

2007-2603/001-001

OIKODOMOS

a virtual campus to promote the study of dwelling in contemporary Europe

WORKPACKAGE PR EP 1

Proposal for Enhanced Environment

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31/05/2008



Lifelong Learning Programme

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	Life-long learning program : Erasmus Virtual Campuses 134370-LLP-1-2007-1-ES-ERASMUS-EVC OIKODOMOS
work package	Proposal for Enhanced Environment
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date	May 31, 2008

Building on the results presented in the report PRE EP 1: "Assessment of the Existing Web-Based Platform", this report describes the indications, guidelines and requirements for the design and implementation of new platforms/environments which will be used within OIKODOMOS. The document is divided in general specifications (section 1), definition of content types and classification structures (section 2), database structure (section 3), user interface and navigation (section 4, which also includes a wireframe functional mockup of the application interface), and the definition of application modules and work distribution.

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Introduction

The virtual learning space HOUSING@21.EU was developed and implemented between 2003 to 2006 by partners keen to collaborate in teaching and learning on a pan-European approach to contemporary housing design.

The OIKODOMOS started its work evaluating the platform developed by its predecessor. The results were presented in the first report for PR EP 01: Assessment of the Existing Web-Based Platform.

This report presents the technical specifications for the development of the enhanced platform for the OIKODOMOS project, as one outcome of Work Package PR EP1.

The report presents both the process undergone for the development of the specifications, and the specifications themselves, along with the main guidelines for implementation.

1) General Technical Specifications

4.1) *Developing the Technical Specifications*

Taking into account the results of the usability study, different scenarios have been discussed during project meetings, concerning both student and teacher uses, and different ways of integrating the platform in carrying out design studios at the partner institutions. The main results were the following:

- The current platform was used in different ways as pedagogical integration in design activities, corresponding to the differences in teaching style and tradition at partner institutions.
- All of HOUSING@21.EU features are useful, even if they are used differently in different courses. Therefore, they should be preserved and enhanced
- The “language” of the web application (as logic and interface) has grown outdated, and should be revised
- Currently the web offers a number of interesting web applications that could be meshed-up with OIKODOMOS platform in order to enhance its features.

4.2) *Learning from the state of the art*

An important task of this Work Package concerned the review of other existing websites in the domain of Architecture, and especially those collecting case studies of single architectural designs and repositories thereof. This was done as a collective work during project meeting, and the following websites were included in the analysis:

- <http://www.mimoa.eu>
- <http://www.greatbuildings.com>
- <http://www.danda.be>
- http://www.archiplanet.org/wiki/Kimbell_Museum
- <http://housingprototypes.org>
- <http://www.datarq.fadu.uba.ar>

The outcome of this investigation was twofold. On the one side it led to a broad overview of different ways to handle architecture case studies. On the other side valuable insights were gained on design details and also inspiration was found on possible additional functionalities. These preceding steps were used as a basis for the specification of the OIKODOMOS web-based platform, the aim of which it is to provide a case repository of valuable architecture objects and to support architecture students' internationally collaborative learning, following a pedagogic approach.

The results of the analysis prompted the project team to move one step further and focus on the actual added value that OIKODOMOS can bring to the world of online Architecture repositories – that is, its pedagogical orientation. Indeed, the focus on teaching and learning is what makes OIKODOMOS different from the websites mentioned above. But where is this reflected in the actual system architecture and features?

This question led to think to the repository not only in terms of structure or content, but also of supported teaching and learning activities in teaching and learning scenarios. From this discussion emerged the need to think of the OIKODOMOS environment as a consistent whole, composed by the repository and the virtual design studio (presented in another report).

4.3) *Definition of the Platform Structure*

The steps presented above were necessary in order to collaboratively create a shared understanding of the main aims and structure of the platform to be developed. The task to envision a new virtual campus platform from the previous HOUSING@21.EU platform was undertaken collaboratively by all

partners. In a general meeting held in Barcelona in April 2008, the structure of a new platform was outlined, consisting of a virtual design studio (VDS) and a case repository:

1. The repository is a collection of high-quality documents (case studies, media assets, bibliographic references and collections of such items) that can be used within learning activities within VDS environments.
2. The activities run within VDS environments can generate new content for the repository, or new versions of existing content.

This led to think of the repository as a double entity, as illustrated in the following Figure 1, which shows a database-centric view of the platform. Two repositories mark the main locations where data is held within the system. Such repositories differ as type of content:

1. The *case repository*, which contains high-quality, editor-approved case studies, which are partly migrated from HOUSING@21.EU and partly newly created. The possibility of creating new case studies and editing existing cases is one central feature of the system..
2. The *project repository*, which containing student projects performed within the OIKODOMOS platform.

On the other hand, the system allows the creation of Workspaces, i.e., access-controlled environments that can also access the case repository itself, allowing online seminars and case analyses to be conducted within the OIKODOMOS platform. The concept of a workspace includes the bilateral connection to a Learning Management System (LMS), which is supposed to be running independently on another server. The administration of classes, reports and grades is thought to be done using the external LMS (e.g. Moodle), which comes with this functionality.

Also, workspaces include the Virtual Design Studio as a means for synchronous online collaborative design tasks within architecture design projects.

