

## **ECP-2007-EDU-427015/Share.TEC**

**Share.TEC**

# **First Project Workshop**

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***eContentplus***

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<sup>1</sup> OJ L 79, 24.3.2005, p. 1.

**Abstract (for dissemination):**

The First Share.TEC workshop “*Representing Teacher Education With Ontologies: Towards a Multicultural Dimension*” (Venice Italy, January 21-24, 2009) was organized with the objective of engaging international experts in a focused discussion and analysis of an ontology of Teacher Education (TE) and metadata modelling for digital TE resources. The aim was to gain insights for validating initial project outputs from WP2 (the Teacher Education Ontology and the Common Metadata Model) and to obtain useful feedback about the proposed Share.TEC system in general, especially regarding semantic, linguistic/cultural and technical interoperability. For this purpose, a pool of external experts was recruited and prepared for the onsite workshop, where they engaged with the consortium, providing critical input. This deliverable reports on the workshop and its outcomes, providing a summary of discussions, response to the key issues raised, and reports from experts.

**Keyword List: ontology, metadata model, teacher education**

<b>1.</b>	<b>EXECUTIVE SUMMARY .....</b>	<b>3</b>
<b>2.</b>	<b>WORKSHOP PREPARATION.....</b>	<b>4</b>
2.1.	RECRUITMENT & PREPARATION OF EXTERNAL EXPERTS .....	4
2.2.	WORKSHOP AGENDA .....	5
<b>3.</b>	<b>THEMES &amp; ISSUES OF WORKSHOP DISCUSSIONS, PROJECT RESPONSE.....</b>	<b>5</b>
<b>4.</b>	<b>POST-WORKSHOP FEEDBACK FROM EXTERNAL EXPERTS.....</b>	<b>13</b>
<b>5.</b>	<b>VIDEO INTERVIEWS WITH EXTERNAL EXPERTS (STOCKHOLM UNIVERSITY).....</b>	<b>15</b>
<b>6.</b>	<b>POST-WORKSHOP QUESTIONNAIRE (CENEC).....</b>	<b>15</b>
<b>7.</b>	<b>CONCLUSIVE REFLECTIONS.....</b>	<b>17</b>
<b>8.</b>	<b>REFERENCES.....</b>	<b>18</b>
	<b>APPENDIX 1: WORKSHOP AGENDA .....</b>	<b>20</b>
	<b>APPENDIX 2: WORKSHOP ANNOUNCEMENT &amp; OVERVIEW.....</b>	<b>23</b>
	<b>APPENDIX 3: WORKSHOP PARTICIPANT LIST.....</b>	<b>25</b>
	<b>APPENDIX 4: INVITED EXPERTS: PERSONAL PROFILES &amp; SUPPORT .....</b>	<b>27</b>
	PERSONAL PROFILES .....	27
	SUPPORT.....	29
	<b>APPENDIX 5: PROJECT MEETING MINUTES.....</b>	<b>31</b>
	<b>APPENDIX 6: GENERAL SCENARIOS FROM THE SHARE.TEC DESCRIPTION OF WORK ...</b>	<b>34</b>

<b>APPENDIX 7: NOTES ON THE RELATIONSHIP BETWEEN TEO, THE COMMON METADATA MODEL AND THE REST OF THE ARCHITECTURE .....</b>	<b>38</b>
<b>APPENDIX 8: EXPERTS' FEEDBACK REPORTS.....</b>	<b>43</b>
1. MARIA TERESA PAZIENZA (UNIVERSITÀ TOR VERGATA, ROME, IT) .....	43
2. DECLAN O'SULLIVAN - TRINITY COLLEGE DUBLIN, IE.....	46
3. MONIQUE GRANDBASTIEN - UNIVERSITÉ POINCARÉ NANCY1, FR .....	47
4. CONOR GALVIN - UNIVERSITY COLLEGE DUBLIN, IE.....	51
<b>APPENDIX 9: DOCUMENTS PRESENTED AND PRODUCED AT THE WORKSHOP .....</b>	<b>52</b>
INTRODUCTION TO THE SHARE.TEC PROJECT .....	53
OVERVIEW OF TEACHER EDUCATION ONTOLOGY .....	53
OVERVIEW OF COMMON METADATA MODEL & ITS RELATIONS WITH TEO (OUNL) .....	53
CONOR GALVIN FEEDBACK.....	53
PRESENTATION OF KEY ISSUES AS SEEN FROM INSIDE THE CONSORTIUM – TEO & CMM (ITD & OUNL) .....	53
REFLECTIONS ON TEO AND CMM (UVA).....	53
ONTOLOGY AND METADATA MODEL & IMPACT ON INTEROPERABILITY OF THE FEDERATED SYSTEM (OUNL) .....	53
ONTOLOGY AND METADATA MODEL & IMPACT ON SYSTEM ARCHITECTURE (UVA).....	53
ONTOLOGY AND METADATA MODEL & IMPACT ON PROPOSED USER FUNCTIONALITIES AND INTERFACE (NIS-SU) .....	53
GROUP SESSIONS REPORT: GROUP 1 SLIDES.....	53
GROUP SESSIONS REPORT: GROUP 1 MINUTES .....	53
GROUP SESSIONS REPORT: GROUP 2 SLIDES.....	53
GROUP SESSIONS REPORT: GROUP 2 MINUTES .....	53
SCENARIO MODEL (NIS-SU) .....	53
USE CASE MODEL (NIS-SU) .....	53
GILBERT PAQUETTE PRESENTATION - "COMPETENCIES: AN ONTOLOGY, ITS DEVELOPMENT AND USE" .....	53

## 1. Executive summary

The First Share.TEC workshop “*Representing Teacher Education With Ontologies: Towards a Multicultural Dimension*” (Venice Italy, January 21-24, 2009) was the first in a series of three workshops to be held during the lifetime of the project. These workshops represent strategic milestones for cycles of validation/evaluation and for project dissemination<sup>2</sup>.

Organised by ITD-CNR, the first workshop was held in month eight of the project. The main objective of the event was to engage international experts in a focused discussion and analysis of an ontology of Teacher Education and metadata modelling for digital TE resources. The aim was to gain insights for validating initial project outputs from WP2 (the Teacher Education Ontology and the Common Metadata Model) and to obtain useful feedback about the proposed Share.TEC system in general, especially regarding semantic, linguistic/cultural and technical interoperability. Consolidation of contacts with a community of experts in the field was also of special importance in laying foundations for dissemination efforts.

Together with Share.TEC partner team members, the project evaluator and one official (the EC project officer), the workshop was attended by external experts<sup>3</sup> with specific expertise in the topics initially proposed for investigation, namely:

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<sup>2</sup> Detailed information on project organization and dissemination events is included in the “Description of Work” (see Appendix 4, Supporting Documentation)

<sup>3</sup> The complete list of participants is provided in Appendix 3.

- Ontological knowledge representation
- Competency modelling in Teacher Education (TE)
- Metadata for effective brokerage of TE-dedicated resources
- Terminology in the TE field across Europe
- Experiential annotation of digital resources
- Building trust for resource reuse in a multicultural TE community
- Ontology development lifecycle.

This deliverable reports on the preparatory groundwork undertaken (Section 2), describes the main issues addressed and the consortium's stance on those matters (Section 3), collects and analyses experts' input and feedback (Sections 3-6), and provides some reflections about the outcome of the event (Section 7). References are given in Section 8, while the documentation related to the event is contained in the Appendixes as follows:

- Appendix 1: Workshop agenda
- Appendix 2: Workshop announcement & overview
- Appendix 3: Workshop participant list
- Appendix 4: Invited experts: personal profiles and support
- Appendix 5: Project meeting minutes
- Appendix 6: General scenarios from the Share.TEC Technical Annex
- Appendix 7: Notes on the relationship between TEO, the Common Metadata Model and the rest of the architecture
- Appendix 8: Experts' feedback reports
- Appendix 9: Documents presented and produced at the workshop

## 2. Workshop preparation

### 2.1. Recruitment & Preparation of External Experts

Identification of suitable international experts for the workshop coincided with recruitment of representatives to the Share.TEC Advisory Board. Members of the Board with specific expertise in ontologies, metadata, and digital resources for TE were invited to attend. Seven of these accepted the invitation (for experts' personal profiles, see Appendix 4).

- Conor Galvin - University College Dublin, IE
- Monique Grandbastien - Université Poincaré Nancy1, FR
- Vittorio Midoro - ITD-CNR, IT
- Declan O'Sullivan - Trinity College Dublin, IE
- Maria Teresa Pazienza - Università Tor Vergata, Rome, IT
- Gilbert Paquette - LICEF, Télé-université Montreal, CA
- Lampros Stergioulas - Brunel University, UK

To help experts gain an understanding of the project and its initial outputs, a set of suitable reference material was identified and made available on a social networking space specially

set up on the NING platform<sup>4</sup> (for details, see Appendix 4). As well as providing easy access to the documentation, this space was intended as an opportunity for online socialisation and support.

In preparation for the workshop, the experts were requested to draw on the reference material and, in the light of their professional expertise, (a) reflect on what they considered were the critical issues to be addressed and (b) make proposals on how these might best be tackled in the project.

Various means were proposed for the experts to express their standpoints within the scope of the workshop. An initial feedback session was scheduled (see Appendix 1: Workshop agenda) in which experts could adopt the approach they favoured most: slide presentation, oral presentation, point-by-point debate. As well as taking an active part in subsequent workshop discussion and activities (see Section 3), each expert was also asked to take part in an individual video interview (see Section 5) and to provide a brief post-workshop report (See Appendix 8).

## 2.2. Workshop agenda

An initial workshop announcement and overview was distributed to invited experts and the consortium in the final months of 2008 (see Appendix 2). Subsequently, in the run-up to the workshop, ITD-CNR proposed an initial agenda that was refined in a process of ongoing negotiation with both project partners and external experts (see Appendix 1) . Moreover, this was adjusted “runtime” during the course of the workshop itself in order to respond to emerging needs and maximise experts’ input (see Section 7) .

## 3. Themes & issues of workshop discussions, project response

This section seeks to report a synthesis of workshop discussion in terms of key issues related to the general themes that emerged during sessions. Each of the identified issues is presented in a brief *description*, and includes references to the *source* of the discussion (with particular regard for input from the invited experts), a summary of the *consortium position* on the matter/s in question, and notes on any *outstanding and/or critical aspects* to be taken into consideration. It should be noted that, in a number of cases, consortium consensus on project positions has been reached directly as a result of the workshop discussions and in this sense can be considered as tangible workshop outcomes.

The four general themes that have been identified are *Teacher Education Ontology*, *Common Metadata Model*, *meeting end user requirements*, and *digital contents & metadata markup*. These same themes have also been adopted for analysis of the experts’ post-workshop feedback reports (see Section 4). Identification of these themes was based on post-workshop examination of notes taken during session discussions, of partners’ presentations, of documents produced during the workshop, and of experts post-workshop feedback (see list of contents, pages 2-3).

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<sup>4</sup> <http://sharetec-venice-workshop.ning.com> This is a private area. To login use the following *Username*: ecsharetec@gmail.com *Password*: 8partners.

## **THEME I. Teacher Education Ontology (TEO)**

### ***I.I - TEO's scope & degree of detail***

**Description:** A key question is how much information to include in TEO and at what level of detail.

**Source for issue:**

Notes from workshop discussion (Thurs. morning session)

- the scope of the knowledge represented and the degree of detail should be governed by the purposes that the ontology is to fulfil within the Share.TEC system (M.T. Pazienza).
- services should define concept granularity and inferences (V. Midoro).

Appendix 9:

- Overview of Teacher Education Ontology
- Presentation of key issues as seen from inside the consortium – TEO & CMM (ITD & OUNL)

**Project position:** The scope and depth of TEO is a response to the perceived need to cater for heterogeneity in describing digital contents and Share.TEC users. The required complexity of description will emerge from the development of detailed use cases (see point *III.I - Definition of user-level services*). For the present, a policy of “adequate bandwidth” is being followed, while recognising that the degree of detail captured by TEO will need to respond to feedback from user testing.

**Critical aspects:** representation of competencies (see point *I.IV – Competencies in the Share.TEC system*)

### ***I.II - TEO's multicultural dimension***

**Description:** there is a strong need to validate TEO's multicultural dimension.

**Source for issue:**

Notes from workshop discussion (Thurs. morning session)

- end-user validation is vital, especially for building consensus on TEO in the TE community (M.T. Pazienza, D. O'Sullivan, G. Paquette)
- separate language/cultural & conceptual issues (M. Grandbastien)

Appendix 9:

- Overview of Teacher Education Ontology
- Presentation of key issues as seen from inside the consortium – TEO & CMM (ITD & OUNL)

**Project position:** Firstly, issues that partners raise when developing their culturally-embedded levels of TEO are being addressed. End-user validation is foreseen as part of a validation cycle centred on the second project workshop (Month 14), which will also seek to validate the Multicultural Metadata Model.

