



ECP-2005-CULT 038261 - AquaRing

# AQUARING

*Accessible and Qualified Use of Available Digital Resources about Aquatic World In National Gatherings*

## AquaRing User Segments, Profiles and Needs

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<b>Abstract (for dissemination)</b>	<p><i>This deliverable describes the User Segments, Profiles and Needs of the Aquaring project. The potential Users and their needs have been specified starting from the analysis of potential users and needs expressed by the scientific partners of the project. The partners defined the portal's potential users, their aims and needs on the basis of previous and new researches carried out in collaboration with the different offices of the single structures. This allowed to characterize and define 5 priority targets. Specific in-depth studies were then carried out on the targets to define the Use Cases.</i></p> <p><i>At the same time, we conducted a study to define what digital resources each partner has and which could be consulted through the portal.</i></p> <p><i>The report illustrates the procedure adopted as well as first results.</i></p>
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## Table of Contents

<b>1 Introduction .....</b>	<b>4</b>
1.1 Scope of the document .....	4
1.2 Applicable and reference documents.....	4
1.3 Revision History .....	4
<b>2 Executive Summary .....</b>	<b>5</b>
<b>3 Methodology and identification of Users and their needs .....</b>	<b>7</b>
3.1 The Users' taxonomy .....	8
3.2 The Users' objectives and related needs .....	10
<b>4 The surveys on visitors' and teachers needs .....</b>	<b>19</b>
4.1 The survey on visitors' needs .....	19
4.2 The survey on teachers' needs .....	37
<b>5 Synthesis of results and Use cases description .....</b>	<b>47</b>
5.1 Individual adult users with personal / private interests.....	47
5.2 Teachers with professional interests.....	50
5.3 Children .....	533
5.4 Aquariums, Natural History Museums, Zoos, Science Centres / professional interests .....	555
5.5 Media / professional interests.....	577
<b>6 Requirement extraction and synthesis .....</b>	<b>59</b>
6.1 Use Cases analysis .....	59
6.2 Thematic Areas / User Areas .....	59
6.3 Complementary Services.....	60
6.4 Requirements Specification.....	63
<b>Grid for identification of users, their objectives and their needs .....</b>	<b>677</b>
<b>Questionnaire for the survey on visitors' needs .....</b>	<b>688</b>
<b>Questionnaire for the survey on teachers' needs .....</b>	<b>744</b>

# 1 Introduction

## 1.1 Scope of the document

This document reports on the objectives and needs and future possible scenarios of AquaRing portal Users. The structure of the document follows the potential users and needs discovery and specification process. After this introduction, Section 2 contains the executive summary. Section 3 introduces the methodology for the identification of portal Users and their needs, the potential Users “taxonomy” and the description of each potential target, its objectives and needs. Section 4 reports on the specific surveys conducted on Acquario di Genova visitors and a group of teachers at the Acquario di Genova for the identification and definition of their attitude to the portal use.. Sections 5 makes a synthesis of the analysis conducted with a description of Use cases of priority target describing for each of them main needs and the possible development of the scenarios. In this specific part of the document the IT experts of the working group tried to take into account even the probable changes in technologies and tools in next three years. Section 6 describes the requirements identified starting from the surveys and the investigation made by the partners on the priority target group.

## 1.2 Applicable and reference documents

This document refers to the following documents:

[1] eContent contract ECP-CULT 038261-AquaRing, Annex 1: “Description of Work”

## 1.3 Revision History

Version	Date	Author	Description
1.0			First release

## 2 Executive Summary

AquaRing addresses the cultural/scientific sector of marine and aquatic sciences and involves science centres, natural history museums and aquariums in Europe.

AQUARING will set up a **cross-border digital collection space** on aquatic environment and resources, a **virtual global knowledge space** that European visitors will be able to explore according to their interests and needs.

This document (Deliverable D2.1) reports on the achievements of Task 2.1 “Target users and their needs”. The goal of the task is to investigate the overall users context addressed by the AquaRing service, to identify the different user segments and their needs and to correlate the findings to the scientific/cultural communication and market objectives of the participating content providers. The attention is focused on the needs and expectations of potential users in terms of information sought and of interaction with the system.

In order to identify the target users and their needs, a user survey form has been designed and submitted to all content providers. In the form there are several fields that are studied to focus on the main possible categories of users and their needs.

The forms have been filled in by content providers according to their experience, to the existing reports and analysis and to the interviews to some experts. In parallel a survey on visitors of the involved institutions and on teachers has been carried out using proper questionnaires.

Forms and questionnaire have been analyzed by University of Genoa and discussed among all the partners.

The main targets identified with a private or a professional interest are the following:

### 1) **General individual visitors,**

The interested users are private individuals with general, or more specific interests about the aquatic world (from 13 years old on). They can be also on site visitors of the partners' exhibitions (zoo, museum and aquaria).

### 2) **Teachers**

They have been indicated as a priority target by many of the project partners. This group includes teachers of primary and secondary schools of first and second grade who teach (particularly the latter) sciences, natural sciences, earth sciences, chemistry, geography, biology and microbiology to young students

3) **Sea Museums, historical science museums, science centers, aquariums, zoos** which are all belonging to the category “structures/organisations”.

We are dealing with professionals who would like to use the portal for obtaining specific and technical information to improve their structure's functionality, to offer their visitors more dedicated services, and to organise events, exhibits, shows, European projects, new exhibitions, collections, exchanges, etc

### 4) **Children**

The “Children” category may be divided according to intellectual interests and technological competence, in at least 2 distinct age groups: “Under age 9” and “from age 9 to 12”. Another

possible distinction, especially in the 9 to 12 age group, could be the approach to the use of computers and technology in general. Children in the Under 9 group do not generally access the portal independently, but most likely under the guidance of a parent at home or a teacher at school, or in any case an adult who wishes to verify the presence of material suitable for children: the material is deemed suitable if it is simple enough to be understood and captivating enough to capture and maintain the child's attention.

### **5) Media**

This user groups includes mostly television, radio, press, press agencies and journalists. These will be professionals who thanks to the Aquaring portal should be able to access useful services for their job. Aquaring will be used by those who work in media editorial offices, by journalists who write for specialised scientific journals and magazines and by free-lance journalists.

According to the results of the investigation the needs of each main target were identified and some possible scenarios were developed as illustrated in Section 5.

Those scenarios will be reviewed and better defined after a deeper investigation that will be carried out by using focus groups and/or more questionnaires for additional dedicated target user categories. This additional investigations will be structured and implemented in parallel and on the basis of the work to be done in Task 2.2 "Analysis of individual data collection" and Task 2.3 "Structuring the global digital collection space". In fact, to better define the paths for information access of each target group it is essential a previous and precise definition of types of digital collections available in each sub-thematic related to aquatic and marine domain. The semantic and conceptual paths characteristic of each target group of the portal will be investigated on the basis.

At the same time a more precise definition of the types of digital technology that will be available for each target group in the next two or three years will be carried out.

### 3 Methodology and identification of Users and their needs

The identification of user segments, profiles and need has been reached by following this procedure:

- 1. Analysis of visitors of the aquaria, museum and zoo involved in the project.**

In this first step partners designed a grid to classify the target potential users of Aquaring portal and their needs. This exercise showed some methodological problems that suggested to better specify the field to fill in and ask the partners to indicate at first the users, their priority, their goals/objective and then the related needs/thematic of interest, the simplicity/complexity of users' needs, if the use of the resources linked to these needs should be "free" / "not free". The grid has been filled in by partners on the basis of the results of previous studies and surveys and interviews with the offices' responsables of the relevant offices concerned.
- 2. Design of users surveys to carry out among partners visitors.**

On the basis of the documents filled in by all partners a preliminary analysis of the results has been carried out by University of Genoa. This is shortly described in section 3.1 and 3.2. In this analysis each category of potential users has been individuated and then structured in a comprehensive taxonomy. The priority assigned by the project' partners to each of the potential users have been analysed - as an average of the priority indicated by each partner – as well as the goals/objectives of these users and the needs/thematic related to these objectives.
- 3. Target group identification**

On the basis of the preliminary user survey, five priority target groups have been identified. Then the partners have decided to conduct more specific investigation to better define the identification and description of a group of "use cases". Among the priority target groups have been identified the adult visitors and the teachers, the children, the media professionals and finally the museums operators have been identified among the target groups. The Use case description is the object of Section 5.
- 4. Trial surveys at "Aquario di Genova"**

The Acquario di Genova in cooperation with the University of Genoa carried out two specific surveys on visitors at the aquarium and on teachers of secondary schools to obtain a preliminary user needs analysis of these target groups.  
The results of these surveys are reported in Section 4.
- 5. Interviews to "children" and "media" target groups**

The investigation on needs of children and media operators has been conducted by mean of some specific interviews made by the project partners.
- 6. Focus group for "museums, zoo and aquariums" target group**

The user needs analysis of museums, zoo and aquariums has been conducted by the partners themselves by means of internal focus groups with the responsables of the relevant offices concerned.

## 7. Use case development

The result of these deeper analysis has been synthesised by the description of five “Use cases”, one for each of the five target groups identified by the partners. The Use case description is the object of Section 5.

## 3.1 The Users’ taxonomy

The partners have pointed out a “taxonomy” of users (typology articulated in different levels) making a first distinction between “individuals” and “organizations” and putting the specific cases in these macro-categories and then in two further levels for a total of three levels.

As stated in the proposal this work package has the objective to specify the main user needs, including the definition of the end-user services to be implemented in relation to each user category. The user service in particular are described in the Use cases.

Then at the first level has **2 macro-categories**: the “**Individuals**”, and the “**Organisations**”.

<b>First level</b>
Individuals
Structures / organizations

At the second level the categories grows up to **8 meso-categories**: the “Individuals”, on one side, are distinguished between “**visitor with general interests**” and “**visitor with specific interests**”.

On the other side the “structures and organisations” are distinguished, at the second level, in *6 specific categories*: the **education institution** including schools and universities - the **science centres**, national or international **research centres** (including universities as research centres) and **museums**, the **tourist operators**, the **media operators**<sup>1</sup> and **professional**, the **local collectivises** and the **public administrations**.

<b>First level</b>	<b>Second level</b>
Individuals	visitor with general interest
	visitor with specific interests
Structures / organizations	education institutions (schools, university)
	science centres, national or international research centres (1) and museums
	tourist operators
	media operators and professionals
	Local collectivises
	Public administrations

At the third level have been identified **25 micro-categories have been identified**. The table below shows the identified categories and the priority level assigned to each one.

Between the “visitors with general interests” can be identified two further categories: **adults**, from one side, and **children** from the other..

<sup>1</sup> In this case we have to distinguish general from specialized media; e.g. CNN vs. Discovery Channel

Eight different groups have been identified among the “visitors with “specific interests””: : **aquariophiles, divers, shipping, sailors and tourists, scientists, restorers, marketing, fisherman.**

First level	Second level	Third level	Priority level (N, R, A, RB, LT)
Individuals	Visitor with general interest	adult visitors	3, 3, 3, 2, 2
		Children	3, 3, 3, 3, 3
	visitor with specific interests	aquariophiles	1, 3, -, -, 3
		Divers	2, 1, -, -, 1
		Shipping operators	2, -, -, -, 1
		sailors and tourists	2, 1, -, -, 1
		Scientist	1, 1, -, -, 1
		Restaurant operators	2, -, -, -, -
		Marketing professionals	1, 1, -, -, 2
		Fisherman	1, 1, -, -, 1
Structures / organizations	education institutions (schools, university)	Teachers	3, 3, 3, -, 3
		high school students	2, 3, 3, -, 3
	science centres, national or international research centres and museums	science centres, research institutions (WON, Ecsite, CNR, CNRS, etc.)	3, 2, 3, 3, 1
		natural history museums, aquariums, zoo	3, 3, 3, 3, 3
	tourist operators	local tourism promotion, public agencies	1, 2, 2, 2, 3
		tour operator (incoming and outgoing)	1, 1, 2, 2, 3
	media operators	Press	2, 3, 3, 3, 3
		Television	2, 3, 3, 3, 2
		Radio	2, 2, -, 3, 2
		editors and writers	2, 1, 2, 2, 2
		web sites	2, 2, 3, 2, 3
		communication's agencies	-, -, 3, -, -
	Local collectivities	citizen's associations, local government	2, 1, 3, 3, 1
	Public administration	environment administration	2, 1, 3, -, 1
		fishery administration	1, 2, 2, -, 1
		coastal area management	1, 2, 2, -, 1

At the third level of structures and organizations the education institutions are characterized by the presence of two main groups: the **teachers** and the **students** (primary and secondary schools and universities).

The second meso-category includes **science centres**, national or international **research centres** (including universities as research centres) and then, **museums, aquariums, zoo**.

In the third category “tourism operators we find **public agencies** for local tourism promotion and **private tour operator**.

Among the “media operators and professionals”, we find: **press, television, radio, editors and writers, web sites and communication agencies**.

The **local collectivises** are represented in particular by citizens associations and, finally the **public administrations** interested in the portal are divided in environment administration, fishery administration and coastal area management administration.

### 3.2 The Users’ objectives and related needs

In our proposal we stressed the importance to clarify the fundamental relations between specific needs / information of users and their objectives; this relation is functional for structuring the digital paths on the web site

For each of the categories identified in the third level there is a short description of users objective followed ( → ) by the needs and the thematic related to these objectives and by the indication of criteria (**criteria**) in terms of simple/complex (**S/C**) need and (+) in terms of free/not free (**F/N**) web service. The objectives and needs indicated by the partners have been matched and set together.