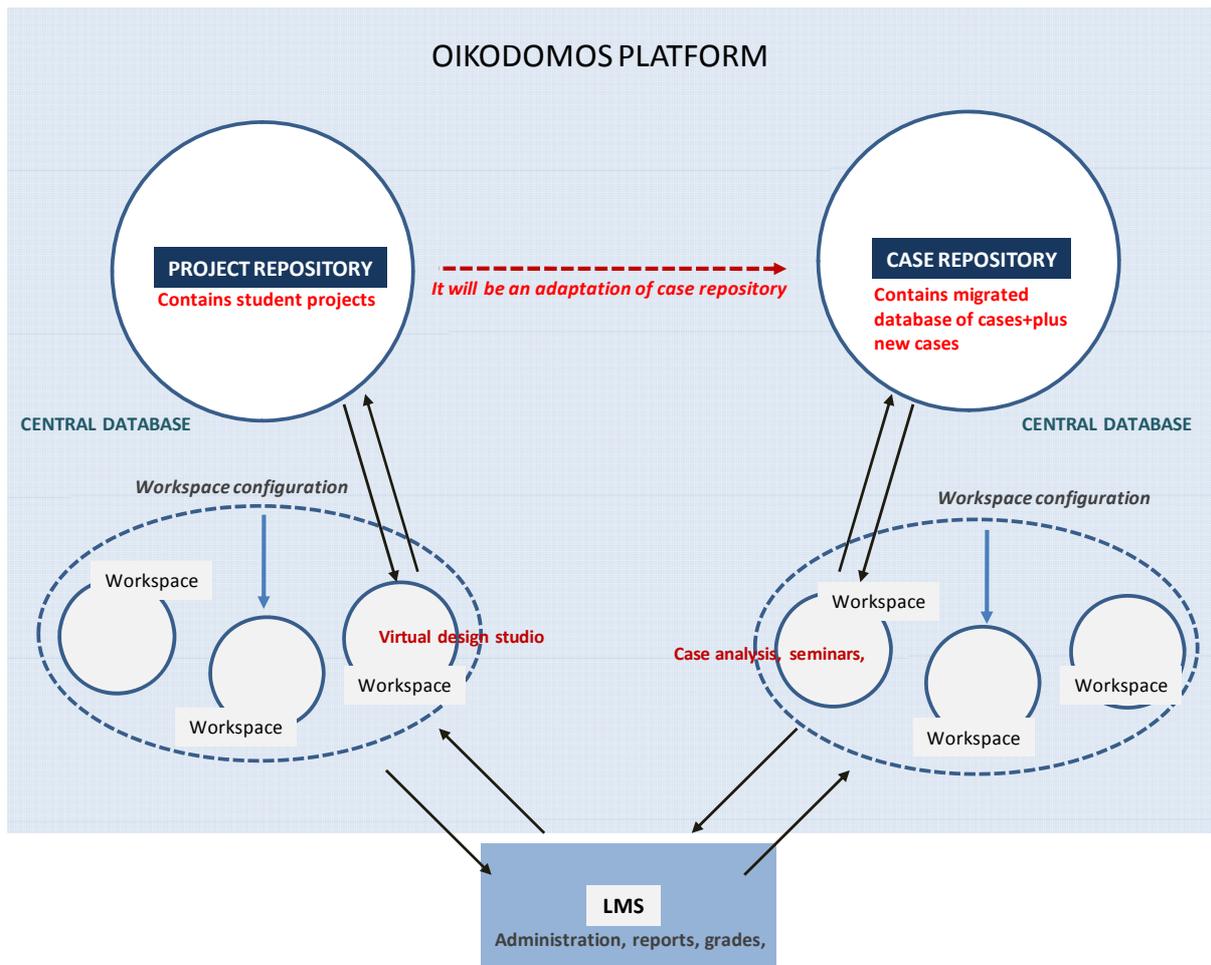


Figure 1 – OIKODOMOS Platform general design

4.4) User roles

After having outlined the basic structure of the platform, the development team needs to define system requirements. This was done by specifying different user roles and the according rights for interaction with the system. As shown in Figure 2, identified roles are, sorted by descending access rights:

- *Administrator*: manages the system configuration and user accounts
- *Editor*: works on content (case studies, projects), is allowed to edit/approve/refuse content
- *Teacher*: can create workspaces, select content for a workspace from the repository, “promote” content generated into a working space to the main repository
- *Student*: can brose the main repository, can work in workspaces with permissions set by the owner teacher
- *None (Public)*: generic access for non academic people.

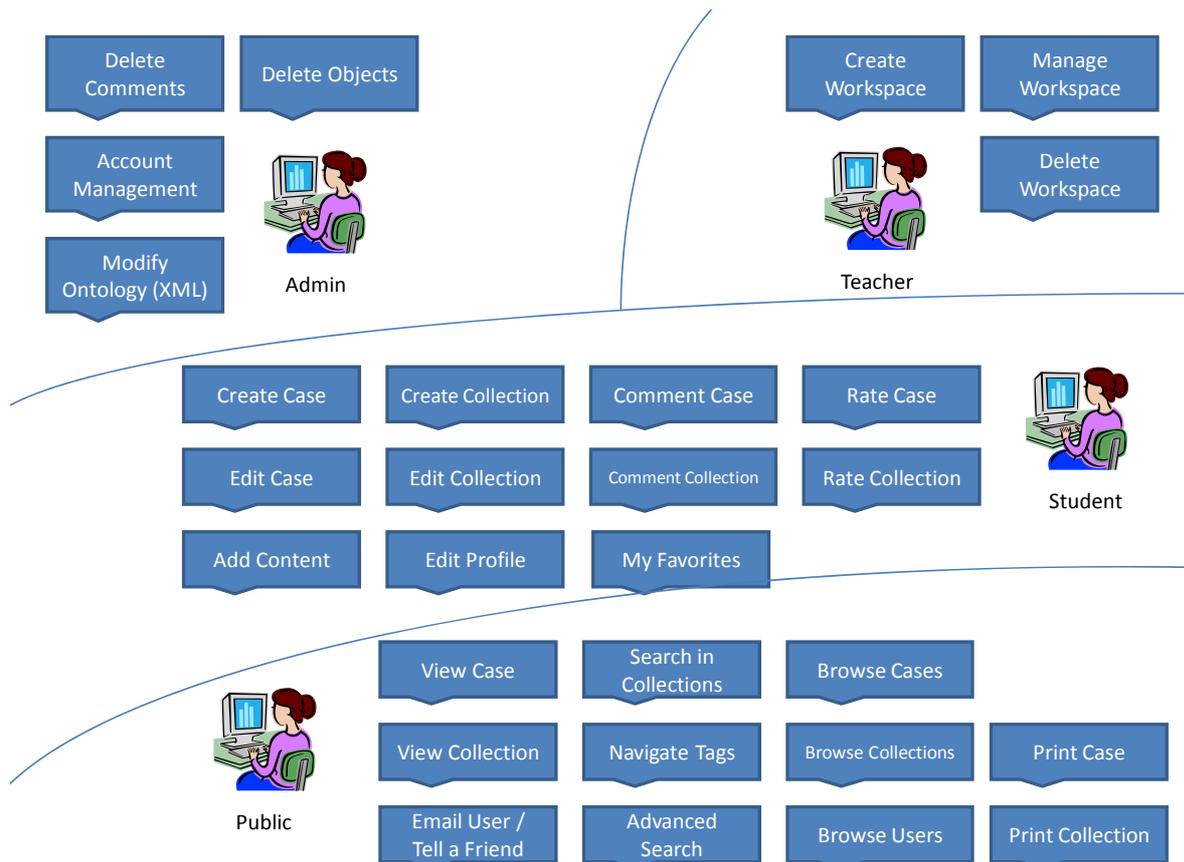


Figure 2 – User profiles and access rights

4.5) Content types

The repository will content types include 5 from the original structure of the Housing@21.EU platform, plus a new type:

1. **Case study**, composed by several
2. **Media assets** (text portions, images, URLs, connections with external applications)
3. **Collections** of case studies
4. Bibliographic **reference**
5. Student (evolved into **user**)
plus the new type
6. **Page**. A page is a document that contains free text along with a reference to any item in the repository (case, collection graphic file, user profile, tag, ontology node). Pages are therefore structured content generated from the basic content already present in the repository. Students and teachers can create pages within workspaces, editors within the main work space.