**Open aspects:** policy on TEO lifecycle management, relationship between TEO and user folksonomies

### ***I.III - TEO's role in the Share.TEC system***

**Description:** How will the ontology support system services? What reasoning capabilities are called for?

**Source for issue:**

Notes from workshop discussion (Thurs. afternoon parallel session)

- couple LOM federated/harvesting search with ontology-based retrieval (G. Paquette)
- identify type of reasoning to be performed (M. Grandbastien)

Appendix 9:

- Overview of Teacher Education Ontology
- Presentation of key issues as seen from inside the consortium – TEO & CMM (ITD & OUNL)
- Ontology and metadata model & impact on system architecture (UVA)
- Ontology and metadata model & impact on proposed user functionalities and interface (NIS-SU)

**Project position:** As well as providing a facility for browsing resources (as in Metadata for Architectural Contents in Europe - MACE)<sup>5</sup>, TEO will also inform services with reasoning capabilities aimed at providing the basis for semantic search, recommending functionality, etc. To do so, inferences will need to be performed on TEO class hierarchies and properties which represent information (such as contextual information) that significantly affects the query engine and user interface; clearly such inferences cannot be performed on the metadata alone. While “reference” elements of the CMM (such as title, contributor, language, etc) are derived directly from LOM for interoperability, other contextual, content-related and pedagogical elements (and their vocabularies) should be derived from ontology branches and be integrated into the CMM. Some TEO elements do not, strictly speaking, correspond to metadata to be used to characterize digital resources, so they will not be represented in the CMM; we should therefore identify the kind of representation they will have in the Share.TEC system and the related requirements imposed on the system architecture (see Appendix 7).

**Open aspects:** implementation in Share.TEC architecture

### ***I.IV - Competencies in the Share.TEC system***

**Description:** What role can competency modelling play in a large scale metadata repository like Share.TEC. Is it too complex for a multicultural context?

**Source for issue:**

Notes from workshop discussion (Thurs. morning session)

- doubts on applicability to large scale resource repository (M. Grandbastien)
- TEO vs. Paquette's competency model - performance element missing (could be added later), levels generalised (G. Paquette)
- functional & behavioural competencies may need to be combined in TEO (G. Paquette)

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<sup>5</sup> <http://www.mace-project.eu/>

- application of general models to specific domain is difficult (V. Midoro)
- consider a “background” role for competencies in system (C. Galvin)
- multicultural dimension is a difficult challenge (G. Paquette, M.T. Pazienza, M. Grandbastien)
- competency terms require clear explanation, especially in multicultural setting (G. Paquette)

#### Appendix 9:

- Overview of Teacher Education Ontology
- Presentation of key issues as seen from inside the consortium – TEO & CMM (ITD & OUNL)
- Gilbert Paquette presentation - “Competencies: An Ontology, its Development and Use”

**Project position:** Competency modelling in TEO does not aspire to human resource management within a clearly defined context, but (more simply) to allow human and digital resources to be attributed competency characterisation: i.e. a content item is declared to address a certain competency at a certain level; an actor’s declared experience includes acquisition of a certain competency at a certain level. Accordingly, TEO adopts part but not all of Paquette’s model (“Generic Skill associated with a Knowledge Element”): the performance dimension is not included. Functional & Behavioural Competencies are to be combined in TEO for the purposes of clarity and simplification.

**Critical aspects:** In order to commit to competency representation, users need clear explanation of the terms adopted, especially given Share.TEC’s multicultural nature. The soundness of TEO’s multicultural approach must necessarily be validated by end-users (see point *III.II– Fostering end user involvement*)

## THEME II. Common Metadata Model (CMM)

### *II.I - Common Metadata Model*

**Description:** What elements should be mandatory? What elements should have a closed list of values? How should such lists be determined? Will multiple values be allowed for elements?

#### **Source for issue:**

Notes from workshop discussion (Thurs. morning session):

- CMM documentation currently contains ambiguities, inc. on mandatory elements. These must also be uniform across languages (M.T. Pazienza).
- quality of LOM data in repositories often doubtful (D. O’Sullivan).

#### Appendix 9:

- Overview of Common Metadata Model & its relations with TEO (OUNL)
- Presentation of key issues as seen from inside the consortium – TEO & CMM (ITD & OUNL)

**Project position:** A review is to be carried out of what fields in the CMM need to be mandatory. Lists of closed values are to emerge from TEO-CMM integration (see point *II.II - Common Metadata Model & its relations with TEO*).

**Critical aspects:** The number of mandatory fields will impact on metadata generation effort (see theme IV. Digital Contents & Metadata Markup).



**Open aspects:** The possibility of multiple values is to be decided.

## *II.II - Common Metadata Model & its relations with TEO*

**Description:** The relationship between CMM and TEO is unclear: there are currently mismatches and ambiguities.

### **Source for issue:**

Notes from workshop discussion (Thurs. morning session):

- CMM-TEO mapping extremely important for project success (MT Paziienza)
- careful not to miss TEO elements in CMM; both should be based on user requirements (D. O’Sullivan)
- TEO fundamental for content description and CMM; consider TEO plus a LOM ontology, with resources as instances of both (G. Paquette)
- CMM should reflect TEO (V. Midoro)

Appendix 9:

- Overview of Common Metadata Model & its relations with TEO (OUNL)
- Presentation of key issues as seen from inside the consortium – TEO & CMM (ITD & OUNL)
- Reflections on TEO and CMM (UVA)

**Project position:** There is dual need to allow: (a) semantic interoperability between different repositories’ metadata (for harvesting/federation purposes) (b) expressive, TE-relevant description of Share.TEC resources (both digital contents and Share.TEC actors) for search/retrieval.

The subset of LOM in CMM should be suitable for metadata “shipping” for harvesting/federation purposes. To gain TE expressiveness, CMM will integrate content-related, educational and contextual metadata derived from TEO (especially from the DigitalContent branch); these will be included either in CMM Category 9 or in CMM Category 10. Likewise, terms proposed in CMM will be adopted/integrated in TEO classes and properties where applicable (see Appendix 7).

**Critical aspects:** Use of TEO for describing (consortium) content items (see point *I.III*); metadata markup effort (see theme IV); quality of harvested LOM metadata.

## **THEME III. MEETING END USER REQUIREMENTS**

### *III.I - Definition of user-level services*

**Description:** A clearer definition of user-level services is required to ensure that Share.TEC responds suitably to end-user requirements. Development of detailed, comprehensive use cases was proposed by the experts as a suitable approach for defining user-level services.

### **Source for issue:**

Notes from workshop discussion (Thurs. morning session):

- need to adopt use cases for defining actual needs (metadata) and services, for support in rapid prototyping with end user involvement (D. O’Sullivan)
- use cases for tuning the ontology and CMM (G. Paquette, D. O’Sullivan)
- use cases for deciding what kind of reasoning to perform (M. Grandbastien)

Appendix 5: Project meeting minutes

Appendix 6: General scenarios from the Share.TEC Technical Annex

Appendix 9:

- Group sessions report: Group 1 slides
- Group sessions report: Group 1 minutes
- Group sessions report: Group 2 slides
- Group sessions report: Group 2 minutes
- Scenario model (NIS-SU)
- Use case model (NIS-SU)

**Project position:** In response to the experts' proposal, two immediate steps were taken at the workshop: (a) Friday afternoon sessions were given over to activities dedicated specifically to laying the foundations for use cases development; (b) a special consortium meeting was held Thurs. evening to examine how use case development could be incorporated into the project work plan.

Two differing interpretations of “use cases” were identified: informal descriptions of the (expected) tasks the user will perform when using the system; and formal definitions of system processes as proposed in software engineering. In the effort to reach a definition of “use case” that strikes a balance between expressiveness and formality suited to project needs, a model was proposed from the TENCompetence project (see Appendix 9). This comprises structured narrative scenarios describing a sequence of user actions in general terms, from which are derived a series of structured use cases, each describing a specific system function related to a specific task. Each use case comprises title, abstract, actors, reference scenario, description of system-supported action.

During Friday morning parallel sessions, two work groups drew on the original scenarios outlined in the Description of Work (see Appendix 6) and sought to develop from these an initial set of user tasks that could subsequently be developed into use cases. Attention focused on three scenarios, which can be summarised thus:

- **Scenario: a teacher educator looking for material**
  - search: filtering by key parameters (validated by end users), perform advanced search, receive recommendations, view result list with items showing icons, statistics, etc.
  - browse (ontology based)
  - keep informed and updated via the system
  - find out what is possible and how to do it
- **Scenario: a teacher educator sharing experience about content**
  - add user rating/feedback (quantitative & qualitative)
  - add context of use
  - identify user with common interest
  - state personal information to share
- **Scenario: a teacher educator searching for other teacher educators using Share.TEC**
  - person/profile search (by competencies, context, country, educational context, activeness, related resources)
  - state personal information to share
  - get information about the availability and accessibility of a person (online, homepage, etc.)
  - visualize and navigate a community network

- keep informed and updated via the system.

In addition, some general portal services were outlined, including optional login-out/registration, basic search, personalization, profile, notification, social window, personal homepage with bookmarking, etc. Output from the parallel sessions is reported in Appendix 9.

At the special consortium meeting mentioned above, an action plan was agreed for incorporating use case development into project activities (see Appendix 5). In accordance with the presented model, use case development will entail (a) identifying a set of general scenarios; (b) completing each scenario with structured data, including a narrative description of tasks; (c) developing each task into a use case.

### ***III.II– Fostering end user involvement***

**Description:** How can the consortium ensure that design and development decisions are informed and guided by the real needs of the European Teacher Education community? Experts propose engaging end-users closely in development and validation of the prototype Share.TEC system.

#### **Source for issue:**

Notes from workshop discussion (Thurs. morning session):

- start with end-user communities to ensure sustainability and response to actual TE needs (C. Galvin)
- user involvement for validation of taxonomy and for prototyping (D. O’Sullivan, G. Paquette, M.T. Paziienza)
- user involvement for building common vision/understanding in TE community (L. Stergioulas)
- more validation checkpoints with community needed (M. Grandbastien)

Appendix 5: Project meeting minutes

**Project position:** Steps are being taken to engage end-users more directly. As agreed in the project meeting (see Appendix 5), a group of Teacher Educators will be engaged by CENEC and UVA in use case development. During definition of the prototype, end-users are also to be engaged using a dummy or mock-up of the system, as suggested by the experts. Validation is also foreseen as part of the second project workshop.

**Critical aspects:** Activating Teacher Education communities across Europe is a vital and urgent priority for the project.

### ***III.III – Keeping the system in line with end-user needs***

**Description:** As well as involving end-users directly in development, other strategies can be adopted for tuning the system to their needs.

#### **Source for issue:**

Notes from workshop discussion (Thurs. morning session).

Various suggestions from experts, regarding:

- System development
  - prioritise TE users/requirements over system functionalities/architecture (C. Galvin)

- focus on added value for Europe's TE community (D. O'Sullivan, M.T. Paziienza);
- System usability/effectiveness
  - consider simplifying the system and its services to guarantee functionality; (C. Galvin)
  - consider providing some mediation in the system for quality control; (C. Galvin); "quality" is context dependent (M. Grandbastien); well-defined resource focus is sufficient & gives added value (G. Paquette, D. O'Sullivan)
- Sustainability
  - dedicate effort to activating TE community involvement; (C. Galvin, L. Stergioulas)
  - promote clustering with similar projects. (L. Stergioulas)

**Project position:** Some of these strategies are already central to the project vision (activating communities, clustering, end-user support). Due consideration will be dedicated to all these suggestions.

**Open/critical aspects:** Top-down definition of quality is a contentious issue and not part of general project strategy. Mediation impacts on sustainability. Activating Teacher Education communities across Europe is a vital and urgent priority for the project.

## THEME IV. DIGITAL CONTENTS & METADATA MARKUP

### *IV.1 - Metadata generation*

**Description:** The Share.TEC consortium aggregates a considerable number of TE resources and proposes (potentially) detailed metadata descriptions that include experiential annotation. This places a heavy burden on mark-up, which may not be fully sustainable. Possible strategies for dealing with this include concentrating on a subset of partners' contents and adopting (semi)automatic metadata generation.

#### **Source for issue:**

Notes from workshop discussion (Thurs. morning session):

- consider: (semi)automatic metadata generation; level of support for markup; a reduced core of "quality" content items (D. O'Sullivan)
- need to engage trained markers & automatic markup (G. Paquette)

Appendix 5: Project meeting minutes

**Project position:** Consideration will be given to the experts' suggestion to identify a subset of partners' aggregated contents and concentrate efforts on marking these up according to Share.TEC requirements. This would entail re-examination of the Description of Work, and renegotiation with the EU Commission, especially regarding success indicators. However, it is felt that such a step is needed in order to (a) avoid imposing unsustainable mark-up demands and (b) ensure that end users involved in pilot testing gain meaningful query results, thus giving a "real feel" of the system and a sense of its ultimate potential when rolled out (essential for sustainability).

Parameters for including contents in such a subset could be accessibility and reusability; there would also be a strong need to ensure adequate "horizontal coverage" in terms of the different partner languages, digital content types, target users, etc.

Furthermore, the consortium is shortly to examine a proposal to adopt *Autonomy*, a proprietary system for automatic metadata generation (see Appendix 5), and a review is also

to be made of which fields in the CMM are to be mandatory (see point *II.I - Common Metadata Model*).

