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DBTechNet portal: A Gateway to Education and Training for the European Database Technology Professional*

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In this paper we consider issues relating to the design, modeling, and realization of the DBTechNet web portal. DBTechNet is an initiative of European universities and IT companies that currently runs the “DBTech EXT” project which is partially funded by the EU LLP Transversal Programme. The intended use of the portal imposes a number of challenging functional and design issues that need to be addressed at model construction phase, as well as requirements with regard to user and content access policies. We describe the decisions made in the direction of implementing the portal using a modified/tailored version of the Moodle open source course management system.

1. Introduction

DBTechNet (www.dbtechnet.org) is an initiative of European universities and IT-companies to set up a transnational collaboration scheme of higher level educational establishments, IT enterprises and vocational training centers in order to achieve a three-fold goal, namely:

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1. Develop efficient Internet based tools which will organize worldwide access to DB technology resources and educational/training material and references,
2. Design and develop virtual workshop type course modules on selected DB topics that will address the wide spectrum of new trends, backed by online support from a network of educational and IT professional experts, and
3. Promote entrepreneurship by developing a business plan of operation, which will make it possible for the collaboration scheme in question to evolve into a self-sustained consortium that will function within the new emerging reality of education and vocational training in today's Information and Communication Technology driven society.

First launched in 1997, two projects of the initiative have been successful in bidding for EU funding: DBTech Pro (December 2002 – May 2005, Leonardo da Vinci Programme), and DBTech EXT (January 2009 – December 2010, EU LLP Transversal Programme). Currently in progress, DBTech EXT involves eleven inner-circle (core) partners from five EU member states: seven higher level academic institutions, one company, and three VET centers. The project invites academic institutions, organizations, companies, and VET centers to join-in as outer-circle members and act as project deliverables recipients. At project initiation time (January 2009), its outer-circle membership included eight ICT companies and four academic institutions.

Project deliverables include educational and training content on modern trends in database technology, in the form of virtual laboratory workshops. The latter consist of trainer and trainee guides, lecture slides, digital video lectures and software 'how-to' clips, self-training exercises with model answers, hands-on laboratory exercises, assessment exercises, etc. To organize and disseminate this educational and training content, the DBTechNet web portal is currently under development at the University of Macedonia. The intended use of the portal imposes a number of challenging functional and design issues that need to be addressed at model construction phase, as well as requirements with regard to user and content access policies; requirements that relate directly to the specifications used for selecting the proper content/course management platform for the realization of the DBTechNet portal.

In this paper we consider issues relating to the design, modeling, and realization of the DBTechNet web portal. Since the portal has to play the role of an educational environment, in Section 2 we discuss issues related to web-based educational environments, and in Section 3, we present the special requirements for the design of the DBTechNet portal. In Section 4, we describe the type of available content we offer through the portal and we conclude in Section 5.

2. Instructional/Educational Environments

In the recent years, web-based instructional technology is advancing at a rapid pace. Hundreds of commercial and free/open source instructional/educational environments have appeared under the terms Learning Management Systems (LMS), Virtual Learning Environments (VLE), or Course Management Systems (CMS), and they have been adopted by almost all educational content providers. These environments offer synchronous and asynchronous tools to support the learning process. The most common ones are commercial products (WebCT, Blackboard), but lately, there is a significant increase in the interest of educational institutes towards free/open-source software solutions (Moodle, Claroline/Dokeos, .LRN, Sakai, ATutor, ILIAS, etc.). An interesting presentation and comparison of the existing instructional environments can be found at the independent service EduTools (http://www.edutools.info) and at the website edutech of the Swiss Virtual Campus (http://www.edutech.ch).

Chickering & Gamson have presented the Seven Principles for Good Practice in Undergraduate Education 5, 5: (1) Encourage Contact Between Students and Faculty, (2) Develop Reciprocity and Cooperation Among Students, (3) Encourage Active Learning, (4) Give Prompt Feedback, (5) Emphasize Time on Task, (6) Communicate High Expectations, and, (7) Respect Diverse Talents and Ways of Learning. We consider these principles to be important for the adequate usage of instructional technology and we have adopted them for the choice and modification of the appropriate CMS.

