Deliverable D7.6
Report on user interface design and community experiments

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# Deliverable D7.6
## Report on user interface design and community experiments

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1 Overview

This deliverable presents the progress of the user interface design and community building experiments within the MACE project.

In Chapter 2 we generally present the interface of the MACE portal, which is a platform to discover and enrich architectural resources and, at the same time, to support the community formed around architectural topics. Besides the advanced search, the portal provides various visual tools for metadata based search and browsing, tailored to architectural needs (see Chapter 3). Different metadata widgets are used to visualize and access multiple dimensions of each resource, as presented in Chapter 4. These widgets not only establish meaningful cross-connections between resources, but also invite to add and edit metadata effortlessly.

In order to generate a critical mass of metadata and ensure sustainability of projects’ outcomes, supporting community and fostering end user contributions are critical. In Chapter 5, we present the components deployed in this direction as well as an analytical framework for incentive mechanisms.

Within the dissemination strategy, the MACE project has got a unique chance to raise its public awareness at La Biennale of architecture in Venice, 2008. In this context we designed an interactive installation, demonstrating, in an exhibition setting, the benefits of resource interconnection via metadata (see Chapter 6).

Chapter 7 presents our preliminary conclusions and an overview of planned future activities.
2 MACE portal

As described in deliverable “D7.1 & 7.3 - Infrastructure & Toolset Prototype”, the MACE portal plays a crucial role in generating additional metadata, and making the results of the MACE project accessible to the general public.

![Figure 1: Start page of the MACE portal](image)

The portal also offers usage support, with orientation to registration, to the enrichment process, and content usage rights.

2.1 Content Access and Detail Page
For resource access, the MACE portal offers a number of search and browse mechanisms via a variety of metadata facets, such as an advanced search, browsing by classification terms, geographic features, and user-assigned keywords (see Chapter 3 of this Deliverable).

![Filtered Search](image)

**Figure 2: Filtered Search**

The MACE Content Detail Page features a patchwork of metadata widgets (Figure 3), which display and make metadata of this resource accessible. Users are able to not only understand the nature and relevance of the presented resource, but also to directly navigate to related items or query the MACE database based on metadata.
values. As every metadata value presented in the individual widgets can constitute a search re-orientation, we generalize the “pivot browsing” principle\(^1\). This way, MACE widgets enable multi-faceted navigation — not only on semantic, but also on social and contextual levels. Furthermore, MACE widgets are used to add and edit metadata. The different widgets are described in more detail in Chapter 4.

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Figure 3: Content Detail Page
2.2 User Page

All resources users bookmarked, commented and rated can be accessed in their User Pages. At the moment, MACE User Pages offer two filter mechanisms: one to filter content based on the action carried out by the user (bookmark, comment, rate positively or negatively), and one to filter resources based on the given tags.

User Pages have a central role in MACE community strategy. On one side, they serve as profile pages that display contextual information, modelling users’ identities through their interests and traces of usage - mainly to be viewed by others. On the other side they are comparable to a workspace, where users can find all contents they have viewed or worked with - mainly for personal use.

Figure 4: User page
3 Interactive visualization for searching and browsing resources

As described in deliverable “7.1 and 7.3 - Infrastructure & Toolset Prototype” (Chapter 7) a simple search has been made available as stand-alone web application (open to the public via the MACE web page, and via incorporation into ARIADNE search), as well as integrated in the Enrichment Tool.

According to our plans, we improved the query possibilities, as the search services switched to higher PLQL\(^1\) levels. This introduces the option to formulate Boolean queries on specified fields in the application profile. On one hand it enables advanced search interfaces, and, on the other hand, for a given resource, related resources (e.g. “more churches”) can be easily retrieved.

Based on first feedback from our colleagues and experts we refined and further developed different search and browsing facilities, which are explained and described in the following.

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\(^1\) PROLEARN Query Language. See deliverable 7.1 and 7.3 (chapter 7.1) for a more in-depth description of PLQL levels.
3.1 Advanced search

A common use of metadata is to serve as filters in addition to a simple keyword search. Based on analysis of search scenarios and the existing metadata, we added to the keyword search filters for repository, language, media type, license and cost. This allows users to specify their query more precisely. One problem with advanced search interfaces is that most filter combinations will return zero results; a problem that can be solved by using a faceted search paradigm (see Chapter 3.5).
3.2 Browsing by classification

![Figure 6: Browsing resources by assigned classification terms](image)

The MACE classification glossary plays a central role not only in the tagging activity, but also in the content retrieval and access. Accordingly, special care has been taken to make the terms and their organization structure accessible to the user in an intuitive manner. The browsing of the vocabulary and associated resources is supported by an interactive visualization of the terms and their relations.