**Open/critical aspects:** Quality, feasibility & cost-effectiveness of automatic metadata generation; parameters for defining content core; renegotiation with commission.

#### 4. Post-workshop feedback from external experts

This section provides an overview of the feedback reports submitted by invited experts following the workshop: the complete reports are contained in Appendix 8. Report excerpts are presented here in accordance with the four general themes discussed in the previous section: *TEO, CMM, meeting end-user requirements and digital contents & metadata markup*.

##### Experts' feedback on Theme I: Teacher Education Ontology (TEO)

Generally speaking, experts expressed a positive impression on the progress that has been made in the early stages of the project with respect to the ontology. They consider it critical to consolidate this progress and address some challenges at an early stage.

One of the main challenges identified by experts is the need to build consensus around TEO within the Teacher Education (TE) community:

*“There are very different views and traditions about teacher education in Europe (and the partners are well aware of that situation), so reaching a consensus will be a long process that should be supported for itself. Maybe this goal goes further than the project’s objectives and should be supported by additional resources (linked projects)”* [Excerpts from M. Grandbastien]

*“My two elephants (in the corner) are: 1. Understanding why & when teacher educators use T&L materials... and the ways this might be problematic for any repository project (Is it mostly Education Sciences area? Is it subject skills related? Is it praxis related?) 2. Teacher educators and how they view their world and their work... (initial, induction/early stage, CPD)”* [Excerpts from C. Galvin]

Experts also pointed out the need to further specify TEO’s scope and its degree of detail:

*“[...] Either starting from scratch or from existing ontologies, it is important since the beginning to define the ontology scope. What is the “knowledge world” your ontology will address? Moreover a list of possible questions to the ontology (identified in the use cases, see previous section) could result to be very useful to check possible inconsistencies of answering path. In fact a few distinctions in branches appear not always so “natural”, sometimes they look as “forced”. [...] In case you would implement a bottom-up approach (further to the top-down one until now adopted) starting from available 70000 resources by identifying commonalities, these resources could be used to define a first partial, technical ontology. Then you could compare the two resulting ontologies.* [Excerpts from MT Paziienza]

##### Experts' feedback on Theme II: Common Metadata Model (CMM)

As to the CMM, experts agreed on the importance to refer to LOM standard for interoperability purposes:

*“Defining CMM as a LOM profile should allow to include already LOM indexed resources. As new fields dedicated to teacher training are concerned, use-cases have to be carefully defined, with some « in depth » orientation in order to provide a significant added value compared to some Google-like search. Try some kind of user indexing (dedicated seminars in each participating institution) and also of course as much automatic generation as possible.” [Excerpts from M. Grandbastien]*

Experts also considered the relation between the Common Metadata Model and TEO as a crucial element for the success of the project:

*“It is clear that the first challenge is quickly coming to an agreement of how to use the CMM and TEO in conjunction with each other and to best effect. It is clear that the real added value to the project from a user's perspective come from an effectively inferencing over the ontology” [Excerpts from D. O’Sullivan]*

### **Experts’ Feedback on Theme III: Meeting End-User requirements**

In order for Share.TEC to succeed, a better understanding of end-users needs is needed. To this ends, experts pointed out the importance of a more clear and detailed definition of use cases:

*“Provided description of use cases are not complete. They describe a general context in which users could be active: no specific modalities, no functionalities are depicted. Deeply analyzing these matter could provide useful information for better defining Share.TEC functional architecture”. [Excerpts from MT Paziienza]*

*“Also I believe that you will not be able to make progress on validating your ontology and designing your search/query/inferencing components until you have a better idea of the needs of the target audience/users. Thus completion and validation of use cases (started at the workshop) in partnership with target users is vital and needs to be undertaken quickly” [Excerpts from D. O’Sullivan]*

A direct involvement of end-user during the design phase is also seen as an essential feature of Share.TEC:

*“Users groups have to be created in each partner’s setting, and as far as possible they should go on working for the whole duration of the project. Of course, as discussed, in parallel, a simple version v1 of a system should be made available in order to keep their attention and willingness to take part in the participative design. Teacher trainers are very busy, but from my experience gained in retraining teachers to ICT in the eighties and nineties, I can say they are also curious and willing to update their understanding of the world, so maybe explaining Web 2.0 issues and participatory design could motivate some of them for the challenge of the Share.TEC project (see O’Reilly founding paper).” [Excerpts from M. Grandbastien]*

### **Experts’ Feedback on Theme IV: Digital Contents & Metadata Markup**

As to metadata generation, experts suggest to carefully consider the effort involved in marking up resources with metadata that includes ontology aspects:

*“It is also clear to me that this challenge must be overcome very quickly, as the generation of metadata from learning objects is very unlikely to be possible automatically, especially when the categorisation involves ontology elements” [Excerpts from D. O’Sullivan]*

## 5. Video Interviews with external experts (Stockholm University)

Consortium partner Stockholm University performed video interviews with invited experts during the workshop in Venice. A total of eight different interviews were recorded by members of Stockholm University team and the material is now being edited in order to adapt a format that is suitable for the web. The goal of this activity was to produce material that illustrated the relevant topics and themes which were discussed during the workshop as part of the dissemination plan of the Share.TEC project. The interviews will be available at the Share.TEC web site as streaming video clips where the different experts' views and opinions are represented and the aim is that this will give an extra dimension of life and activity to the website and the project where visitors are given further insight to the project's development.

Invited experts were contacted about the interviews in advance and before the workshop in Venice by Project Coordinator ITD and were later contacted by members of Stockholm University team at the workshop for scheduling of the interviews. All interviewed experts signed a letter of consent where they allowed the video recorded material to be published as streaming video clips on the Share.TEC web site during the project's period of time and for dissemination and information purposes only.

Interview questions:

- Please describe your interest/expertise concerning teacher education and digital resources.
- If feasible, please describe your interest/expertise concerning metadata and ontologies and its value to teacher education.
- What are your thoughts about the importance of creating digital repositories such as Share.TEC for teacher education?
- Can you put Share.TEC in a broader perspective according to your previous experience and other related projects?
- Do you have any thoughts on how the information, the instances of digital contents should be delivered?
- Do you have any ideas about the business model and about sustainability of Share.TEC?
- What do you think you can find through Share.TEC that you do not find anywhere else?
- In Share.TEC and in many other projects, a rich ontology was created. How do you think that educational resources should be classified according to this ontology? By humans, machines, teachers, librarians or by users of a specific community?

## 6. Post-workshop questionnaire (CENEC)

At the conclusion of the workshop, experts were requested to complete a questionnaire produced by CENEC, who also processed the results (see below):

*Rating scale: (1) - strongly disagree (2) - disagree (3) - agree (4) - strongly agree*

**1. Preliminary documents and synchronous sessions have been useful to prepare the Workshop**

EXPERT 1	EXPERT 2	EXPERT 3	EXPERT 4	ST. DEV.	MEAN
4	3	4	4	0.5	3.75

*one expert complaining that he/she did not know about the synchronous sessions  
 (editor's note: no such sessions were held)*

**2. Preliminary documents and synchronous sessions have been useful to prepare the project's meeting**

EXPERT 1	EXPERT 2	EXPERT 3	EXPERT 4	ST. DEV.	MEAN
	3		4	0.707107	3.5

**3. The meeting management met my expectations / needs**

EXPERT 1	EXPERT 2	EXPERT 3	EXPERT 4	ST. DEV.	MEAN
4	3		3	0.58	3.33

**4. Explored issues met my expectations / needs**

EXPERT 1	EXPERT 2	EXPERT 3	EXPERT 4	ST. DEV.	MEAN
4	2	3	2	0.96	2.75

**5. Parallel sessions conducted by the partners have been useful**

EXPERT 1	EXPERT 2	EXPERT 3	EXPERT 4	ST. DEV.	MEAN
	3		3	0	3

**6. The agenda was suitable, taking into account hot-issues and time available**

EXPERT 1	EXPERT 2	EXPERT 3	EXPERT 4	ST. DEV.	MEAN
4	2	4	4	1	3.5

**7. Meeting room facilities were adequate**

EXPERT 1	EXPERT 2	EXPERT 3	EXPERT 4	ST. DEV.	MEAN
4	4	3	2	0.96	3.25



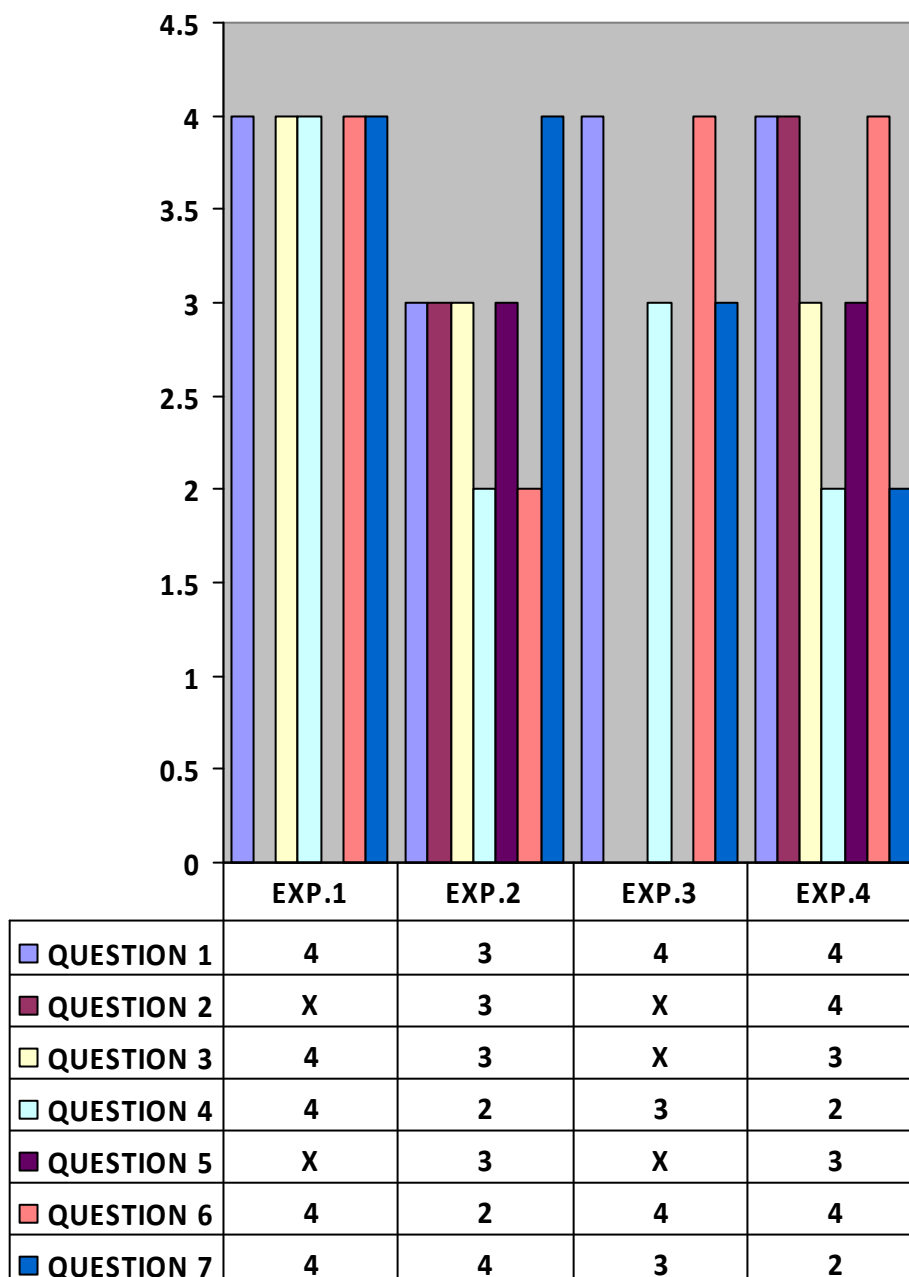


Figure 1: Questionnaire results

## 7. Conclusive reflections

As outlined in the Executive Summary (see Section 1), the primary aim of the first workshop was to gain insights for validating the Teacher Education Ontology and Common Metadata Model, while a more general objective was to obtain useful feedback about the proposed Share.TEC system. During the course of working sessions, the focus of attention shifted away somewhat from the former to the latter. A number of factors may have contributed to this shift in emphasis:

- identification on the part of a number of experts of two priorities deemed to be of particular urgency, namely to create detailed, structured descriptions of the services that the system is expected to offer, and to engage end users systematically throughout the development process (see Section 3. Theme III – Meeting End User Requirements);
- the inherent complexity of the ontology and the TEO/CMM relationship, which may have made some central concerns less immediately apparent to those outside the project context;
- the fact that TEO and CMM were still under consortium review, and that some degree of ambiguity and uncertainty remained about their respective roles in the Share.TEC system;
- the absence of user-focused scenarios in the introductory presentations, which could have conveyed a more comprehensible sense of TEO and CMM in the Share.TEC system.