#### Individuals

The objectives and related needs for **adult visitors** (priority: **2,6**) (thematic and tools / actions) are the following:

- to get information about Animal Kingdom and learn biological characteristics (animal behaviour, biology of aquatic organism, biodiversity...) → sea world encyclopaedia with photos, documentaries, reports ...; habitat related species information (e.g. which species live in North Sea) **criteria: SC+FN**
- to have information about marine environment → deep information on thematic as:
  - ✓ the ocean system, marine ecology (energy, cycles, biodiversity, interconnections)
  - ✓ the link between man and the ocean (economy, health, food resources, employment, threats);
  - ✓ deterioration of the ocean as a result of the human activities;
  - ✓ deterioration of the habitats and the marine species;
  - ✓ rights and responsibilities of the citizen of the ocean; **criteria: SC+FN**
- to get information about sea’s actualities and keep updated on what happens in terms of marine environment → news on line with latest news items (e.g. tsunami); the point of views on topic; **criteria: SC+FN**
- to discover, know about and get involved in concrete actions to protect the marine environment → Decalogue of actions and forum based on environmental problems (user content management); individual or group actions (i.e. passport of the citizen of the ocean, World Ocean Day...) **criteria: S+F** (follows)

- to have the possibility to provide personal opinions and to get involved into life web with ideas, proposals: social networking → Forum and discussion area **criteria:** SC+F
- to get information about the European network of Aquaria and their main characteristics → maps, links to websites and key facts and key words **criteria:** S+F
- to get knowledge about activities and different projects developed by single structures and by European Network → Essays, reports, conferences and link to different news about projects **criteria:** S+F
- to get practical information about the structures → clear information on prices and opening hours etc... **criteria:** S+F
- to prepare their visit → see above (practical information and all thematic information. **criteria:** SC+FN

The objectives and related needs for the **children** (priority: **3**) (thematic and tools / actions) are the same identified for adult visitor with an obvious stress on the entertainment and educational functions. The digital resources accessible for children and the access itself has to be balanced with respect to the child age.

the *specific* objective and related needs (thematic and tools / actions) for the **aquariophiles** (priority: **1,4**) is the following:

- To be aware of good practices to make and manage an aquarium → Diseases and treatments of the pisces; How to make a sustainable aquarium at home; Marine biology **criteria:** SC+F

Other objectives and needs are the same of those previously described out for “adult visitors”: i.e. to have information about Animal Kingdom and learn biological characteristics (animal behaviour, biology of aquatic organism, biodiversity...) → sea world encyclopaedia with videos, photos, documentaries, reports ...; habitat related species information (e.g. what kind of animals live in our own North Sea) **criteria:** SC+FN

The *specific* objective and related needs (thematic and tools / actions) is the following for the **divers** (priority: **0,8**):

- To look for sustainable places and trips → Physiology; Diving sites and places for sustainable diving (submarine path); Decalogue of actions for a good diving and conservation interests **criteria:** SC+F

Other objectives and needs are the same of those previously described out for “adult visitors”: i.e.

- to get information about Animal Kingdom and learn biological characteristics (animal behaviour, biology of aquatic organism, biodiversity...) → sea world encyclopaedia with photos, documentaries, reports ...; habitat related species information (e.g. which species live in our own North Sea) **criteria:** SC+FN
- to get information about marine environment → as the following:
- ✓ the ocean system, marine ecology (energy, cycles, biodiversity, interconnections)

- ✓ the link between man and the ocean (economy, health, food resources, employment, threats);
- ✓ deterioration of the ocean as a result of the human activities;
- ✓ deterioration of habitats and the marine species;
- ✓ rights and responsibilities of the citizen of the ocean; **criteria:** SC+FN

The *specific* objective and related needs (thematic and tools / actions) for the **shipping operators** (priority: **0,6**) is the following:

- To be informed of news dealing with their job → Policy, Law of the sea, , Security on sea **criteria:** S+F

The *specific* objective and related needs (thematic and tools / actions) for the **sailors and tourists** (priority: **0,8**) is the following:

- To get information for planning sustainable holidays and leisure to have fun and make discoveries → Sea-life discovery places and trips, coastal places for holidays and places for a sustainable holidays; Fishing (where, what, how); Aquatic sports; Cruising, security on sea and maritime navigation (code,,) **criteria:** S+F

The *specific* objective and related needs (thematic and tools / actions) for the **scientists** (priority: **0,6**) is the following:

- To have specific and detailed information → Research updating; Exchange of information; Use of species for scientific purposes and husbandry information **criteria:** SC+FN

The *specific* objective and related needs (thematic and tools / actions) for the **restaurant operators** (priority: **0,5**) is the following:

- To know which fish species is better to use → Information about fishing stocks **criteria:** S+F

The *specific* objective and related needs (thematic and tools / actions) for the **marketing operators**(priority: **0,8**) is the following:

- to compare admission prices, services provided → Information about the other structures **criteria:** S+F

*If we correctly understand this point, it seems a need expressed by “marketing professionals” belonging to the project partners. If it is the case, we propose to put this objective together with those of natural history museums, aquariums, zoo etc...*

The *specific* objective and related needs (thematic and tools / actions) for the **fisherman** (priority: **0,6**) is the following:

- To be informed about news dealing with their job → Fishing stocks; Commercial interests; Legislation and social regime; Professional training; National and regional policy; Policy **criteria:** S+F

### Structures / organisations

The objectives and related needs (thematic and tools / actions) for the **teachers** (priority: **2,4**) are the following:

- to prepare their courses and particularly to prepare documents and leaflets for their lessons → both deep, updated, reliable and synthetic information on different subjects such as
  - ✓ Salt-water and fresh water biodiversity
  - ✓ Human vs nature interaction/influence
  - ✓ Physiology of aquatic organisms
  - ✓ Behavior of aquatic organisms
  - ✓ Aquatic habitat info
  - ✓ Conservation issues
  - ✓ Biology
  - ✓ Bbiodiversity/interrelations/cycles/energy
  - ✓ Human responsibility for the environment of the planet,
  - ✓ Environment Education for a sustainable development,
  - ✓ Direct and indirect actions of Humans on other species populations,
  - ✓ Phylogénétic Classification **criteria:** SC+FN
- To get knowledge about activities and different projects developed by single structures and European Network → Essays, reports, conferences and link to different news about projects **criteria:** S+F
- to give their opinions and discuss with both colleagues and experts → Forum and discussion area for teachers also with experts interventions **criteria:** SC+FN
- to prepare their visits with students → tools for on line booking and visit preparation (automatic itinerary related to the specific information needs). **criteria:** SC+FN

The objectives and related needs (thematic and tools / actions) for the **students** (priority: **2,2**) are the following:

- to write dissertations end researches related to environmental issues and aquatic world → deep, updated, reliable and synthetic information on different subjects such as:
  - ✓ sea world
  - ✓ Salt-water and fresh water biodiversity
  - ✓ Human vs nature interaction/influence
  - ✓ Physiology of aquatic organisms
  - ✓ Behavior of aquatic organisms
  - ✓ Aquatic habitat information
  - ✓ Conservation issues

- ✓ Species names and species specific info
- ✓ training/stages **criteria:** SC+FN
- To have information about their future job → Professional training, Maritime transport – Merchant navy, Exploitation of biological resources (fishing/aquaculture,..) **criteria:** SC+F
- To prepare an exam → advanced scientific information **criteria:** C+FN

The objectives and related needs (thematic and tools / actions) for the **science centres research institutions** (priority: **2,4**), are the following:

- To find a reliable source of global data and information about ocean and S&T in general → Updated and deep information on thematic such as:
  - ✓ Relationship between Man and sea all around the world
  - ✓ Ocean and sustainable development
  - ✓ Climate change
  - ✓ Waste and Pollution
  - ✓ Ocean in general including different related topics
  - ✓ Biodiversity and threatened species
  - ✓ Relationship between men and the ocean
  - ✓ Damages and actions
  - ✓ All subjects on the sea and ocean
  - ✓ Information about actions of the partners of the World Ocean Network : WOD... **criteria:** SC+FN
- to exchange ideas, info, and discuss between science centres → Forum and discussion area, connection lively with men on sea **criteria:** SC+FN
- To get information on news dealing with the activities and events of the moment → sea actualities space **criteria:** SC+FN
- To have a basis for evaluation of research projects → Information about completed and on going research projects, **criteria:** S+F

The objectives and related needs (thematic and tools / actions) for the **natural history museums, aquariums, zoo** (priority: **3**) are the following:

- to exchange ideas, info, and discuss between aquariums, natural history museums and zoo → Forum and discussion area, connection lively with men on sea **criteria:** S+F
- to improve knowledge on management and to achieve a common European know how → best practices on how to manage structures, information on past exhibits ; exchanges of structures managers **criteria:** S+F
- to get data and information about ocean in general → Updated and deep information on thematic such as:
  - ✓ Relationship between Man and sea all around the world
  - ✓ Ocean and sustainable development
  - ✓ Climate change
  - ✓ Waste and Pollution
  - ✓ Ocean in general with different topics

- ✓ Biodiversity and threatened species
- ✓ Relationship between men and the ocean
- ✓ Damages and actions
- ✓ All subjects on the sea and ocean
- ✓ To be updated about the actions of the partners of the World Ocean Network : WOD...  
**criteria:** SC+FN
- to get materials to built the exhibits : info, pictures, videos → materials about thematic of interests (see above) **criteria:** SC+FN
- to get information on news dealing with the activities and events of the moment → sea actualities space **criteria:** S+F
- 
- to make our visitors more aware of various the issues about of the ocean providing them the public access to scientific data and/or the possibility to complete their visit having more information on all subjects of the exhibits (species,,,) → deep and updated information about thematic such as:
  - ✓ the ocean system, marine ecology (energy, cycles, biodiversity, interconnections)
  - ✓ the link between man and the ocean (economy, health, food resources, employment, threateness)
  - ✓ deterioration of habitats as a result of the human activities
  - ✓ deterioration of the habitats and the marine species **criteria:** SC+FN
- to increase the awareness of visitors and inform them about concrete actions to preserve the environment → to participate to the World Ocean Day; favourite Individual or group actions (passport of the citizen of the ocean); Rights and responsibilities of the citizen of the ocean **criteria:** SC+FN
- improving organisation and evaluation of educational projects → common projects and research; common education projects **criteria:** S+F

The objectives and related needs (thematic and tools / actions) are the following: for the **tourist operators** (priority: **2**)

to organize their service and products and provide interesting options to their customers → Being up to date on activities and programmes

to promote both local and European heritage → Being up to date on locations and structures to promote

The objectives and related needs (thematic and tools / actions) for the **media operators** as a general group (priority: **2,8**) are the following:

- to disseminate information about ocean and related thematic → Updated and deep information on thematic such as:
  - ✓ Relationship between Man and sea all around the world
  - ✓ Ocean and sustainable development

- ✓ Climate change
- ✓ Waste and Pollution
- ✓ Ocean in general with different topics
- ✓ Biodiversity and threatened species
- ✓ Species names and species specific information
- ✓ Habitat related species information
- ✓ On relationship between men and the ocean
- ✓ On damages and actions
- ✓ On all subjects on the sea and ocean

On the actions of the partners of the World Ocean Network : WOD... **criteria:** SC+FN

- to promote both local and European heritage → Being up to date on location and structures to promote → **criteria:** S+F

*The details concerning level three groups (press, television, radio, editors and writers, web site )are shown below*

The objectives and related needs (thematic and tools / actions) for the **press operators** (priority: **2,8**) are the following:

- write an article on a "water" related topics with original piece of information; need to collect quick, easy to understand and reliable information. → direct contact with scientists as "stories tellers"; first hand documentation and grey literature; press releases on scientific results; original iconography; literature references; quick access to the latest changes/interesting initiatives, "to bring off a scoop" ; species names and species specific information; habitat related species information **criteria:** C+FN

The objectives and related needs (thematic and tools / actions) for the **television operators** (priority: **2,6**) are the following:

- to set up a video or a programme with original images; need to collect information allowing the creation of original images → digital high quality footages; interesting themes with good shooting opportunities and or visual material already available and identification of original site/object/people to be filmed; historical archives of images (photography and animated images); digital models of phenomena or systems (e.i. modelisation of the Gulf Stream dynamics); **criteria:** C+FN

The objectives and related needs (thematic and tools / actions) for the **radio operators** (priority: **1,8**) are the following:

- need to easily find scientists to cover news issues → interesting themes and latest news/updates; scientists direct contacts for interviews; general written documentation to prepare a subject; audio archives and original recording (bioacoustics for instance). **criteria:** C+FN

The objectives and related needs (thematic and tools / actions) for the **editors and writers** (priority: **1,8**) are the following:

need to access to a large amount of original information about a specific topic → huge documentation and grey literature; names of people to be contacted to collect detailed information; Internet links; **criteria:** C+FN

The objectives and related needs (thematic and tools / actions) for the **web site** (priority: **2,4**) are that listed above for all media operators: **criteria:** C+FN

The objectives and related needs (thematic and tools / actions) For the **citizen's associations, local government** (priority: **2**) are the followings:

- to improve awareness and involve citizen to the different thematic related to the aquatic (biodiversity, climate change, water pollution...) and prepare an awareness campaign → totally reliable information (Essays, reports and conferences) about aquatic world and environmental problems. **criteria:** S+F

The objectives and related needs (thematic and tools / actions) for the **environment administration** (priority: **1,4**) are the following:

- to be aware of the stake holder dealing with the ocean and environmental thematic (and improve awareness and involve citizen to the different thematic related to the sea world) → totally reliable information on Economy (statistics) Institutional and administrative background; Pollution, Transnational, national and regional policy, Law of the sea : Marine environment (oceanology, pollution); Environment **criteria:** S+F
- To stay informed/explore areas of possible cooperation → Info on projects and programmes, common goals **criteria:** SC+F

The objectives and related needs (thematic and tools / actions) are the following for the **fishery administrations** (priority: **1,2**):

- information on thematic of interests **criteria:** S+F
- To stay informed/explore areas of possible cooperation → Info on projects and programmes, common goals **criteria:** SC+F

The objectives and related needs (thematic and tools / actions) for the **costal area management** administrations (priority: **1,2**) are the following:

- information of interests → ecosystems land forms and land use **criteria:** S+F

- To make decision for further developments → To exchange ideas on European experiences **criteria:** S+F
- To stay informed/explore areas of possible cooperation → Info on projects and programmes, common goals **criteria:** SC+F

## 4 The surveys on visitors' and teachers' needs

As agreed with Nausicaa - leader of WP2 – and with the other partners, in the first meeting held in October 2006, in Genoa, the Acquario di Genova proceeded, in collaboration with the Di.S.A., to carry out some surveys to define the needs of the Aquaring portal's potential users. In particular, two surveys were conducted: the first one targeted secondary school teachers, and the second one the visitors of the Aquarium. In total, the survey involved 199 people, of which 176 visitors and 23 secondary school teachers

### 4.1 The survey on visitors' needs

As agreed with Nausicaa - leader of WP2 – and with the other partners, in the first meeting held in October 2006, in Genoa, the Acquario di Genova proceeded, in collaboration with the Di.S.A., to carry out some surveys to define the needs of the Aquaring portal's potential users. In particular, two surveys were conducted: the first one targeted secondary school teachers, and the second one the visitors of the Aquarium. In total, the survey involved 199 people, of which 176 visitors and 23 secondary school teachers.

### 4.2 The survey on visitors' needs

The questionnaire (see att. 1) was submitted to the aquarium's visitors between the 10th and 23rd of December, 2006: this is not a peak time in the number of visitors, but because time was short it was not possible to choose a peak season period.

