



**Cultural and historical digital libraries  
dynamically mined from news archives**

# **Domain Specific Validation Scenarios**

<b>Project Reference No.</b>	<b>FP7-215874</b>
<b>Deliverable No.</b>	<b>D7.1: Domain Specific Validation Scenarios</b>
<b>Work package no:</b>	<b>WP7: System testing and user evaluation</b>
<b>Nature:</b>	<b>R (Report)</b>
<b>Dissemination Level:</b>	<b>PU (Public)</b>
<b>Document version:</b>	<b>1</b>
<b>Date:</b>	<b>05/03/2009</b>
<b>Editor(s):</b>	Eirini Mergoupi-Savaidou (NKUA/h), Akrivi Katifori (NKUA/i), Aristorelis Tympas (NKUA/h), Jan Korsten (SHT)
<b>Document description:</b>	This document contains a description of the main functions of the Papyrus platform to be evaluated, as well as the user scenarios to be used in the user evaluation



## History

Version	Date	Reason	Revised by
01	04/03/2009	First Version of Document	Martin Maass, DW
02	05/03/2009	Second Version of Document, after internal review	Akrivi Katifori, NKUA/i Aristorelis Tympas NKUA/h Jan Korsten, SHT Martin Maass, DW

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# Table of Contents

- List of Figures ..... 5
- List of Tables ..... 6
- List of Abbreviations and Terms ..... 7
- Executive Summary ..... 8
- 1. Introduction ..... 9
- 2. Papyrus Users .....10
  - 2.1. Administrators.....10
  - 2.2. News Content Managers .....10
  - 2.3. Ontology Administrators .....10
  - 2.4. End Users .....10
- 3. Papyrus Use Cases and Functionality.....12
  - 3.1. Papyrus Use Cases .....13
  - 3.2. Papyrus Basic Functionality .....14
    - 3.2.1. Ontology Administrator .....14
      - 3.2.1.1 Add concept .....14
      - 3.2.1.2 Add instance.....14
      - 3.2.1.3 Edit concept/instance .....14
      - 3.2.1.4 Approve/reject submitted material .....15
      - 3.2.1.5 Map History and News Ontology entities.....15
      - 3.2.1.6 Initiate content analysis.....15
    - 3.2.2. End user .....15
      - 3.2.2.1 Ontology Browsing .....15
        - 3.2.2.1.1 Ontology Concept View .....15
        - 3.2.2.1.2 Topic/subject View .....16
        - 3.2.2.1.3 Combined history and news ontology view.....16
        - 3.2.2.1.4 Browse ontology within a time period.....16
      - 3.2.2.2 Ontology Querying .....16
        - 3.2.2.2.1 Keyword querying .....16
          - Alternative 1 .....16
          - Alternative 2 .....16
          - Alternative 3 .....16
          - Alternative 4 .....17
          - Alternative 5 .....17
        - 3.2.2.2.2 Querying using predefined query types.....17
      - 3.2.2.3 Save retrieved results.....17
      - 3.2.2.4 Submit new secondary source material.....17

**D7.1: Domain Specific Validation Scenarios**



- 4. User Scenarios.....18
  - 4.1. Ontology Administrator Scenario .....18
  - 4.2. End User Scenarios .....18
    - 4.2.1. Advanced Use Scenario (A) .....18
    - 4.2.2. Intermediate Use Scenario (I) .....19
    - 4.2.3. Beginner Use Scenario (B) .....20
- 5. Conclusions .....21
- 6. References .....22



# List of Figures

Figure 3-1. Overview of Papyrus.....12



## **List of Tables**

Table 2-1 All Papyrus Users and Representative Papyrus Users .....11  
Table 3-1. Overview of Papyrus Use Cases.....13



# **List of Abbreviations and Terms**



## **Executive Summary**

This document presents the main user groups that will be involved in the evaluation of the Papyrus platform, the main functionalities to be tested as well as a set of user scenarios to be used for the user trials.



# 1. Introduction

Evaluating the Papyrus prototype will be a crucial step for the project. Evaluation will provide valuable insight and feedback on the research accomplished, on developed ontologies as well as the user interface and functionalities provided. In order to be successful and provide useful information about the effectiveness of the system, the evaluation must be based on carefully constructed evaluation scenarios. This document aims at providing these scenarios, which are constructed according to the set of functionalities to be tested.