Given this shift of focus, a decision was taken to adjust the workshop agenda “runtime” so as to respond adequately to emerging needs and to maximise experts’ onsite input. Accordingly, on Friday afternoon parallel group sessions were given over to collaborative definition of use cases (see Appendix 1) in an effort to bring system services into clearer focus. In addition, a special consortium meeting was held after presentation and discussion of experts’ feedback, and this decided on concrete steps for (a) incorporating use cases into the project work plan and (b) involving end users more directly in system development (Appendix 5).

Consequently, input from the experts has resulted in a significant realignment of project objectives, which are now deemed to be more closely identifiable with the concrete needs of the Teacher Education community across Europe. This change is reflected not only in the general approach to the Share.TEC system, but also in the practical steps currently being undertaken towards its development. Consequently it represents a very positive contribution to the project, and as such can be seen as one of the major outcomes – and positive results - of the first Share.TEC workshop.

Likewise, consortium convergence towards consensus on the project positions expressed in Section 3 is another direct result of workshop discussions, and in this sense can be considered as tangible workshop outcomes that will make a key contribution to the project’s overall success. Furthermore, the experts’ involvement in the workshop has allowed them, in their capacity as Advisory Board members, to gain familiarity with the project and to identify more strongly with its objectives. This will not only help to strengthen future project validation efforts, it should also give a significant boost to dissemination. As key players in areas of strategic importance to Share.TEC such as Teacher Education and digital resources for education and training, the experts are ideally placed to act as “contact hubs” for reaching - and engaging - important end-user communities and representatives.

## 8. References

This section provides references to the websites referred to during the course of the workshop.

[http://www.tpck.org/tpck/index.php?title=Main\\_Page](http://www.tpck.org/tpck/index.php?title=Main_Page)

- Implementation & Employment of the learning Design Specification (IDLD)  
<http://www.idld.org>

- Metadata for Architectural Contents in Europe (MACE)  
<http://www.mace-project.eu/>
- Quality for Reuse (Q4R)  
<http://www.q4r.org>
- Sharing digital resources in the Teaching Education Community (Share.TEC)  
<http://www.share-tec.eu/>
  - Share.TEC D2.1 Teacher Education Ontology (TEO): version 1 (ITD-CNR)  
[http://www.share-tec.eu/content/1/c6/04/41/02/D2\\_1\\_TEO\\_v1.pdf](http://www.share-tec.eu/content/1/c6/04/41/02/D2_1_TEO_v1.pdf)
  - Share.TEC D2.2 Common Metadata Model (OUNL)  
[http://www.share-tec.eu/content/1/c6/04/41/02/D2\\_2\\_Common\\_Metadata\\_Model.pdf](http://www.share-tec.eu/content/1/c6/04/41/02/D2_2_Common_Metadata_Model.pdf)
  - Share.TEC D7.2 Project presentation (SU)  
[http://www.share-tec.eu/content/1/c6/04/41/02/D7\\_2project\\_presentation.pdf](http://www.share-tec.eu/content/1/c6/04/41/02/D7_2project_presentation.pdf)
- TPCK - Technological Pedagogical Content Knowledge  
<http://www.tpck.org>

## Appendix 1: Workshop agenda

In the run-up to the workshop, the initial agenda proposed by ITD was refined in a process of ongoing negotiation with both project partners and external experts. Moreover, it was adjusted “runtime” during the course of the workshop itself in order to respond to emerging needs and maximise experts’ input (see Section 7). The final version of the agenda is shown below: documents presented and produced at the various sessions are listed and provided in Appendix 9.

### FINAL VERSION

## Share.TEC First Workshop 2009

### Representing Teacher Education with Ontologies: Towards a Multicultural Dimension

Italy, January 21-23

### Agenda

#### Wed 21<sup>st</sup>

- |             |   |
|-------------|---|
| 14:00-17:00 | Registration & welcome  |
| 17:00-18:30 | Opening session (Chair - CENEC) <ul style="list-style-type: none"> <li>• Welcome &amp; personal introductions</li> <li>• Sharing workshop objectives &amp; organisation</li> <li>• Introduction to the Share.TEC project</li> <li>• Overview of Teacher Education Ontology</li> </ul> |
| 20:00       | Social dinner   |

#### Thu 22<sup>nd</sup>

09:00-09:15	Plenary (Chair - ITD)
09:15-09:45	Overview of Common Metadata Model & its relations with TEO (OUNL)
09:45-10:30	Invited presentation from <b>Gilbert Paquette</b> (topic: competency modelling) and general discussion
10.30-10.45	<i>Coffee break</i>
10.45-12.30	Experts share their feedback
	Monique Grandbastien
	Lampros Stergioulas
	Declan O'Sullivan
	Maria Teresa Paziienza
	Vittorio Midoro
	Conor Galvin
	Plenary discussion
12.30-14.00	<i>Lunch</i>
14:00-17:00	Opening the validation process - key issues in Share.TEC ontology development & metadata modelling:
	<ul style="list-style-type: none"> <li>• Presentation of key issues as seen from inside the consortium – TEO &amp; CMM (ITD &amp; OUNL)</li> <li>• Reflections on TEO and CMM (UVA)</li> </ul>
	Plenary discussion
17:00 +	Onsite video interviews with experts (in accordance with their schedules)
20:30	Dinner

<b>Fri 23<sup>rd</sup></b>	
09.15-10.45	<p>In-depth study session:</p> <p>How the ontology and metadata model contribute to &amp; impact on:</p> <ul style="list-style-type: none"> <li>• interoperability of the federated system (OUNL) -</li> </ul>

	<ul style="list-style-type: none"> <li>• system architecture (UVA) -</li> <li>• proposed user functionalities and interface (NIS-SU) –</li> </ul>
	Plenary discussion
10.45-11.00	<i>Coffee break</i>
11.00-13.00	Parallel group work - session I
	Collaborative definition of use cases (2 parallel groups comprising partners and experts)
13:00-14.30	<i>Lunch</i>
14:30-16:15	Parallel group work - session II
	Collaborative definition of use cases (2 parallel groups comprising partners and experts)
16:15-16:45	Plenary reporting of group sessions with rapporteurs' reports
	Group 1 + Group 2
16:45-17:00	Closing session: Joint considerations & summary
17:00 +	Onsite video interviews with experts (continued) - in accordance with their schedules
20:30	Dinner

## Appendix 2: Workshop announcement & overview

### SHARE.TEC FIRST WORKSHOP 2009–ITALY, JANUARY 21-24 REPRESENTING TEACHER EDUCATION WITH ONTOLOGIES TOWARDS A MULTICULTURAL DIMENSION

**Location:** Venice, Italy

**Venue:** [San Servolo Congress Centre, Venice](#)

**Start:** 21 Jan 2009 - 17:00

**End:** 24 Jan 2009 - 12:00

Participation by invitation only

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#### Workshop overview

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This workshop is organized as part of the EU *eContentPlus* Share.TEC project ([www.share-tec.eu](http://www.share-tec.eu)). The goal of the workshop is to involve international experts in a focused discussion and analysis of an Ontology in the field of Teacher Education and metadata modelling for digital TE resources. The rationale for the ontology is that it allows for collaborative definition and understanding of a set of concepts relevant in the TE domain; it also provides a non-ambiguous and consistent vocabulary to identify those concepts. Drawing on the ontology, a metadata model will be identified to allow for effective brokerage of digital TE contents.

The ontology and metadata model will provide the basis for the semantic, linguistic/cultural and technical interoperability of the Share.TEC system.

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#### Workshop topics

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The key topics for discussion are:

- Ontological knowledge representation
- Competency modelling in Teacher Education (TE)
- Metadata for effective brokerage of TE-dedicated resources
- Terminology in the TE field across Europe
- Experiential annotation of digital resources
- Building trust for resource reuse in a multicultural TE community
- Ontology development lifecycle

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## **Venue**

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The workshop venue is a conference centre in Venice (San Servolo Island), where accommodation and meals will be provided.

Detailed information on travel and accommodation will be provided later on.



### Appendix 3: Workshop participant list

#### Share.TEC First Workshop, Italy 2009 – Participants

##### INVITED EXPERTS

CONOR	GALVIN	University College Dublin
MONIQUE	GRANDBASTIEN	Université Poincaré Nancy1
VITTORIO	MIDORO	ITD-CNR
DECLAN	O'SULLIVAN	Trinity College Dublin
GILBERT	PAQUETTE	LICEF, Télé-université Montreal
MARIA TERESA	PAZIENZA	Università Tor Vergata, Rome
LAMPROS	STERGIOULAS	Brunel University, UK

##### PROJECT EVALUATOR

CLAIRE	BELISLE	CNRS, France
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##### OFFICIALS

RAY	HUDSON	EC (project officer)
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##### PROJECT STAFF

LUIGI	BODI	CENEC
MONICA	BANZATO	CENEC
PAOLO	TOSATO	CENEC
GIADA	NENCETTI	CLUEB
JENNIFER	MONROE	CLUEB
DONATELLA	PERSICO	ITD-CNR
JEFFREY	EARP	ITD-CNR
LUIGI	SARTI	ITD-CNR (project manager)
SERENA	ALVINO	ITD-CNR
STEFANIA	BOCCONI	ITD-CNR
KRASSEN	STEFANOV	NIS-SU
PAVEL	BOYTCHEV	NIS-SU
FRED	DE VRIES	OUNL
ROBERT	SCHUWER	OUNL
STEFAAN	TERNIER	OUNL
WIM	WESTERA	OUNL
ERIK	AXDORPH	SU

EVA	EDMAN-STÅLBRANDT	SU
LENA	OLSSON	SU
NIKLAS	OLAISSON	SU
ANN	FITZGIBBON	TCD
ANNA MARIE	HIGGINS	TCD
IMMACULADA	ARNEDILLO-SÁNCHEZ	TCD
BEATRIZ	CARRAMOLINO	UVA
GUILLERMO	VEGA	UVA
MARÍA JESÚS	RODRÍGUEZ	UVA
YANNIS	DIMITRIADIS	UVA

## Appendix 4: Invited experts: personal profiles & support

### Personal Profiles



#### **Conor GALVIN, University College Dublin, IE**

Conor Galvin is a Lecturer and Researcher at UCD Dublin College of Human Sciences where he works on various education, ICT, public policy and research methods programmes. He speaks regularly at national and international events on ICT and education. His research interests include social capital, professional knowledge, innovation transfer in an information society, e-learning, schools ICT and the impact of new and emergent technology on learning and society. He was lead education evaluator on the highly-regarded research evaluation of the Diageo Liberties Learning Initiative (2005-07) and was a Member of the Minister for Education's (Ireland) Strategy Group on Schools ICT (2007-08) for which he co-authored the final report; Investing Effectively in Information and Communications Technology in Schools, 2008-2013. In addition, Dr Galvin was External Evaluator on the EU DigEuLit project (2004-06) and acted as Assessor on a number of EU actions relating to the Information Society - including eLearning and MINERVA. He has been National Delegate (Ireland) to OECD summits on the Information Society & Education, and since 2004 has been Pedagogical Adviser to and, more recently, Research Evaluator of the EUN eTwinning Project – the principal EU schools' ICT project funded under the eLearning and Comenius Action. Dr Galvin is currently the Chair of the Computers in Education Society of Ireland (CESI), a member of the UCD Strategy Group on Education Technology and a research and policy Adviser to the National Centre for Technology in Education, Ireland.



#### **Monique GRANDBASTIEN, University Henri Poincaré, FR**

Monique Grandbastien is professor in Computer Science at the university Henri Poincaré in Nancy (France). From 1989 to 2000 she was the head of a research team on the applications of computers in Education. She supervised 10 PhD students on the topic and authored or co-authored many papers. She is currently involved in the AIDA virtual multidisciplinary research team. Her interests focus on knowledge representation for learning systems. She is the chief editor of the French scientific journal for Computers in Education and co-editor of a new journal on Distance learning. She is a member of the French normalisation body on ICT for learning, teaching and training and of the ISO/JTC1/SC36/WG1 working group on the same topic.



#### **Vittorio MIDORO, ITD/CNR, IT**

From 1974 to 2008 Vittorio Midoro was Senior researcher at ITD, involved in educational technology. He has been leader of many projects in methodological and theoretical issues, including the ULEARN and UTEACHER projects in the European eLearning initiative. His main research interests include online education, co-operative learning and Teacher Education at European level.