The surveyors<sup>2</sup>, standing at the end of the exhibit area, after briefly describing the project's objectives, asked the visitors if they were willing to fill out a questionnaire in order to consider their opinions in the following phases of the project.

#### *The interviewees*

This allowed to survey the opinions of 176 visitors, of which 82 male (47%) and 94 female (53%).

Chart 1 – Interviewees by gender

	Frequency	Percentage
Male	82	46,6
Female	94	53,4
Total	176	100,0

<sup>2</sup> The questionnaire was distributed by Claudio Torrigiani, Beba Molinari and Sebastiano Benasso, collaborators of Di.S.A..

In terms of age– the interviewees were aged between 13 and 68 – the most numerous age group was the one between 21 and 30 (39%), followed by the 31 – 40 age group (27% of the total) and by the under 20 group (19%). 58% of the interviewees was under 31 years of age, while those aged 51 and over represented only 4% of the total.

Chart 2 – Interviewees – age groups

	Frequency	Percentages	Compounded Percentages
Under 20	33	18,8	18,8
21 to 30	69	39,2	58,0
31 to 40	47	26,7	84,7
41 to 50	20	11,4	96,0
51 to 60	3	1,7	97,7
61 to 70	4	2,3	100,0
Total	176	100,0	

In terms of profession, it is important to distinguish workers (69% of the total) and those who do not work in the strict sense of the term, such as housewives, retired people and students, which altogether make up 31% of the sample. In particular, the students amounted to 48, that is 27% of the total.

Among the workers, employees were the most numerous (32% of the interviewees) followed by professionals and entrepreneurs, which equalled to 20% of the sample.

Chart 3 – Interviewees by profession

	Frequency	Percentages
Factory worker	14	8,0
Employee	56	31,8
Middle ranking manager	6	3,4
Manager	4	2,3
Professional	28	15,9
Freelance	2	1,1
Entrepreneur	8	4,5
Innominate worker	4	2,3
Student	48	27,3
Retired	1	0,6
Housewife	5	2,8
Total	176	100,0

Although the brief presentation of the project explicitly referred to the Web, the questionnaire contained a question which aimed to verify the interviewee's actual use of the Internet to gain a deeper knowledge on the subjects of his interest ("Do you usually use the internet to search for information on subjects of your interest?") This question aimed to validate the interviewees' answers to specific questions on the means, times and instruments used to access the internet.

As shown in the chart below, only 3% of the interviewees declares "never" to use the internet to research information, while 63% uses it habitually and 33% uses it "sometimes".

Chart 4 – Use of the Internet

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	no, never	6	3,4	3,4	3,4
	yes, sometimes	58	33,0	33,3	36,8
	Yes, always	110	62,5	63,2	100,0
	Total	174	98,9	100,0	

Lost answers		2	1,1		
Total		176	100,0		

The interviewees generally showed a very positive attitude towards the survey: at the end of the questionnaire there was a question that read “Do you wish to be contacted by the Aquarium staff when the project is ready to show its first products?”.

Chart 5 below shows that almost 50% of the visitors who agreed to fill out the questionnaire also gave their availability to be contacted in the future (to this end they supplied their e-mail address): this is very encouraging with regards to the degree of collaboration of the interviewees at the time of the survey, and it is also a first step in the recruiting of users who will need to further cooperate in the evaluation of the portal prototype.

Chart 5 – Interviewees’ availability to be contacted

	Frequency	Percentages
No	89	50,6
Yes	87	49,4
Total	176	100,0

### ***Subjects of interest***

The questionnaire supplied to visitors wished to understand their needs regarding the information resources that will be made available by the on-line portal, with regards to the subjects treated, to the type of digital resources, the types of possible pathways, the possibility of booking visits through the portal.

In particular, with regards to the subjects of reference of the digital material which will be available on the portal, we supplied the interviewees with the list created by Nausicaa (up to the second level) and asked them to tick the boxes next to each of the subjects if they thought that they corresponded to their need for information and/or to their interests. Otherwise, they were to leave the box blank.

The choice of the Nausicaa index as reference is due to the fact that the same index was offered during the October meeting as reference in the compiling of the thesaurus and of the index of digital resources, and could maybe favour trans-national comparison among partners. At the bottom of the list we left a blank space labelled “other” where one could eventually add subjects which weren’t present in the list.

The results which emerged from this first questionnaire are shown in the following chart with a brief commentary.

### **A Marine activities and technologies**

With regards to the first macro-theme A, “Marine activities and technologies”, we found that the subject “Exploitation of marine resources” (A1), is considered interesting to 80% of visitors.

A1 – Exploitation of marine resources

	Frequency	Percentages
No	37	21,0
Yes	139	79,0
Total	176	100,0

Lesser interest was shown for the subjects in theme A2, “Ship construction and hydraulic engineering” which was ticked by 26% of visitors, and “Navigation and safety at sea” (A3) which interested 35% of interviewees.

#### A2 – Ship construction and hydraulic engineering

	Frequency	Percentages
No	130	73,9
Yes	46	26,1
Total	176	100,0

#### A3 – Navigation and safety at sea

	Frequency	Percentages
No	115	65,3
Yes	61	34,7
Total	176	100,0

Some subjects are definitely “niche” arguments such as “Mercantile marine and marine transportation” (A4) and “Navy” (A5) which are considered interesting by respectively 5% and 8% of the visitors surveyed.

#### A4 – Mercantile marine and marine transportation

	Frequency	Percentages
No	167	94,9
Yes	9	5,1
Total	176	100,0

#### A5 – Navy

	Frequency	Percentages
No	161	91,5
Yes	15	8,5
Total	176	100,0

### B Marine Biology– Marine Sciences – Environment

With regards to macro-theme B, “Marine Biology– Marine Sciences – Environment”, the visitors’ interest is particularly focused on the subjects “**Oceanology**” and “**Environment and pollution**”, ticked by **57%** of the interviewees.

#### B1 - Oceanology

	Frequency	Percentages
No	76	43,2
Yes	100	56,8
Total	176	100,0

#### B2 – Marine and geophysical geology

	Frequency	Percentages
No	107	60,8
Yes	69	39,2
Total	176	100,0

The subjects considered less interesting are “Climatology” and “Meteorology” (about 26%), and slightly more interesting to visitors is “Marine Paleontology”, chosen by 34% of interviewees.

### B3 - Climatology

	Frequency	Percentages
No	129	73,3
Yes	47	26,7
Total	176	100,0

### B4 – Meteorology and climatology

	Frequency	Percentages
No	130	73,9
Yes	46	26,1
Total	176	100,0

### B5 – Marine Paleontology

	Frequency	Percentages
No	116	65,9
Yes	60	34,1
Total	176	100,0

In intermediate positions are “Marine biology (B7) – with a consent of 46% – “Aquarium sciences” (B8) chosen by about 43% of visitors and “Marine and geophysical geology” (B2, 39%).

### B6 – Sustainable development and resource preservation

	Frequency	Percentages
No	96	54,5
Yes	80	45,5
Total	176	100,0

### B7 – Marine Biology (microbiology, botanics and zoology)

	Frequency	Percentages
No	95	54,0
Yes	81	46,0
Total	176	100,0

### B8 – Aquarium sciences

	Frequency	Percentages
No	101	57,4
Yes	75	42,6
Total	176	100,0

### B9 – Environment and pollution

	Frequency	Percentages
No	76	43,2
Yes	100	56,8
Total	176	100,0

## C General knowledge hobbies and leisure activities

With regards to the 3d macro-theme proposed to visitors - “General knowledge, hobbies and leisure activities” - C, from the opinions expressed by interviewees, there is a well defined ranking of the three subjects indicated: “**General knowledge**”, C1, is considered of interest to **72% of interviewees**, followed by “Sports and leisure activities” C3, which gained a consent of 46% (also due to the fact that the majority of the visitors surveyed were of a young age) while “Art and literature” (C2) was deemed interesting only by 23% of visitors.

### C1 – General knowledge

	Frequency	Percentages
No	50	28,4
Yes	126	71,6
Total	176	100,0

### C2 - Art and literature

	Frequency	Percentages
No	136	77,3
Yes	40	22,7
Total	176	100,0

### C3 – Sports and leisure activities

	Frequency	Percentages
No	95	54,0
Yes	81	46,0
Total	176	100,0

## D Legislation, politics, economy and society

With regards to the fourth macro-theme indicated by Nausicaa “**Legislation, politics, economy and society**” (D), the only subject which captured visitors’ interest was the “Social sphere” (regarding sea professions and professional training, occupation and working conditions): this subject was chosen by 52% of interviewees; definitely lower percentages were obtained by the other subjects: Marine Economy (D2), chosen by 25% of interviewees; Marine Politics (23%), and Marine Law (31%).

### D1 - Law

	Frequency	Percentages
No	122	69,3
Yes	54	30,7
Total	176	100,0

### D2 – Marine Economy

	Frequency	Percentages
No	131	74,4
Yes	45	25,6
Total	176	100,0

## D3 – Marine Politics

	Frequency	Percentages
No	135	76,7
Yes	41	23,3
Total	176	100,0

## D4 – Social Sphere

	Frequency	Percentages
No	84	47,7
Yes	92	52,3
Total	176	100,0

With regards to “Other”, the subjects indicated by visitors themselves are the following:

- “places of interest”, which can fall under subject C1, “General knowledge”,
- “rules and regulations regarding energy and resource saving practices” which is astride subject D1 (Law), B6 (Sustainable development and resource preservation) and B9 (Environment and pollution)
- “Sea and Ocean preservation”, included in subject B1 (Oceanology) B6 (Sustainable development and resource preservation) and B9 (Environment and Pollution).

In summary:

A1 – Exploitation of marine resources: 79%

A2 – Ship construction and hydraulic engineering 26%

A3 – Navigation and safety at sea: 35%

A4 – Mercantile marine and marine transportation 5%

A5 – Navy 8,5%

B1 – Oceanography 57%

B2 - Marine and geophysical geology: 39%

B3 – Climatology: 27%

B4 – Meteorology and climatology: 26%

B5 – Marine Paleontology: 34%

B6 – Sustainable development and resource preservation: 45%

B7 – Marine Biology (microbiology, botanics and zoology): 46%

B8 – Aquarium sciences: 43%

B9 – Environment and pollution: 57%

C1 – General knowledge: 72%

C2 - Art and literature: 23%

C3 - Sports and leisure activities: 46%

D1 – Legislation: 31%

D2 – Marine Economy: 26%

D3 – Marine Politics: 23%

D4 – Social sphere: 52%

### ***Assumptions on possible uses of the portal***

In this phase of the project, we decided it would be interesting to make some assumptions on how the portal may be used: the questionnaire continued then with a series of questions aimed at exploring this subject.

First of all, we inserted a question<sup>3</sup> which wanted to verify how often the visitor used the internet to gain a deeper knowledge on subjects of his/her interest. (“Do you usually use the internet to find information on your subjects of interest?”): the aim of this question was to validate visitors’ answers to the specific questions regarding the best ways, times and instruments to include in the portal.

As shown in the following graph, only 3% of interviewees declared “never” to use the internet to research information, while 63% of visitors have a settled habit of using the internet to widen their knowledge and, finally, 33% of visitors declared to use it at least “sometimes”. These “numbers” are quite comforting as they confirm that we indeed collected the opinions of people who are “proficient and competent” about surfing the web.

Chart 6 – Habitual use of the Internet

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No, never	6	3,4	3,4	3,4
	Yes, sometimes	58	33,0	33,3	36,8
	Yes, always	110	62,5	63,2	100,0
	Total	174	98,9	100,0	
Lost answers		2	1,1		
Total		176	100,0		

The next question regarded possible uses of the Aquaring portal; we asked the interviewees “Do you think you would use the on-line portal dedicated to water and aquatic resources that the Aquarium is developing together with other European partners?” It is in fact reasonable to assume that the people who visit marine centres, museums, aquariums etc., are also the people who are most likely to use the portal to take “virtual tours” of the various structures and to view and use the digital resources made available. It is thus important for us to know if and how they would like to use this technological infrastructure.

Visitors’ answers were quite encouraging: only 5% of interviewees answered that they “don’t think” they would use the portal, while the other 95% responded positively. It is important to underline that use of the portal is conditioned by ease of access and use: 50% of visitors think that they would use the portal depending “on ease of access and use”. This aspect– **ease of access and use of the portal** – will have to be carefully considered during the planning stage and will certainly be one of the **evaluation elements** for the prototype.

<sup>3</sup> Answers to this question have already been cited and briefly commented in paragr.. “The interviewees” - in which we described the sample of interviewees.

Chart 7 – Assumptions on use of the on-line portal

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid Answers	No, I don't think so	8	4,5	4,6	4,6
	Yes, depending on ease of access and use	88	50,0	50,3	54,9
	Yes, definitely	79	44,9	45,1	100,0
	Total	175	99,4	100,0	
Lost answers		1	0,6		
Total		176	100,0		

The question which followed had the aim of clarifying the ways in which on-line portal could be used with regards to acquiring information on subjects of interest, on discussion forums with other visitors, on on-line booking, on finding information about structures and attractions that are similar to the Aquarium.

The interviewees could indicate more than one answer, if they felt that the various items matched with possible ways of using the portal.

The first item was “to book a visit”: 32% of visitors think they would use the portal in this way.

Chart 8.1 - Uses: before a visit, to book a visit

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	119	67,6	68,0	68,0
	Yes	56	31,8	32,0	100,0
	Total	175	99,4	100,0	
Lost answers	System	1	,6		
Total		176	100,0		

The second answer considered using the portal “to acquire information and prepare oneself before a visit”: in this case, the percentage of interviewees who answered yes is much higher, with 64%, while only 45% of interviewees think they would use the portal “after a visit, to deepen one’s knowledge”.

Chart 8.2 - Uses: before, to acquire information and prepare oneself

		Frequency	Percentages	Valid Percentages	Compound Percentages
Valid answers	No	63	35,8	36,0	36,0
	Yes	112	63,6	64,0	100,0
	Total	175	99,4	100,0	
Lost answers	System	1	,6		
Total		176	100,0		

Chart 8.3 – Uses: after, to deepen one’s knowledge

		Frequency	Percentages	Valid Percentages	Compound Percentages
Valid answers	No	97	55,1	55,4	55,4
	Yes	78	44,3	44,6	100,0
	Total	175	99,4	100,0	
Lost answers	System	1	,6		
Total		176	100,0		

The last two answers which offered uses such as chatting with other visitors and giving opinions on one’s visit were not very popular: The answer “to chat with other visitors, after a visit” is chosen only by 7% of the interviewees, while only 11% of them think they would use the portal “to give their impressions, after a visit”, in a discussion forum or blog for example.