4.6) Definition of Information Structure

In order to have a consistent information structure, the following formal description model for case studies was carefully defined, which is respected throughout the system. Following the case study definition model, the formal ontology is described in 6.2. This was developed to define a logical and formal relation of the case studies with each other.

2) Case Study Definition and Classification

The main content of the OIKODOMOS platform are case studies. This section presents the data that will be collected for each case study and their main classification, i.e., the ontology that will be used to structure the case study repository.

2.1) Case information

Mandatory fields in the following definitions are marked with an asterisk.

1. Title *
2. Architect
3. Dates (at least one of the two *)
 - Year of the project (optional)
 - End of works (optional)
4. Location
 - Address (exact)
 - City *
 - Country (list) *
 - (Google map coordinates)
5. Number of dwellings
 - 1 dwelling
 - 2-8 dwellings
 - 9-20 dwellings
 - 20-60 dwellings
 - 60- 200 dwellings
 - More than 200 dwellings
6. Description (short description of project)
7. Icon (representative image of the project)
8. Automatic system data
 - User
 - Date added

Textual Documentation

1. Levels
 - Social
 - Economical
 - Technological
2. Dimensions
 - Individual
 - Communal
 - Urban
3. Bibliography (simple text)
4. URL (clickable)

Graphic Documentation

1. For each graphic file
 - Source for each graphic file *
 - Copyright indication (full or creative commons, defaults to full) *

- Public / registered students only (registered user is forced for copyrighted materials, defaults to registered students only) *
- Type of picture (list) *
- Descriptive/Analytical (defaults to descriptive) *
- Comment

Type of document

One of the following:

1. Drawing
2. Plan
3. Section
4. Elevation
5. Render
6. Perspective
7. Photo
8. CAD 2D (.dwg) or other vectorial file
9. CAD 3D or other kind of 3D (Sketch up or others)

Mash-ups

1. Videos on Youtube
2. Link to Google Images (as in the case of www.greatbuildings.com)
3. Link to Google Maps or Google Earth

2.2) Ontology Classification

Case studies will be classified on a structured ontology, and classification will be mandatory when users enter a case. Classifications are all non-exclusive.

1. Typology
 - single-family housing
 - row house
 - clustered low-rise
 - courtyard structure
 - perimeter block / infill block
 - slab / detached block / singular building
 - tower
2. Relation to the context and urban situation
 - Rural
 - Suburban development
 - Historical urban structure, old city center
 - Planned urban expansive development /grid structure
 - New urban masterplan, great estate development
 - Reconversion/renovation
3. Social factors
 - Social housing, low-cost housing, state-subsidized housing, controlled rent housing
 - Private developments, medium-cost housing, free market housing
 - High standing housing or housing designed for a client (custom-made)
 - Halls of Residence (for students, old people or others)
 - Other communal residential buildings
 - Rented
 - Owned

- Gated communities
- 4. Construction
 - Renovation, refurbishment
 - Self-construction
 - Prefabricated structure/ major components and prefabricated façades.
 - Standardization and modulation
 - Skin, innovative facade, curtain wall
 - Transportable housing, nomadic dwellings
 - Wood, concrete, steel (referred to construction system)
 - Bearing masonry
 - Brick
 - Concrete
 - Curtain wall
 - Fabric and textile
 - Geodesic
 - Glass
 - Light wood frame
 - Steel
 - Timber
- 5. Sustainability and ecological concerns
 - Passive energy-saving systems
 - Active energy-collecting systems (solar cells, solar warmers, wind-power devices)
 - Water saving systems (collection and re-use of rain water or gray waters)
 - Natural ventilation systems – courtyards, patios, crossed ventilation, ventilated facades
 - Use of recycled or recyclable materials (afterwards)
 - Waste management throughout the life of the building

2.3) Additional features

2.3.1) Free tags

In addition to the structured application of the ontology, the system will provide a free tagging system. This will be a revision of the HOUSING@21.EU keyword system.

2.3.2) Content features

Some content types are core to the repository, namely: case studies, collections and pages. Two features will be consistently applied to such core contents:

1. *Comments* will be consistently extended to all content types, so that it will be possible to post comments case studies, medi assets, collections, pages, users, references.
2. *User rating*

2.3.3) New modules

Additional modules have been proposed, but are currently left as nice-to-have features:

- Connection with other architecture website (see list above)
- Search books in Amazon
- Search images in Google Images
- Exporting to IMS-CP

3) Database Structure

Based on the developed formal definitions and ontology and on the requirements identified, the database for the OIKODOMOS web-based platform was developed, using an entity relationship diagram (ERD). Out of the entities and their fields and relations in the created ERD, formal database tables were derived, which are shown in the following tables:

Cases
ID *
Title *
User_ID (Creator) *
Country
City
Address
Year_start
Year_end
Architect
Description
Dwellings
References
WS_ID *
Approved [y,n]
Date_Creation *
Date_Edit
Rate_Average
Rate_Count
Main_Picture_ID

Texts
ID *
Case_ID *
User_ID (Author) *
WS_ID *
Text
Text_Type_ID *
Approved [y,n] *
Date_Creation *
Date_Edit

Pictures
ID *
Case_ID *
User_ID (Author) *
WS_ID *
Filename *
Caption
Picture_Type_ID *
Approved [y,n] *
Date_Creation *
Date_Edit

Comments
ID *
Table_ID *
Object_ID *
User_ID *
WS_ID *
Date_Creation *
Date_Edit
Text *

Externals
ID *
Case_ID *
User_ID (Author) *
WS_ID *
Parameters *
Caption
External_Type_ID *
Approved [y,n] *
Date_Creation *
Date_Edit