**Declan O'SULLIVAN, Trinity College Dublin, IE**

My personal research focuses on how to achieve semantic mapping as a means to enhance collaboration. In particular I have an interest in the Network and Telecoms Management, Collaborative Working and Online Communities, and Autonomic Management domains. I am the Director of the Knowledge and Data Engineering Group (KDEG). More information can be found at <http://kdeg.cs.tcd.ie>



**Gilbert PAQUETTE, Research director LICEF-CIRTA Télé-université, Montreal, CA**

Gilbert Paquette holds a PhD from the Université du Maine (FRANCE) in Artificial Intelligence and Education. Researcher at the Center for Interuniversity Research on Telelearning Applications, (CIRTA-LICEF) he has founded in 1992, Gilbert Paquette holds a Canada research chair in knowledge-based instructional engineering, acts as the Scientific Director of the LORNET Canadian research network and is a professor at Télé-université du Québec in Montreal. In 2007, he has received an Honoris Causa Doctorate from the University Pierre et Marie Curie (Paris VI). He has pioneered strategic projects in the field of knowledge-based systems, instructional engineering and distance education. Recent publications include three books on technology-based learning. He has given invited conferences in many parts of the world and sits on the scientific committee for six Journals, three in France, one in the US and two in Canada. He is "fellow" of the World Technology Network, a group of international experts. He represents Canada on the Globe consortium on learning objects and sits on the scientific committee of the European network TENCompetence. He has also founded two companies and has acted as Minister for Science and Technology in the Quebec Government (1982-1984)



**Maria Teresa PAZIENZA, University of Roma Tor Vergata, IT**

**Dept. of Computer Science, Systems and Production**

**Professor - Head of AI research group**

Maria Teresa PAZIENZA is currently full Professor at the Engineering Faculty of the University of Roma "Tor Vergata". She coordinates researches and development activities on Artificial Intelligence and Natural Language Processing at the Dept. for Computer Science, Systems and Management where she founded the ART Laboratory. Prof. Paziienza cooperates with several research groups, international institutions and companies for NLP research and application programs. Inside European consortia/projects, she has been (and currently is) scientific responsible for the activities carried on at the University of Roma Tor Vergata. She is reviewer and evaluator for the European Community and for the Italian Ministry of University. Her areas of expertise include education, research, system development and user applications of AI technologies ( natural language processing, information extraction, conceptual knowledge engineering, knowledge-based systems, linguistic resources

production, linguistic agents, semantic web). She is author/co-author of more than 100 scientific publications. She is in the editorial board of a few international journals (Journal of Terminology, Cognitive Processing, Applied Ontology), in the scientific committees of ECONA and CERTIA (academic consortia for cognitive science and applied AI technologies) and participates in the scientific committees of several international conferences on AI. She is in the Steering Committee of ESA (European Space Agency)-Roma Tor Vergata University Convention.



### **Lampros STERGIOULAS, Brunel University London, UK**

Dr Lampros Stergioulas is currently a Senior Lecturer in the Department of Information Systems and Computing at Brunel University, UK. Dr Stergioulas is a qualified Chartered Engineer, has studied Informatics and Physics in his first degree at the University of Athens, and received a M.Sc. and Ph.D. in Electrical Engineering from the University of Liverpool, UK, specialising in Information Engineering and Communications. He has worked as a Research Associate in Cambridge University Engineering Department and has held Lectureship posts in the Department of Computer Science at the University of Ioannina, Greece, in Manchester School of Engineering at Manchester University, and in the Communication Systems Department of Lancaster University. Dr. Stergioulas has published over 100 papers in journals and international conferences and chapters in books, and has co-authored 1 book. He has supervised and examined numerous PhD dissertations in computer science. He has held many National and European Grants in technology-enhanced learning, educational computing, human-centred information systems, communications and computing, medical and health informatics, information processing, and intelligent information systems.

## **Support**

To help experts gain an understanding of the project and its initial outputs, a set of suitable reference material was identified and made available on a social networking space specially set up on the NING platform<sup>6</sup>. Documentation made available in the NING group includes:

- Presentation and summary of the Share.TEC project<sup>7</sup>
- Description of work (Annex 1)
- Teacher Education Ontology: natural language description<sup>8</sup>, and pprj / owl files (DEL 2.1)
- Share.TEC Common Metadata Model (DEL 2.2)<sup>9</sup>
- Workshop outline and objectives (see Appendix 2)

<sup>6</sup> <http://sharetec-venice-workshop.ning.com> This is a private area. To login use the following - *Username:* ecsharetec@gmail.com *Password:* 8partners.

<sup>7</sup> [http://www.share-tec.eu/content/1/c6/04/41/02/D7\\_2project\\_presentation.pdf](http://www.share-tec.eu/content/1/c6/04/41/02/D7_2project_presentation.pdf)

<sup>8</sup> [http://www.share-tec.eu/content/1/c6/04/41/02/D2\\_1\\_TEO\\_v1.pdf](http://www.share-tec.eu/content/1/c6/04/41/02/D2_1_TEO_v1.pdf)

<sup>9</sup> [http://www.share-tec.eu/content/1/c6/04/41/02/D2\\_2\\_Common\\_Metadata\\_Model.pdf](http://www.share-tec.eu/content/1/c6/04/41/02/D2_2_Common_Metadata_Model.pdf)

- Share.TEC system use scenarios (initial versions in Technical Annex - see Appendix 6)
- List of invited experts (see Appendix 3)



Fig.4.1. Screenshot of the NING environment

## Appendix 5: Project meeting minutes

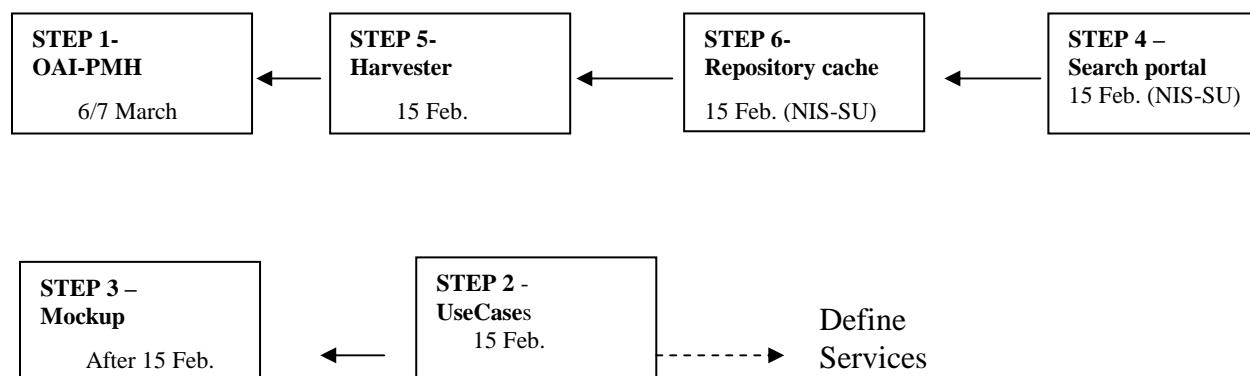
The main project meeting was held over the two days immediately prior to the workshop. During the workshop period, some impromptu project meeting sessions were also held in order to discuss and define project positions in response to workshop outcomes. The positions are reported in the minutes hereunder.

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### MINUTES OF SHARE.TEC 2ND PROJECT MEETING SESSIONS TUES. 20TH - FRI. 23RD JANUARY SAN SERVOLO, VENICE

#### PROTOTYPE DEVELOPMENT (WP5)

- **Steps towards development of the prototype system (by Month 12)**
  1. deployment of OAI-PMH (targets) -
  2. use case development
    - define user level services
  3. mock-up based testing with end users
  4. Set up search portal
  5. Set up harvester
  6. Set up repository cache
  
- **Interdependencies, scheduling & roles for above 6 steps**



- **OAI-PMH deployment meeting** to be held for technical staff ( OUNL: Amsterdam, March)
- **Proposed workshop for partner staff members responsible for metadata markup** (NIS-SU - to be defined)
- **Contact person for partners' resources/repositories:**  
CENEC – Paolo Tosato

CLUEB - Jennifer Monroe

ITD - Luigi Sarti

OUNL – Robert Schuwer

SU - Niklas Olsson

TCD – Macu Arnedillo-Sánchez

UVA - María Jesús Rodríguez Triana (Chus) / Bartolomé Rubia Avi

## USER MODELLING

- **User modelling** to be performed by ITD with NIS-SU, providing input for wizard (T4.1), brokering service (T5.3) and sustainability plan (T7.2).

## VALIDATION & EVALUATION (WP6)

- **T.6.1 - need to clarify validation plan**

## DISSEMINATION (WP7)

- **Periodic reports on user network activation**
  - 1<sup>st</sup> report from OUNL to be included in project half-year report (June-Nov. 2008)
- **Sustainability Plan**
  - Identified by all partners as a critical output that must be produced on schedule (Month 12)
  - Where aspects of the plan depend on later project decisions/outputs, a set of options will be provided in the plan, specifying the time frame/conditions for final decision. The plan will subsequently be updated accordingly.
  - Proposal to create an internal taskforce specifically focusing on links between sustainability and technical matters (to be decided by WP7 leader)
- **Quarterly progress bulletins** to be translated by partners in their language and made available on project website.
- **Dissemination kit** to be translated by partners in their language.
- **Video trailer of Share.TEC system (e.g. Europeana) to be produced by SU**
  - Partners to identify interesting example of their own digital content for showcasing in trailer

## TEO & CMM (WP2)

- **Relationship between TEO & CMM**
  - metadata migration needs a common set of metadata to support interoperability between different repositories. The subset of LOM in CMM (DEL2.2) could fit this need.
  - TEO will adopt/integrate the same terms that are proposed in CMM (DEL2.2) where applicable
    - OUNL to provide list of required TEO modifications
  - CMM integrates content-related, educational and contextual metadata derived from TEO
    - ITD to list candidate elements from TEO for integration in CMM.



- Proposed approach for integrating TEO-derived elements/vocabulary: (a) integrating these in LOM Category 9 when vocabularies are organized as a taxonomy; (b) integrating these in SHARE.TEC-CMM Category 10, as specific elements (10.1, 10.2, etc) when they are a flat, closed set of values.
- ITD, UVA and CENEC expressed doubts about the impact of this approach on the possibility of performing TEO-based semantic searches.
- **TEO v.2 multicultural development**
  - NIS-SU is to produce an English version of problematic issues regarding the Bulgarian multicultural level of TEO.
- **Metadata & CMM**
  - automatic metadata generation: Proposal for adoption of proprietary system for automatic metadata generation. OUNL will prepare a proposal for adoption of Autonomy within the consortium. This will specify licensing conditions and costs, demo of technical capability, and project applicability. Commission confirms site license as eligible cost.
  - OUNL is to review the number of mandatory fields in CMM, seeking to keep these to a minimum.
  - CMM will provide for expression of the full range of IPR policies and access rights
- **Role of TEO in Share.TEC system**
  - Ontology to be integrated in the system to inform services with reasoning capabilities aimed at providing the basis for semantic search, recommending functionality, etc.

## **IPR, ACCESS RIGHTS, PRIVACY (WP7)**

- **IPR on partners' content and on metadata** are central to sustainability
- **During the project, access rights to partners' contents are covered by non-disclosure agreement**
  - TCD can provide clearance letter for videos as a model for dealing with privacy issues related to partners' videos

## **INTERNAL ORGANISATION & COMMUNICATION**

- **WP leaders are to oversee tasks and monitor progress within their WPs;**
  - they will organise WP conference calls where required
- **WP leaders' communication of project progress.** Conference calls are to be held at least monthly as checkpoints.
- **Communication policy on BSCW**
  - All contributions posted on BSCW are to be accompanied by a notification (via BSCW or email).
  - Notifications are to be sent only to those individuals directly involved in the task
  - Each task leader is responsible for soliciting name/address of specific contact person within each partner group involved in the task. These are to be listed in <Consortium communication: BSCW & other tools / Partners' contact/s for individual tasks>

## Appendix 6: General scenarios from the Share.TEC Description of Work

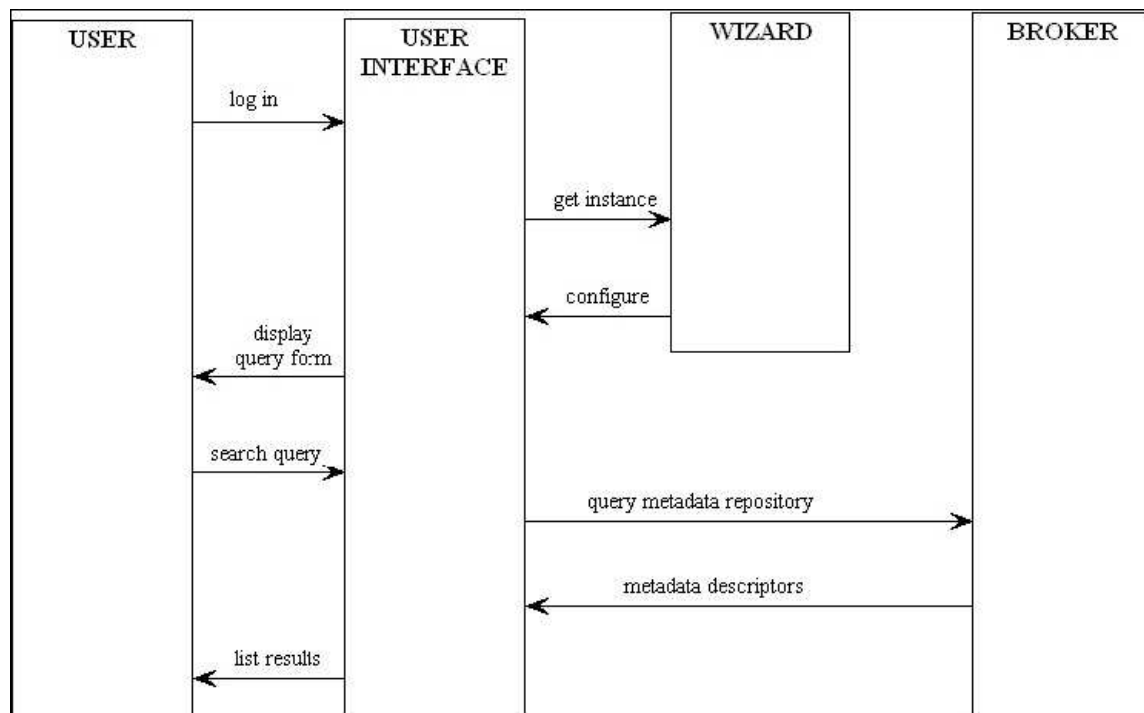
The following scenarios were included in the Share.TEC Description of Work (DoW) in order to illustrate some key tasks that different users might perform with the system.