Chart 8.4 – Uses: after a visit, to chat with other visitors

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	162	92,0	92,6	92,6
	Yes	13	7,4	7,4	100,0
	Total	175	99,4	100,0	
Lost answers	System	1	,6		
Total		176	100,0		

Chart 8.5 – Uses: after a visit, to give one’s impressions

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	156	88,6	89,1	89,1
	Yes	19	10,8	10,9	100,0
	Total	175	99,4	100,0	
Lost answers	System	1	,6		
Total		176	100,0		

Quite popular is the last answer (40%) which foresees using the portal both “before and after a visit, to receive information on other museums and attractions”.

Chart 8.6 – Uses: before and after, for information on other museums and attractions

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	104	59,1	59,4	59,4
	Yes	71	40,3	40,6	100,0
	Total	175	99,4	100,0	
Lost answers	System	1	,6		
Total		176	100,0		

In conclusion, we can observe that the main aim of the project, which is to organize the digital resources available to the various partners and to make them accessible and available through a common portal, matches well with the visitors’ answers (to deepen one’s knowledge both before and after a visit), and with the idea of finding information on other European structures that are similar to the one that is already known.

In summary:

Uses: before, to book : 32%

Uses: before, to inform and prepare oneself: 64%

Uses: after, to deepen one's knowledge: 45%

Uses: after, to chat with other visitors: 7%

Uses: after, to give one's impressions: 11%

Uses: before and after, to find information on other museums and structures: 41%

Less interest is shown for a system that allows the exchange of ideas and opinions on subjects of interest, although it is interesting to see that a high number of interviewees is available for further contacts in order to receive more information on the project.

With regards to the criteria for evaluation, the portal prototype must allow users to **broaden their knowledge**, most of all before a visit – and in preparation of a visit – regardless of the knowledge of the single structure and of how much info they put in the portal, in view of a better experience, both before and after a visit, starting from what the visitor has already learned and observed during his visit.

Given the ways the portal will be designed and the partnership which has been established for its creation, it seemed important for the questionnaire to present a specific question on the use of this instrument as a means to access other aquariums, museums and marine centres through the Internet. This was also done to have an idea on the possible spin-off effects the project might have from this point of view; we then asked the visitors: “Would you use the on-line portal to have internet access to other Italian and European Aquariums and Museums?”

The interviewees' answers to this question are quite encouraging: only 4% answered “I don't think so” while 96% of them answered, “yes, definitely” (52%) or yes, depending on ease of access and use<sup>4</sup> (44%).

Chart 9 – Use of portal to access other structures

		Frequency	Percentages	Valid Percentages	Compounded percentages
Valid answers	no, I don't think so	7	4,0	4,0	4,0
	yes, depending on ease of access and use	77	43,8	44,3	48,3
	yes, definitely	90	51,1	51,7	100,0
	Total	174	98,9	100,0	
Lost answers		2	1,1		
Total		176	100,0		

<sup>4</sup> It is important to carefully consider language problems.

**Needs regarding the various types of digital resources**

The questionnaire continued with a question on the *type of digital resource* that visitors think best corresponds to their needs; from the answers it emerges that the majority of visitors expects to find images (“photos” = 74%) and videos (“videos” = 70%). Written documents are also expected (word documents, acrobat documents etc.) by 50% of the interviewees as resources which correspond to their information needs.

Definitely less popular are the digital resources marked as “audio”, which obtain 34% of preferences, and, maybe unexpectedly, multi-media files, chosen by 31% of visitors.

Chart 10.1 – Written documents

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	87	49,4	49,7	49,7
	Yes	88	50,0	50,3	100,0
	Total	175	99,4	100,0	
Lost answers		1	,6		
Total		176	100,0		

Chart 10.2 - Audio

		Frequency	Percentages	Valid Percentages	Compound Percentages
Valid answers	No	116	65,9	66,3	66,3
	Yes	59	33,5	33,7	100,0
	Total	175	99,4	100,0	
Lost answers		1	,6		
Total		176	100,0		

Chart 10.3 - Photos

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	45	25,6	25,7	25,7
	Yes	130	73,9	74,3	100,0
	Total	175	99,4	100,0	
Lost answers		1	,6		
Total		176	100,0		

Chart 10.4 - Videos

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	53	30,1	30,3	30,3
	Yes	122	69,3	69,7	100,0
	Total	175	99,4	100,0	
Lost answers		1	,6		
Total		176	100,0		

Chart 10.5 - Multimedia

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	121	68,8	69,1	69,1
	Yes	54	30,7	30,9	100,0
	Total	175	99,4	100,0	
Lost answers		1	,6		
Total		176	100,0		

The indications collected on the **types of digital resources “preferred”** by the visitors, can be used in **comparison with the digital resources that have already been indicated as available** by the various partners, this allows us to judge if the latter are more or less correspondent to the visitors expectations.

As shown by the survey conducted among secondary school teachers, this category of visitors prefers written documents rather than photos and videos, unlike “common” visitors: the **different preferences** on resources expressed by the **different types of potential users** should be kept in consideration in the planning of **alternative pathways for different types of users**.

#### *Pathways and means of access*

Next in the questionnaire we deemed it necessary to insert a question regarding the types of pathways and means of access to the resources present on the web portal; this question aims to understand whether visitors prefer a high degree of autonomy – which should correspond to a higher degree of previous knowledge and awareness of the subject or subjects he wishes to expand on – or, vice versa, if he prefers to be guided and accompanied along the path because he feels he might get lost among the huge quantity of available information. The question read: “What type of pathway /means of access do you feel would best meet your needs? Please order the following items assigning the number 3 to the most satisfying way and the number 1 to the least satisfying way.” We then offered three items to be ordered as indicated.

Chart 11.1 - Access to information on subjects of interest

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	Not very satisfying	44	25,0	26,2	26,2
	Averagely satisfying	44	25,0	26,2	52,4
	Very satisfying	80	45,5	<b>47,6</b>	100,0
	Total	168	95,5	100,0	
Lost answers		8	4,5		
Total		176	100,0		

Chart 11.2 - Access to educational pathways that are pre-constructed on macro-thematic areas

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	Not very satisfying	52	29,5	31,0	31,0
	Averagely satisfying	68	38,6	<b>40,5</b>	71,4
	Very satisfying	48	27,3	28,6	100,0
	Total	168	95,5	100,0	
Lost answers		8	4,5		
Total		176	100,0		

Chart 11.3 - Access to educational pathways constructed in interaction with an expert

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	Not very satisfying	73	41,5	<b>43,5</b>	43,5
	Averagely satisfying	41	23,3	24,4	67,9
	Very satisfying	54	30,7	32,1	100,0
	Total	168	95,5	100,0	
Lost answers		8	4,5		
Total		176	100,0		

As demonstrated by the visitors' answers, the preferred pathway is **individual access to resources and information** on subjects of interest, which scored the highest percentage (48%) and is at least averagely satisfying for **74%** of visitors.

Secondly, interviewees indicated **access to educational pathways pre-constructed on macro-thematic areas**, which are averagely satisfying for 40% of visitors and positive in **69%** of cases.

Lastly, **access to educational pathways constructed in interaction with an expert** is considered not very satisfying by 43.5% of interviewees and judged positively in **56.5%** of cases.

These data show that it is important to design a system that makes it as easy as possible for visitors to independently access and use the available resources according to their different needs.

#### ***Usefulness of discussion forums***

The next question intended to explore visitors' opinions on "virtual forums" in which to exchange and share opinions on their visit and on the on-line resources with other visitors. The question read: "What discussion forums do you think are more useful? (Please order the following items assigning the number 4 to the most satisfying way and the number 1 to the least satisfying way) and was followed by four items to be ordered as indicated.

The answers given to this question must obviously be read in light of the answers given to a previous question; as highlighted in the paragraph "assumptions on use of on-line portal". Indeed, the two uses suggested for the exchange of opinions with other visitors were not well

greeted: the assumption of using the portal to “chat with other visitors, after a visit” was chosen only by 7% of interviewees, while only 11% of them think they would use the portal to “give their impressions, after a visit” for instance on a forum or blog.

Chart 12.1 - Forum visitors

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	Not very useful	55	31,3	33,1	33,1
	Pretty useful	45	25,6	27,1	60,2
	Useful	30	17,0	18,1	78,3
	Very useful	36	20,5	21,7	100,0
	Total	166	94,3	100,0	
Lost answers		10	5,7		
Total		176	100,0		

As observed in the chart above, the “visitors’ forum” is not considered particularly useful by interviewees, who in total consider it “useful” or “very useful” only in 40% of cases. Opinions change when considering a forum in which to exchange ideas with experts in the field: in this case, the percentage rises to 73%.

Chart 12.2 - Forum with experts

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	Not very useful	18	10,2	10,8	10,8
	Pretty useful	27	15,3	16,3	27,1
	Useful	34	19,3	20,5	47,6
	Very useful	87	49,4	52,4	100,0
	Total	166	94,3	100,0	
Lost answers		10	5,7		
Total		176	100,0		

The usefulness attributed to the “chat room with other visitors” (regardless of the difficulty of actually creating exchanges of this sort in non-structured environments) drops to 31%, while in the case of “chat rooms with experts”, the interviewees who think it would be “useful” or “very useful” rises overall to 54% of cases.

Chart 12.3 – Chat room with visitors

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	Not very useful	67	38,1	40,4	40,4
	Pretty useful	48	27,3	28,9	69,3
	Useful	33	18,8	19,9	89,2
	Very useful	18	10,2	10,8	100,0
	Total	166	94,3	100,0	
Lost answers		10	5,7		

Total		176	100,0		
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Chart 12.4 - Chat room with experts

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	Not very useful	39	22,2	23,5	23,5
	Pretty useful	38	21,6	22,9	46,4
	Useful	51	29,0	30,7	77,1
	Very useful	38	21,6	22,9	100,0
	Total	166	94,3	100,0	
Lost answers		10	5,7		
Total		176	100,0		

We can thus safely assume that, with regards to an area in which to exchange opinions between visitors, the latter would consider more useful an instrument which could allow them to have a **direct line with an expert**, preferably as a forum, which allows more time to reflect on contents, rather than quick and instant messaging such as a chat session.

One of the **assumptions** which emerged while discussing results was to create – if possible from an IT point of view – **an automatism which allows to simulate a confrontation with an expert** on the basis of pre-defined pathways with which to deepen one’s knowledge on various subjects which the digital resources will refer to. A mechanism such as a “**FAQ**” might represent a good solution in this sense.

#### ***Instruments for on-line booking***

The next question intended to explore visitors’ opinions on the usefulness of instruments for on-line booking among which “Instruments for online booking of independent visits, those for the booking of guided tours and those for the construction of specific user pathways”.

No direct indication emerged from the interviewees answers to this regard, in fact each of the assumed booking instruments was chosen by about 50% of interviewees.

These answers must also be read keeping in mind the answers given to a previously asked question in the assumed uses of the portal, when we asked if visitors would use the portal “before a visit, to book”: 32% of visitors said they would use the portal to this end.

Chart 13.1 – Instruments for on-line booking of independent visits

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	89	50,6	51,7	51,7
	Yes	83	47,2	48,3	100,0
	Total	172	97,7	100,0	
Lost answers		4	2,3		
Total		176	100,0		

Chart 13.2 – Instruments for on-line booking of guided tours

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	87	49,4	50,6	50,6
	Yes	85	48,3	49,4	100,0
	Total	172	97,7	100,0	
Lost answers		4	2,3		
Total		176	100,0		

Chart 13.3 – Instruments for construction of specific user pathways

		Frequency	Percentages	Valid Percentages	Compounded Percentages
Valid answers	No	95	54,0	55,2	55,2
	Yes	77	43,8	44,8	100,0
	Total	172	97,7	100,0	
Lost answers		4	2,3		
Total		176	100,0		

### 4.3 The survey on teachers' needs

The survey on teachers' needs was carried out during a training seminar sponsored by the San Paolo Foundation on the use of instruments such as Internet and the Aquarium in lesson planning. Experts from the Aquarium took part as teachers in the event.

#### *The interviewees*

As the chart below shows, the survey was carried out on 23 teachers, who teach biology and micro-biology, chemistry, physics and maths, natural science, earth science and information technology, geography.

Chart 1 – Subject/subjects taught by teachers

	Frequency
No answer	1
Biology; chemistry; earth science	1
Biology; micro-biology; chemistry; earth science	1
Biology; earth science	1
Chemistry; biology; earth science	1
Physics	1
Physics; environmental physics	1
Physics; Laboratories	1
Maths; Physics	2
Maths; physics; information technology	1
Science	5
Natural science	3
Natural science; chemistry; geography	3
Support humanistic area	1
Total	23

The following chart shows in detail what type of school the teachers teach at. All teachers were happy and willing to cooperate in our project.

Chart 2 – Type of school teachers teach at

	Frequency	Percentages
No answer	1	4,3
C.F.P.	1	4,3
I.P.S.I.A.	3	13,0
I.S.C.	1	4,3
I.T.I.S. – Scientific secondary school	1	4,3
I.T.I.S.	4	17,4
SECONDARY SCHOOL	1	4,3
CLASSICAL SECONDARY SCHOOL	4	17,4
LINGUISTIC SECONDARY SCHOOL	1	4,3
SCIENTIFIC SECONDARY SCHOOL	5	21,7
SOCIAL SCIENCE SECONDARY SCHOOL	1	4,3
Total	23	100,0

As shown by the chart almost all the teachers are happy to be contacted further on, and left an e-mail address to this end.

Chart 3 – Availability for further contacts

	Frequency	Percentages
No	3	13,0
Yes	20	87,0
Total	23	100,0

### ***Subjects of interest***

The questionnaire given to the teachers intended to explore their needs with regards to the resources that may be made available on the on-line portal (subjects treated, type of digital resources, type of pathways, etc.)

1. To this end – and also to favour transnational comparison – we inserted (up to level 2) the chart supplied to partners by Nausicaa and we asked teachers, first of all to tick the boxes next to the subjects they feel best meet their personal or professional interests, or, on the contrary to leave the box blank. We also offered a blank space in which to insert subjects not on the list.

The results that emerged from this first part of the questionnaire are shown in the charts below and followed by a brief commentary.