Texts_Types
ID *
Label *
Description

Pictures_Types
ID *
Label *
Description

Externals_Types
ID *
Label *
Description

Tags
ID *
Label *

Cases_Tags
ID *
Case_ID *
Tag_ID *

Cases_Ontologys
ID *
Case_ID *
Ontology_ID *

Ontologys
ID *
Label *
Son_Of

Collections
ID *
Title *
User_ID (Creator) *
WS_ID *
Description
Date_Creation *
Date_Edit
Rate_Average
Rate_Count

Cases_Collections
ID *
Case_ID *
Collection_ID *

Notifications
ID *
User_ID (Sender) *
User_ID (Recipient) *
Text
Date_sent

Historys
ID *
User_ID *
Table_ID *
Object_ID *
Timestamp *
IP *
Action [create, edit, view, rate, add_pic,add_ext, edit_pic,edit_ext, ...] *

Pages
ID *
Title *
User_ID (Creator) *
WS_ID *
Text (with tags)
Date_Creation *
Date_Edit
Rate_Average
Rate_Count

Bibliographys
ID *
User_ID *
WS_ID *
Title *
Author *
Publisher
Place
Year
Date_Creation *
Date_Edit

Cases_Bibliographys
ID *
Case_ID *
Bibliography_ID *
User_ID *
WS_ID *
Date_Creation *
Date_Edit

Workspaces
ID *
Title *
User_ID (Manager) *
Description
Active [y,n]
Date_Creation *
Date_Edit

Users_Workspaces
ID *
User_ID *
Workspace_ID *
Date_added

Cases_Workspaces
ID *
User_ID *
Workspace_ID *
User_ID *
Date_added

Pages_Workspaces
ID *
User_ID *
Workspace_ID *
User_ID *
Date_added

Collections_Workspaces
ID *
User_ID *
Workspace_ID *
User_ID *
Date_added

Universitys
ID *
Name *
City *
Country *
User_ID *

Users
ID *
Email
First_Name *
Last_Name
University_ID
Date_of_Birth
Profile
Role [T,S,E,-] *
Is_Admin [y,n] *
Picture
Homepage
Country
City
Address
Affiliation
Active [y,n]
Date_Creation *
Date_Edit

4) Recommendations for the User Interface

The usability study of HOUSING@21.EU resulted in a number of issues that needed to be respected in the development of a new web-based platform for the OIKODOMOS project. Having taken into account all indications for the development of new consistent data structures, several issues concerning the user interface were also to be addressed. For the layout of the system, the following guidelines emerged out of identified issues in the usability report:

- Avoid using multiple windows (e.g., login, search)
- Add “back” and internal navigation.
- Design predictable menus + place them on top
- Better display of user profiles
- More space for reading content

Also, in order to improve the usability of the application and reduce the possibility of redundant or misspelled information, the user interface will consistently exploit a consistency check (with Ajax), most of all on author names and bibliographic references.

4.1) Navigation Map

The following diagrams present the tentative layout and navigation map of the new OIKODOMOS repository application.

