

# Large-Scale Integrated Academic Portals

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## INTRODUCTION

The increasing availability of fixed/wireless network connectivity and the integration of telecommunication systems and the Internet create novel opportunities for users who can benefit from anytime-anywhere access to a growing amount of Internet/intranet Web information. In particular, university communities clearly perceive the potential benefits of widespread availability of Web-based services, which should satisfy heterogeneous requirements from different classes of users, for example, students, teachers, administrative and technical staffs.

However, university Web sites are typically populated by autonomous institutions (faculties, departments, research groups, etc.) that desire to maintain an independent control over data content. Consequently, data from different sites of the same university are usually organized in different ways, by rarely reflecting a common standard for data presentation, representation, and communication. Such a plethora of heterogeneous academic/educational information poses novel management and technological challenges. On one hand, the lack of a centralized entry point for service delivery and information retrieval creates difficulties for users, forced to browse many links before reaching the desired contents. On the other hand, the lack of a standard for data classification and presentation obstacles service/data integration and interoperability.

The academic community of the University of Bologna, the oldest university in the western world, had to face the aforementioned technological and management challenges emerging in large scale organizations. In fact, the Bologna University community includes many academic and administrative institutions (faculties, departments, administrative centers, etc.) willing to maintain their autonomy in data management but requiring to share common standards for data presentation and communication.

These challenges have been faced by designing and implementing an integrated academic/educational Web portal (UniBo) (The Web Portal, 2005). The UniBo project focuses on two main goals: first, to impose the University of Bologna

as a single entry point for transmitting social-cultural knowledge through novel communication channels, such as fixed and wireless networks; second, to organize and customize the heterogeneous data provided by different institutions to easily satisfy the requirements of various user targets (different views for students, teachers, and administrative staff). In the following, we present the peculiar aspects of the UniBo project, by pointing out the motivations of the technological choices made and the crucial challenges of activity reorganization deriving from developing such a large-scale Web portal. In particular, the contribution underlines the relevance of implementing an integrated technological platform that not only enables common technological, graphic, and usability standards, but also permits the access to shared application services and to university databases about staff, students, teaching activities, and research projects.

The remainder of the article is organized as follows: the Background section overviews some related work about academic/educational portals. The next section, The Integrated UniBo Web Portal, presents the UniBo project, by pointing out its peculiar technological and organizational aspects. Lessons learned from the UniBo portal experience and concluding remarks follow.

## BACKGROUND

Several research groups have recently claimed that developing an educational/academic portal is a strategic technology decision that affects the entire campus community and that requires careful analysis of long and short-term needs. The view from the California State University (Daigle, 2002) states that one obvious reason for deploying portals is to improve productivity by increasing the speed and customizing the content of information to internal/external users and institutions. The California State University portal provides advanced knowledge management functions and an organizational model to classify information on the basis of target users.

A user-oriented value added approach has been widely adopted in institutional information systems. The project named Institutionally Secure Integrated Data Environment (INSIDE) in the Universities of St. Andrews and Durham (Ling, 2002) has the goal of designing and implementing a Web-based, user-oriented portal built around the identity of users (roles and responsibilities within the institution). The INSIDE Web portal is also intended to provide a single point of distribution of services for the end-user academic community. This requires the delivery of integrated supports, such as unique authentication, that enables users to profitably cooperate on common applications. The Université de Savoie (Martel, 2001) experiments with nearly 500 students and teachers using an open source Web platform that provides users with the access to adaptive content from anywhere, anytime. The platform facilitates cooperative tasks for sharing knowledge about academic/educational activities.

The University of Bologna integrates the above aspects in an organizational and technological project that enables to manage the editorial workflows, from the content creation to the data/service delivery to the overall academic community. A crucial feature of the portal project is the attention to user satisfaction: UniBo adopts a user-oriented approach in the implementation of dedicated areas, such as MyPortal (The English version, 2005), where contents and services are not only personalized on the basis of the classes of users, such as students or teachers, but also on the basis of the user own identity. The user-oriented approach is strengthened by the whole UniBo Web portal adhesion to accessibility and usability rules (Accessibility, 2005) in order to knock down the virtual Web barriers and to facilitate the access by every kind of user, including foreigners or disabled users. The UniBo community collaborates with the ASPHI (ASPHI, 2005) non-profit association to encourage the integration of disabled users in the academic/educational activities through the exploitation of information and communication technologies.

### THE INTEGRATED UniBo WEB PORTAL

The UniBo Web portal finds its origins in 2002, when a group took the responsibility of carrying out the overall community Web strategy by fully supporting its educational, academic, and administrative activities. The group was named DSAW (*Direzione e Sviluppo delle Attività Web—Direction and Development of Web Activities*) and nowadays it consists of 35 people, including graduating students and scholarship holders. DSAW staff members are organized in four different divisions and nine teams with responsibilities that vary from developing and monitoring the portal technological platform and application services, to administrative tasks

including service quality management and the training of the 300 Web operators distributed in the different institutions of the University of Bologna.

The UniBo Web portal is a federated system with more than 180,000 recognized users, capable of personalizing and unifying their access to data from 72 sites of academic institutions and organizations, from more than 3,000 teacher Web sites, and from more than 30 application servers (such as *AlmaWelcome!* (AlmaWelcome!, 2005) that integrates UniCredit Bank services to enable student online payments for courses, masters, etc.). As depicted in Figure 1, single Web sites continue to be managed autonomously by local institutions, but they are integrated over a common platform that not only enables to share common technological, graphic, and usability standards, but also enables the access to shared application services and to central university database systems about staff, students, teaching activities, and research projects.

Such a complex and large-scale academic community imposes different organizational challenges, exacerbated also by the fact that the campuses of our university are spread over five cities. This requires coordinating online and off-line communications to involve academic/administrative staffs of every campus. Differentiated target needs are satisfied via profile analysis and the possibility to establish one-to-one and one-to-many relationships, with consequently different communication mechanisms and different personalized content.

The UniBo project supports integrated communication through three main channels: *vademecum pages*, *student newsletters*, and *banners*. Vademecum pages are UniBo Web pages that unify different navigational paths for various target users, such as students or teachers. The exploited language and the communication approach is designed in ad hoc manner by considering different target user expectations. Figure 2(a) shows an example of a vademecum page that unifies the guidelines for performing searching operations within the UniBo Web portal: the page is subdivided into four sections on the basis of target information to be searched. The student newsletter delivers news, events, and deadlines about the overall University to more than 80,000 users. The newsletter involves editorial operators from nearly 10 institutions. Figure 2(b) shows an example of a student newsletter regarding important news about the academic life in November/December 2005. Finally, more than 70 banners are contemporary published in the main UniBo Portal Web site (The Web Portal, 2005). Banners exploit graphic elements to concisely communicate news and information regarding specific thematic channels, by facilitating the access to information of interest. Banners are spread in the 17 thematic channels that regard the UniBo academic institution (history, current organizational structure, and administrative staff), the UniBo educational activities (Laurea and Master courses, PhD, and post-graduating projects), research activities and

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