#### **A Marine activities and technologies**

With regards to macro-theme A, “A Marine activities and technologies”, only subject A1 - Exploitation of marine resources - corresponds to a need for information for almost all the teachers (90%), while the other subjects (A2 – Ship construction and hydraulic engineering, A3 – Navigation and safety at sea, A4 – Mercantile marine and marine transportation, A5 – Navy) are deemed interesting only in 10% of cases.

## A1 – Exploitation of marine resources

	Frequency	Percentages
No	1	4,3
Yes	22	95,7
Total	23	100,0

## A2 – Ship construction and hydraulic engineering

	Frequency	Percentages
No	20	87,0
Yes	3	13,0
Total	23	100,0

## A3 – Navigation and safety at sea

	Frequency	Percentages
No	21	91,3
Yes	2	8,7
Total	23	100,0

## A4 – Mercantile marine and marine transportation

	Frequency	Percentages
No	22	95,7
Yes	1	4,3
Total	23	100,0

## A5 – Navy

	Frequency	Percentages
No	22	95,7
Yes	1	4,3
Total	23	100,0

## B Marine Biology – Marine sciences - Environment

With regards to the second macro-theme B, “ Marine Biology – Marine sciences - Environment”, the opinions expressed are definitely less univocal than in the previous case: subject B9 - Environment and pollution – is considered correspondent to a need by 80% of interviewees, while Marine Biology (B7) and la Marine and geophysical geology (B2) and Climatology (B3) are interesting only for 60-70% of teachers.

Percentages are lower for the other subjects: 40% for Oceanology (B1) Meteorology (B4), 30% for Marine palaeontology (B5), 20% for Oceanography (B6) and only 10% for Aquarium sciences (B8).

## B1 - Oceanology

	Frequency	Percentages
No	14	60,9
Yes	9	39,1
Total	23	100,0

## B2 – Marine and geophysical geology

	Frequency	Percentages
No	9	39,1
Yes	14	60,9
Total	23	100,0

## B3 - Climatology

	Frequency	Percentages
No	10	43,5
Yes	13	56,5
Total	23	100,0

## B4 - Meteorology

	Frequency	Percentages
No	13	56,5
Yes	10	43,5
Total	23	100,0

## B5 – Marine paleontology

	Frequency	Percentages
No	16	69,6
Yes	7	30,4
Total	23	100,0

## B6 - Oceanography

	Frequency	Percentages
No	18	78,3
Yes	5	21,7
Total	23	100,0

## B7 – Marine biology

	Frequency	Percentages
No	8	34,8
Yes	15	65,2
Total	23	100,0

## B8 – Aquarium sciences

	Frequency	Percentages
No	20	87,0
Yes	3	13,0
Total	23	100,0

## B9 – Environment and pollution

	Frequency	Percentages
No	4	17,4
Yes	19	82,6
Total	23	100,0

## C General knowledge and free time

With regards to the third macro-theme offered to teachers “C General knowledge, hobbies and leisure activities”, from the opinions expressed by the teachers it emerged that subject C1 – General knowledge – is considered correspondent to a need by 65% of interviewees, Art and Literature by 55% of them while only 15% of teachers answered that “Sports and leisure activities” C3 (B7) is a subject of interest.

### C1 – General knowledge

	Frequency	Percentages
No	8	34,8
Yes	15	65,2
Total	23	100,0

### C2 - Art and literature

	Frequency	Percentages
No	10	43,5
Yes	13	56,5
Total	23	100,0

### C3 – Sports and leisure activities

	Frequency	Percentages
No	19	82,6
Yes	4	17,4
Total	23	100,0

## D Legislation, politics, economy and society

With regard to the 4th macro-theme identified by Nausicaa “Legislation, politics, economy and society”, the only subject deemed interesting by a large part of the teachers interviewed is Marine Economy (D2), indicated by 60% of interviewees; only 25-30% of teachers surveyed believes that Law, Marine Politics, and Social Sphere correspond to the actual personal or professional needs of the category.

### D1 - Law

	Frequency	Percentages
No	17	73,9
Yes	6	26,1
Total	23	100,0

### D2 – Marine economy

	Frequency	Percentages
No	9	39,1
Yes	14	60,9
Total	23	100,0

## D3 – Marine politics

	Frequency	Percentages
No	17	73,9
Yes	6	26,1
Total	23	100,0

## D4 – Social sphere

	Frequency	Percentages
No	16	69,6
Yes	7	30,4
Total	23	100,0

Only one of the teachers added another subject which was “The relation between subjects B2, B3, B4, D2 and the dynamic of complex structures”.

***Teachers’ needs and types of digital resources***

To the question on what *type of digital resource* the teachers feel best corresponds to their needs, almost all teachers (95%) agree on “multi-media”, while none of them chose “audio files”. Photos and videos interested 35-40% of the teachers surveyed.

## Chart 4.1 – Written documents

	Frequency	Percentages
No	9	39,1
Yes	14	60,9
Total	23	100,0

## Chart 4.2 - Audio

	Frequency	Percentages
no	23	100,0

## Chart 4.3 - Photos

	Frequency	Percentages
No	15	65,2
Yes	8	34,8
Total	23	100,0

## Chart 4.4 - Videos

	Frequency	Percentages
No	14	60,9
Yes	9	39,1
Total	23	100,0

## Chart 4.5 – Multi-media

	Frequency	Percentages
No	1	4,3
Yes	22	95,7
Total	23	100,0

**Types of pathways and means of access**

With regards to type of pathways and means of access to the resources present on the web portal, access to information and to pre-constructed educational pathways are indicated by 50% of teachers, while 55% of them would need specific pathways constructed with an expert and 40% of them would like to find learning evaluation tests.

Chart 5.1 - Access to information

	Frequency	Percentages
No	12	52,2
Yes	11	47,8
Total	23	100,0

Chart 5.2 - Access to pre-constructed pathways

	Frequency	Percentages
No	11	47,8
Yes	12	52,2
Total	23	100,0

Chart 5.3 - Access to educational pathways constructed with an expert

	Frequency	Percentages
No	10	43,5
Yes	13	56,5
Total	23	100,0

Chart 5.4 - Access to learning evaluation tests

	Frequency	Percentages
No	14	60,9
Yes	9	39,1
Total	23	100,0

**Usefulness of discussion areas.**

Regarding discussion areas, those that are deemed more useful are the “teachers’ forum”, indicated by about 75% of teachers, while only 25% of them consider “student forums” to be useful. Chat sessions with experts obtained about 50% of preferences.

Chart 6.1 – Teachers’ Forum

	Frequency	Percentages
No	6	26,1
Yes	17	73,9
Total	23	100,0

Chart 6.2 – Students’ Forum

	Frequency	Percentages
No	17	73,9
Yes	6	26,1
Total	23	100,0

Chart 6.3 - Chat sessions with experts / teachers

	Frequency	Percentages
No	12	52,2
Yes	11	47,8
Total	23	100,0

***Instruments for on-line booking***

The instruments for on-line booking that are considered to be most useful to teachers are those needed to book guided tours (90%). 75% of teachers think that the “Instruments for the construction of specific user pathways” would best meet their needs, while only 40% of them think that “Instruments to book independent visits” are useful.

Chart 7.1 – Instruments to book independent visits

	Frequency	Percentages
No	14	60,9
Yes	9	39,1
Total	23	100,0

Chart 7.2 – Instruments to book guided tours

	Frequency	Percentages
No	2	8,7
Yes	21	91,3
Total	23	100,0

Chart 7.3 – Instruments for the construction of specific user pathways

	Frequency	Percentages
No	6	26,1
Yes	17	73,9
Total	23	100,0

***The values of educational efficiency***

In the second part of the questionnaire, we asked the teachers to focus their attention on the concept of educational efficiency of European aquariums and science museums.

Considering that the partners in the project are interested in creating an instrument with which to “measure” this concept, and knowing that, to this end, it is crucial to define a value of educational efficiency which varies after a visit to a particular structure, we asked the surveyed teachers to assign a rating from 1 to 10 to the following items:

- Learning information on specific subjects
- Motivating users to gain a deeper knowledge of subjects
- Activating connections between different subjects
- Activating behaviours which show respect for environment
- Activating behaviours which show respect for life

on the basis of how much they felt the value was relevant to the concept of educational efficiency.

As shown by the chart below, the highest average rating was the one obtained by the items “Activating behaviours which show respect for the environment” and “Activating behaviours

which show respect for life” (about 9) while the item “Activating connections between different subjects” and “Learning information on specific subjects” obtained an average rating only slightly higher than 7. Between these two ratings is the one obtained by “Motivating users to gain a deeper knowledge of subjects” (8).

The values: minimum and maximum rating, mean rating, standard deviation.

Chart 8 – Educational efficiency values; ratings

	N	Minimum	Maximum	Mean	Std. Deviation
Learning information on specific subjects	22	5	10	7,41	1,221
Motivating to gain deeper knowledge	22	4	10	8,09	1,688
Activating connections between subjects	22	3	10	7,32	1,492
Activating behaviours respectful of life	22	7	10	8,91	1,109
Activating behaviours respectful of environment	22	7	10	9,14	,990
Valid N (listwise)	22				

We then aggregated the teachers’ answers and labelled ratings in the following way: 1-3 equals “not very relevant”, 4-6 equals “averagely relevant” and 7-10 equals “very relevant”. From this operation, it becomes all the more obvious that “activating behaviours that show respect for life and the environment” is considered very relevant by all the teachers surveyed when reflecting on the concept of educational efficiency. The charts below show – for each value – the distribution of answers in the three above mentioned categories.

Chart 9.1 - Learning information on specific subjects

	Frequency	Percentages	Valid Percentages
Averagely relevant	4	17,4	18,2
Very relevant	18	78,3	81,8
Total	22	95,7	100,0
Missing answers	1	4,3	
	23	100,0	

Tab. 9.2 - Motivating to gain deeper knowledge

	Frequency	Percentages	Valid Percentages
Averagely relevant	3	13,0	13,6
Very relevant	19	82,6	86,4
Total	22	95,7	100,0
Missing answers	1	4,3	
	23	100,0	

Chart 9.3 - Activating connections between subjects

	Frequency	Percentages	Valid Percentages
Not very relevant	1	4,3	4,5
Averagely relevant	4	17,4	18,2
Very relevant	17	73,9	77,3
Total	22	95,7	100,0
Missing answers	1	4,3	
	23	100,0	

Chart 9.4 - Activating behaviours respectful of life

	Frequency	Percentages	Valid Percentages
Very relevant	22	95,7	100,0
Missing answers	1	4,3	
	23	100,0	

Chart 9.5 - Activating behaviours respectful of the environment

	Frequency	Percentages	Valid Percentages
Very relevant	22	95,7	100,0
Missing answers	1	4,3	
	23	100,0	

#### *Other educational efficiency values*

13 teachers did not answer.

Here follow the answers of those who wrote something in the blank space supplied.

- Activating behaviours which show respect for life and the environment and motivating to gain a deeper knowledge of subject.
- motivating to gain a deeper knowledge of subject; activating behaviours which show respect for...
- Activating motivation to explore subject further; activating interdisciplinary subjects; use and application of contents and stronger motivation to learn; stimulating creativity in students as well.
- Knowing how to observe reality in a critical way; returning to visit structure as a guide; independent visits to related structures; creating a discussion group on the visit; elaborating designs on the "ideal" structure.
- Behaviours which show respect for life and the environment
- Interactivity; active and creative participation to the tour; possibility to plan and personalise tours; activate the ability to observe, choose and connect.
- Interest demonstrated; questions asked; further research
- Language which is in line with the users' receptive abilities; possibility of interaction between guide and visitor.
- Keep in contact with the teachers who brought students to visit structure because they have more time and opportunities to evaluate educational efficiency of their visit.
- I don't understand the question

## 5 Synthesis of results and User cases description

On the basis of their activities, the partners decided to describe a series of “User cases” favouring those targets that were awarded high priority by all partners.

The categories of users for which the user cases were described:

- adult visitor
- children
- teachers
- museums, aquariums, zoos
- media operators

For each category there’s a general user profile, the aims and motivations which bring him to access the Aquaring portal, the information needs which the portal should satisfy, and any extra services there may be (discussion forums, newsletters, contacts etc...)

### 5.1 Individual adult users with personal / private interests

#### 5.1.1 USER NEEDS

The interested users are private individuals with general, or more specific interests about the aquatic world (from 13 years<sup>5</sup> old on).

Generally these visitors are expected to access the portal asking for general information about the aquatic environment or species to learn about different issues (animal behaviour, biology of aquatic organism, biodiversity, habitat related species information, marine navigation, etc.).

The adult users look also for information about marine environment, and particularly for deep information on the ocean system and the marine ecology (energy, cycles, biodiversity, interconnections), the relation between the man and the ocean (economy, health, food resources, employment, threatens), the deterioration of the ocean as a result of the human activities, the deterioration of the habitats and the marine species stocks, the rights and responsibilities of the “citizen of the ocean”.

Sometimes the users of the portal have **specific interest** about aquatics issues due to their hobbies: for example, if they are **divers** they would like to get information about places where there is a sustainable tourist activity or trips and particular and deep information about physiology; diving sites and places for sustainable diving (submarine path), decalogue of actions for a responsible diving and conservation interests. If they are **sailors or tourists** they look for information to plan sustainable holidays and leisure to have fun and make discoveries, so they need to know sea-life discovery places and trips, coastal places for holidays and places for a sustainable holidays; they may look for information about aquatic sports and cruising, security at sea and maritime navigation.

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<sup>5</sup> For the portal needs, we consider as children the individuals up to 12 years old (included in the use case 2); then, from this age on, all the others are included among “adults”.

The visitors are particularly interested in finding images and video but also written documents (word and .pdf files) and multimedia files about aquatic themes; some categories of disable people (blind people) could be very interested in audio files that make available the information to them.

The adult users of our portal also need information about news, events and sea's actualities and to keep updated on what happens in terms of marine environment. The users of our portal access would like also to know concrete man's actions to protect the marine environment and to be involved in active action for the environment (active citizenship).

Our portal users needs are also spaces for common discussion and for exchange: a space where they can give their opinions and get involved in life web with ideas, proposals, social networking and where they can read the opinions of experts on specific issues and exchange resources about aquatic themes. They prefer the use of asynchronous tools, because they can not stay connected all day long and they need more time to reflect on and what they have read and what they want to write.

The adult users access the portal looking also for information about the portal itself, the European network of Aquaria and their characteristics, activities and different projects developed by single structures and the European Network.