In a relevant study that used focus groups with 33 teachers who used Blackboard and e-Scholar at the University of Wisconsin 5, it was found that the first four of the principles are being enhanced as teachers and students use the available course management tools. In addition, the study indicated a transition in the conception of teacher role. Nowadays, a teacher is considered to play the role of the "guide" in the learning process.

The primary functionality of the DBTechNet portal is to offer educational content, and, since we had in mind certain requirements for the way users should interact with the portal content (see next section), we thoroughly examined the flexibility in user and content access policies offered by various free/open-source course management systems (CMS). We ended up choosing Moodle (http://moodle.org), which, despite being quite complex and offering an overwhelming set of features, it is the only CMS that can be parameterized with a minimal programming effort and satisfy all our requirements.

3. Special Design Requirements of the DBTech Web Portal

The DBTechNet portal should have a dual function. It should be both a content management system (i.e., portal) and a course management system. More specifically, it should serve as a portal for the collaboration of the members of DBTechNet in various projects, and for the dissemination of the deliverables of those projects. Also, it should play the role of an instructional environment like a

typical modern course management system does by offering virtual educational content units. The design of the portal was greatly influenced by the work of 5.

We envisioned the DBTechNet portal as having two modes of operation: (a) generic portal, and (b) course management system offering units. A unit is equivalent to a course in the terminology of course management systems, that is, content in the form of a collection of documents, multimedia items, news, forums, wikis, calendars, etc. Practically, the portal itself is a unit that in addition to the content described above hosts all the units of the course management system. Moodle appeared to be the right choice in our case, since it allows this functionality. Portal content can be either public or private and unit content can be public, public to portal members or private.

The user roles we considered to be adequate are: a) portal and unit guest, b) portal member, c) unit member, d) unit coordinator, and e) portal manager or administrator. Let's see the roles in more detail:

a) **Portal and unit guest**. This is the typical public visitor of the portal. No login credentials are required and the visible content is the public content (assigned as such by the portal manager and the unit coordinators). A unit with no public content is not accessible to guests.

b) **Portal member**. This category includes all users of the portal. These users, in addition to the public content have access to (i) private portal content, and, (ii) unit content public to portal members. A unit with no public content to portal members is not accessible by those users.

c) **Unit member**. Portal members who enroll in a particular unit. Typically, they are students participating in a unit of the virtual lab type.

d) **Unit coordinator**. Portal members who manage units. Typically, they are educators who offer educational content, e.g., DBTechNet faculty or researchers and IT industry members. Unit coordinators (i) manage unit membership, i.e., they assign existing portal members as members of their units, and, (ii) decide on the accessibility of the unit's content: public, available at the portal level, or private to the unit.

e) **Portal manager or Administrator**. This user (usually a single person), in addition to the standard duties that relate to the management of the portal content and its users, s/he is responsible for creating new units, and assigning coordinators to them.

It has to be mentioned that content managers (i.e., the administrator and the unit coordinators) can decide on the visibility of content. Content can be hidden to all users, but visible to the content manager while it is being developed and tested. Once developed, the content can become visible and in that case it is public content. Alternatively, it can remain hidden in which case the content manager can update the specific resource and override its permissions to give access to specified user groups (i.e., to unit members or portal members). Again, Moodle is very flexible at controlling the visibility of content to specific users and user roles.

In Figure 1, we can see what a portal member sees when logged in. A guest would see exactly the same content except from the green links that represent content that is available to non-guests (i.e., logged-in users) only. Notice that in this screenshot there is just one available unit.

In Figure 2, we can see the content of unit “BI Virtual Lab” that is available to portal members, and in Figure 3, we can see the content of the same unit that is available to unit members. Again, guests can only see the content represented by blue links. Obviously, a unit coordinator has the option to disallow portal/public access to the content for his/her unit.

4. Suppoted Content

Moodle offers a vast number of content choices a user (administrator or unit coordinator) has, so we tried to keep only a minimal set of options. The administrator and the unit coordinators can easily generate content directly or upload any type of electronic file. All a unit member, portal member or guest has to do in order to access content is make sure that the appropriate software is installed on their computers. The optimal set up is a web browser able to handle embedded pdf and video files, but this is not a requirement since a user can choose to download the content and use external applications to view/process it locally.