We extended the classical radial tree layout mechanism\(^1\) towards a structured tag cloud, where frequently applied terms are presented larger (see Figure 6). Additionally, special care has been taken to produce a pleasing visualization that respects the Gestalt law of good continuation for the edge drawing. This improves the joy of use and satisfaction with the interface, as this has been shown to have a measurable effect on performance.\(^2\) The visualization was implemented in Adobe Flash using the flare toolkit\(^3\).

3.3 Browsing by geolocation

Architecture is inherently tied to spaces and places. Accordingly, the geophysical dimension of resource tagging has special relevance in this field. In addition to the theoretical and functional classification of contents, the MACE portal features a large map for searching and browsing contents by geolocation. Both navigation methods

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3 http://flare.prefuse.org
can be improved by using an adequate visual representation of the respective positions and their surroundings.

A user can select an appropriate region by panning and zooming the map, thus getting the possibility to explore specific areas in more detail, or acquiring an overview by zooming far out. In “A usability evaluation of web map zoom and pan functions” ¹, You showed that “original center zoom” is more efficient, while “re-center zoom” needs two interactions, but is more fitting to the user’s mental model. We implemented a new feature, where the user can double-click on a spot to zoom in that area. This method aims at combining the best of both approaches, simplifying the precise selection of a specific location in an efficient and intuitive way.

Resources are continuously fetched and displayed on the map within the chosen section. The Map Widget loads the contents after a slight while, to not unnecessarily fetch data if the user is still panning the map.

![Map with overview of France](image)

**Figure 7: Map with overview of France**

The markers on the map are clustered, due to the amount of positioned contents. A cluster consists of multiple contents which are near-by in the currently chosen zoom level. These clusters help the users gaining overview efficiently, without getting distracted by too many single markers. They now are quickly able to locate areas

with lots of resources, and can zoom in or simply click on one of the cluster markers to investigate further, and see the located resources.

**Figure 8: Map with search “Paris”**

Furthermore, the user now can search for locations via a freeform text field (Figure 8). When the user enters a country, city, street, or a special landmark, the search tries to return it to the most proper matching result and automatically pans to that spot, displaying the contents therein. The tool automatically zooms in to an appropriate level (e.g. country-level, or street-level), utilizing an accuracy value from the Google Maps API.

The popup window with more information on the selected resource also features a detail tab, which shows a high-resolution satellite image, so the user can view the building or spot itself. Furthermore, we allowed the user to switch between satellite and topographic views of the whole map, to provide different aspects of context to view and compare.
Figure 9: Satellite view

The Map Widget (Section 4.2) has been embedded in the Enrichment Tool since early spring 2008, so experts could not only classify contents with terms from the MACE application profile, but also position those resources on a map. Up to now, more than 700 contents are geo-located and can be shown on and browsed via a map.

3.4 Social Search

The Social Search application supplements our content retrieval approaches with user-generated metadata. All social annotation services are technically based on the ALOE web services (see Deliverable D7.1 and 7.3).

This application is based on free form tags added by common users to resources via Tagging Widget (see Section 4.5.1). It consists of two interface components:

1) A cloud of popular tags
2) A search box with dependent result list to trigger a free form tag search.

The terms in the tag cloud are visually weighted according to their usage. The tag cloud enables users to search for common bookmark bundles under an unrestricted vocabulary in an intuitive way.

In contrast to other MACE searches, this one delivers only contents that were previously bookmarked by the community. In this sense one can search for contents that other users found interesting in different contexts. It is important to note that in MACE a resource can be bookmarked by adding tags, commenting or rating. In the Social Search only bookmarking by tagging is considered.
The Social Search is the application that will enable the connections between MACE repositories and free online resources by bookmarking external resources. This is planned to be implemented in the next phase of the project, as explained in Chapter 7.

Figure 10: Social Search interface
3.5 Elastic lists for faceted search and browsing

![Figure 11: Project Browser](image)

In general, there is a limit to the quality of search results merely based on keyword matching in metadata fields. In order to fully exploit the potential of metadata in content access and browsing, not only more sophisticated search mechanisms, but also improved forms of metadata visualisation are necessary.

