expects to double this number over the next year.

From the functionality point of view, the working spaces enable to share documents, participate in debates, send emails to the members of a same group and invite any other person to take part in the working groups, among other functions.

### Mentoring

Through an invitation system, mentors can grant access to their profile to the residents they supervise without the intervention of any other agent. From the assignment of the resident to the mentor and vice versa the EIRPortal offers both a common working space and knowledge sharing as well as concrete tools for mentoring. Both mentor and resident can share internal and external rotation

applications and assessments, information on courses taken, clinical sessions, bibliographic sessions, reflection reports, etc. Furthermore, all this system is available to the teaching commissions, head of studies and the Health Department that can analyze how these relationships are doing and thus, evaluate the mentoring system from their point of view.

One key tool in mentoring is the Resident Electronic Portfolio where each student can self-evaluate his/her learning based on competences such as citizen guidance, the learning attitude and continuous improvement and teamwork. The portfolio guides the resident in acquiring these and other competences through the tasks carried out and the evidences detected. The mentor participates guiding the resident with comments on his/her progress.

### Teletraining

The teletraining platform of the EIRPortal is based on Moodle and it is integrated with the learning management application so that functions such as including new users, student enrollment and assignment of teaching staff to courses are completely automated. Thus, when creating a course edition from the training management system, the corresponding course in Moodle is automatically requested based on course templates previously designed.

### Teaching Network

The EIRPortal also offers the first tool of the Andalusian Public Health System where the model of the training structure exists, in this particular case the structure of the specialized training. Thus, the portal can be used as a guide for anybody who may need to get in touch with any teaching commission, teaching unit, head of studies or mentor. Also, the implementation of this system enables the Health Department to know the structure of the teaching staff network all the time, being able to detect the proportion of mentors to residents in a particular area of Andalusia or at a specific center in real time.

One of the most relevant aspects of the implementation of the teaching network is that its data has been gathered by collaborative methods<sup>7</sup>, unlike what usually happens in this type of organizations. Any user can contribute with data to the teaching network enabling to gather information and updating it with great efficiency and conciseness.

## Methodology for gathering requirements

With more than 50 teaching commissions in Andalusia, there is the urgent need to standardize the processes implemented in the portal, so that it will be possible to establish a common communication channel between all the commissions, residents, mentors and the Health Department. The team of experts that analyzes the needs of the portal found here an important challenge to overcome: to develop a global portal through the proactive contribution of needs by all the users at the same time that the processes are standardized and improved.

When gathering requirements we had to face the need of having to do re-engineering of essential processes of the learning management in order to have in its definition the new tool to be developed. This meant to re-define a great amount of processes completely. It was necessary to make an analysis of the requirements that should have the participation of a huge amount of people. In order to solve this inconvenient working and requirement gathering methodologies were applied based on quick processes<sup>9</sup>. These processes enable to give fast and efficient answer to specific needs of the users the evaluation of the result including within the process itself, enabling a continuous improvement process, which is really innovative in this environment.

In order to achieve a proactive attitude from the users, the team prioritized the needs to be able to quickly optimize processes and increase the efficiency of the training management, so that users could see reliable results in a short term making them more confident in the system and getting more involved in the improvement process.

## FUTURE

The EIRPortal project is funded by the European Social Fund until 2013, that is why there are many expectations regarding its final progress. The main improvements that will be done during this period of time are presented below.

Due to the need of guaranteeing the authenticity of documents, it is planned to integrate the digital signature of documents through the use of the electronic Identity Number in all training management processes, such as yearly evaluations, final evaluation of the specialty, signing of records, etc.

In a very near future the integration of the EIRPortal with the systems of the Ministry of Health will be a reality, enabling to exchange all data on specialized training directly

with the central government. This aspect is extremely important in Spain where the allocation system of vacancies for specialized training is coordinated at the central Ministry, whereas healthcare issues are delegated to the regional governments.

One of the most important components of the EIRPortal is teletraining and this is why there are plans for incorporating new supports to implement teaching methodologies such as mobile learning, personal learning, rapid learning, 3D learning, etc.

The importance of social networks in internet also requires a dissemination and communication strategy for them. The integration with networks such as Facebook, Twitter and others is expected.

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