### 5.1.2 USE CASE - POSSIBLE DEVELOPMENT OF THE SCENARIOS

The users of our portal needs both general information and deep or specific information on aquatic themes, but for them it is very important to have an easy access to it; so they should have access to a system for easy digital data search: the presentation layer of the portal would result in a web search page with an on-line form, containing a check list based on multi level index related to the digital resources available on the portal. In this form the visitor puts a check on the thematic that is interested in, and the system<sup>6</sup> should answers showing him the related sub-thematics (and directly related documents) at the following level and so on till the choice of the specific thematic of digital data required. At the last level of the system the visitor could choice the type of digital data he is looking for, and he gets only this type of digital data related to the specific thematic (i.e. only "photos" about "dolphins", acoustic files, etc.).

For adults looking for details on animal natural history issues, it would be useful to find in the portal a sort of "Aquatic World Encyclopaedia", a list of files or links able to supply photos, videos, reports. The multimedia and hypermedia "look&feel", although not specifically asked, seems to be a promising feature for a more immersive navigation inside the portal.

For the adult users looking for a more detailed information, a controlled part of the portal should be organized with a presentation layer equipped with some customised functionalities based on wiki-based technologies, e.g. using a Wikipedia-like organisation of resources: some collaborative tools will be used more for annotations and comments than for co-construction of contents.

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<sup>6</sup> This type of system is feasible with **precise** indexation of each digital data with respect both to the thematic and to the file type..

For those looking for specific hobbies or leisure issues, as well as for other user categories like media professionals and tourism agencies, some new trends on geo-referenced interactive maps might be an interesting opportunity for improving the portal functionalities, e.g. Google Maps value-added services.

One of the possible evolution of the system is that the visitors might also register and subscribe for an instant messaging service and other infomobility services that make them be up dated about the latest news items on their mobile and smartphones.

For those visitors having a particular interest in real-time news, it should be possible to develop a system where they can register on our portal with a customised profile and subscribe for: RSS-based<sup>7</sup> dedicated channels for conveying specific news to feed aggregators; a weekly/monthly news letter containing a list of the latest news items (e.g. forecast, environmental changes, disasters), containing different links to the portal where the visitors can find deeper information and the different points of view about the topics.

The visitors looking for a discussion forum should possibly find a moderated “Forum area”, where they should have the possibility to register and access a thematic forum: in each forum they could possibly read the opinions written by the other visitors or by experts about the thematic and write their own opinions or upload their digital data (photos, video, documents, audio...).

For the adults asking for an active participation about concrete actions, they could possibly register and access dedicated space (moderated forum) where they should be involved in discussions and decisions about aquatic issues and read specific documents (Decalogue of actions) . They might also register and receive newsletter or instant messages inviting them to individual or group actions (i.e. passport of the citizen of the ocean, World Ocean Day...). In this direction, a blog-like functionality will be investigated as a value-added service for special interests groups.

For the adults looking for information about the network of aquaria, science centres and natural history museums, the portal will include a specific section with the information required: an interactive map with links to a short presentation of each partner organization containing also a link to the partner website; a sub-section presenting a list of all science centres, research institutions, natural history museums, aquariums and zoos in the world, specifically related to the aquatic themes, with links to the websites of these organizations; finally a sub-section containing a list of research project on aquatic issues and eventual links to related projects’ website

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<sup>7</sup> RSS (acronym standing for Rich Site Summary or also Really Simple Syndication) is a new XML-based technology for news delivering (called *feeds*) on websites: all the recent web browsers, e.g. Microsoft Internet Explorer 7, embeds RSS feed aggregator, giving the opportunity of building customised news lists.

## 5.2 Teachers with professional interests

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### 5.2.1 USER NEEDS

A second group of potential users of the Aquaring portal is represented by ‘teachers’, who have been indicated as a priority target by many of the project partners. This group is made up by teachers of primary and secondary schools of first and second grade (particularly the latter) who teach sciences, natural sciences, earth sciences, chemistry, geography, biology and microbiology to young students.

Teachers who access the aquatic environment portal need to prepare their courses and particularly to prepare documents and leaflets related to these subjects for their lessons: with this goal in mind what they need is deep, updated, reliable and concise information on different subjects such as:

- Salt-water and fresh-water biodiversity
- Human vs. nature interaction and influence
- Physiology of aquatic organisms
- Behaviour of aquatic organisms
- Aquatic habitat information
- Conservation issues
- Biology
- Ecological economics
- Biodiversity/interrelations/cycles/energy
- Human responsibility for the planet’s environment
- Environment education for a sustainable development
- Direct and indirect actions of human being on ecological populations
- Phylogenetic classification.
- Exploitation of biological resources
- Environment pollution.

Teacher of humanistic subjects are instead interested in topics related to general issues regarding aquatic or marine environments such as arts, literature or mythology, or in the professions related to water exploitation.

Technical College teachers, particularly those related to nautical subjects are interested in those niche subjects such as shipbuilding, hydraulic engineering, safety at sea, merchant shipping and naval transport, military Navy, in addition to those mentioned above.

Teachers need both general information and deep or specific information on aquatic issues. For them it is very important to have an easy intuitive and quick semantic data search.

Regarding the type of digital resources, teachers are usually very interested in multimedia files, which allow multisensorial exploitation and, at the same time, an easy learning even for young primary school students. Of course, written documents are also very useful for teachers. These allow to keep themselves up-to-date and to set-up educational tools to supplement the standard documents as well as images to integrate textual content and provide

a visual aid to the subjects discussed in the classroom. Powerpoint presentations (ppt files) are also very useful to use in lessons.

Teachers can address students to access the portal to retrieve information and to improve their knowledge about issues and subjects to be learned. In these instances, teachers are also interested in having a tool to evaluate the educational input the portal can provide.

Teachers are also very interested in the portal to be kept up-to-date with reliable data and to acquire knowledge about activities and different projects developed by single structures and European Network. They therefore hope to find on the portal essays, reports, conferences and links to different news about projects. This allows them to virtually consider themselves taking part in conferences on specific topics or in research projects.

They also need also to plan study trips for their students during which they can conduct further research on specific topics or look for additional up-to-date information for their students.

Teachers also need to have **specific** information about news and events regarding the sea and to receive updates on what is happening in the marine environment.

Teachers also need spaces in which to discuss and exchange ideas **with other teachers** and with experts about aquatics: a space where they can give their opinions, read the opinions of other teachers and experts on specific themes and exchange resources about aquatic issues; a space where they can share their didactic methodologies and find help for their work. They prefer to use asynchronous tools (like e-mail or forum) because they cannot stay connected all day long and they have more time to reflect on what they have read and what they want to write.

## 5.2.2 USER CASE - POSSIBLE DEVELOPMENT OF THE SCENARIOS

To get the professional information they need, teachers would access a system for easy digital data search: the portal features an online form with a checklist based on a multi level index related to the various digital resources. In this form, the teacher ticks the theme he/she is interested in, and the system<sup>8</sup> replies by showing him/her the related sub-themes on the following level. This should be repeated until the choice of the specific theme of digital data required is displayed. To make it easier and faster, teachers' access to this index could be based on the themes of the national education programs so that it should become a sort of **dedicated system** for digital data search.

According to their needs to have the availability of various digital resources (multi-media files, text files, images, etc.) and striving in this direction, the management of the various "types" of digital resources could change the search focus from "digitalised contents" to "known formats" (files in formats typically used by teachers). To be sure that the portal does not quickly become technologically obsolete, we would consider standards and open formats (i.e. XHTML for multimedia texts, PNG for images, etc.) as opposed to proprietary formats (still widely used). In the same way, to satisfy the teachers' request for "easy to use" (and

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<sup>8</sup> This type of system is feasible with **precise** indexation of each digital data with respect both to the thematic and to the file type..

especially for repeated use) of the portal's material, we are considering the idea of distinguishing the digital resources that are intended mainly for teachers in terms of "learning objects". However, regarding Aquaring, we are not treating the portal as a *learning object repository*, but as a source of digital assets that enable "also" the building of learning objects, which are typically used in long distance learning situations or *blende*.

For those teachers having a particular interest in real-time news, it should be possible to develop a system where they can register on our portal with a customised profile and subscribe for: RSS-based<sup>9</sup> dedicated channels for conveying specific news to feed aggregators; a weekly/monthly news letter containing a list of the latest news items (e.g. forecast, environmental changes, disasters), containing different link to the portal where the visitors can find deeper information and the different points of view about the topics.

For the teachers' professional need, in terms of exchanging work experience with other colleagues, on the Aquaring portal, teachers should possibly find a "**Teacher - Forum area**" where they would have the possibility to register and access thematic forums specially targeted for education professionals (in this space they could read opinions written by the other teachers or experts on the chosen theme, they are invited to participate in the forum and write their own opinions or upload their digital data (didactic materials, presentations, photos, videos, documents, audio...)).

In this case, freeware and open source software tools to create, elaborate and upload digital resources (including assets and learning objects) would be available for registered teachers.

A specific issue to consider for teacher is a dedicated Copyright policy, as is necessary to allow them to download some resources and use them for teaching purposes.

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<sup>9</sup> RSS (acronym standing for Rich Site Summary or also Really Simple Syndication) is a new XML-based technology for news delivering (called *feeds*) on websites: all the recent web browsers, e.g. Microsoft Internet Explorer 7, embeds RSS feed aggregator, giving the opportunity of building customised news lists.

## 5.3 Children

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### 5.3.1 USER NEEDS

The interested users are children with general, or more specific interests about aquatics (up to 12 years of age<sup>10</sup>).

The “Children” category may be divided according to intellectual interests and technological competence, in at least 2 distinct age groups: “Under 9” and “9 to 12”. Another possible distinction, especially in the 9 to 12 age group, could be the approach to the use of computers and technology in general.

Children in the Under 9 group do not generally access the portal independently, but most likely under the guidance of a parent at home or a teacher at school, or in any case an adult who wishes to verify the presence of material suitable for children: the material is deemed suitable if it is simple enough to be understood and captivating enough to capture and maintain the child’s attention.

Apart from the way they access the portal, under the guidance of the parents or without it, the interests of the two children groups are not different: as their parents, children look for general information on the Animal Kingdom to learn animals’ biological issues (animal behaviour, biology of aquatic organisms, biodiversity, habitat related species information etc.). It is very important for children to find material that is simple and easy to read and understand, but most of all that is interesting and possibly fun.

Children love to look at photos of the animals that most fascinate them, but they also love to hear the sounds that the animals make and the ones that characterise their environment.

Children who visit the structure and then the portal, like to live experiences that are as direct and enthralling as possible, so they would be very happy to see a video of their favourite animal and to be able to maybe download it and watch it over again at home on their television at any time they want while sitting comfortably on the sofa with their moms and dads.

When they visit a facility, the children like to know what happens “behind the scenes”. For example, in case of an Aquarium, they would like to know how things work, how the fish are fed, what they eat, the food chain, etc.

### 5.3.2 USER CASE - POSSIBLE DEVELOPMENT OF THE SCENARIOS

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<sup>10</sup> By children we mean potential users under 12 years of age, whose needs are considered in detail in Use Case 2.

Using advanced multimedia technologies it should possibly to create the educational resources specifically designed for children. Those should be able to offer an “enriching” experience (i.e. use of Flash simulations or animations for the explanation of climatic phenomena and/or the enhancement of aquatic environments).

For children and parents looking for details on animal natural history issues, it would be useful to find in the portal a sort of “Aquatic World Encyclopaedia”, a list of files or links able to supplies photos, videos, reports, although this should be a “Children’s Encyclopaedia”: On the portal, the adult should find under each theme a list of subjects which are most suitable for children, and maybe even a privileged access mode dedicated to children themselves, with dedicated and simplest files.

For those more interested in pictures or even natural sounds, an immersive type of structure with regards to the section dedicated to children would facilitate the children’s use. Concepts such as, for example, “Virtual Album” and “Adventure Game” might be taken into account, as well as simple sound files related to specific animals or environments.

A specific scenario should be designed for children who have visited a facility (i.e.: an aquarium or a museum) and would like to know something more on the structure, particularly for the daily life behind the scenes. On the portal, they could possibly find interactive maps on the different structures involved in the project, showing how they work and what happens “behind the scenes”, with a particular reference to facts able to stimulate curiosity and interest. Some of these should be used with the support of an adult.

Furthermore, due to the fact that children like to draw and colour, it should be possible to put on the portal files of their favourite animal (for instance, a seal) that they can print out from their home computer and colour in.

## 5.4 Aquariums, Natural History Museums, Zoos, Science Centres / professional interests

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### 5.4.1 USER NEED

One of the strongest targets that have been identified is represented by: Natural History Museums, Aquariums, Zoos, Science Centres and Sea Museums, which all belong to the category “structures/organisations”. We are dealing with professionals who would like to use the portal for obtaining specific and technical information to improve their structure’s functionality, to offer their visitors accurate services, and to organise events, exhibits, shows, European projects, new exhibitions, collections, exchanges, etc.

The users needs are essentially tied to the ever growing request for communicating and sharing information between the various structures and to the need to provide their visitors with on site information and through the web, which will make their visit more enriching and which can raise awareness towards safeguarding marine environments.

Aquaria, Science Centres, Natural History Museums and Zoos are also very interested in finding information about the following issues:

- Partnership availability for common projects;
- Professional forum for discussion on specific issues;
- Exchange possibilities for temporary exhibits, panels, etc.
- News about the aquatic world.

One of the main necessities is to access general information on aquatic environments and, in particular, about themes such as:

- ✓ Aquatic environment and sustainable development
- ✓ Climate change
- ✓ Waste and Pollution
- ✓ The Ocean in general with its different topics
- ✓ Biodiversity and endangered species
- ✓ The relationship between Man and the aquatic environment
- ✓ Damages and actions
- ✓ All subjects regarding sea, ocean and fresh water environments
- ✓ As the actions of the international network partners
- ✓ Maritime navigation
- ✓ The relationship between Man and the sea around the world

There is a clear request about an intuitive searching utility.

The relative documents will be annotated by means of metadata model and domain ontology, to be defined, in order to provide semantic search and navigation.

Other needs that felt by this category of users is to raise awareness for the public on the management, conservation and correct use of aquatic environments. It is necessary to inform the citizens and to get them involved through activities aimed at raising awareness and spreading information.

A specific request of reliable information is demanded about environmental themes which are crucial to our planet's development, such as pollution, climate change, the ocean system, marine ecology, (energy, cycles, biodiversity, interconnections), the link between man and the ocean (economy, health, food, resources, employment, threat) deterioration of the aquatic environment as a result of human activities, deterioration of aquatic habitats and species.