### ***Scenario 1: A teacher educator looking for material***

*This scenario shows how Share.TEC addresses teacher educators' needs to gain personalised access to quality content. The scenario could also apply to pre- and in-service teachers seeking content that supports self-directed learning and sharing of educational and professional experiences. The process described highlights how Share.TEC enhances teacher educators' professional growth and enriches their cultural perspectives.*

Prof. Ingrid Holmberg has just been appointed to take over a course entitled “Technology Enhanced Learning in Primary School” that her School of Education offers to undergraduates embarking on a teaching career. She is looking for fresh ideas and material to enhance her practice, so she turns to the Share.TEC portal for help. She visits the home page and decides, as suggested, to register so she can make the most of the system’s personalisation features, particularly for more effective brokerage. First of all she selects her working language, Swedish. In the background, the system’s User Wizard retrieves the Swedish ontology instantiation from the Multicultural Metadata Model (M<sub>3</sub>) for interface personalisation. Consequently, Ingrid now has a Swedish-language registration form to complete, and the closed set of terms proposed for completing the items reflect the specific nature of Sweden’s education system. When Ingrid saves the completed form, two important things happen in the system: (a) a unique user record is generated and so henceforth all data from her interaction with the system is stored and retrieved for personalisation purposes (via data mining techniques); (b) the Wizard maps Ingrid’s registration data and associates her user record with one of the Share.TEC user profiles; henceforth the system will recognise her as a trainer of Swedish primary teachers and will provide personalisation accordingly. Now that she is a registered user with a recognised profile, Ingrid can perform her search on Share.TEC. She can opt for the default “simple search” or the “advanced search” with its wider range of parameters; either way, the values of some key fields have been set automatically from her user profile (e.g. working language, target level). Anyhow, she can always set multiple (or no) values for the parameters she is interested in (see section 11.3.3); an open text field is available for inserting key words. Ingrid’s query is handled by the Wizard, which searches Share.TEC’s metadata repository for matches and compiles a list of results automatically ranked by relevance. Each result is shown as a title with a short description and a link address (uri). Icons also indicate further information like IPR conditions applying to the resource’s reuse, availability of experiential description/s, the community’s star rating. Ingrid scans through the list and decides on the first item. The record displays more details about the resource (e.g. specific objectives and strategies, suitability to her context, reusability, usage conditions) together with a preview. Ingrid notes the flag icon signalling that a fellow practitioner has provided a description of his/her reuse experience with this resource. As well as the list of results, the system’s recommender function suggests resources that have been retrieved, previewed and reused by those whose profile is similar to Ingrid’s, including teacher trainers operating in different cultural contexts in Europe. So Ingrid now has a rich set of suitable alternatives to choose from that can enhance her practice, provide models of innovation and help to broaden her professional and cultural perspectives. She has also gained trust in the Share.TEC community as a reliable support.

*The following diagram shows some of the Share.TEC architecture elements involved together with the schematic data flow.*



### ***Scenario 2: A teacher educator reusing content and sharing experience***

*This scenario shows how Share.TEC fosters and supports teacher educators' skills for active involvement in a community dedicated to resource and experience sharing. It also illustrates how these Share.TEC users can enhance their professional skills by sharing best practices.*

After a successful run in her course using the resource she located in Share.TEC, Prof. Holmberg has some insights about the material that she believes will be of use to other (potential) users and to the resource author. She now has a firm understanding of how to make the most of the material to meet her needs, and has some suggestions on how the resource might be improved to make it even more effective. When she logs back in to the system, Ingrid goes to the list of most recently viewed records without having to query the repository. She decides to tag the record with a personally-chosen keyword and this automatically identifies it as one of her "Favourites"; from now on, the record is just a single click away, just like her bookmarks on del.icio.us. As a registered teacher-trainer on Share.TEC, Ingrid has the rights to submit a experiential annotation about the resource. To help her, she has an open text form that she can complete freely using her own language and customary terminology. Machine translation tools and a glossary are available for possible English translation. The form helps Ingrid describe things like the context and rationale of reuse, unforeseen obstacles, suggestions for improvements. The information is largely for other teacher educators or content developers who can build on the reusers' expertise. The system will associate Prof. Holmberg's reuse description to the related content-item record so that anyone who retrieves the record will see the original author's metadata plus any reuse descriptions, including Ingrid's. In this way, the content-item record will dynamically accumulate added value within the community with successive reuse. In return for her contribution to that added value, Ingrid receives due recognition in line with the Share.TEC users' reward policy, as does the original (individual) contributor whose resource she reused. This strengthens her sense of belonging to the community.

### ***Scenario 3: A teacher educator enriching Share.TEC***

*This scenario shows how Share.TEC encourages teacher educators to share their proven resources with their peers and in this way develop a sense of active community involvement.*

After her course in “Technology Enhanced Learning in Primary School” has concluded, Ingrid realises that she has created a body of content which, like the resource she located and reused thanks to Share.TEC, could be of use to others. What’s more, as she has now had the opportunity to use the system effectively and understand its potential for supporting her practice, she has a strong motivation to take a more active role in the community and to raise her own profile within it. So she logs into the system to create new resource records for the contents she has developed and to describe her practical experience with them. To start with, she consults the Resource Integration Companion Kit (RICK), which provides support in her language and guides her through the processes of creating her resource records according to the Share.TEC metadata model; it also suggests suitable web services (e.g. Slideshare, YouTube) where Ingrid can upload the related content online. RICK also shows her how to express and apply the IPR conditions on reuse of her content. At the end of the process Ingrid has further enhanced her status in the Share.TEC community by becoming a contributor and, as in the previous case, she receives due recognition in line with the Share.TEC users’ reward policy. She now feels she has a new an opportunity to grow professionally.

### ***Scenario 4: An education publisher expanding customer base***

*This scenario shows how Share.TEC meets the requirements of publishers for:*

- *a wider market for digital content specifically for TE*
- *direct access to a federated system capable of reaching users across Europe*
- *a means for monitoring trends at European level and for identifying emerging user needs*

Philippe Mercer is head of the Teacher Development Division at Éditions La Pensée Future (EPF), a French publisher specialised in language learning. His division, which produces reference materials for CPD, has been distributing digital TE content at national level for the past two years and they are now looking for opportunities to extend their customer base outside France. Philippe has been contacted by the Share.TEC committee as part of its dissemination campaign to involve educational publishers such as his own in the Share.TEC federation. He is keen to join, as Share.TEC offers him the opportunity to directly reach a broad community of specialists with strong potential interest in his division’s patrimony of quality TE content, and to do so in a way that is consistent with TE practice and concerns. After establishing that the Share.TEC system allows his company to maintain control over content access and IPR conditions, he gains company clearance and makes an agreement for linking to the Share.TEC system for a set period. The federation process is handled by EPF’s technical staff, who use Share.TEC’s Metadata Migration Facility (MMF) to ensure (a) interoperability between their metadata system and the Share.TEC application profile; (b) automatic harvesting of their own metadata repository for updating purposes.

### ***Scenario 5: A content provider testing new contents***

*This scenario shows how Share.TEC meets the requirements of content developers for:*

- *a TE-specific arena across Europe for showcasing digital products and services, and for testing their potential*
- *direct access to a grassroots user community capable of providing rapid feedback for content development*
- *- a means for monitoring trends at European level and for identifying emerging user needs*

Paula Dawkins has recently gathered a small team of young professionals with a background in training, multimedia and e-learning to form a spinoff venture focusing on content development and education-oriented services. She considers teacher training as an area with potential because it is strategic, has good growth possibilities as demands rise for “digitally literate” schooling, and yet is still relatively untapped. As a small operation, the group will concentrate on well defined niches and so may well need to interest publishers operating in different countries. Share.TEC provides a good overview of market potential and an important test-bed for piloting the group’s new content. An early

project is to develop a comprehensive set of teacher training materials on the interdisciplinary topic of concept maps for learning. The idea is to put together a range of different TE resources (multimedia maps, videos, audiovisuals, text) that can be variously configured into a training module applicable in a range of settings. Paula's team already has a limited body of material and has made this available to the Share.TEC community to gain feedback; other elements remain to be refined or produced from scratch. Paula's searches in Share.TEC for resources on this topic have uncovered some very interesting material from Bulgaria, something that would have remained totally unknown to her otherwise. What's more, the Creative Commons licence permits her to reuse this with due acknowledgement of authorship. Via Share.TEC she has already located teacher trainers interested in concept mapping who have adopted her material in their ICT courses, so she decides to localise the Bulgarian material and pilot it to gauge its potential.

## Appendix 7: Notes on the relationship between TEO, the Common Metadata Model and the rest of the architecture

Some relevant decisions taken in Venice involve the interrelationship between TEO and the CMM:

- As the CMM includes a number of elements defined in the LOM, some TEO classes will be renamed using the LOM terms
- Further metadata elements that are not at the moment incorporated in the CMM but can be derived from TEO classes (esp. the *DigitalContent* branch) will be included either in category 9 (taxonomic classification) or in an additional<sup>10</sup> category 10 (non-taxonomic elements). ITD has to elaborate a proposal for these elements.

We are now facing the issue of selecting the TEO elements that should be resembled by CMM elements. We have to strike a balance between expressiveness and conciseness: on the one hand digital resources will be described in the repository by CMM elements only, and leaving out any digital content feature that is captured in TEO will inevitably limit the query affordances; on the other hand too many elements might discourage users and make the system more complex to use, although we would probably employ specific user interface policies that smooth the learning curve by offering a range of interfaces at varying difficulty levels. Besides, most additional elements should be either recommended or optional.

### CMM CATEGORY 9

Under these assumptions, we propose to incorporate in CMM-Category 9 five taxonomies, corresponding to five TEO's sub-branches (DigitalContent, Knowledge Area, Generic Skill, TeacherPracticeContext, Educational Institution). They could allow us to represent the possible values of important digital contents' descriptive elements:

- Digital Content Type
- Knowledge area
- Competency
- Audience Educational Level.

To this end, we also tried to identify possible values of the 9.1 LOM element (*Purpose*) that could be associated to the selected taxonomies/branches. The value space of this element is: discipline, idea, prerequisite, educational objective, accessibility, restrictions, educational level, skill level, security level, competency.

We propose that only 4 out of these 10 values be used to represent the purposes of the selected taxonomies: the CMM should refer to a subset of the LOM value list that consists in the following elements:

- discipline
- 

<sup>10</sup> Not present in the official LOM specification

- educational objective
- educational level
- skill level

### Digital Content Type element

This important descriptive element can be represented in CMM by importing the Category 9 TEO's DigitalContent branch (see Figure 1: The Digital Content taxonomy).

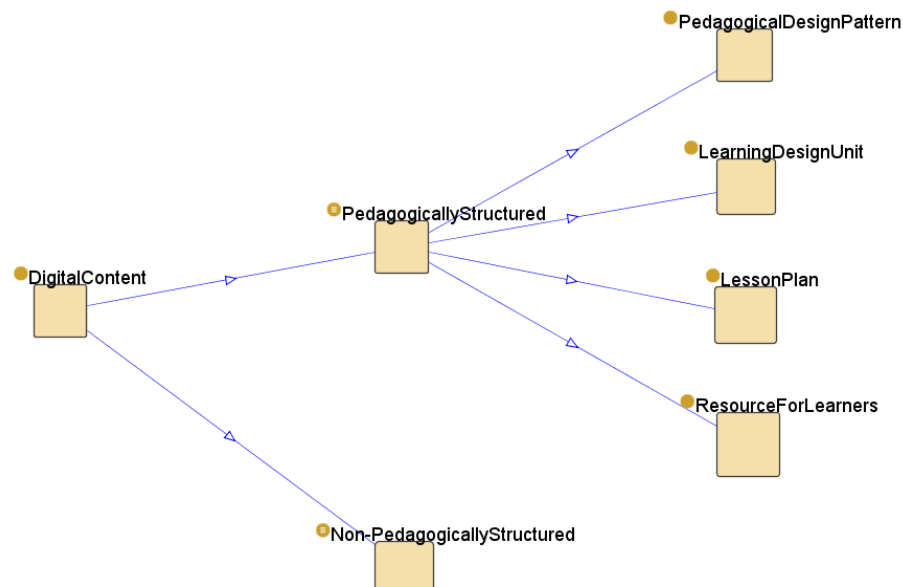


Figure 1: The Digital Content taxonomy

Actually, the LOM 9.2 “Purpose” element does not offer a suitable value to capture our intended meaning of DigitalContent branch, as we articulate the taxonomy on structure and target. Anyway, the 9.2 “Purpose” element could take the value “educational objective”, because it distinguishes between different typologies of resources according to their pedagogical characteristics.