Home page

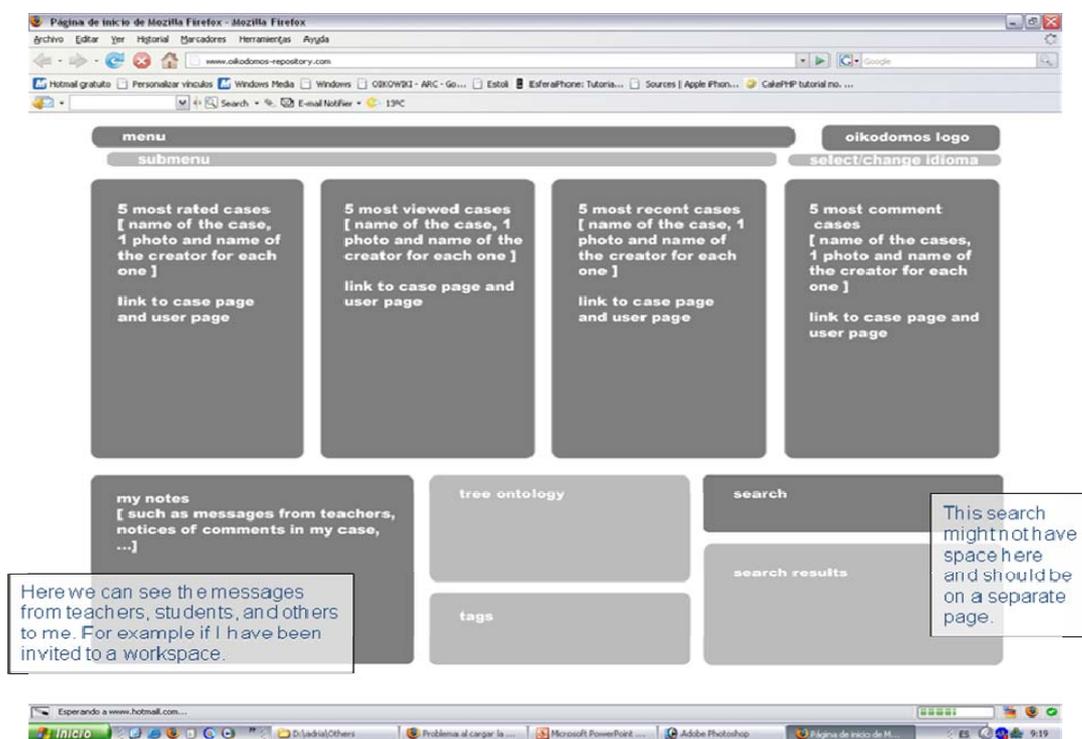


Diagram 1 - Homepage

Case page

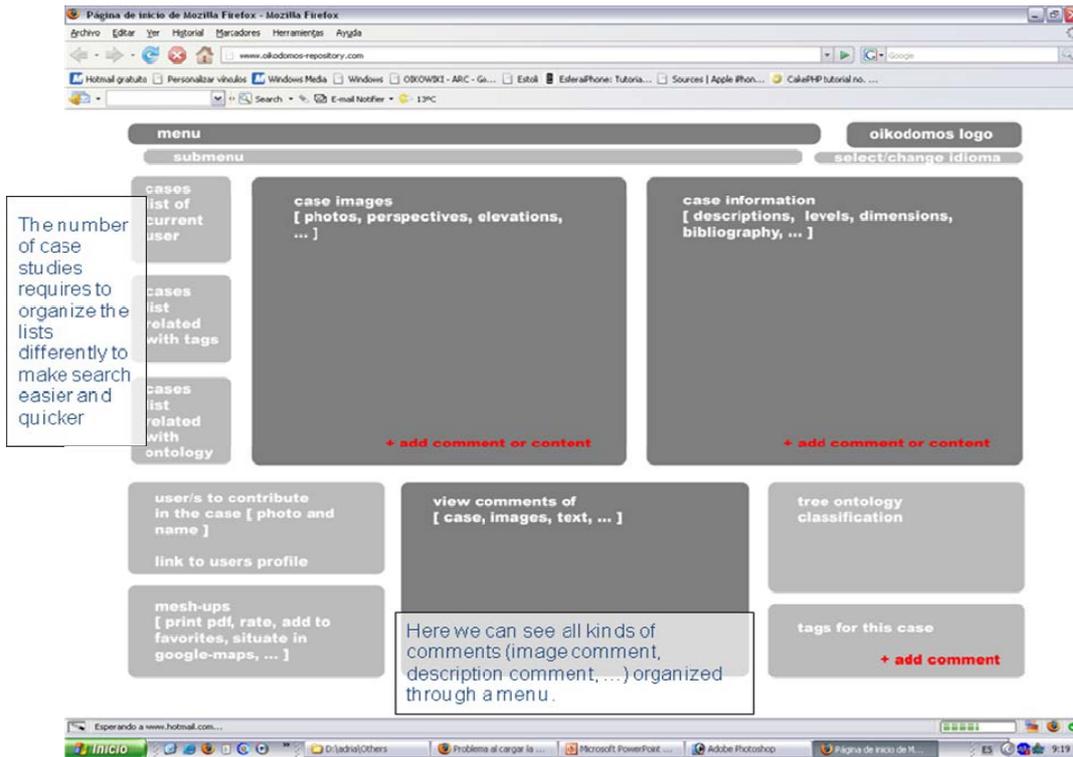