It must be noted that the scenarios presented here will be refined and updated as the project progresses and the foreseen functionalities are designed and implemented. Addressing issues arising alongside the planned incorporation of features that accommodate multilingual Papyrus use and/or make research possible beyond textual archival material (e.g. audio and video) will also enrich the scenarios.

The validation scenarios described here are based on an inclusive definition of the users of Papyrus, both in terms of the level of the user and the area she/he may come from. This definition has been developing in interaction with advances in (findings from) other Papyrus WPs (most notably WP2). At the same time, these validation scenarios benefit from steady progress in the Papyrus Ontologies (WP3), which have provided us with increasingly informative sketches of specific Papyrus-supported researches.

Section 2 provides a description of the main Papyrus user groups. Section 3 provides a brief overview of the Papyrus use cases and the functionalities to be tested during the evaluation stage. Section 4 provides 4 user scenarios, 1 for the ontology administrator and 3 for representative end users. Section 5 concludes this document.



## 2. Papyrus Users

We may distinguish four main user groups for the PAPHYRUS platform depending on their authorization level for content access:

- Administrators
- News Content Managers
- Ontology administrators
- End Users

User groups are presented in more detail in the following sections.

### 2.1. Administrators

*Administrators* have full access rights in the system and are able to manage users and assign rights.

### 2.2. News Content Managers

*News Content Managers* are authorized users that are responsible for adding new content as well as editing the existing one<sup>1</sup>.

Furthermore, when the PAPHYRUS platform is deployed within a News organization, the management of news content will be accomplished through the tools already available for handling the digital material of the organization.

### 2.3. Ontology Administrators

*Ontology Administrators* are domain experts authorized to edit the News and History Ontologies. Users with these rights may be history domain experts for the history ontology and journalists and news archivists for the news ontology.

For the evaluation scenarios we intend to use a representative ontology administrator. Owen is the ontology administrator of Papyrus. He maintains and improves the history ontology of Papyrus.

### 2.4. End Users

*End users* include all those who may take advantage of the PAPHYRUS system for research or recreational learning activities. In respect to the area of use, they may come with an interest in any of the four following areas: Social Sciences and Humanities in general, History (e.g. of science and technology), Journalism (e.g. science and technology journalism) and Science (mathematical, physical and life sciences and engineering). We have also discerned three levels of use: the Advanced/Professional level, the Intermediate level and the Beginner/Amateur level. As far as the users' domains of interest are concerned, we have chosen Biology/Biotechnology, and Climate Change/Energy/Wind Power. For an open domain example, we will take one from Computing.

For the evaluation scenarios we intend to use three representative types of Papyrus users, whose characteristics can provide us with distinct process steps. These characteristics can be separated according to the areas in which the users work, their level of use, and, the domain of their interest.

These three representative users are:

- a) An Advanced/Professional researcher in History of Science and Technology or in Science and Technology Journalism, who is interested in Biology/Biotechnology, named Antonia.

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<sup>1</sup> "Content" in this case includes the news content available from the News Archives.

## D7.1: Domain Specific Validation Scenarios



- b) An Intermediate level researcher, who is a university student in the Mathematical, Physical, Life Science and Engineering or in the Social Sciences and Humanities and is interested in Computing, named Ian.
- c) A Beginner/Amateur researcher, who is a high school student and is interested in Climate Change/Energy/Wind Power, named Betty.

**Table 2-1** All Papyrus Users and Representative Papyrus Users

<b>User Level / Area of use</b>	<b>Advanced/ Professional</b>	<b>Intermediate</b>	<b>Beginner/ amateur</b>
<b>Social Sciences and Humanities in general</b>		Ian	
<b>History (e.g., of science and technology)</b>	Antonia		
<b>Journalism (e.g., science and technology journalism)</b>	Antonia		
<b>Science (mathematical, physical, life sciences and engineering)</b>			Betty

### 3. Papyrus Use Cases and Functionality

The aim of Papyrus is to create a cross-disciplinary digital library and show-case it with the domains of News and History. History researchers, either professionals or amateurs, will be able to access the primary source content (News multimedia content) through a structured view of the secondary material (history).