#### 5.4.2 USER CASE - POSSIBLE DEVELOPMENT OF THE SCENARIOS

Information about specific and technical information to improve the functionality of each structure should be available to curators, managers and operators according to their needs and to the extent required, within the current availability of professional information.

The broad theme that characterises the contents of the portal should allow us to create a useful instrument for various types of structures which deal with many general and specific themes on a daily basis.

To allow an easy exchange of opinions among professionals, the portal would open discussion forums on specific themes, but also built up a sort of permanent forum for all the professionals concerned. One of the possible challenges of the portal should be to become a useful tool, helping for the creation of temporary exhibits thanks to the possibility of accessing texts, images, photos and videos, panels of other exhibits which have been created in the past or that are currently under production.

A “news” area should possibly provide information of new events, projects, exhibits in the various institutions, or any international news regarding the aquatic world. In this area we might activate an RSS function, creating news *feeds* with publish-subscribe policy, in order to allow selective joining of special interests groups.

The portal would certainly satisfy the need of an easy searching mode, at first by adopting the semantic WEB assessed and reliable ontology, but also by using or interoperating with, for example, Google advanced search and Clusty (ex. Vivisimo). Furthermore, it would be interesting to plan the development in the short-term of “visual semantic search” engines based on the meta-tagging of image features (eVisionglobal) or on conceptual maps (KartOO).

To satisfy the need to communicate reliable information to visitors, able to be able to create or increase their awareness, the portal should supply information regarding the best practices in structure management, as well as updates on the current European projects, reproduction protocols (possibly shared between a restricted area and a public area, according to the various levels of confidentiality required), and aquatic conservation. The portal should offer specific information on various awareness campaigns, as well as useful suggestions to promote eco-sustainable behaviour, inviting visitors to act positively towards the environment. It should be possible to find a calendar of events for International Ocean Day which is celebrated every year on June 8th. Users could possibly register and download the application form to obtain a passport as Citizen of the Ocean (an awareness project launched by the World Ocean Network) and support conservation campaigns.

The portal should possibly shows the most relevant exhibits of the various partners or other institutions, helping the user to prepare the visit and structuring personalised tours. For instance, a visitor interested in coral reefs would like to know which institutions have tanks

having coral reef environments, where exhibits on that specific subject are held, and receive information about the problems and emergencies about these delicate ecosystems.

## **5.5 Media / professional interests**

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### **5.5.1 USER NEEDS**

Another target identified includes the media, meaning mostly television, radio, press, press agencies, journalists and the web. These will be professionals who, thanks to the Aquaring portal, should be able to access useful services for their job. Aquaring will be used by both those who work in media editorial offices and by journalists who write for specialised science publications and free-lance journalists.

The media's primary need is the possibility to access assessed and reliable information on different subjects regarding the aquatic world and to find personal contacts with scientists or professionals to discuss or verify news.

The importance of a reliable, easily and quickly accessible source is especially clear in case of sudden and unforeseeable events such as environmental disasters, sightings or findings of specific animals, beached whales, climatic events, etc. Furthermore, environmental problems and climate changes are under the spotlight of the media which are often in need of expert opinions.

Press operators would like to have access to information which help them in setting up articles on aquatic subjects.

Another need which was pointed out by this target group is to have high quality photographic images which enable journalists to document the different subjects treated in their articles. Television operators need video images and multimedia products. Radio professionals also express the need to find reliable information about the aquatic world.

In all these cases (texts, images, audio and video) the integrity, authenticity and originality of the digital resources available on the portal need to be guaranteed.

For this user category, a critical issue to consider is Copyright policies.

### **5.5.2 USER CASE - POSSIBLE DEVELOPMENT OF THE SCENARIOS**

The Aquaring portal should possibly create channels for the fast diffusion of information with software technologies such as RSS and Instant Messaging, besides newsletters and mailing lists. All these channels will undergo security procedures which guarantee the integrity of the information and the authenticity of the source, allowing also for a quick professional personalisation of the news generated by the portal and fast crosschecking.

The Aquarinig portal would offer up dated and specific information on different subjects such as:

- ✓ The relationship between Man and the sea around the world
- ✓ The Ocean and sustainable development
- ✓ Climate change
- ✓ Waste and Pollution
- ✓ The Ocean in general with its different topics
- ✓ Biodiversity and endangered species
- ✓ Names of species and specific information
- ✓ Habitat related species information
- ✓ Damages and actions

It should be possible to access a data base of press releases concerning the main events and scientific news related to aquatic issues.

To satisfy the need to quickly find an expert to interview, journalists should possibly have access to a list of scientists along with their contact information or specific press offices in structures able to contact the most relevant experts in the various fields.

To respond to the need of high quality pictures, images, audio files, bio-acoustic sounds, video or multimedia products, the media professionals should access a data base of catalogued images along with their description, which might be used upon payment, depending on the providers' decision and according to national and international rules.

In order to avoid early technological obsolescence as well as elaboration problems with ownership software, the contemplated file formats should guarantee an easy use and re-use of the information, as already indicated in Teacher User Needs.

## 6 Requirement extraction and synthesis

This section describes the requirements identified starting from the surveys and the investigation carried out by the partners on the priority target group.

Use Cases analysis (see §6.1) describes the general requirements in relation with the user target needs; the paragraph 6.2, Thematic Areas / User Areas shows the choice that still has to be done between different possible structures of the portal and the following sub-section Complementary Services, (§ 6.3) illustrates the complementary services that could be made available on the portal.

Finally the Requirements Specification (see §6.4) describes specifically how information should be analysed, filtered and presented to the potential Users.

### 6.1 Use Cases analysis

From a general overview of all the requirements, it emerges the need to stress the user interface usability and to include intelligent interaction modalities. The user aims at interacting with a system through a simple and clear interface where the information they are watching for is immediately; but different users have different needs: professionals or teachers have usual more punctual and specific interests than visitors of aquariums and museums, and children needs different kind of information than adults as well as dedicated user interface.

In general, this is not the actual situation with web sites. The user is often forced to discover the solution to her/his problem by navigating in a huge amount of information that is “related” to her/his interest, but not actually match the specific topic of interest. This is especially evident with search engine results.

The possibility to deliver a successful service in the AquaRing addressed field depends on the capability to provide some innovative interaction modality that allows the users to receive answers to their needs, not just an overwhelming amount of data to analyse. This is also the basis for the provision of successful paid services.

There is a need for a system with knowledge management characteristics. All the background information concerning the information resources is very important from the point of view of finding and filtering relevant information. Classification and thesaurus are extremely important.

### 6.2 Thematic Areas / User Areas

At this step of the project it is not possible to identify precisely the thematic areas that will be used to classify and group the types of information the users’ target are interested in.

As we showed before the potential Users of the AquaRing portal are represented by groups with so different characteristic that it is still to decide if will be more proper to set-up a single portal with various thematic areas or dedicated accesses for the different users having specific properties according to the profiles; these should be identified by different passwords, according to the “typical conceptual framework” of each user.

In this second hypothesis each area could be a sort of sub-site that gives a complete view of aquatic and marine domain and allows accessing all related sub-thematics with a dedicated access path.

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### 6.2.1 Free services

- Guided navigation through the information related to the aquatic and marine domain. This is mainly a tutorial tool suitable to achieve an initial knowledge of this field.
- Search of specific information related to the aquatic and marine domain (title and summary of written documents, preview of images; pieces of videos and audios and so on...).
- Contextual link page. Listed links are mainly internal and goes to sections related to the topic displayed at the moment.
- Full copies of free available documents
- Low density images or videos

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### 6.2.2 Paid services

- Full copies of the selected documents, images or videos.
- Access to updated research documents, photos and videos.
- Periodic newsletter summarising updates in a selected thematic or sub-thematic.
- Selected resources monitoring, a service that sends immediate notification when a specific sector (e.g: legislation) has been updated. This is an integration to the periodic newsletter and is much more selective. The user can specify the topic of interest with high precision and a notification is sent as soon as updates are available in the selected sector.
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## 6.3 Complementary Services

In addition to the thematic or users' areas, the web site would offer some other services. These services allow achieving the functionalities required for each thematic area and complementing these functionalities.

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### 6.3.1 Glossary

The use of a common controlled vocabulary is very important in the AquaRing addressed field. Misleading interpretation of terms can completely change the meaning of the

information provided. The Glossary Thematic Area provides information on the meaning of terms used in the AquaRing website in agreement with terminology commonly adopted in the aquatic and marine domain. Information on different meanings of terms in different contexts will be reported and potentially misleading cases will be indicated.

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### 6.3.2 Training

This area should give classified information on training in the AquaRing addressed domain. This includes both internal training tools as well as links to other organisations providing training courses on this issue. The information is organised according to the type and level of the training (courses, seminars, e-learning... initial, expert, professional...) and according to the target topic (aquatic environment, biology, diving...).

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### 6.3.3 Educational Effectiveness Measurement Tools

This area should contain tools to evaluate the educational effectiveness of the information related to the AquaRing addressed domain especially for individual adult users, students and children. This includes both on line tools to evaluate the educational effectiveness of virtual visit of AquaRing portal as well as tools to evaluate the educational effectiveness of real visit of each of the partner structures.

The most important dimensions to be analysed with the purpose to evaluate the educational effectiveness of the visit (either real or virtual) will be:

- learning specific information
- activating a motivation for more knowledge
- activating connections among issues
- activating more conscious life behaviour
- activating more conscious environmental behaviour

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### 6.3.4 Links

This area should give a unified view of information on links to relevant sites in the AquaRing addressed field. Links include addresses of organisations, institutions and companies operating in the fields related to aquatic and marine domain. They are grouped according to the Thematic Areas identified and can be sorted according to keywords, topics and type of organisation.

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### 6.3.5 Forum

A forum will be created with different current subjects related to the AquaRing domain and target groups. At this forum every user can discuss or ask about different subjects. The web site administrators will propose the subjects to debate at the forum and they will act as moderators.

This forum will have free access.

### 6.3.6 User Registration

The new users will always have access to the registration form. On this form the user will indicate her/his personal profile, among personal data, email address and if the user desires to access the paid services. In this last case it will be necessary to indicate the method of payment and all the necessary data.

The site will answer the user with a user name and password. With these data the user will have access to the contents based on her/his profile and in the case the payment option was selected will have access to the paid services.

### 6.3.7 “About this site” Section

At this section, the users can consult the essence of this site. Why was it built? What are its main purposes? Who is the audience?

The text will be shown in English, French, Dutch, Italian, Lithuanian and Spanish.

### 6.3.8 “Who we are” section

At this section, the users can consult information about all the partners involved in the development (all the partners). The information will consist of company name, postal address, telephone and fax number, contact person, email address of the contact person and URL of each partners.

### 6.3.9 Commercial Information Area

Private institutions and companies related to the AquaRing addressed field could inform about products and services offered at this site. A banner will be reserved for that purpose.

### 6.3.10 Web Site Administration

The normal users will not know the URL of the web site administration. Only the AquaRing administrators will know this URL and will have access.

With the administration tool, the AquaRing site administrators will have a private Intranet where to manage the whole web site. This tool will allow the following administrative tasks to be performed:

- User Maintenance, (add, modify and delete) in order to guarantee the privacy protection over the users data.
- Content and Metadata model management, in order to add, modify or delete documents and databases.
- Periodic Newsletter Maintenance,
- Forum Management: maintenance of the forum subjects and to act as a moderator.
- Search Tools management: indexes and metadata model updating.

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## 6.4 Requirements Specification

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Requirements are divided into the following classes: functional requirements, system requirements and update and maintenance requirements.

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### 6.4.1 Functional requirements

These requirements address the way information is provided to the user and the functionality the user can expect from the system. They can be dependent on the thematic area considered.

#### 6.4.1.1 Adaptation to the user

The type of information should match the type of user (private, professional, expert...). The user can specify the level of information required by selecting a standard profile from a list.

#### 6.4.1.2 Semantic based interaction

The system should be able to deal with the specific semantics of the domain, including knowledge of synonyms, classification of terms, relationships among terms and representation of the knowledge of main concepts used.

#### 6.4.1.3 Search help tools

Search help tools including: spelling checker, proposal of a list of synonyms, alternative and related search terms.

The user can refine the search on the current results.

Definition and storage of search criteria to use for future search in other thematic areas.

Provision of “roadmaps” to explore a new topic.

Provision of a list of topics related to the requested search.

#### 6.4.1.4 Controlled Vocabulary

Use of controlled vocabulary (...).

Capability to understand commercial names and synonyms (...).

#### 6.4.1.5 On-line help

Support to the user in the identification of suitable search keys (...).

General information on the system and on the domain.

Description of standard user profiles recognised.

#### 6.4.1.6 Contextual links presentation

A page of best links for the present context is always available.

#### 6.4.1.7 Highlights

In the presented text the following items are always highlighted and linked to the corresponding glossary item:

- words from a vocabulary (selectable)

- words in the glossary
- word from a thesaurus

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## 6.4.2 System requirements

These requirements address the interaction modality of the user and the system. In principle they should be independent on the type of information provided and thus common to all thematic areas.

### 6.4.2.1 Always provide printable documents

A printer friendly page is provided for all topics.

### 6.4.2.2 User friendly

The user interface complies with most advanced usability guidelines and standards, with support for people with disabilities and people not experienced in use of computers. Following the Web Content Accessibility Guidelines from the World Wide Web Consortium (W3C).

A site map will be provided, so the user will have a whole view of the web site without visiting all the thematic areas one by one.

### 6.4.2.3 Coherence in look and feel

The look and feel of the interface follows a common model and approach all over the site to improve readability and reduce time for practicing the navigation.

A model for all the web pages will be defined. This model will observe at least these premises:

- The main links (thematic areas) will always be accessible and positioned in the same place on every page.
- The history navigation tree inside a thematic area will be shown (the path taken inside a thematic area), so the user can navigate through the tree, since each node will be a link to a thematic sub-area already visited.
- Access to the home page will be granted at every page.

### 6.4.2.4 Contextual look and feel

Some graphical details help differentiating the thematic areas in order to help the identification of the topic considered.

### 6.4.2.5 Feedback

The user can always send feedback to the Aquaring organisation through e-mail or feedback forms. This feedback is contextual.

#### 6.4.2.6 Multi-lingual

The basic language supported is English. Contents are always provided in English and in the original language of the content provided. In this case the local navigation is in the content provider language too. A brief introduction to the site is provided in several languages.

#### 6.4.2.7 Speed and reaction time

The user should have the feeling that the system is alive even when the reaction is not immediate. Some kind of progress advance tool must be used to indicate that the system is making a consultation to the database. If any error occurs while accessing to the database the user must be informed about it with a clear message.