Diagram 2 – Case page

Collection page

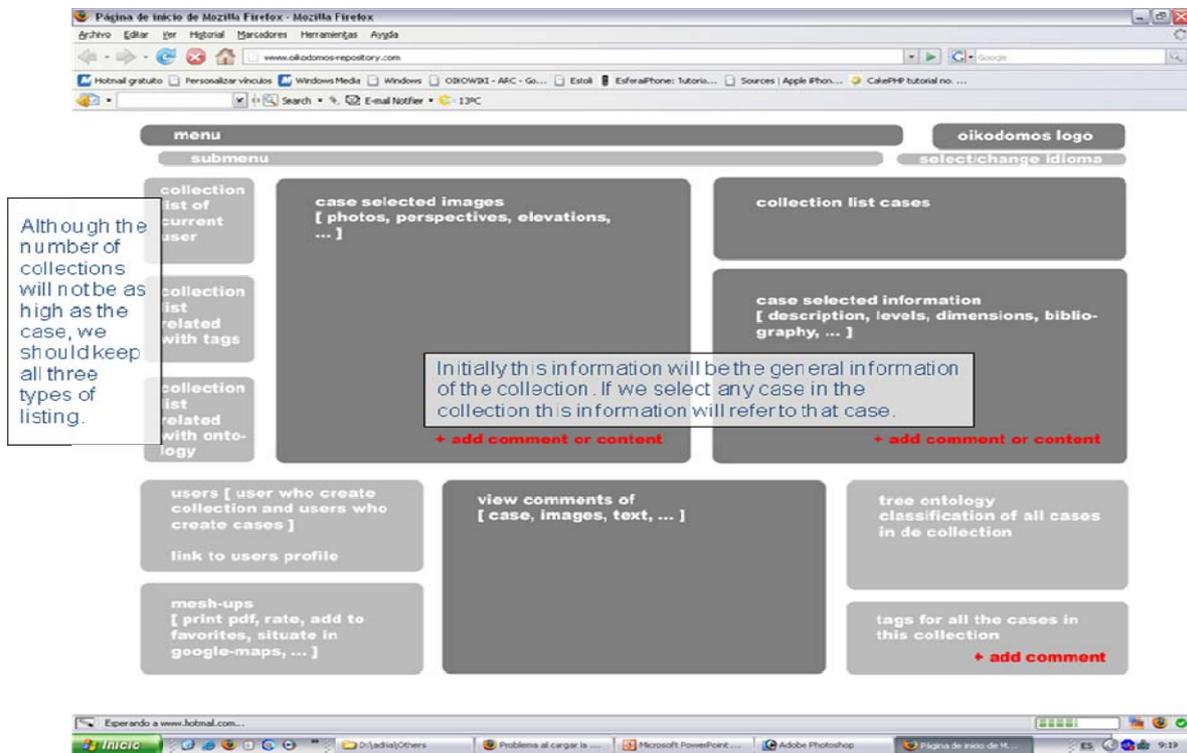
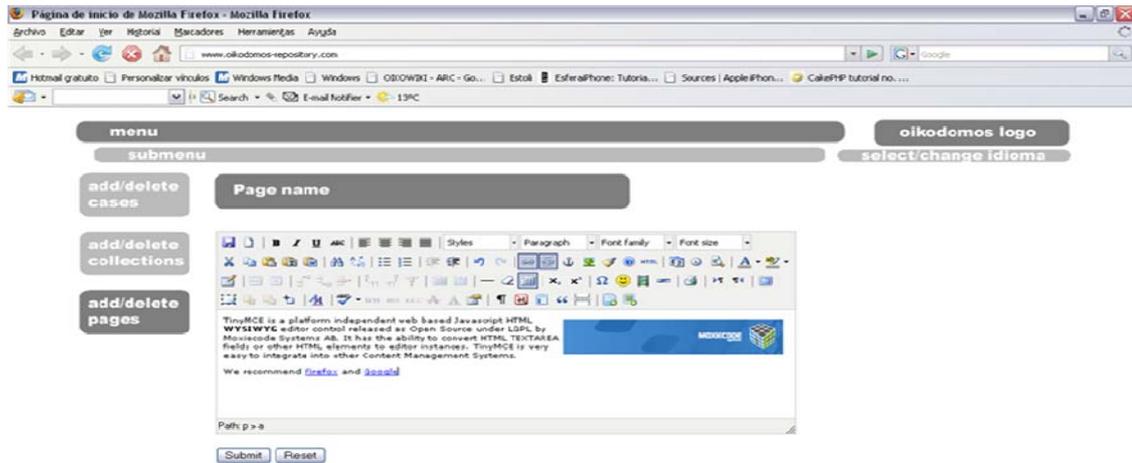