In Figure 3-1, an overview of Papyrus is presented. On top of the multimedia content, the primary source material, there are News ontologies that serve as its categorization. New multimedia content is mapped to the News ontology off-line with a semi-automatic content analysis process. The News Ontology is managed by authorized users.

The History ontology represents the secondary source material in Papyrus and is also managed by users with the appropriate authorization level. This ontology is mapped to the News one by the ontology administrators. End users looking for either secondary or primary source material on particular historical research topics may browse the ontologies, navigate between them and access through them the primary source material. They may also query the history ontology directly and then either refine their search or view the results in various presentation methods. They may save the results of their queries along with the query that produced them in an appropriate structure.

End users may also submit new material for the history ontology, which the ontology administrators review and reject or approve.

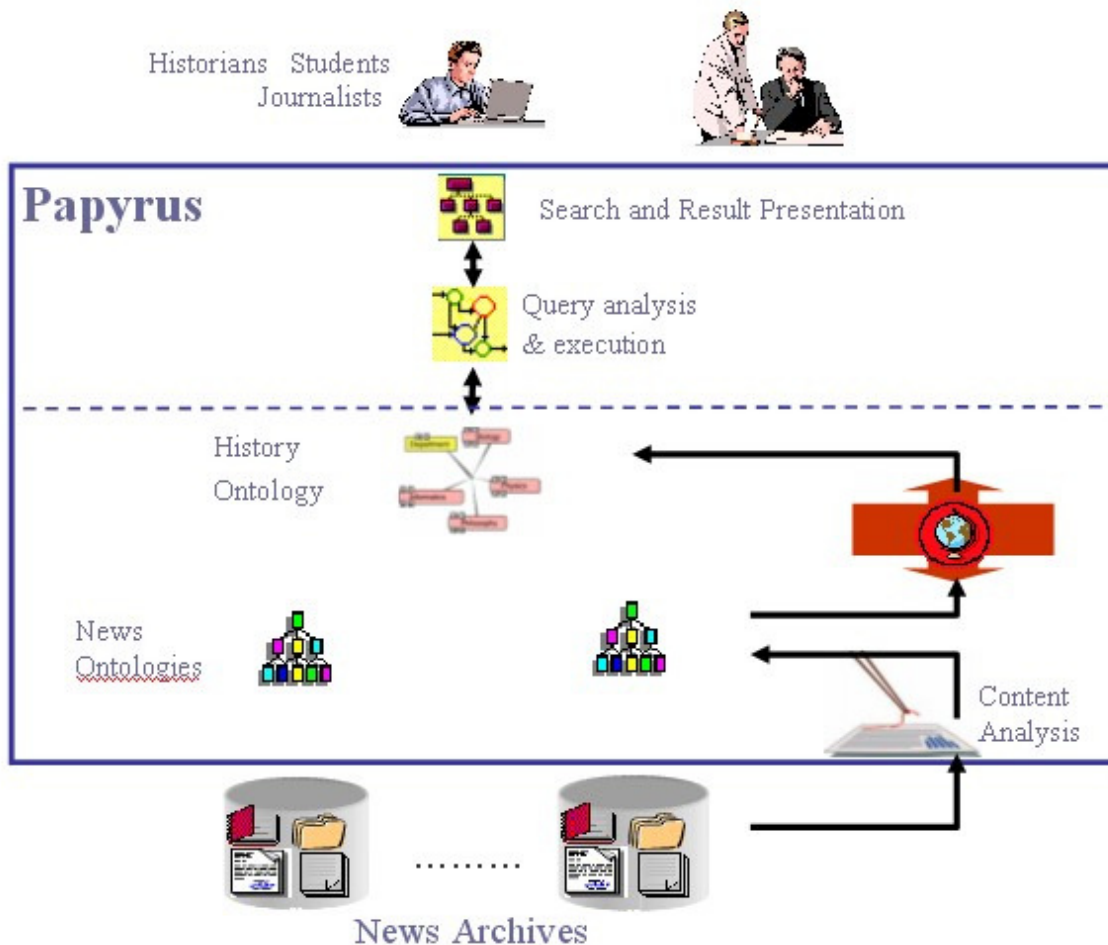


Figure 3-1. Overview of Papyrus



### 3.1. Papyrus Use Cases

This section presents the Papyrus prototype platform use cases as they have been identified after the analysis of user needs. It is certainly expected that the use cases will be refined during the design and implementation processes according to a constant exchange of ideas with the users and will be finalised with the final delivery of the Papyrus system. The identified use cases for accomplishing the Papyrus prototype platform are listed in Table 3-1. UID is the incremental identifier of the use case. For each use case, we present its title, a brief description and the user group that it is applicable.