The exploration of dynamic taxonomies in faceted browsing applications is often seen as a most promising candidate for "rich exploration of a domain across a variety of sources from a user-determined perspective". These make different aspects of the underlying data accessible in parallel. Selecting one of the values, and thus...

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filtering the result set, restricts the available metadata values to only those occurring in the results. Consequently, the user is visually guided through an iterative refinement process, effectively never encountering situations with zero results.

The field was pioneered by Kargel and Schraefel\textsuperscript{1} and gained wider attention with the Flamenco system\textsuperscript{2}. Other implementations include the Exhibit browser developed in the MIT SIMILE project\textsuperscript{3}, the “/facet” system\textsuperscript{4}, or the mspace browser\textsuperscript{5}.

In a faceted search setting, widgets display aggregations of metadata values, rather than single resource values. E.g., for a search for “churches”, the map widget will display the number of churches found in each country or region. On the one hand, this often constitutes interesting information already; on the other hand, a click on the respective region offers drill-down possibilities for search refinement.

Especially in combination with the widget patchwork on MACE Content Detail Pages, this navigation principle is suited for navigating multi-faceted and multivalent “long tail”\textsuperscript{6} metadata structures, which typically arise from collaborative tagging activity, since this approach both allows quick and intuitive drill-down navigation as well as “context hopping”. By successively selecting metadata values across facets, a “place” query can provide an entry point for a concept space, where individual concepts might in turn be related to specific users and so on.

We are currently experimenting with variants of the principle for different scenarios of content access. We are also investigating the technical feasibility of making parts of our contents available in dedicated faceted browsing and coordinated view applications.

As a design prototype, the elastic lists interface for facet browsing has been adapted to browsing architectural contents based on architectural style, architects, and/or building types (see Figure 11)\textsuperscript{7}.

\footnotesize{
\begin{enumerate}
\end{enumerate}

\footnotesize{http://interface.mace-project.eu/projectSearch}
3.6 Future work

In a first version, all important search and browsing mechanisms are in place and ready for beta testing and first user evaluations. We plan to add a dedicated visualization for browsing by competence metadata; other extensions and improvements to the existing applications will be based on the results of the evaluation and online usage tracking.
4 Widgets for metadata visualization and enrichment

In the UI Concept (deliverable 7.1 and 7.3) we presented widgets as the basic building blocks of our interfaces. The MACE widgets are compact interface components that characterize individual resources according to their metadata, and invite to edit and add metadata to these resources.

4.1 Classification Widget

The Classification Widget displays the categories and the classification terms related to each resource. It is, besides the basic search, the central tool in the EnrichmentTool.

Mainly, the Classification Widget itself was refined and further developed to reflect suggestions and feedback from first evaluations. The user now is easily able to remove assigned values from a resource. Furthermore, the Classification Browser has become an integral component of this tool, and helps users to browse the MACE taxonomy, to see which terms are currently selected for a given resource, and eventually select new appropriate ones.

A basic, non-editable version of the Classification Widget is integrated in the Content Detail Page.
### Classification

<table>
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<th>Assigned values</th>
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<tbody>
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<td><strong>Intervention Type</strong></td>
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<tr>
<td><strong>Project Type</strong></td>
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<tr>
<td><strong>Theoretical Concepts</strong></td>
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<tr>
<td><strong>Project Actions</strong></td>
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<tr>
<td><strong>Urban Context</strong></td>
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<tr>
<td><strong>Project Cues</strong></td>
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<tr>
<td><strong>Styles, Periods and Trends</strong></td>
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<tr>
<td><strong>Architecture Competency</strong></td>
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<td></td>
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<tr>
<td><strong>Functional Typology</strong></td>
</tr>
</tbody>
</table>

Figure 12: Basic version of the Classification Widget
4.2 Map Widget

The Map Widget can be used in different web pages where a resource (learning object) is shown. Besides the Enrichment Tool it is included in the Content Detail Pages of the MACE portal. The Joint Deliverable 4 describes how the Map Widget generally works, how the interface can be used to show the location of a resource, as well as contents in its proximity. Furthermore, in former versions of this widget users could already place a resource onto its appropriate location.

