Accessibility of information

2.3.1.1 ARIADNE (By: Hans Põldoja, University of Art and Design Helsinki, UIAH, Media Lab hans.poldoja@uiah.fi)

The ARIADNE Foundation was created to exploit and further develop the results of the ARIADNE and ARIADNE II European Projects, which created tools and methodologies for producing, managing and reusing computer-based pedagogical elements and telematics supported training curricula.

ARIADNE and ARIADNE II are research and technology development (RTD) projects pertaining to the "Telematics for Education and Training" sector of the 4th Framework Program for R&D of the European Union.
The first phase of ARIADNE lasted from January 1996 to May 1998 and the second phase from June 1998 to June 2000. ARIADNE was supported financially by the European Union Commission, and, for Swiss contractors, by the Swiss Federal Office for Education and Science (OFES).

The exact number of members of ARIADNE I & II is not published on the project website, but 50 man-years was invested in the first phase and 75 man-years in the second phase. Currently 51 institutional and 5 individual members are listed on the project website.*(22-09-2005)*

ARIADNE is highly relevant for UNIVe Accessibility of information theme, because it has been one of the most important R&D projects in the field of learning technology standards. IEEE Learning Object Metadata standard has its origins also in ARIADNE.

Main source of information about ARIADNE project is the project website at: http://www.ariadne-eu.org/.E-mail address for contacts is ariadne@ariadne-eu.org.

Main outcomes of the project

The aim of **ARIADNE I** was to develop and test prototypes of the tools and basic methodologies for maintaining and exploiting the knowledge pools in all forms of classical, continuing, open and distance education or training.
The aim of **ARIADNE II** was to perfect and validate the tools and methodologies through large-scale demonstrations.

ARIADNE's Work in Educational Metadata

Since December 1997, ARIADNE has been involved in standardization activities performed under the auspices of the IEEE LTSC Committee.
In this context, ARIADNE has agreed to collaborate with the IMS Project, in view of reaching as quickly as possible an Educational Metadata set that would be widely acceptable. This collaborative work has produced various successive IEEE Working Documents that draw largely on ARIADNE's inputs. ARIADNE is also active in the standardization activities initiated by the European Commission, taking place under the auspices of the CEN/LTWS (Learning Technologies Workshop). ARIADNE has

also established cooperation with the ADL Initiative, which is working on the SCORM specification.

ARIADNE's latest Educational Metadata Recommendation version 3.2 is from February 2002 (Ariadne, 2002). The current Educational Metadata Recommendation is an application profile of the LOM specification, in the sense that this recommendation is fully compatible with the LOM specification, and instantiates it for the ARIADNE community. It takes into account the specific needs and requirements of a community that is highly representative of European Higher Education and Continuing Professional Training. It should also cover the needs of other educational or training communities that value cultural and linguistic diversity and favour wide scale sharing and reusing of knowledge resources.

ARIADNE has emphasized on solving the following usability problems that arise when a metadata system is widely used:

1. *indexation* (i.e. the creation of the metadata by human persons) should be as *easy* as possible;
2. *exploitation* of the metadata by users looking for relevant pedagogical material should be as *easy* and *efficient* as possible.

ARIADNE provides an easier subset of IEEE LOM metadata standard (IEEE, 2002). The main differences in grouping of data elements between IEEE LOM and ARIADNE Educational Metadata Recommendation version 3.2 are presented in Table 1.

Table 1. Comparison of metadata elements between ARIADNE and IEEE LOM

ARIADNE v 3.2	IEEE LOM
1. **General**: groups the general information that describes the learning object such as document title, document language, etc. 2. **Semantics**: groups elements that describe the semantic classification of the learning object like the science type, main discipline, sub discipline etc. 3. **Pedagogical**: groups elements that describe the pedagogic and educational characteristics of the learning object such as semantic density, interactivity level, etc. 4. **Technical**: groups elements that describe the technical requirements and characteristics of the learning object like OS version, required disk space, etc. 5. **Indexation**: groups elements that describe the general information about the metadata itself of the	1. **General**: document title, document language, etc. 2. **Life Cycle**: version, status, contributors. 3. **Meta-metadata**: the general information about the metadata itself. 4. **Technical**: technical information about the learning object and requirements for using it. 5. **Educational**: educational characteristics of the learning object. 6. **Rights**: cost and copyright issues. 7. **Relation**: relations between the learning object and it's target learning object. 8. **Annotation**: groups elements that describe notes about learning objects. 9. **Classification**: describes the place of the learning object in a particular classification system.

learning object such as the identifier of the metadata instance, metadata creation date, creator, etc. 6. **Annotations**: groups elements that describe people or organizations notes about learning objects like annotator, language of annotations, and date of annotation.	

The most innovative original ARIADNE work is the educational metadata, including:

- Document type (active or expositive);
- Format (questionnaire, simulation, hypertext, and others);
- Usage remarks (explaining how the document can be used in a pedagogically sound way);
- Didactical context and course level (describing the kind of learners for whom the document is intended);
- Difficulty level, interactivity level, and semantic density (qualitative indicators range from "very low" to "very high"); and
- Pedagogical duration (time typically needed by learners to work with the document).

The ARIADNE metadata structure can be mapped into the IEEE LOM structure. The reverse mapping from IEEE LOM to ARIADNE is currently under research (Najjar, Duval, Ternier, Neven, 2003).

ARIADNE system tools

Several tools were developed in the frame of ARIADNE project. These tools can be categorized as:

- Core tools
- Authoring tools
- Communication tools

The purpose of the core tools is to allow indexing, storage, and diffusion of the various teaching documents. Core tools include the Knowledge Pool System (KPS), The Indexation Tool (TM5), The Ariadne Curriculum Editor (TM6), The Curriculum Description File Editor (TM6/A) and The Ariadne Learner Interface (ALI).