Supported content in DBTechNet portal is categorized to be any one of the following types:

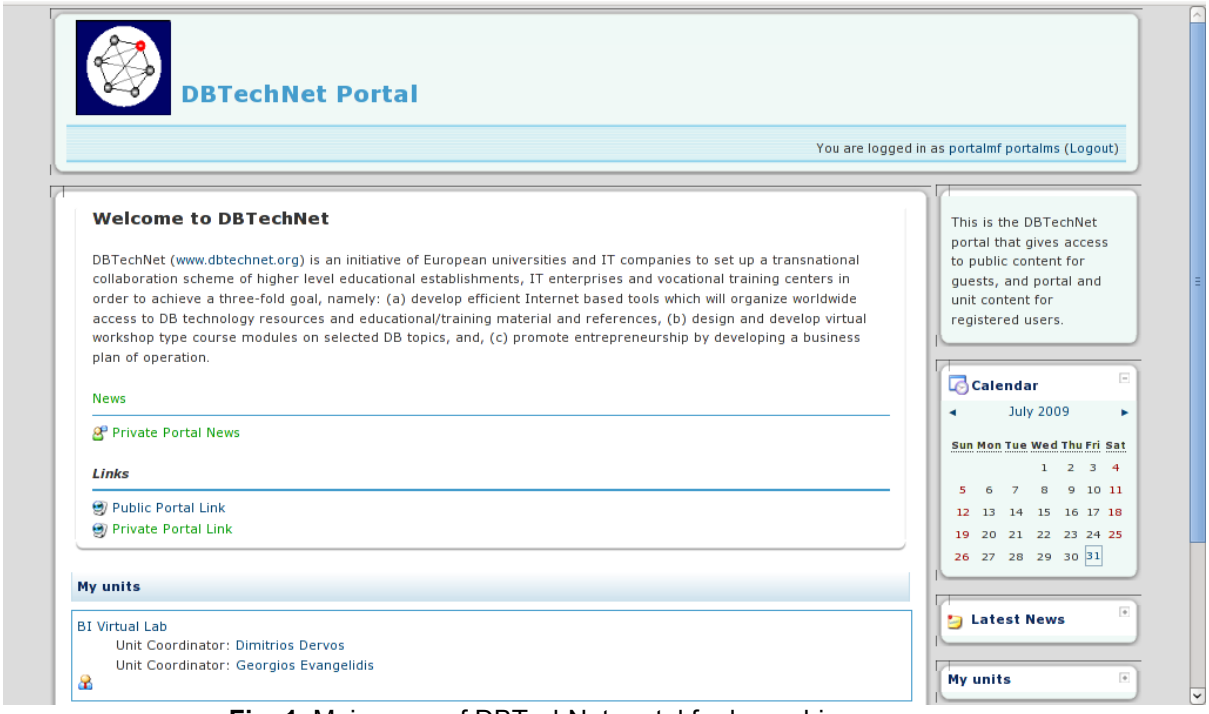

Fig. 1. Main page of DBTechNet portal for logged-in users.