In this case, the 9.2.1 “Source” element should specify the name of the descriptive element that refers to this taxonomy, i.e. “Digital Content Type”.

### Knowledge Area element

This descriptive element can be represented in CMM by importing in the Category 9 the TEO's Knowledge Area branch.

As suggested by the official LOM documentation, the 9.2 “Purpose” element should take the value “discipline”. The 9.2.1 “Source” element should specify the [“en”, “Knowledge Area”] langstring.

### Competency element

According to the modifications proposed during the Venice workshop, “competencies” in TEO will be represented only by associating one or more Knowledge Areas with one or more Generic Skills (the distinction between Functional and Behavioural competencies has been dropped).

So, for example, the “Competency” descriptive element could be managed at “interface level” by associating one or more “Knowledge Area” values with one or more “Generic Skill” values.

To this end, the “Generic Skill” taxonomy (see Figure 2) should be represented in the CMM-Category 9.

In this case, the 9.2 “Purpose” element could assume the value “skill level”, while the 9.2.1 “Source” element should specify the [“en”, “Generic Skill”] langstring.

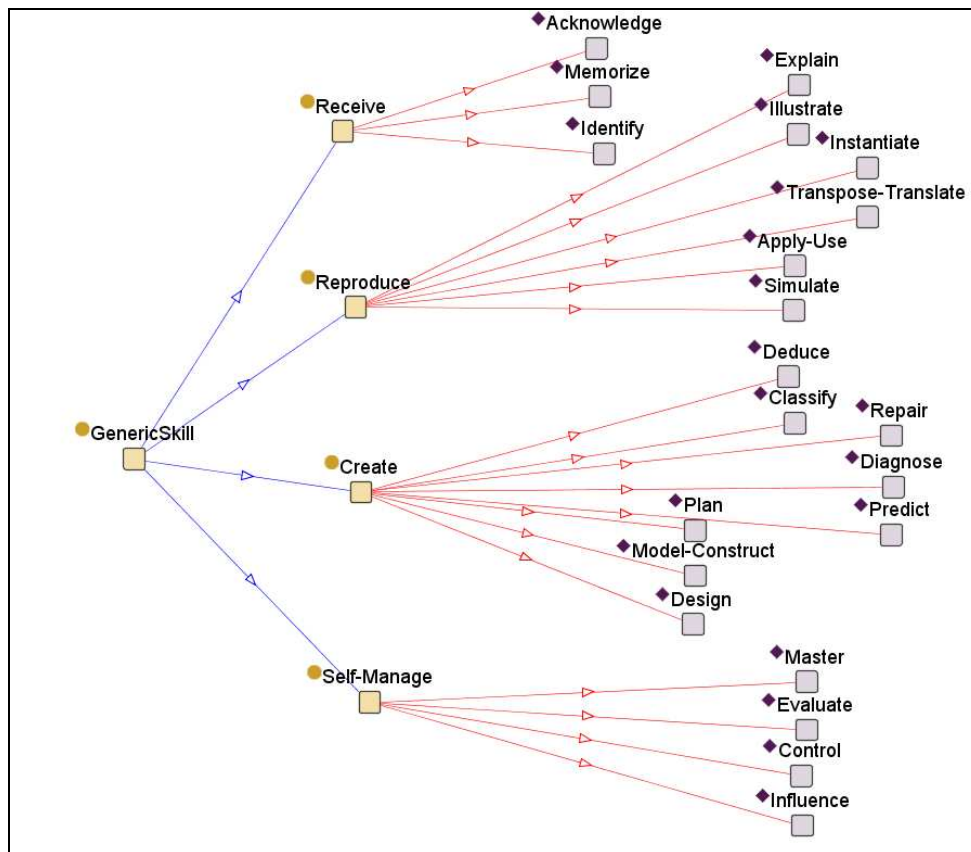


Figure 2: The Generic Skill taxonomy

### Audience Educational Level element

This descriptive element should refer to the EducationalInstitution taxonomy in TEO’s Context branch, which is currently under re-examination.

This taxonomy should assume the value “educational level” as to the 9.2 “Purpose” element. The 9.2.1 “Source” element should specify the [“en”, “Audience Educational Level”] langstring.



## CMM CATEGORY 10

Some of the other TEO classes that are not already present in the CMM/LOM should go into the additional, non-structured category 10. We would probably consider here the following classes of the *DigitalContentFeature* sub-classes:

- **EmploymentMode**
- **InteractivityType** (might match with LOM 5.1, but with different vocabulary)<sup>11</sup>
- **Non-PedagogicallyStructuredContentType** (might match with LOM 5.2, but with different vocabulary)
- **PedagogicallyStructuredContentType** (separated from the previous one because they have different vocabularies)
- **DidacticStrategy**
- **ActivityType**

In this approach some of the TEO classes would become CMM elements; the corresponding instances in TEO would make up the vocabularies, which constitutes a simple and –in our opinion- affordable way of stating a general relationship between TEO and the CMM.

## INFERENCE ISSUES

Of course, a (pretty consistent) number of TEO classes and properties would **not** impact on the CMM. The most evident case is probably the relation between *DigitalContent* and *Competency*: how can we represent the piece of knowledge addressed by a resource? Should we rely on category 9 again?

While “reference” elements of the CMM (such as title, contributor, language, etc) are derived directly from LOM for interoperability, other contextual, content-related and pedagogical elements (and their vocabularies) should be derived from ontology branches and

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<sup>11</sup> Can we specify a different vocabulary for any given LOM element? The LOM specs say “*Vocabularies are defined for some data elements. A vocabulary is a recommended list of appropriate values. Other values, not present in the list, may be used as well. However, metadata that rely on the recommended values will have the highest degree of semantic interoperability, i.e., the likelihood that such metadata will be understood by other end users or systems is highest.*” IMS Metadata Best Practice says: “*Particular communities may find LOM based vocabularies insufficient and may achieve increased specificity in describing their learning resources by using terms that have high semantic value within that community. However implementers should be aware that this approach compromises interoperability when records created using different application profiles are exchanged. Consequently, it is advisable that local or customized vocabularies should be used in conjunction with the vocabularies recommended by the LOM conceptual data schema.*” We have to be careful, considering harvesting issues.

be integrated into the CMM. Some TEO elements do not, strictly speaking, correspond to metadata to be used to characterize digital resources, so they will not be represented in the CMM; we should therefore identify the kind of representation they will have in the Share.TEC system and the related requirements imposed on the system architecture.

Speaking of architecture: the repository will be hosted in a database whose schema will be directly derived from the CMM structure; the database, however, can be used to store also non-metadata information, such as for example individual user/account data, history of interaction, social tagging & folksonomies etc. Is the whole database schema static (i.e., defined once and for all at design time) or might it be dynamically derived from the ontology using schema evolution facilities?

A final issue: how will NIS-SU (Pavel) proposal of considering users as resources be addressed in this framework? Shall we have user-description metadata in the repository? Clearly, this could not be derived from LOM.

## Appendix 8: Experts' feedback reports

The following external experts have documented their feedback in reports:

1. Maria Teresa Paziienza
2. Declan O'Sullivan
3. Monique Grandbastien
4. Conor Galvin

### 1. Maria Teresa Paziienza (Università Tor Vergata, Rome, IT)

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#### SHARE.TEC

#### M.T. PAZIENZA PERSONAL COMMENTS

##### Premise

1. Hereafter provided comments must be considered as my personal belief and are completely influenced by my specific background as computer scientist.
2. Being not a partner, I did not participated to Share.TEC activities from the inside; then, may be, I could have missed important details and motivations on developed actions.

These facts could cause a few misunderstanding from my side: I apologize since now for that!

##### Introduction

In the following I am providing my comments as emerged after reading provided documentation and participating to the 1st workshop "Representing Teacher Education with Ontologies: Towards a Multicultural Dimension" held in Venice.

Share.TEC objectives appear very ambitious! In fact, while it is publicly stated the interest in providing means to

- describe heterogeneous TE resources,
- foster reusability,
- develop semantic, linguistic/cultural and technical interoperability,

it is assumed neither to do research activities, nor to develop new tools/systems: just "reusing" numerous world wide published TE resources, by providing multilingual search modalities in a multicultural environment for a (human) end-user. Reuse of these resources is not an easy task!

Definition of an ontology (partly reusing previous ones) while being a noticeable result, seems me not enough to fulfil project objectives.

At the moment it appears very important the brainstorming activity ongoing inside the consortium. I hope partners have clear ideas on how to proceed on the following matters.

##### Functional system architecture

Definition of the functional architecture could proceed in parallel with identification of precise objectives to be reached in the context of Share.TEC project.

For example, to define a reasoner over TEO, instead of supporting the access to an aggregate of resources, may require different architectures.

The functional architecture will derive by complete project analysis that will highlight also the type of final user. Let me provide an example for what concerns ontology development and management tasks. In fact its choice could heavily influence also the system architecture.

In case of humans:

1. Instead of identifiers, we need unambiguous terms to identify concepts enriched by free text descriptions and an easy access to further linguistic/cultural contexts.
2. For what concerns reasoning, the task of navigating inside TEO ontology remains under the complete user's responsibility
3. Support to human machine interaction reveals to be a crucial aspect: it becomes mandatory a very friendly graphical interface enriched by buttons to activate specific services as well as windows for accessing to a multilingual space and helping comments.
4. Ontology updating task, for consistency purposes (as linguistic, cultural, technical inconsistencies may occur), cannot be carried on by an user; what he could do is just sending comments to the ontology manager that will provide offline updating under his own responsibility. May be a team could be in charge of such a task periodically providing new TEO versions.

In case of an intelligent agent accessing TEO:

5. It is mandatory to provide identifiers; no free text description, no multilingualism, no multiculturalism will be considered. In fact, multiculturalism relates modalities in which ontology structure and visiting processes will be implemented.
6. Reasoning activities will be carried on by a dedicated subsystem. It represent a relevant task!
7. A simplified interface will support I/O: any language or graphic interface could be defined.
8. Updating could be done by the ontology manager subsystem by considering constraints associated to TEO concepts. The process could be completed automatically.

At the moment it seems difficult to define a *real* Share.TEC system architecture: a detailed description of project's scope and objectives are still missing. It is not clear how currently provided architecture (distributed document) could evolve during the time by following new and different objectives (zooms in/out ???).

Has been designed the Share.TEC portal? What kind of interaction is foreseen? Have you considered to develop web services to support collaborative Share.TEC users?

### The search

It is foreseen multilingual search (stated in the document on architecture) will be modelled and implemented as a multilingual thesaurus of keywords:

- May you consider further approaches?

- May you cross-evaluate them?

Please consider that multilingualism is of interest whether connected to multiculturalism, that is in case both of them will be considered in the conceptual knowledge representation. It is not only a search matter, it is a reasoning-over-data matter!

### Use cases

Provided description of use cases are not complete. They describe a general context in which users could be active: no specific modalities, no functionalities are depicted. Deeply analyzing these matter could provide useful information for better defining Share.TEC functional architecture. (see previous section).

## **The ontology**

### Ontology creation

TEO ontology is currently the main project result! It is rich of information and an initial structure design has been provided. It emerged you have partially reused previously defined ontologies: it seems a good approach. As there exist several repositories/information searchers/taxonomies/, etc. it could be nice to reuse as much as possible what exists, while stressing pan-European components and resource sharing.

Have you carried on a complete inventory of conceptual and technological resources for education? The last ones could be used to populate TEO ontology. Have you considered to implement methodologies for automatic acquisition of concepts from document processing techniques? While they could be out of the scope of your current job, it could be important to compare different approaches.

Either starting from scratch or from existing ontologies, it is important since the beginning to define the ontology *scope*. What is the “knowledge world” your ontology will address? Moreover a list of possible questions to the ontology (identified in the use cases, see previous section) could result to be very useful to check possible inconsistencies of answering path. In fact a few distinctions in branches appear not always so “natural”, sometimes they look as “forced”.

How many relations have been identified? What’s about their types?

To distinguish between in-branch and between-branches relations does not appear a clear matter.

Both multicultural and multilingual dimensions need to be stressed and further specified. Moreover it could be nice to relate such a dimension with different branches; may be each branch could contain, among others, multicultural dimensions.

It is not necessary to connect different branches to a unique class “thing”; in fact you could consider to have different ontologies over which a reasoning process could be launched by an application.

It is necessary to use coherently terms: instance, class, subclass, attribute, property, ... concept instance, instance value, etc. Moreover, please, pay attention to use the same term in the same context with different meaning (for example what does “skill” mean in Competency branch?).

### Ontology population

The experience of *EuroWordNET* could be very useful in defining your multilingual multicultural ontology. You are in a better situation as since the beginning you can create the ontology in a multilingual multicultural fashion.