Authoring tools include instructional simulations authoring tool OASIS (TM1), questionnaire tool set TestIT (TM2), pedagogic hypertext generators SEPHYR and OPHELIA (TM3) and autoevaluation generation tool GenEval (TM7).

Communication tools are not integrated into ARIADNE package yet, but they may be integrated into Ariadne Learner Interface easily.

Most of the ARIADNE tools are available only to authorized ARIADNE users. Older applications have been implemented only for Windows, recent applications are developed on Java platform and can be used on various operating systems that support Java.

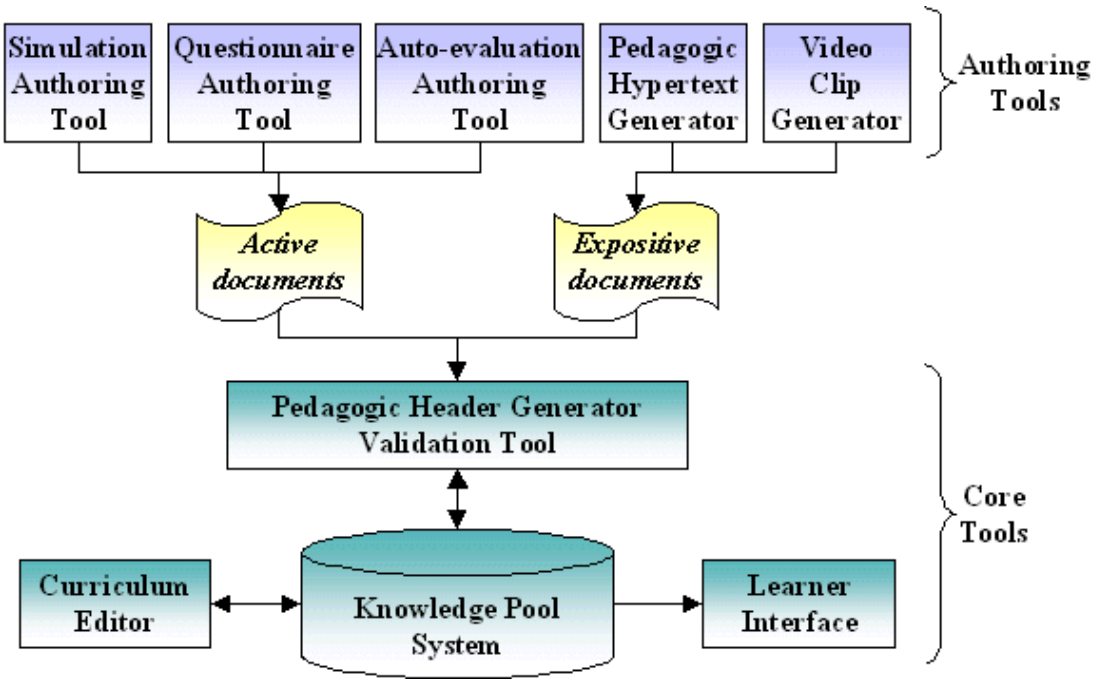

Image 1. Ariadne system tools (Ariadne, 2004)

The ARIADNE Knowledge Pool System consists of local and regional knowledge pools. Due to the KPS's distributed nature and European context, support for multiple languages is extremely important. English and French each account for more than 30% of the documents; Italian, German, and Dutch each account for about 10% of the documents (Duval *et al*, 2001).

The KPS includes descriptions (metadata), as well as the documents themselves. KPS content can include anything digital without format restrictions. When a document consists of more than one file (such as an HTML document with embedded images) all relevant files are included in one compressed zip file. Documents are divided to active documents requiring a reasoned action by the learner (such as a questionnaire or an exercise) and expositive documents (such as a text or video clip) requiring the learner to read, listen, or watch. The access to the documents is granted to the ARIADNE community, others have access only to the metadata.

In 2003 Ariadne KPS included more than 3900 learning objects, which were collected during 7 years. Most learning objects are HTML files, also, PDF, MS-Word, and MS PowerPoint media types also occur frequently. It is common that only part of metadata fields are filled. Almost all learning objects had the granularity (aggregation level) specified, didactical context, interactivity level, semantic density and dificulty level were used in about 50% of the descriptions. Other fields like technical information were left blank in most of the cases (Najjar, Ternier, Duval, 2003).

Usability of outcomes in the UNIVe context

ARIADNE can be recommended as a good example of social and legal cooperation model. Currently ARIADNE works on as a non-profit association; The ARIADNE Foundation.

The main social objectives of the foundation are:

- Foster cooperation between educational bodies through the set-up and exploitation of a truely European Knowledge Pool;
- Keep social and citizenship aspects dominating Education, combat an evolution towards making it a mere marketable item;
- Uphold and protect multilinguality and the use of national/regional languages in education;
- Define by international consensus what aspects of ICT-based formation should be standardized and what should be left local (Ariadne 2004).

Estonian E-university needs a learning content management system, which is shared between all members of consortium, compatible with learning technology standards and interoperable with various learning management systems.

Nowadays IEEE LOM is the preferred metadata model for the development of a learning content management system. One of the main concerns remains is the selection of the metadata subset that supports the needs of the target community. ARIADNE provides the subset that is suitable for the European context.

It is not realistic to develop a learning object repository with same functionalities as ARIADNE KPS in Estonia. Therefore Estonian e-University should ponder about joining the ARIADNE foundation. The main benefit would be possibility to store Estonian learning objects in the repository. Learning objects that are freely available from KPS can be modified and translated to Estonian. In 2001 about 50% of the learning objects were about computer science (Duval *et al* 2001).

References

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