Not all use cases will be tested in the trial as some are trivial or out of the scope of Papyrus. This is shown in Table 3-1. For more details on the use cases see [1].

**Table 3-1. Overview of Papyrus Use Cases**

<b>UID</b>	<b>User Group</b>	<b>Use Case Title</b>	<b>Use Case Description</b>	<b>To be tested in the user evaluation</b>
1	Administrator	Manage User	The administrator may add, edit and delete users.	No
2	All	Login	Authorized users have to login before performing specific actions	No
3	Content Manager	Manage content	Content Managers may add or remove text and multimedia content	No
4	Ontology Administrator	Manage News Ontology	Ontology Administrators may edit the News Ontology and its instances	Yes
5	Ontology Administrator	Manage History Ontology	Ontology Administrators may edit the History Ontology and its instances	Yes
6	Ontology Administrator	Content Analysis	Ontology Administrators may initiate the automatic analysis of parts of the stored content.	Yes
7	Ontology Administrator	Map History and News Ontology entities	Ontology Administrators may create mappings between classes and instances of the history ontology and the news one. This may be done manually or semi-automatically.	Yes
8	Ontology Administrator	Manage ontology versions	Ontology Administrators may create versions of the News and History Ontology	No
9	All	Browse the History and the News Ontology	All users may browse the ontologies and navigate through the mappings between them and also through them to the multimedia content	Yes
10	All	Query the History Ontology	All users may perform queries to the History Ontology to get relevant ontology classes and instances as	Yes

			well as multimedia content through them.	
11	All	View the search results	All users may navigate within the search results, which may be presented in different ways, according to the needs of the user.	Yes
12	All	Save the search results	All users may save the results of the query as well as the query itself for their personal archive	Yes
13	End user	Submit new secondary source material	The non-authorized users may prepare and propose new content for the history ontology to be approved by ontology administrators.	Yes
14	End User	Register	End users may register to have the right to submit material	No
15	Administrator	Approve user registration	The administrator may approve or reject user registration requests.	No

## **3.2. Papyrus Basic Functionality**

This section presents a list of the functionalities to be tested in the evaluation stage of the Papyrus project. These will be incorporated in usage scenarios to be presented in the following section.

The functionalities are grouped according to the user who is authorized to perform them.

### ***3.2.1. Ontology Administrator***

#### **3.2.1.1 Add concept**

1. The ontology administrator selects the concept creation option.
2. The ontology administrator defines the parent(s) of the concept.
3. The ontology administrator provides the concept name and other information if necessary (definition, properties, etc).
4. The ontology administrator saves the newly created concept.

#### **3.2.1.2 Add instance**

1. The ontology administrator selects the instance creation option.
2. The ontology administrator defines the concept(s) the instance belongs to.
3. The ontology administrator fills in the instance properties.
4. The ontology administrator saves the newly created instance.

#### **3.2.1.3 Edit concept/instance**

1. The ontology administrator finds the concept/instance to be edited, either by searching or browsing the ontology.
2. The ontology administrator edits the concept instance by making corrections or additions or changing property values or relations to other concepts/instances.
3. The ontology administrator saves the changes.

### 3.2.1.4 Approve/reject submitted material

End users may suggest changes to the ontology administrator in two ways:

- By filling in a form, for the addition of new instances or concepts.
- Through a free-text e-mail for other types of suggestions like corrections, structural changes

For the first case the ontology administrator has to follow the following steps:

1. The ontology administrator accesses the list with new submitted instances/concepts.
2. The ontology administrator approves or rejects the suggestions.
3. A e-mail is sent automatically to inform the end user of the status of his/her submission request. The ontology administrator has the option to add a justification for his/her choice to submit or reject the material.

For the second case the ontology administrator has to read the end user suggestions in the e-mail and act accordingly.

### 3.2.1.5 Map History and News Ontology entities

The mapping process is a semi-automatic one, meaning that the ontology administrator may request from Papyrus a set of suggested mappings. Also s/he can edit or directly provide the mappings manually with an appropriate tool.