![Map Widget Image](image)

**Figure 13: Map Widget**

As described in Section 3.3, the present version of the Map Widget uses clustering of contents to reduce the visual complexity when many contents are positioned in the currently selected area. Additionally, we added a search form where the user can enter a location as free text, to lookup places or areas of interest. This search also can be used to search for a position to place a resource. Here, too, the accuracy of the found place is used to set the zoom level of the map to an appropriate level, so the user can easily pinpoint the marker of the content to its accurate location.

Furthermore, we are plan to show more information about each positioned resource. For this the Context Service is under refactoring developments, so in the near future the Map Widget can show more details, such as the title and description of a nearby content.
4.3 Content Detail Widgets

Content Detail Widgets show generic information, such as description, repository information and usage rights, for each resource.

Figure 14: Detail view: description, repository and link buttons

Currently on the Content Detail Page, we show rudimentary metadata: description of the resource, the repository it originates from, and a link to the original web page. Another Content Detail Widget shows copyright information for the selected content.
Content Detail Widgets will be used in 3rd party web pages and applications, to easily reference contents, and act as starting point for the MACE widget API (Application Programming Interface) functionalities.

4.4 Competence widget

The Competence widget is developed by the OUNL and is implemented with the Adobe Flex1 Builder based on the open source Flex SDK. The resulting binary file is embedded in a widget container placed on the MACE Content Detail Page. This enables the widget to receive information about the user and the currently selected content. Furthermore the widget is connected to the competence web service and the MACE content enrichment service, as described in Deliverable 5.5 “Integration of Competence Metadata in MACE”, which enables the widget to access the competence catalogue as well as the content’s LOM (Learning Object Metadata) instance.

1 http://en.wikipedia.org/wiki/Adobe_Flex
In its current stage of development the widget provides basic enrichment functionalities. It visualizes the competence metadata for every content item, filterable by domains, using a bar chart as a basic metaphor showing the aggregated...
competencies with their European Qualification Framework\(^1\) (EQF) range. Additionally the widget can be used to enrich resources with competencies defined in the competence catalogue. The user simply selects a domain and a subordinated competence and can then add this competence to the resources. These changes are immediately reflected in the visualization. A logged in user can then save these changes, which stores the enriched metadata in the LOM instance.

The next stage of development will enhance the widget’s enrichment functionality. The users will be able to remove their aggregated competencies and edit the EQF-ranges of the competencies by adjusting the values directly in the bar chart.

### 4.5 Social Widgets

The social widgets enable user-generated metadata as a facet of MACE contents. In contrast to other widgets that mostly display contextual data, they are developed for personal use, fostering the enrichment of MACE resources as a side effect.

All user actions performed within the scope of the Social Widgets add usage metadata to contents: in addition to the specified action (rating, tagging or commenting) the widgets collect the data as users’ contents of interest and make them available on their User Pages (see Chapter 2).

We developed three social widgets that allow users to leave traces on contents they stumbled upon and found interesting/comment worthy/good or bad. These widgets have the twofold task of:

- informing about user contributions to a specified content, and
- providing an “Edit mode” for contributions.

The Social Widgets are enabled by the ALOE System web services.

#### 4.5.1 Tagging Widget

This widget enables users to add free form tags to MACE resources. The free form tags are interesting because they enrich the classification terms with a spontaneous, spontaneous,
associative and community grounded vocabulary\(^1\). As mentioned in section 3.4, tagging also enables the retrieval of contents that are meaningful for MACE users. It informs about the interests of the community and bundle up spreaded contents associated with users’ vocabulary, enabling the tracking of content usage.

Figure 17: Tagging interface

The Tagging Widget, as all social widgets, has a visual separation indicating the two different uses of the application. The upper display shows terms used by the community to bookmark the specified content in a visually weighted manner. The lower section serves to display, edit and add tags. The Widget is aware of users’ login state and guides them through the necessary steps. A link to the tagged resource together with the defined tag is saved to the User Page.

This widget provides the basis of the Social Search, one of the many facets, through which we provide content access via metadata (see 3.4).

4.5.2 Rating Widget

The Rating Widget allows users to evaluate contents. As the Tagging Widget, it is divided in two sections: the upper one informs about the average rating of the community and number of votes, and the lower section allows or displays personal rating.

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4.5.3 Comment Widget

This widget enables users to leave and see community comments about the selected resource. In this widget the comments are displayed in a browseable carousel. The carousel provides the possibility of seeing large amounts of information in a very compact way.