#### 6.4.2.8 Privacy protection

The privacy statement must be clearly identifiable and user data collection policy known and approved by the user. The necessary tools will be developed that allow the user to access, modify and cancel its personal data. The user will always be informed about the way of contact (email address, postal address, phone or fax number) to access to its personal data and to expose her/his rights about it.

#### 6.4.2.9 Web Site Marketing

To develop the web pages, their promotion on the Internet must be taken into account, so their design will be adequate for the existing Internet search tools format. The realisation of the crawler and bridge pages will also be taken into account.

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### 6.4.3 Content update and maintenance

The domain addressed by AquaRing is rapidly changing, following scientific and technical advancement. The AquaRing service must reflect this dynamic situation by providing updated information to the users.

All the “Thematic Areas” identified are of interest for this continuous upgrade and maintenance requirement, even if some types of information are changing more slowly.

The provision of rapidly updated information can become an attractive feature for the users and especially for professional users that use the information for their activity. In this case, the user might be interested by a paid service for an update notification. This intelligent service should be able to alert interested users when some relevant update has been delivered.

Some requirement on content update modality and policy are as follows:

#### 6.4.3.1 On-event/periodic update

Two update policies are possible: periodical updates (e.g. each day, each week) or based on events (e.g. when a new law is published). In principle, both these policies must be applied together. The first is useful to maintain the interest of users that can find last news at each update period. The second ensures immediate availability of updated information. This is of critical importance for professional users when dealing with information that can have some type of effect (e.g. new legislation or regulations).

#### 6.4.3.2 Trustable information assumption

The update policy must ensure that the information found on the site at any time is trustable and can be used by professional users for their activity.

#### 6.4.3.3 Easy localisation and access

Users interested in the AquaRing addressed domain might visit the site regularly to know about new information and updates. This is especially true for professional users. Unlike occasional users, they are mainly interested in new information and require having a quick access path to locate the update of their interest. The site must be organised in order to highlight news and updates; to report them in a single “news and update page” that is the starting point for the navigation. News and updates must be classified according to date, thematic area, update type, relevance etc.

#### 6.4.3.4 Selection of the Thematic Area

The main organisation scheme of the AquaRing web site is the User Area or Thematic Area. Users (especially professional) can be interested in only one of them and might require having a selective view of all AquaRing data, limited to the area of their interest. The news and update information should follow this organisation to permit a rapid approach to the information of main interest for the users. Although a general “News and Update” page is necessary at the top level, each User Area or Thematic Area should have its own page focused on what is relevant in the context of that area.

## Grid for identification of users, their objectives and their needs

TYPE OF USERS (0)	PRIORITY (3)	GOALS and OBJECTIVES OF USERS (4)	NEEDS and THEMATICS that correspond to the objectives (5)	SOURCE OF DATA (6)	CRITERIA OF NEEDS			
					LEVEL (7)		COST (8)	
					Simple	Complex	FREE	NOT FREE

(0) proposals for adding new categories at the different levels have to be sent to the WP leader for common discussion)

(1) including universities as research centres.

(2) distinguishing general from specialized media; e.g. CNN vs. Discovery Channel

(3) please give a note from 1 (low priority users) to 3 (high priority users)

(4) e.g. for teachers one of the goals / objectives is "to prepare their courses"

(5) e.g. for the teachers the need corresponding to the goal / objective "to prepare their courses" is "deep informations about .... thematics related to the general national educational program": indicate the thematics

(6) please indicate where the informations about those needs have been founded

(7) please indicate the level of the need / the thematic: "simple" VS "complex"

(8) please indicate if AT THE MOMENT the digital ressource related to the thematic / the service is "free" or "not free"

## Questionnaire for the survey on visitors' needs

### QUESTIONNAIRE ON VISITOR'S NEEDS

*Dear visitor,*

*The Acquario di Genova, in partnership with other European museums and educational institutions, is currently working on creating a system which allows different types of users to access the available digital resources of our current and potential partners.*

*We plan to create an on-line portal dedicated to water and to marine resources which will supply services to different types of users.*

*In order to best address these services making them useful for our visitors, we kindly ask you to answer a few questions that will allow us to create a portal that truly meets our users' needs.*

*Thank you for your kind cooperation,*

*The Aquarium Staff*

1. What resources would you like to find in the on-line portal (written documents, video and audio files, photos and multimedia)? Please tick the box next to each of the following items *if you feel that it corresponds to the information needs and/or your interests*. If not, please do not tick the box.

A MARINE ACTIVITIES AND TECHNOLOGIES

- |     |   |                          |
|-----|---|--------------------------|
| A 1 | Exploitation of marine resources (oceanographic research, aquaculture and fishing, energy and mineral resources...) | <input type="checkbox"/> |
| A 2 | Ship construction and hydraulic engineering (sciences and technologies applied to naval and hydraulic engineering)  | <input type="checkbox"/> |
| A 3 | Navigation and safety at sea  | <input type="checkbox"/> |
| A 4 | Mercantile marine and marine transportation   | <input type="checkbox"/> |
| A 5 | Navy  | <input type="checkbox"/> |

- B     MARINE BIOLOGY – MARINE SCIENCES - ENVIRONMENT
- B 1    Oceanography
- B 2    Marine and geophysical geology
- B 3    Climatology
- B 4    Meteorology and climatology
- B 5    Marine Paleontology
- B 6    Sustainable development and resource preservation
- B 7    Marine biology (microbiology, botanics and zoology)
- B 8    Aquarium sciences
- B 9    Environment and pollution
- C     GENERAL KNOWLEDGE, HOBBIES AND LEISURE ACTIVITIES
- C 1    General knowledge (marine archaeology, marine history and geography, myths and traditions...)
- C 2    Art and literature (design and scale-models, photography, literature, poetry and theatre, painting and drawing...)
- C 3    Sports and leisure activities (diving, yachting, water sports, amateur and professional fishing...)
- D     LEGISLATION, POLITICS, ECONOMY AND SOCIETY
- D 1    Legislation on navigation and marine activities
- D 2    Marine Economy
- D 3    Marine Politics
- D 4    Social sphere (marine professions and professional training, occupation and working conditions...)

Other (specify)

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2. Do you usually use internet to find information on your subjects of interest?
- YES, always
  - YES, sometimes
  - NO, never
3. Do you think you would use the on-line portal dedicated to water and aquatic resources that the Aquarium is developing together with other European partners?
- YES, definitely
  - YES, depending on ease of access and use
  - NO, I don't think so
4. Do you think you would use the on-line portal (multiple answers are possible)
- Before a visit, to book your visit to the Aquarium
  - Before a visit, to acquire information and to prepare for your visit to the Aquarium
  - After a visit, to deepen the knowledge gained during your visit
  - After a visit, to chat with other visitors of the Aquarium
  - After a visit, to give your impressions on your visit to the Aquarium
  - Before and after a visit, to receive news and information on other museums/aquariums/ centres you can visit
5. Would you use the on-line portal to have internet access to other Italian and European Aquariums and Museums?
- YES, definitely
  - YES, depending on ease of access and use
  - NO, I don't think so
6. Among the various kinds of digital resources that will be accessible through the portal, which do you think best correspond to your needs? (multiple answers are possible)
- written documents (word files, pdf, ecc...)
  - Audio
  - Photo
  - Video
  - Multimedia
  - other (specify)\_\_\_\_\_

7. What type of pathway /means of access do you feel would best meet your needs?  
Please order the following items assigning the number 3 to the most satisfying way  
and the number 1 to the least satisfying way.

	access to information on the subjects of interest (i.e. dossiers according to species; dossiers according to habitat etc...)
	possibility to access educational pathways that are pre-constructed on macro-thematic areas (like virtual documentaries)
	possibility to access educational pathways constructed through interaction with an expert.

7. Do you think there are other pathways / means of access that might meet your needs?

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8. What discussion forums do you think are more useful?  
(Please order the following items assigning the number 4 to the most satisfying way  
and the number 1 to the least satisfying way)

	Discussion forum between visitors
	Discussion forum with experts
	Chat sessions with other visitors
	Chat sessions with experts

- 8.1 Do you think there are other discussion areas which you might find useful?

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9. What online booking services do you feel are most useful? (multiple answers are possible)

- services which allow the booking of independent visits to the structure of choice
- services for the booking of guided tours (also on specific themes, according to your specific needs)
- services for the construction of specific user pathways through interaction with an expert
- other (specify) \_\_\_\_\_

*In conclusion, please supply the following information*

10. Age

11. Gender  Male  Female

12. Profession (*please tick the corresponding box*)

Factory worker	<input type="checkbox"/>
Employee	<input type="checkbox"/>
Middle-ranking manager	<input type="checkbox"/>
Manager	<input type="checkbox"/>
Self employed	<input type="checkbox"/>
Freelance	<input type="checkbox"/>
Entrepreneur	<input type="checkbox"/>
Innominate contract worker	<input type="checkbox"/>
Unemployed	<input type="checkbox"/>
Student	<input type="checkbox"/>
Retired	<input type="checkbox"/>
Housewife	<input type="checkbox"/>

13. Do you wish to be contacted by the Aquarium staff when the project's first products are ready to be shown?

YES  NO

If you answered "yes", please write the e-mail address we can contact you at:

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*Thank you for your kind and precious cooperation!*

## Questionnaire for the survey on teachers' needs

### TEACHERS' NEEDS EVALUATION FORM

*Dear Teacher,*

*The Acquario di Genova, in partnership with other European museums and educational institutions, is currently working on creating a system which allows different types of users to access the available digital resources of our current and potential partners.*

*We plan to create an online portal dedicated to water and to marine resources which will supply services to different types of users, with a special attention placed on teachers.*

*Teachers have been singled out among the various target types when defining the needs of the platform users. For this project, then, we feel it is very important to know your personal opinions, needs and suggestions.*

*Please fill out the following form. We are truly interested in your opinions.*

*Thank you for your kind cooperation,*

*The Aquarium Staff*

B. The first elements we wish to investigate with your cooperation are teachers' needs regarding the information they might find on the online portal, with regards to the subjects treated, to the type of digital resources, to the types of pathways.

1. Resources for consultation: please tick the box next to each of the following items *if you feel that it corresponds to the information needs and/or your professional interests*. If not, please do not tick the box.

A Marine activities and technologies

A 1 Exploitation of marine resources (oceanological research, aquaculture and fishing, energy and mineral resources...)

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- |     |  |                          |
|-----|--|--------------------------|
| A 2 | Ship construction and hydraulic engineering (sciences and technologies applied to naval and hydraulic engineering) | <input type="checkbox"/> |
| A 3 | Navigation and safety at sea   | <input type="checkbox"/> |
| A 4 | Mercantile marine and marine transportation  | <input type="checkbox"/> |
| A 5 | Navy   | <input type="checkbox"/> |
|     |  |                          |
| B   | Marine Biology – Marine sciences - Environment   |                          |
| B 1 | Oceanology   | <input type="checkbox"/> |
| B 2 | Marine and geophysical geology   | <input type="checkbox"/> |
| B 3 | Climatology  | <input type="checkbox"/> |
| B 4 | Meteorology  | <input type="checkbox"/> |
| B 5 | Marine Paleontology  | <input type="checkbox"/> |
| B 6 | Oceanography   | <input type="checkbox"/> |
| B 7 | Marine biology (microbiology, botanics and zoology)  | <input type="checkbox"/> |
| B 8 | Aquarium sciences  | <input type="checkbox"/> |
| B 9 | Environment and pollution  | <input type="checkbox"/> |
|     |  |                          |
| C   | General knowledge, hobbies and leisure activities  |                          |
| C 1 | General knowledge (marine archaeology, marine history and geography...)  | <input type="checkbox"/> |
| C 2 | Art and literature (design and scale-models, photography, literature, poetry and theatre, painting and drawing...) | <input type="checkbox"/> |
| C 3 | Sports and leisure activities (yachting, water sports, amateur and professional fishing...)                        | <input type="checkbox"/> |
|     |  |                          |
| D   | Legislation, politics, economy and society   |                          |
| D 1 | Law  | <input type="checkbox"/> |
| D 2 | Marine Economy   | <input type="checkbox"/> |
| D 3 | Marine Politics  | <input type="checkbox"/> |
| D 4 | Social sphere (profession and professional training, occupation and working conditions...)                         | <input type="checkbox"/> |

Other (specify)

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2. What type of digital resource do you feel best meets your needs? (multiple answers are possible)
- written documents
    - Audio
    - Photo
    - Video
    - Multimedia
    - other (specify)\_\_\_\_\_
3. What type of pathway /means of access do you feel would best meet your needs? (multiple answers are possible)
- access to information on the subjects of interest (i.e. dossiers according to species; dossiers according to habitat etc...)
    - possibility to access educational pathways that are pre-constructed on macro-thematic areas
    - possibility to access educational pathways constructed through interaction with an expert.
  - access to tests which evaluate what has been learned on a certain subject
  - other (specify)\_\_\_\_\_
4. What discussion forums do you think are more useful? (multiple answers are possible)
- teachers' forum
    - chats with experts for teachers / students
  - other (specify)\_\_\_\_\_
5. What online booking services do you feel are most useful? (multiple answers are possible)
- services which allow the booking of independent visits to the structure of choice
  - services for the booking of guided tours (also themed visits based on the specific needs of the teachers and students)
  - services for the construction of specific user pathways through interaction with an expert
  - other (specify)\_\_\_\_\_

C. A second element of great interest for this project is the construction of an instrument which allows us to evaluate the teaching efficiency of European aquariums and science museums; to this end, it is essential to identify the range of educational efficiency which must be evaluated in relation to its change after a visit to the exhibition centres and museum.

1. Could you please indicate, on a scale of 1 to 10, how much the following values are relevant to the concept of educational efficiency?

<i>Educational efficiency values</i>	<i>Points</i> <i>(from 1 = not very relevant to 10 = very relevant)</i>
Learning information on specific subjects	
Motivating users to gain a deeper knowledge of subjects	
Activating connections between different subjects	
Activating behaviours which show respect for life	

2. What are some *other fundamental values*, besides the ones listed above, on which we must focus on in order to evaluate the educational efficiency of a visit to the aquarium or to other museums (zoos, science museums, nature reserves, planetariums, etc.)

3. Do you wish to be contacted by the Aquarium staff when the project's first products are ready for evaluation?

YES  NO

If you answered "yes", please write the e-mail address we can contact you at:

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In conclusion, we ask you to indicate the type of school you teach at and the subjects taught:

Type of school:

Subjects taught:

*Thank you for your kind and precious cooperation!*