For the first case, the ontology administrator has to proceed as following:

1. The Ontology Administrator selects the news and history ontology parts to be mapped. S/he may select the whole ontologies if needed.
2. The Ontology Administrator initiates the mapping process.
3. The system analyzes the two ontologies and identifies mappings and matching between them.
4. The Ontology Administrator may review the results.

For the second case, the ontology administrator may directly edit the mappings.

1. The Ontology Administrator may browse the two ontologies and create new mappings.  
The Ontology Administrator may edit or delete mappings.

### 3.2.1.6 Initiate content analysis

1. The Ontology Administrator selects the news content to be analyzed.
2. The Ontology Administrator starts the analysis process.
3. The system analyzes the multimedia content and relates it to ontology concepts and instances.
4. The Ontology Administrator views the analysis results.
5. The Ontology Administrator edits or deletes links between the material and the ontology that have been suggested by the analysis results.
6. The Ontology Administrator may explicitly create new links if necessary.
7. The Ontology Administrator approves the new or edited mappings.

## 3.2.2. End user

### 3.2.2.1 Ontology Browsing

#### 3.2.2.1.1 Ontology Concept View

## **D7.1: Domain Specific Validation Scenarios**

1. The user selects the ontology concept view of either the news or the history ontology.
2. The user is presented with the whole ontology and may browse it.

### **3.2.2.1.2 Topic/subject View**

1. The user selects the topic/subject view of the history ontology.
2. The user is presented with the main 6 topic categories.
3. The user may see the sub-topics of a selected topic.
4. The user may restrict browsing to one of the domains, biotechnology or climate change/renewable energy.
5. The user may view concepts related to the selected sub-topic and domain

### **3.2.2.1.3 Combined history and news ontology view**

1. The user selects to view both the news and the history ontology in the same window, the one beside the other.
2. The user when selecting a concept may view highlighted the related news ontology concepts.

### **3.2.2.1.4 Browse ontology within a time period**

1. The user selects the view option s/he wishes to use for browsing the history ontology.
2. The user selects a time period to restrict presented concepts.
3. Only concepts within the selected time period are visible.

### **3.2.2.2 Ontology Querying**

There are two main options available to the user for querying, simple keyword querying and working with predefined query types.

#### **3.2.2.2.1 Keyword querying**

1. The user submits a keyword.
2. The user reviews the returned results, which are history ontology super-concepts, sub-concepts and related concepts. Concepts are grouped according to their super-concepts. If available the user may see concept history, definitions or related essays, and related news ontology concepts

The following are alternatives of how the user would proceed after conducting the basic keyword querying functionality.

#### **Alternative 1**

1. The user selects one of the returned concepts.
2. The user views related history ontology concepts as well as news ontology concepts, and, (through them) news items..

#### **Alternative 2**

Restrict query with time period:

1. The user selects a concept from the returned results.
2. The user inputs time period of interest.
3. Returned results are constrained within the requested time period.

#### **Alternative 3**

Change of a concept in time/ history of a concept:

## **D7.1: Domain Specific Validation Scenarios**

1. The user selects a concept from the returned results.
2. The user selects the option to view the history of the concept.

### ***Alternative 4***

Restrict query with domain (biotechnology – climate change/renewable energy):

1. The user selects a concept from the returned results
2. The user selects the domain of interest
3. Returned results are related to the selected domain

### ***Alternative 5***

Access news items, through the mappings of the history ontology with the news ontology:

1. The user selects a concept from the returned results
2. The user requests to see related news ontology concepts
3. The user may view related news items to the news ontology concepts, with several options available. Among these are:
  - a. To group news items by:
    - Period
    - Source
    - Specific history ontology concepts (Scientific Disciplines)
    - Specific News Ontology concepts
  - b. To see the selected news ontology concepts highlighted within the news item text

#### ***3.2.2.2 Querying using predefined query types***

1. The user browses the history ontology and selects a concept.
2. The user selects one of the predefined query types ("conceptual change of", "history of", etc), available for this particular concept.
3. The user views the results of the query (with an appropriate visualization if necessary). These results may be related history and news concepts as well as news items, appropriately categorized, according to the query type.

#### **3.2.2.3 Save retrieved results**

The user may save the query that s/he has performed in order to re-submit it in the future.