Figure 18: Rating Interface

Figure 19: Comments Interface
4.6 Related Contents Widget

One of the main objectives of MACE is to interlink contents from different repositories in order to ease not only the access to, but also the browsing between various learning objects. Thus, the interfaces aim at visualizing those relations and providing clear and comprehensible links. MACE can be seen as knowledge organization system, which “guides the user through a discovery process”. Having this in mind, we designed and implemented two relational widgets with different approaches:

- **Links between metadata and browsing facilities**
  This Content Relation Widget offers direct links to metadata searches, so that users can trigger searches easily and browse contents described by the same classification terms.

- **Display of simple relations**
  The LOM standard allows the storing of relational data to link two resources in uni- or bidirectional ways. The relations additionally have a type to indicate what kind of connection exists (e.g. “isPartOf” or “represents”) between those learning objects. The first basic version of our Relation Widget shows related resources as a simple list, which once clicked takes the user to the Content Detail Page.

More sophisticated approaches such as recommendation algorithms are currently planned. (See also JD 4 chapter “Ranking Metrics description”).

For the Biennale installation we experimented with weighing relations between contents to show the most important connection paths at a time, see chapter 6 for details.

4.7 Future work

In the next phase of the project we plan to allow users to freely relate online resources to MACE contents, making these resources available within our Social Search Application. That will be carried out via a bookmarklet that connects Social Widgets with external web pages.

We also plan to design permeability between free form tags and the vocabulary catalogue of the classification tool. Possibilities would be:

- to use the free form tags as input for experts that have the right to define new terms.

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• to allow the definition of free tags in the classification if no matching index term is found - also enabling the ongoing growth and refinement of our classification vocabulary
• to match classification terms while defining tags.
5 Fostering community contributions

5.1 The MACE portal as a social platform

As experienced over the last years, often subsumed under the umbrella term “Web 2.0”, online communities can develop a strong dynamic of their own, generating and sharing contents and metadata in previously unexperienced dimensions. By offering services that “get better, the more people use them”\(^1\), social platforms are able to attract the attention of users for long periods of time, thus establishing sustainable communities.

By providing focused, well-annotated content from the domain of architecture, the MACE portal aims to build a “Community of Practice” around architectural topics. This kind of community can be defined as a group of people who share a concern or a passion for something they do, and learn how to do it better as they interact regularly.\(^2\) As community aspects and user contributions became a major strategy to ensure evolution and growth in online services in general, we rely on design patterns of community research to enable a self-organisational, and therefore sustainable evolution of the MACE Community.

In his article, "What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software", Tim O’Reilly stresses three ways of making users contribute with content to a database. The first would be to pay people to do it. The second would be to get volunteers. The third, which he called “Architecture of participation”, sets inclusive defaults for aggregating user data and building value as a side-effect of ordinary use of the application. In this way the system gets improved constantly, the more people are using it.

It is important to note that this architecture is shaped by users primarily pursuing their own “selfish” interests, yet building collective value as a by-product. One good example of Architecture of Participation is the tagging system of Flickr\(^3\). Flickr users contribute and tag their photos in order to manage their own collections of images. In doing so they also enrich the Flickr database as a whole\(^4\).


\(^3\) [http://www.flickr.com](http://www.flickr.com)

5.2 Incentives for participation

The architecture of the system, however, is not the only responsibility for user participation, which may involve a variety of reasons, very much related to the community dynamic. For this reason we studied and considered a series of mechanisms that would motivate users to visit and contribute to the MACE portal.

In the MACE portal, users may act as direct or indirect content producers. In the first case the contribution is intentionally expressed by means of tagging, rating, commenting or adding location references. In the second case the contribution is a result of simple actions such as the contribution to popularity statistics when visiting a resource.

As shown by different online systems\(^1\) and academic research\(^2\), mechanisms can be created in order to encourage users to visit a service or contribute content. The community created around a service, for example, may enable contributions as a result of members’ communication (such as in a sequence of comments, in which one user comment the comment of another). While the definition of profiles based on user actions may lead users to contribute more in order to draw attention from other members.

Indeed each project and situation demands a different incentive strategy. In the context of MACE two levels of incentives were defined. The first refers to the “first impression” users have of the system. It comprises the quality of the browsing mechanisms, the visualizations and the information structuring. The second level aims to motivate existing members to return periodically to the portal and contribute some content.