Have you carried on a complete inventory of conceptual and technological resources for education? The last ones could be used to populate TEO ontology. Have you considered to implement methodologies for automatic acquisition of concepts from document processing techniques? While they could be out of the scope of your current job, it could be important to compare different approaches.

You declare availability of about 70000 resources from project partners: please be careful that all of them be described by the ontology; check for consistence and coherence.

In case you would implement a bottom-up approach (further to the top-down one until now adopted) starting from available 70000 resources by identifying commonalities, these resources could be used to define a first partial, technical ontology. Then you could compare the two resulting ontologies.

It is not evident where “real” instances will be stored. Where are the resources described in the ontology? Who will manage them? Are they proprietary? Are on the web and publicly accessible?

Check consistency of data model and ontology structure before populating activity.

#### Ontology evaluation

As ontology is one of the most relevant outcome of Share.TEC, it is important to evaluate such a resource.

Have you considered the task of ontology evaluation? Who will be in charge of it? Have been identified classes and number of evaluators? Has been defined the evaluation protocol? The structure of evaluators team needs to be defined with accuracy.

What parameters (types and range) will be used for ontology evaluation purposes? (at the very end, the success of a resource as *WordNet* is in the number of its users!).

## 2. Declan O’Sullivan - Trinity College Dublin, IE

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### Feedback to SHARETEC Project

1. This is a very ambitious project and it is clear from interactions with project participants at the workshop that it is staffed by committed and skilled people.

2. It is impressive the amount of progress that has been made in the early stage of the project but it is critical now to consolidate this progress and address some challenges at an early stage.

3. It is clear to me that the first challenge is quickly coming to an agreement of how to use the CMM and TEO in conjunction with each other and to best effect. It is clear that the real added value to the project from a user's perspective come from an effectively inferencing over the ontology.

4. It is also clear to me that this challenge must be overcome very quickly, as the generation of metadata from learning objects is very unlikely to be possible automatically, especially when the categorisation involves ontology elements

5. Also I believe that you will not be able to make progress on validating your ontology and designing your search/query/inferencing components until you have a better idea of the needs of the target audience/users. Thus completion and validation of use cases (started at the workshop) in partnership with target users is vital and needs to be undertaken quickly.

### 3. Monique Grandbastien - Université Poincaré Nancy1, FR

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#### REMARKS AND SUGGESTIONS ABOUT THE SHARE.TEC PROJECT AND THE TEO ONTOLOGY

MONIQUE GRANDBASTIEN, LORIA, UHP NANCY1, FRANCE, JANUARY 2009

##### *Introduction*

Grasping the essence of a project where many persons have worked for several months in a limited amount of time is always a risky task ! So the following remarks and suggestions have to be read and taken (or not taken) into account keeping this context in mind.

As an expert for the Venice January workshop, I was asked to provide a feedback about the TEO (Ontology for Teacher Education) version released on December 31st 2008. Although I tried to provide such a feedback, it appeared during the workshop that the project context was not clear enough in the ontology deliverable. Many questions were clarified during the workshop which provided me with a broader and better informed view on the project. The following remarks and suggestions have been enriched after the workshop, consequently they are dealing with the whole project as well as with the TEO deliverable.

##### *About the Share.TEC project*

The objectives and rationale of the Share.TEC project are clearly understandable from the Annex 1 of the Share.TEC proposal :The project aims at supporting the Europe's knowledge society by creating a digital environment that fosters access, retrieval, and reuse of resources for Teacher Education (TE) across Europe. Although there are several attempts and proposals for sharing resources in the Education field, no one is dedicated to Teacher Education and nothing is currently available and working for fostering TE resource sharing throughout Europe. So I fully support this initiative.

After only six months bringing together partners that were not used to work together before, many issues have already been tackled as exemplified by the deliverables and the presentations provided during the workshop. This is not so usual in many projects !

Among those issues :

##### User involvement

User involvement is stated as an essential feature of Share.TEC. This point has been discussed a lot during the workshop, In addition to the summary provided on February 5th, I will argue later that it is true from the very beginning of the modelling process, namely for the TEO design also.

Moreover, scenario patterns have been proposed during the workshop, but they must urgently be replaced by real scenarios provided by a significant number of targeted end-users. Users groups have to be created in each partner's setting, and as far as possible they should go on working for the whole duration of the project.

Of course, as discussed, in parallel, a simple version v1 of a system should be made available in order to keep their attention and willingness to take part in the participative design.

Teacher trainers are very busy, but from my experience gained in retraining teachers to ICT in the eighties and nineties, I can say they are also curious and willing to update their understanding of the world, so maybe explaining Web 2.0 issues and participatory design could motivate some of them for the challenge of the Share.TEC project (see O'Reilly founding paper). For others, other starting points should be proposed, the important point is to attract them and to keep their interest, and many different ways have to be adopted.

### **TEO's role in the project**

The TEO ontology plays a major role in the project, and in fact several roles that should be better identified and commented in the TEO deliverable. In my view, there are three major roles :

**Role 1 : Providing a consensus about basic concepts within the TE community** throughout Europe. Even if this role is not described in these terms in the project plan, such a consensus is essential if the Share.TEC system is to be widely adopted and used in the future. This is always true for any ontology design process in which human users are involved. The consensual view of a domain is an essential component in any ontology design process. Again from my experience in the LUISA project ( STREP from the FP6 framework, 2006-2008), the teachers who tested our system (also about retrieving resources for students) asked for the addition of an explanation service showing which inferences were performed in order to compute the solution, answering such a request needs to share with them our domain ontology and our competency ontology on which were based our reasoning rules. Of course the students who tested the system did not ask for such a service. That is to underline that a community of teachers is likely to ask for understanding what is hidden behind the scene.

In my view, taking actions for reaching such a consensus has been underestimated in the Share.TEC workplan as until now.

**Role 2 : To stand as a semantic description of the domain and to be used for describing** the TE resources

**Role 3 : To allow inferences as requested by the services** that are provided on the Share.TEC system (advanced retrieving process, user adaptation, etc...)

### **Common metadata model**

The CMM is another core issue, as the availability of a significant number of indexed resources is essential for getting end-users feedback.



Defining CMM as a LOM profile should allow to include already LOM indexed resources. As new fields dedicated to teacher training are concerned, use-cases have to be carefully defined, with some « in depth » orientation in order to provide a significant added value compared to some Google-like search.

Try some kind of user indexing (dedicated seminars in each participating institution) and also of course as much automatic generation as possible.

In LUISA we chose to work with a very small set of the LOM metadata (plus the LUISA specific data), it prevented us from filling all the LOM fields !

### **Competencies versus topics**

The discussions during the workshop reveal cultural differences about the use of competencies in teacher training, and for having worked with Canadian colleagues for many years, I have always been impressed by their « culture of competency » that was not used at all in France for initial teacher training twenty years ago. So I completely agree with the necessity of taking these still existing cultural differences into account. However, if Share.TEC aims at preparing teachers for the future, including competency management, or at least letting a door well opened for competency management seems very important to me.

### ***About the TEO ontology***

#### **Originality and requirements**

Hereafter, I start with some of the Share.TEC objectives and comment about related issues concerning the TEO ontology.

« Bridging cultural differences »

This is a novel and interesting issue in educational environments design as well as in ontology design, see for instance (see for instance CATS 2008 Culturally Aware Tutoring Systems, a workshop held with the 2008 ITS conference, another CATS is likely to be announced for 2009)

« Semantic, linguistic, cultural interoperability »

In my view, an ontology is providing a semantic framework at the conceptual level, the linguistic level should be kept separate... It does not mean that this language issue is not important, I agree with the requirement of having definitions, views, etc.. adapted to the linguistic context, but it is a different issue.

« Collaboratively develop a common European-level TE ontology »

Which collaborative process has been set up ? As far as I understand a small group of persons have browsed existing models and proposed a first version to other partners. That is a good starting point, but how to go on now for getting more input about the concept definitions, how to make this ontology available, for itself and through services ?

There are very different views and traditions about teacher education in Europe (and the partners are well aware of that situation), so reaching a consensus will be a long process that should be supported for itself. Maybe this goal goes further than the project's objectives and should be supported by additional resources (linked projects)

### **Better documenting the ontology development process**

One point is to document the result of the process, I mean TEO, this is done through the comment fields. Another point which is crucial for future adoption is to carefully document the process that lead to the present version, as well as it will be crucial to document the reasons and decisions that will lead to other versions.

Write what you agree on and also what you disagree on !

For example, we need to know more precisely which existing ontologies were considered, what you borrowed from them, this could be easily summarized in an array... an empty case would be meaningful...it informs the reader that nothing has been found in the paper or ontology.

TEO is a component of the system, the life-cycle of TEO development, deployment, updating should be set up, with who is in charge of what and when.

### **More detailed remarks about the deliverable**

The first set of concepts is OK for me at a first glance. And I am not in the position of performing a detailed analysis.

§3 Communalities and Specificities «instantiated with concrete specific language ontologies», see previous paragraphs, and keep conceptual issues separated from linguistic and cultural issues. In the document, language issues are sometimes mixed with cultural issues

However, as this is an, important and difficult issue, provide a meaningful set of examples where the difficulty occurs, it will help to make design choices.

Is-A and Part-Of relations

How did you use these relations ? Where they sufficient to describe the domain ? Any discussion or slight deviation in the use of the basic relations (see papers from Guarino about the semantics of the basic relations from upper ontologies) should be carefully documented. No modelling difficulty is related in the present document???? The problems you experienced are likely to be raised again by newcomers, and instead of misunderstanding your model, they should be informed of the choices you made.

The reference part should be enriched.

### ***Conclusion***

The general questions raised by the TEO design are addressed in different communities. For instance in France the Knowledge Engineering community is setting up a workshop for building « a good practices guide » intended for new ontology designers. There are many specialized publications in the KE community about methodological issues, but they are not always understandable and usable by beginners. So maybe we come back with additional suggestions in the coming months.

The TE specific questions raised are challenging and I do hope getting in touch with the project progress.

#### 4. Conor Galvin - University College Dublin, IE

(from the Slide presentation at workshop – slides contained in Appendix 9)

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#### **Share.TEC - Some Key Challenges for the Project in Relation to Teacher Education.**

(Conor Galvin PhD UCD Dublin School of Education and Share.TEC Advisory Board:  
Share.TEC Project Partners Meeting and Workshop San Servolo,  
Venice 21-24 January 2009)

- Whose need? “ A response to a need within the teacher education field...”
- My elephants...1  
Understanding why& when teacher educators use T&L materials... and the ways this might be problematic for any repository project.  
Is it mostly Education Sciences area? Is it subject skills related? Is it praxis related?  
Lesson plans... worksheets... websites.... On line resources...
- My elephants...2  
Teacher educators and how they view their world and their work... initial, induction/early stage, CPD.  
NOT FaceBook addicts in the main! It must be the most accessible ‘site’ out there.  
Del.icio.us is the edge of the world.  
Competencies... not a straightforward issue.
- My elephants...3  
Where’s the PCK?  
“Pedagogical content knowledge identifies the distinctive bodies of knowledge for teaching. It represents the blending of content and pedagogy into an understanding of how particular topics, problems or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction. Pedagogical content knowledge is the category most likely to distinguish the understanding of the content specialist from that of the pedagogue.” (Lee Shulman)
- Grazie! conor.galvin@ucd.ie

## **Appendix 9: Documents presented and produced at the workshop**

The following documents were presented at the workshop or produced as part of, or in conjunction with, workshop activities. Please note that in the electronic version the following documents are contained separately (see “Appendix 9” folder).

### *Index of included documents*

**Introduction to the Share.TEC project** (*file1.pdf*)

**Overview of Teacher Education Ontology** (*file2.pdf*)

**Overview of Common Metadata Model & its relations with TEO (OUNL)** (*file3.pdf*)

**Conor Galvin Feedback** (*file4.pdf*)

**Presentation of key issues as seen from inside the consortium – TEO & CMM (ITD & OUNL)** (*file5.pdf*)

**Reflections on TEO and CMM (UVA)** (*file6.pdf*)

**Ontology and metadata model & impact on interoperability of the federated system (OUNL)** (*file7.pdf*)

**Ontology and metadata model & impact on system architecture (UVA)** (*file8.pdf*)

**Ontology and metadata model & impact on proposed user functionalities and interface (NIS-SU)** (*file9.pdf*)

**Group sessions report: Group 1 slides** (*file10.pdf*)

**Group sessions report: Group 1 minutes** (*file11.pdf*)

**Group sessions report: Group 2 slides** (*file12.pdf*)

**Group sessions report: Group 2 minutes** (*file13.pdf*)

**Scenario model (NIS-SU)** (*file14.pdf*)

**Use case model (NIS-SU)** (*file15.pdf*)

**Gilbert Paquette presentation - “Competencies: An Ontology, its Development and Use”** (*file16.pdf*)

**Introduction to the Share.TEC project**

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**Group sessions report: Group 1 minutes**

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**Group sessions report: Group 2 minutes**

**Scenario model (NIS-SU)**

**Use case model (NIS-SU)**

**Gilbert Paquette presentation - “Competencies: An Ontology, its Development and Use”**