S/he may also download individual news items if this is allowed by the news provider.

#### **3.2.2.4 Submit new secondary source material**

1. The user selects the option to submit new concept/instance.
2. The user provides the details of the concept/instance and the super-concept(s) (in the case of a concept) or the concept it belongs to (in the case of an instance).

## **4. User Scenarios**

### **4.1. Ontology Administrator Scenario**

Owen is the ontology administrator of Papyrus. His task is to improve and maintain the history ontology of Papyrus. Owen decides about alterations either by responding to patterns of Papyrus use by the end users (internal improvements) or by taking into consideration end user comments submitted to Papyrus about the structure of the history ontology (external improvements).

#### **Scenario 1: Internal Improvements (Internally Induced Improvements)**

Owen enters Papyrus and checks the patterns of queries that are favoured by the end users. He observes that some History Ontology concepts (from different clusters) are usually used together by the end users when querying Papyrus. In this case, he notices that queries about "utopias" in the coverage of the domains under study also involve queries about 'metaphors and analogies'. He then decides to reshuffle the clusters of concepts so as to place the above two under the same cluster. Later, Owen observes that the end users employ very frequently the keyword "debate" when asking for results on climate change. Owen decides to 'elevate' this keyword into a History Ontology concept for the Climate Change domain.

#### **Scenario 2: External Improvements (Externally Induced Improvements)**

The advance of the historical study of science and technology brings along reclassifications of the History of Science (HSS) and the History of Technology (SHOT) societies. Let us recall that the HSS and SHOT classifications have been used in the initial version of the Papyrus History Ontology. Owen accordingly uses some of these reclassifications to adjust the Papyrus History Ontology to the advance of historical scholarship.

## **4.2. End User Scenarios**

This section presents 3 end user scenarios that include the Papyrus functionality to be tested. The three representative end user types, as defined in section 2.4 are used.

These scenarios will be tested during the trials at the final stage of the Papyrus project, the user evaluation.

### ***4.2.1. Advanced Use Scenario (A)***

#### **Advanced researcher in the History of Science and Technology (Biology/Biotechnology)**

Antonia, an advanced researcher on history of science and technology, is preparing an academic paper on the history of cloning. By using Papyrus, she is expecting to enrich her research with information about the social meaning and the discussions on ethics raised by cloning experiments, as well as with information about the way media covered this topic.

1. Antonia enters Papyrus and starts her research by typing the keyword "cloning". Papyrus returns results about this query in two windows, the one beside the other, which correspond to the history ontology and the news ontology. These results are super-concepts and sub-concepts, such as "experiments and experimentation" (super-concept), and "human cloning", "animal cloning", "gene cloning", "therapeutic cloning", "experimental cloning" etc (sub-concepts). Antonia chooses to see the definitions of these super- and sub-concepts. She can also view an essay on the history of biotechnology, which is provided as a property of the term "Biotechnology, in order to understand to what extent and from which point henceforth has cloning been part of biotechnological research. An essay on the history of a chosen domain (in this case on the history of biotechnology) is an overview article based on a set of

## D7.1: Domain Specific Validation Scenarios



articles that include as many of the super-concepts as possible and it includes references to these articles. The articles are also written by specialists in the history of this domain..

2. Antonia asks for related concepts to "cloning". Papyrus presents her with related concepts from history and news ontologies, grouped according to their super-concepts. For example, related concepts in the history ontology may be "biotechnology", "genetics", "genetic engineering", which are grouped under the super concept "academic disciplines". In the news ontology, related concepts to "cloning" may be "health", "treatment", "therapeutics", which are also related to the history ontology super concept "research and development". Then Antonia can view the groups of concepts and gets an idea of the variety of historical topics cloning is related to.
3. Antonia is interested mostly in ethics and the social impact of cloning experiments, so she can explore more deeply the "science and ethics" group of concepts from the history ontology. She selects some of these concepts, such as "human experimentation" and "bioethics", in combination with "cloning" and asks to survey news items that dealt with the ethical dimensions of cloning.
4. One of the topics that concerns Antonia for her research is modes of popularization that media used in respect to cloning. She selects concepts of the group of popularization in combination with "cloning" and sees that media used "therapeutic" and "experimental" cloning not only to make a language distinction between them but also as a contrasting pair in order to suggest positive or negative connotations of cloning. Antonia inserts "therapeutic cloning and experimental cloning" as a key phrase and asks to see specific news items that include this contrasting pair of concepts, in order to watch more closely the language and conceptual context of media discourse when dealing with cloning.
5. According to the period she focuses on, Antonia refines her search about news items on cloning by defining a specific time period.
6. Antonia views news items of interest using the news content presentation tools offered by Papyrus, created to accommodate the different requirements of textual and audiovisual material.