Regarding the first level we focused on both the user experience (including aspects such as the handling with situations of negative answer to users’ expectations). Regarding the second level we defined different mechanisms that explore users’ sense of efficacy - defined by different authors as an important motivation to act in a community\(^3\). The following section gives further details on these levels.

\(^1\) Such as Flickr (www.flickr.com) and YouTube (www.youtube.com)


\(^3\) Bandura, for example defines that regular and high quality contribution made to the group can help a person believe he/she has the impact on the group and support his/her own self-image as an
5.2.1 Incentive mechanisms

5.2.1.1 First interaction level

In a first contact with the system, situations of deception may discourage users to return to the portal. A typical situation of deception in search systems is the returning of zero results for a submitted query. To deal with this situation we plan to offer users the possibility to:

- Ask an expert: this option puts users directly in contact with MACE experts
- Upload some material: transforms deception into activity

In the first contact, animated graphs and visualizations also enhance the joy of searching content motivating users to spend more time in the portal.

Figure 20: the classification browser is an example of how animations can improve the experience of browsing content

5.2.1.2 Second level

The second level of incentives targets users that are already members of the community. The mechanisms here are based mainly on users’ wish of status and their sense of efficacy within the community.

a) Defining profiles based on users’ behaviours:

efficacious person [Bandura, Albert. Self-efficacy in changing societies. Cambridge University Press, 1995]
• **Defining roles according to the nature of users’ actions (qualitative):**
  Though contribution happens in different ways, users end up by dedicating more time to one single action. At the end we have those that are more dedicated to tagging, others are more used to comment resources, etc. The clear definition of profiles, based on these actions, leads users to recognize each other within the community, motivating them to pursue and assume one of these profiles.

• **Defining roles according to level of users’ activity (quantitative):**
  This mechanism includes the definition of hierarchical profiles that are automatically granted according to users’ activity level. In this case, users are motivated to contribute in order to reach the next upper profile in the hierarchy.

• **Defining usage paradigms and locate each user in relation to it (relative):**
  This mechanism includes: 1) awarding high level of contributions, by stressing, for example, the top contributors, the top experts, and the highest quality contributors. 2) Sign the status of each user in relation to these top levels.

b) Signalling discovering of resources:
  Chronologically recording bookmarking actions (tagging, commenting, or rating) allows to indicate who was the first user to “discover” each resource. This motivates them to keep looking for non bookmarked items, also leading to a playful competition. Internet services such as Delicious\(^1\) and Plazes\(^2\) already use this feature as bookmarking incentives.

c) Achieving content enrichment aims:
  A range is defined for the enrichment of resources. The achievement of the maximum level of this range (100%) means the resource has been fully enriched. In this case users are motivated to accomplish this mission reinforcing their sense of efficacy within the community.

e) Exploring local “patriotism”:
  This mechanism includes the recording of contributions according to authors’ locations. Displaying these data as scores can lead to a inter-city competition with the motto “help your home town to contribute the most metadata”. In this case, however, it is necessary to compensate smaller towns by calculating the score based on the number of inhabitants. Furthermore, it is also possible to

\(^1\) [http://delicious.com/](http://delicious.com/)

\(^2\) [http://plazes.com/](http://plazes.com/)
define a “local hero”, or the user that made the most contributions in each city. This would lead to an inner-city competition.

d) Community gardening mechanisms:
- Periodical newsletter of user profile status with personalized content recommendation.
- Macy: a virtual person looking after the community. Macy also serves as a behaviour paradigm within the community.

5.2.2 Future Work
Some steps have already been done in order to stimulate user participation. The basis for the social structure has been set in the MACE portal and it is already possible to see user activity on the portal start page. In the next phase of the project we plan to refine, test and select the mechanisms cited above. Some will be already tested in the recently launched MACE portal. In order to understand the effectiveness of each single item, however, the introduction of these features must be carefully planned.

Mechanisms that can be independently evaluated, such as the zero results handlers (measured mainly by users’ feedback) will be firstly introduced in the MACE portal.

The different possibilities of profile definition will be tested in parallel, with different groups of users, as soon as the portal gets more subscriptions. The most effective will be definitively incorporated in the MACE portal.
6 Interactive Installation at La Biennale

6.1 Set up

Figure 21: the MACE interactive table is the central part of the installation

The MACE installation at La Biennale exhibition, as explained in deliverable “D8.5.2 - Report on publications”, aims to make architects aware of the interconnections between architectural resources based on metadata.