Diagram 3 – Collection page

Creation of summary page



This is an open source module that allows us to write text with any format, insert images, files and web links and then, automatically generates html code needed to show via the web. <http://tinymce.moxiecode.com/index.php>



Diagram 4 – Summary page creation

Visualization of summary page

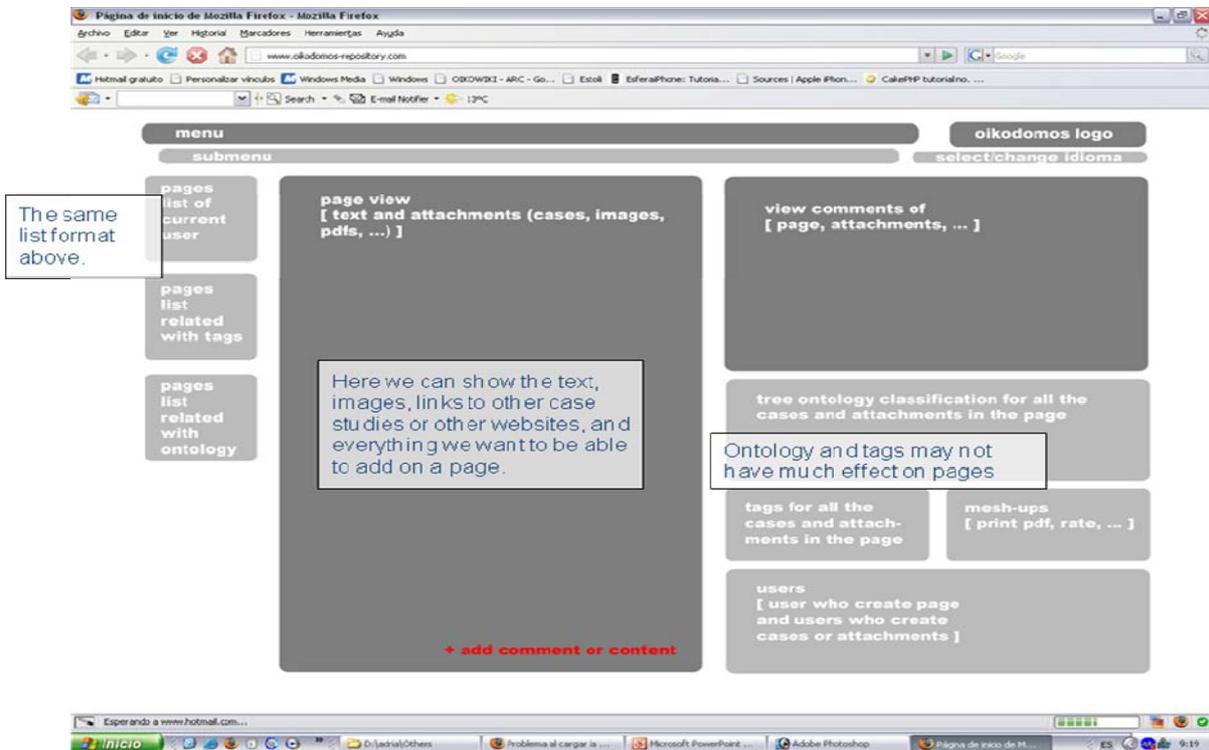


Diagram 5 – Summary page visualization

User profile page

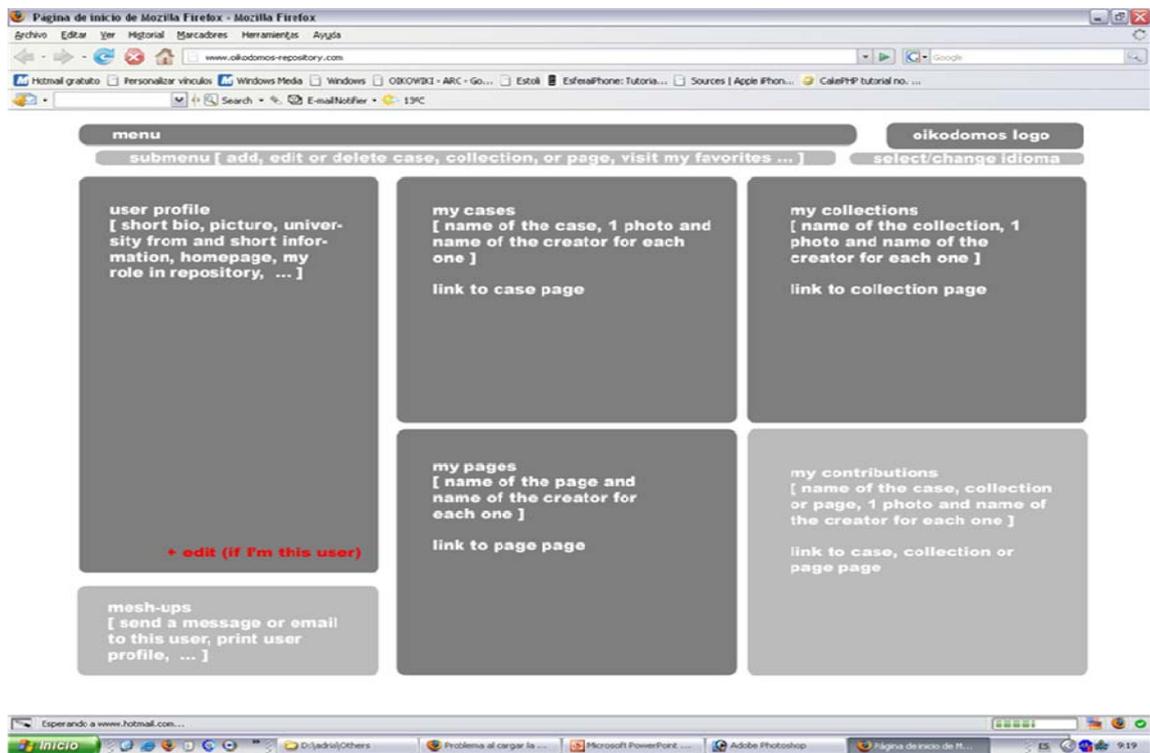


Diagram 6 – User page

Workspace validator page

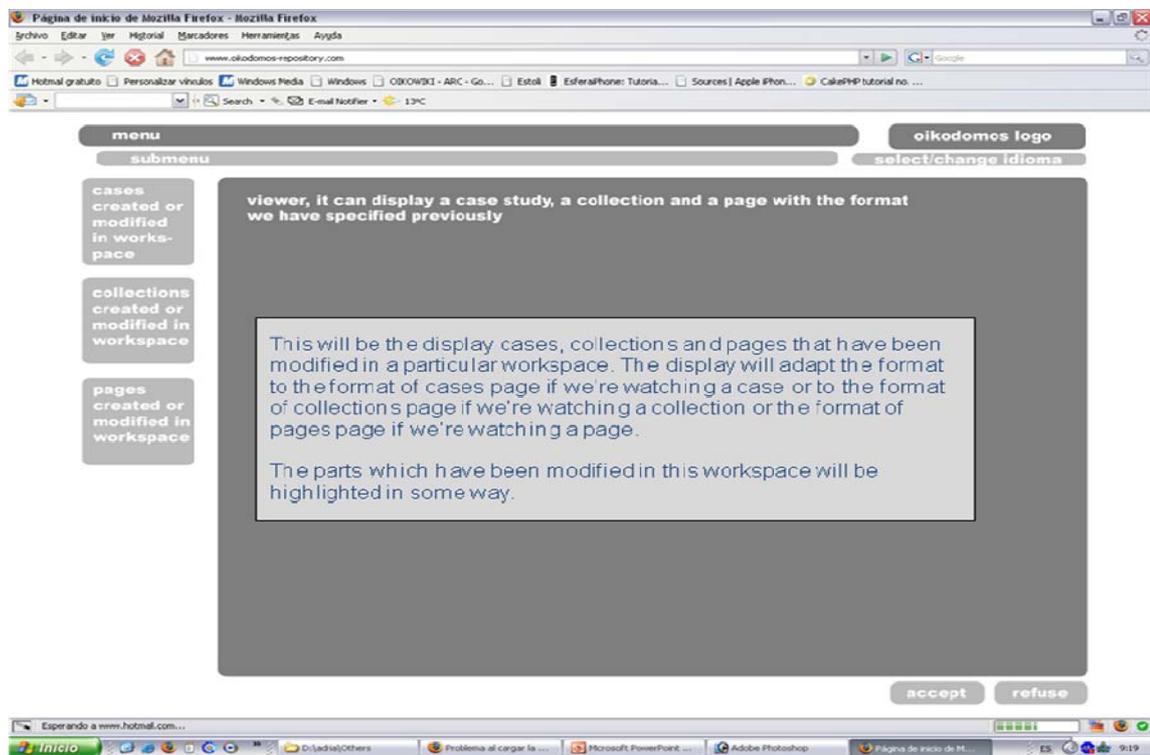


Diagram 7 – Workspace validator

Administration tool (add workspace page)