### **4.2.2. Intermediate Use Scenario (I)**

#### **University student who is a researcher of an intermediate level concerning a topic on Computing**

Ian is a university student in computer science and engineering who prepares a term paper on the history of artificial intelligence. By using Papyrus, he is expecting to undertake research in digitized news agency archives in an efficient and engaging manner.

1. Ian enters Papyrus and inserts the key phrase "artificial intelligence". For the history ontology, Papyrus shows an essay on the history of computing that is provided in the "history" property of the term. This essay presents changes in the history of the public image of artificial intelligence. This essay informs Ian that what is now called "artificial intelligence" was expressed in the past by terms such as "electronic brain" or "mechanical brain". These term changes are all presented in a visual form.
2. Ian also browses the history ontology of Papyrus viewing the super concepts, sub-concepts and related concepts. Furthermore, he sees a relevant secondary bibliography and links to professional websites which he uses to further follow up this topic.
3. For the news ontology, Papyrus returns related concepts to "artificial intelligence" as well as hundreds of news item results from the news archives referring to "artificial intelligence". Concerning the news items, Ian refines his search, since he is interested only in the history of artificial intelligence and not in its current state. To do so, he inserts "electronic brain" and

## D7.1: Domain Specific Validation Scenarios



"mechanical brain" as key phrases and gets more relevant results (i.e. news items). These results show that items on "mechanical brains" and "electronic brains" were teeming with the word "progress". "Progress" is a history ontology concept, linked to others and Ian decides to follow this lead in order to widen his understanding.

4. Ian goes back to the news ontology inserting his newly found concepts as keywords. This search yields even more rich results. Ian asks for the words appearing more frequently in conjunction with "brains". The word "robot" is one of them. Ian uses it for even more specialized research.

### **4.2.3. Beginner Use Scenario (B)**

#### **High school student prepares an essay on Wind Energy, as an amateur researcher in the domain of the Climate Change**

Betty is a high school student preparing a school presentation on wind energy. By using Papyrus she is expecting to get a general idea about this topic as well as some specific information to use for her presentation.

1. Betty enters the history ontology of Papyrus and submits the concept "wind energy" as a key phrase. Papyrus presents her with a definition of "wind energy", as well as the history ontology structure of the Climate Change domain that she can browse.
2. Browsing the history ontology, Betty finds an essay discussing how the concept of "climate change" replaced former concepts (such as "greenhouse effect" and "global warming") that had almost the same meaning in the debate. Betty uses this information in order to prepare the introduction for her presentation.
3. In order to take valuable information for the main part of her presentation, Betty enters "wind energy" as a key phrase. Papyrus returns results from the history and news ontology in two different windows, the one beside the other. These results are super concepts, such as "environmental history", "alternative energy" and "renewable energy", sub-concepts, such as "wind energy plant", and related concepts, such as "wind power", "windmills", "wind farms", "wind parks", "offshore wind parks", "solar energy", etc. Betty sees the definitions of these concepts. She selects some of them and asks Papyrus to return more related concepts in order to incorporate them in her presentation, after understanding by their definitions what they are about.

Since Betty wants to enrich her presentation on wind energy with the media perspective, she inserts some of the relevant concepts she had already come about, asking Papyrus to return results of news items. To her convenience, she chooses these news items to be presented with the related concepts highlighted in the text.



## **5. Conclusions**

This document has presented main user scenarios to be used during the evaluation stage of the Papyrus prototype. These will be updated and refined as the project progresses and at a later stage they will be combined with the appropriate methods and metrics necessary for a formal evaluation. Clearly, such refinement will result from advances made in other Papyrus WPs, which will suggest more concretely defined Papyrus use paths.



## **6. References**

[1] Papyrus project deliverable D2.2 User Requirements Specification