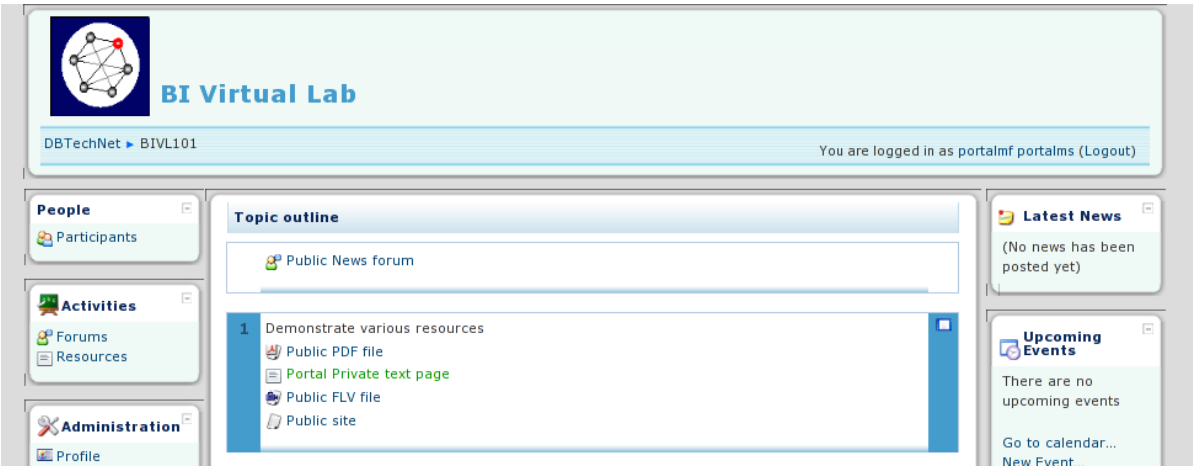

Fig. 2: Unit content available to portal members

1. **Labels:** These are simple text elements used to categorize content or further explain special content.
2. **Documents on the fly:** Text or web documents can be created on the fly and become available to other users in “txt” or “html” format.
3. **Links**: These are links to external web sites or documents with a given url, title and description. Advanced customization can be added, in order to specify if links are opened in the same window, in a new window, or as popups.
4. **Document Files**: All known types of documents can be uploaded to portal units and become available to users: text documents, spreadsheets, presentations, pdfs etc.
5. **Media Content**: The portal automatically recognizes media files. Supported media content are audio (mp3, ogg, wma, etc.) and video files (flv, wmv, etc).
6. **Discussion Fora**: Each DBTechNet portal unit may have its own (one or more) online discussion fora.

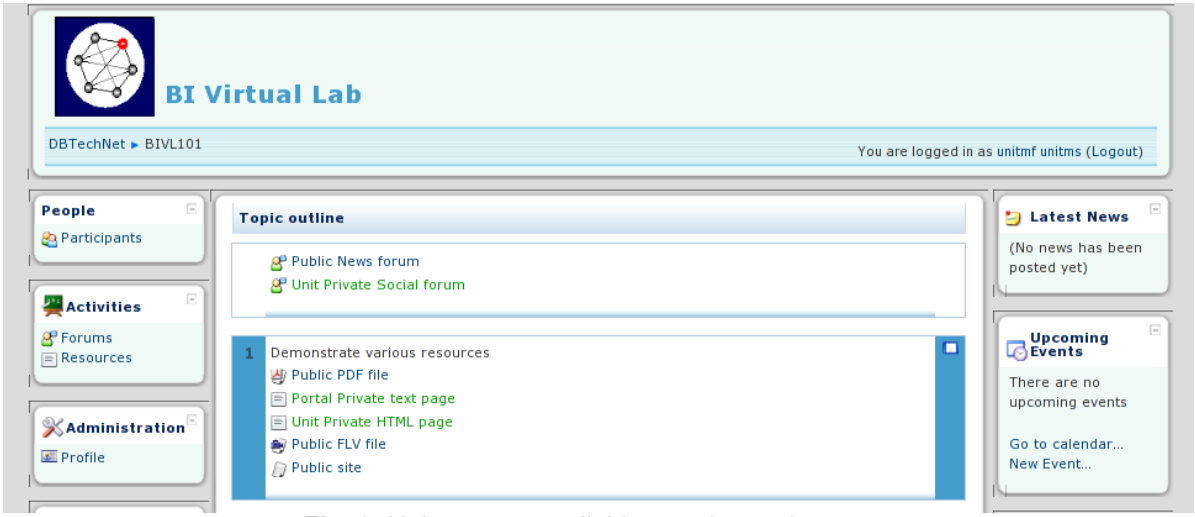

Fig. 3: Unit content available to unit members

5. Conclusion

We report on a tailored implementation of Moodle that supports all the design requirements considered being important for the DBTechNet portal. Since the University of Macedonia has prior experience in content management systems (http://www.uom.gr is based on PostNuke and operates since 2002) and course management systems 5 (http://compus.uom.gr is a fork of Claroline and e-Class and operates since 2004 with 11000 users) it was relatively easy for the developing team to appropriately modify Moodle and satisfy the design requirements.

The portal is temporarily hosted at http://dbtech.uom.gr and will be thoroughly tested by the DBTechNet partners before going public.

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