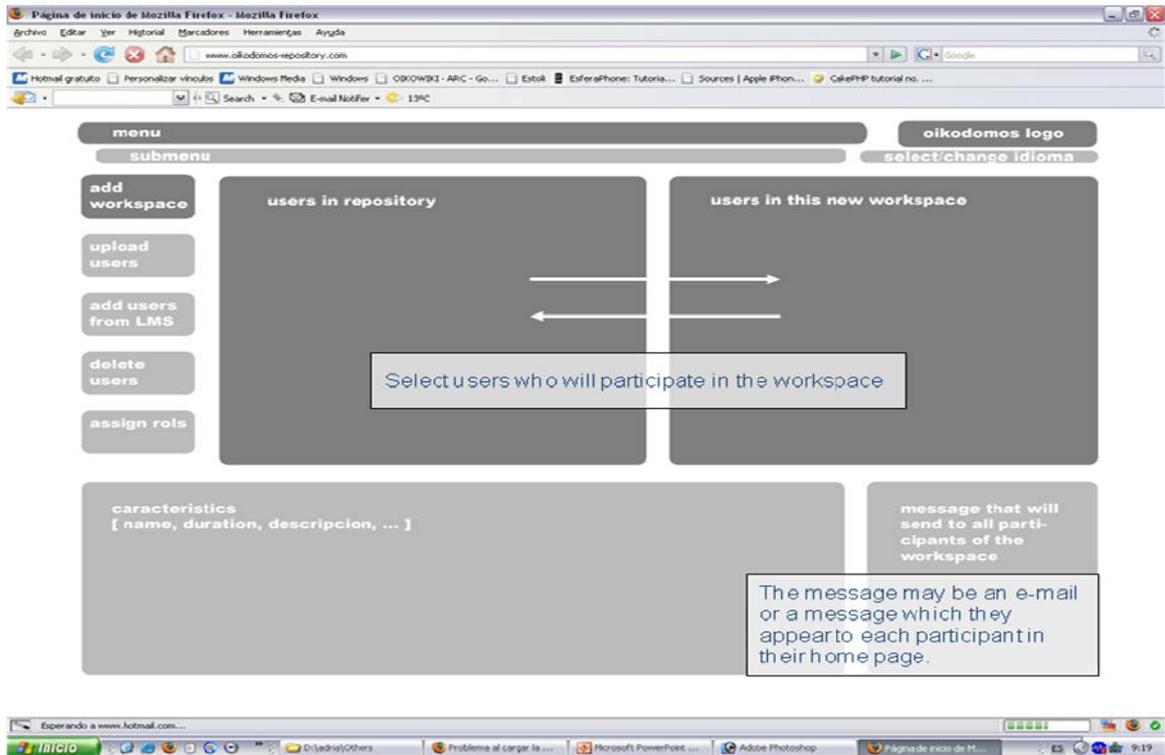


Diagram 8 – Administrator user account management tool

Add users from LMS page

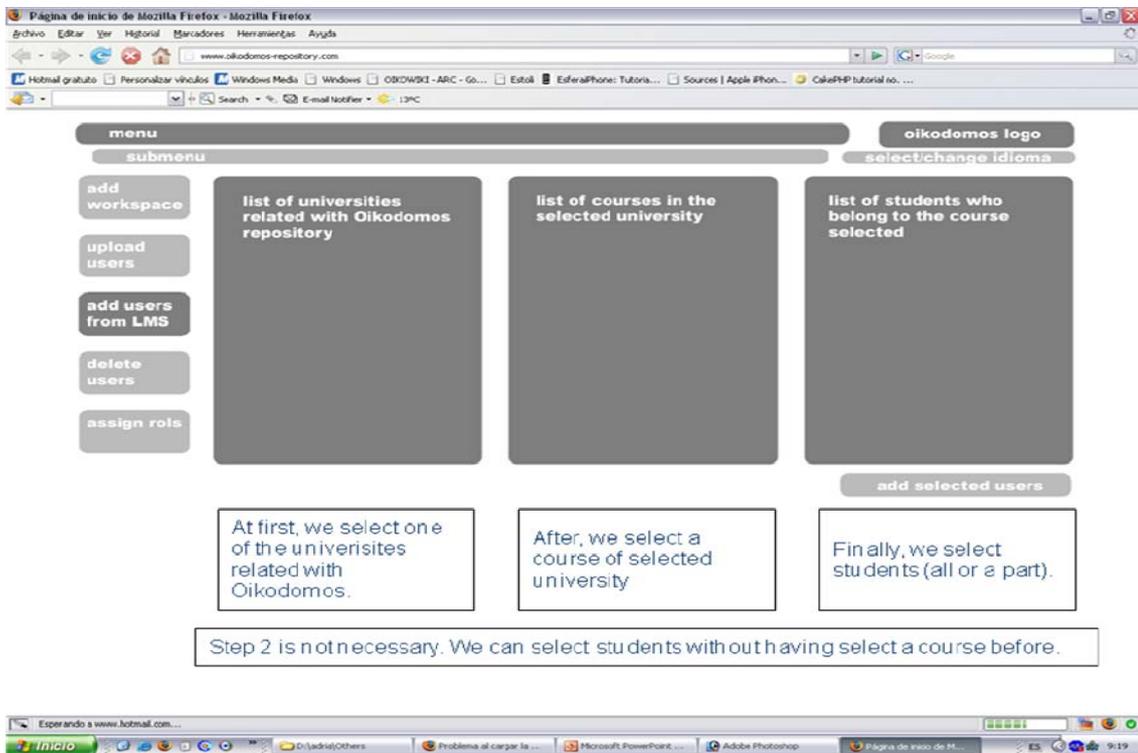


Diagram 9 – LMS interface page

4.2) Graphical Design of the Platform

The graphical design of the OIKODOMOS platform is currently under development.

5) Application modules and work distribution

Figure 3 shows the partitioning of the OIKODOMOS case repository into functional modules. The development of these modules have been allocated to project partners at La Salle-URL, Lugano-NewMine and Bratislava-FASTU. Each of the three partners participating in the development of the case repository was assigned to a number of tasks, according to their level of participation defined in the OIKODOMOS project proposal.

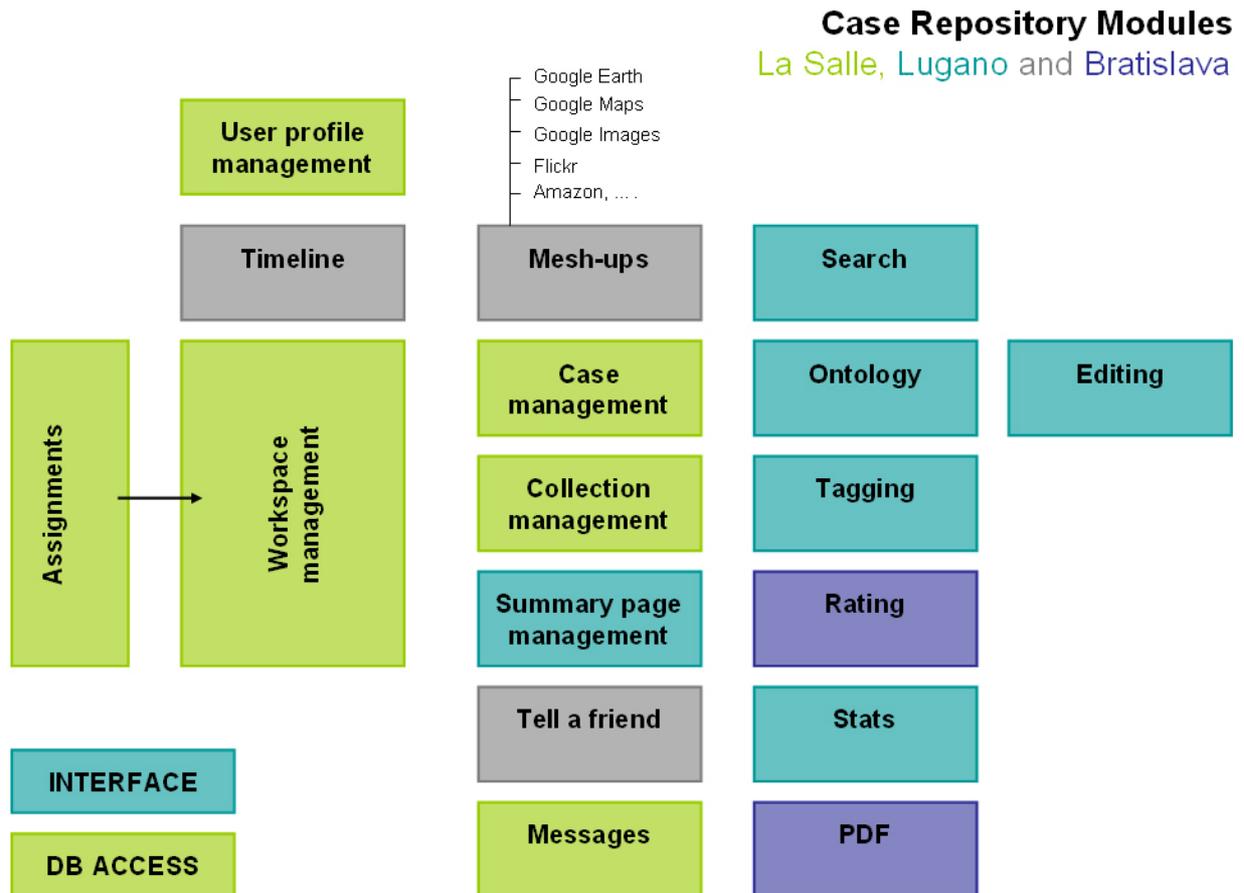


Figure 3 – Application modules and work distribution