The installation is constituted by an interactive table, three wall projections, and 21 cards. The cards trigger the interaction with the table, whose effect will be displayed on the central wall projection. The two lateral projections are not interactive. They show sequences of previously selected images. Figure 22 illustrates the setup of the installation.
Figure 22: Set up of the installation in the location

Figure 23: Set up of the installation with dimensions
The University of Applied Sciences Potsdam conceived the installation and produced the necessary software applications. Table and hardware were produced and hired by Werk5, Berlin\(^1\).

### 6.2 Data and Metadata

The starting points to interact with the installation are the ten winning projects of the Everyville student competition\(^2\). The ten young architects are asked to indicate known projects used as inspirational sources. Both inspirational and Everyville winning projects are described by MACE metadata. In the case of Everyville projects, however, the students may intervene choosing the most appropriate terms. Aaron Betsky, the curator of the event and member of the competition jury, also got the freedom to choose terms.

A database for the installation was built with
- material related to the competition projects sent by the students (descriptive photos, text, sketches and films), and
- data from MACE repositories related to the inspirational projects.

As explained in section 4.4, all these data will be displayed when a card is placed over the table.

Figure 24 presents an example of a student project, its data and metadata.

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\(^1\) [http://www.werk5.de/](http://www.werk5.de/)

6.3 Cards

21 different card sorts will be produced and massively distributed during the event:
   a) one for each Everyville project (ten Everyville cards)
   b) one for each of the inspirational projects indicated by each student (ten Inspirational cards).
   c) one display card for the other 40 Everyville projects

a) and b) will trigger the data presented in the previous section (see Interaction section). The last card sort, c), is expositive and only displays brief information of the 11th – 50th competition winners.

The front side of each Everyville project card shows a picture of the respective project, its title, classification within the competition, author name, and two URLs: the Everyville competition URL and the MACE URL where further content related to this project can be found.
The front side of each inspirational project card shows a picture of this project, its title, author name, and the MACE portal URL where this project can be found. The intention is that visitors take these cards home and go to the MACE portal to consult these items.

On the backside of each card there is a fiducial mark (Figure 25) that reflects an infrared light and is recognized by a high-resolution camera inside the table. Through these marks it is possible to recognize which card is placed in which moment over the table.

![Figure 25: Front and back sides of installation card](image)

### 6.4 Interaction

The whole installation follows the metaphor of a bottom-up movement: in the “bottom” of the interactive table, float all content from the installation, as if it was incorporated in a liquid substance.

Once an Everyville card is placed on the table, content, metadata and inspirational projects referring to the student project emerge to the table surface. Organic lines connect this data to the card. Once an Inspirational card is placed on the table, content, metadata and Everyville projects referring to the inspirational project emerge to the table surface. Organic lines connect this data to the card.
Related projects slowly and randomly come to surface making their metadata connections visible. This process can be accelerated by dragging the card in the direction of the emergent project. Once the project is “touched”, it stays on the surface for some minutes. This interaction leads to a playful experience of discovering projects by means of metadata. This discovering follows two directions: from students to famous (inspirational) projects or in the other way around.

When a second card is placed over the table, its content and metadata emerge to the table’s surface and connect to the content that is already displayed over the table forming a network.
Figure 27: Table surface with several cards on it

Each card and interaction setup presents a new structure, once the structure formed is determined by several factors, among them:

- kind of cards placed over the table
- number of cards
- the related projects emerge to the surface
- position of the card
- time in which the card is placed

The installation will be available during the whole period of the Biennale, during the first 10 days a person hired by MACE will monitor visitors, giving explanations and looking after the functioning of the system.
7 Conclusions and outlook

For developers and repository owners, the MACE portal will be a central access point. In the portal they will be able to access the documentation of the MACE API (Application Programming Interface), and to download and integrate MACE embeddable widgets. In doing so, they will be able to easily add their contents to MACE. As seen in this report, the MACE portal will also take a more user oriented approach, getting members constantly involved in the community, and stimulating them to contribute data.

As a next step, we prioritized the development and testing of metadata services and the support for MACE users. Within this strategy we include improvements at the membership roles, and the opportunity for users to upload and share their own material. Furthermore, as explained in Section 3.4, up to now the MACE portal only allows users to bookmark internal contents. It is a wish that MACE could provide a tool for bookmarking external pages and contents as well. A greater integration between classification terms (defined by experts) and free form tagging (user related) will also be studied.