METASCHOOL

Challenges in Training Teacher about Metadata and Online Resources
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METASCHOOL

Challenges in Training Teacher about Metadata and Online Resources

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Preface

Contribution to key competences in a digital world

As Alvin Tofler wrote: “The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn”.

The evolution of Information and Communication Technologies creates numerous opportunities for providing new standards of quality in educational services. The Internet is increasingly becoming one of the dominant mediums for learning, training and working, and learning resources are continuously made available online in a digital format to enable and facilitate productive online learning. Online learning resources may include online courses, best practices, simulations, online experiments, presentations, reports, textbooks, as well as other types of digital resources that can be used for teaching and learning purposes. They may cover numerous topics such as computing, business, art, engineering, technology and agriculture. They are offered by various types of organisations in different languages, at different cost rates, and aim at different learning settings. In general, the potential of digital resources that can be used to facilitate learning and training, and which are available online, is rapidly increasing.

Recent advances in the e-learning field have witnessed the emergence of the learning object concept. A learning object is considered to be any type of digital resource that can be reused to support learning. Learning objects and/or their associated metadata are typically organised, classified and stored in online databases, which are termed as learning object repositories. In this way, their offering to learners, teachers and tutors is facilitated through a rich variety of different learning object repositories that is currently operating online.

Today's teachers need to be prepared to provide technology-supported learning opportunities for their students. Being prepared to use technology and knowing how that technology can support student learning have become integral skills in every teacher’s professional repertoire. Teachers need to be prepared to empower students with the advantages technology can bring. Schools and classrooms, both real and virtual, must have teachers who are equipped with technology resources and skills and who can effectively teach the necessary subject matter content while incorporating technology concepts and skills.

In this framework, the conference aims to raise teachers’ digital competence by developing skills in using computers to retrieve, assess, store, produce and exchange digital learning resources. A rich collection of examples of scenarios and visions will be presented and discussed in detail. Through the conference teachers will participate in a series of presentations that will not only improve teacher practice, but also to raise the awareness of teachers across Europe on the need for accurate tagging of resources.

The Editors
Towards Teacher Competence on Metadata and Online Resources: the Case of Agricultural Learning Resources

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Abstract

Schools and classrooms, both real and virtual, must have teachers who are equipped with technology resources and skills and who can effectively teach the necessary subject matter content while incorporating technology concepts and skills. This need becomes even more evident in the case of agricultural, environmental and other life science topics, where the existence of interactive learning resources can greatly facilitate the teaching activities within the classroom. In this direction, a new European initiative (the METASCHOOL Comenius project) has been deployed to improve the in-service training of school teachers and school ICT staff on topics related to the organisation, sharing, use and re-use of digital learning resources that can be accessed online through learning repositories. Particular focus is given to agricultural topics, since learning resources on organic agriculture and agroecology will be collected, organised, annotated with metadata, and published in a learning repository. This paper presents this new initiative, introduces its aims, and outlines its main objectives.

Keywords: digital learning resources, learning repositories, metadata.

1. Introduction

Digital learning resources were initially conceived as a tool to make distance education efficient, by easing teacher’s re-use of self-contained chunks of educational material (referred to from now on as teaching & learning resources/objects) for course construction. Digital learning repositories (DLRs), where digital learning resources are systematically organised, classified and published online, can be a potential source for covering such lifelong learning needs (Tzikopoulos et al., 2006). Many institutions are currently engaged in developing DLRs that can be searchable and accessible from a wide audience. Examples include MERLOT (http://www.merlot.org), CAREO (http://careo.netera.ca/), Online Learning Netowork (http://www.onlinelearning.net/), Digital Think (http://www.digitalthink.com/), EDNA (http://www.edna.edu.au), and SMETE (http://www.smete.
Many of these DRLs contain digital learning resources that are related with the rural sector (Tzikopoulos et al., 2005). They were subsequently recognised to have the potential to be helpful for education in general, since into learning resources repositories teachers may find innovative proposals to improve their educational practice (such as materials to carry out problem-based activities), as well as simple technological tools (such as Java applets for simulating complex scientific phenomena) whose implementation might be beyond their competence. However the diffusion of digital learning resources has been slowed down as a sequence of the fact that computers, despite having been introduced into schools from the eighties, are not yet deeply integrated into school activity. Moreover, research has highlighted a number of difficulties that still hinder teachers’ appreciation and actual use of digital learning resources in school, such as the scarce information on the resources quality and the limited congruence of the metadata standards with the current indications of the learning theories. There is also a problem of context: an educational resource suitable for teaching in UK schools may be unsuitable for supporting the teaching of the National Curriculum in a school in Greece.

In this direction, a new European initiative (the METASCHOOL Comenius project, http://www.ea.gr/ep/metaschool/) has been deployed improve the in-service training of school teachers and school ICT staff on topics related to the organisation, sharing, use and re-use of digital learning resources that can be accessed online through learning repositories. Building upon previous successful experience, a consortium that brings together significant expertise from the fields of teacher training programmes and curriculum development, content and web repositories organisation and teachers’ performance evaluation and assessment, has been set up. Its aim is to develop a practical training framework for improving the quality of teaching and learning in the classroom through the effective use of digital content. The overall objective of the project is not only to improve teacher practice, but also to raise the awareness of teachers across Europe on the need for accurate tagging of resources. It achieves this through a user-friendly approach that motivates teachers to quickly and easily add metadata to resources that they have both used and created. Particular focus is given to agricultural topics, since learning resources on organic agriculture and agroecology will be collected, organised, annotated with metadata, and published in a learning repository. These resources will be available by school teachers to use in order to support educational activities in their schools like the preparation, planting, and growing of an organic garden in their school. More specifically, METASCHOOL will mainly carry out the following activities:

- It will adapt, develop, test, implement and disseminate a new training framework (including an appropriate curriculum, training activities that include good in-school practices, as well as a variety of supporting material) that will support the in-service training of (mainly) teachers and (also) ICT personnel of school staff on topics related to metadata, learning resources, and learning repositories.
- It will adapt, develop, test, implement and disseminate strategies and best practices for organising favourite/useful learning resources into personal portfolios of digital resources, as
well as setting up and using learning repositories on a school or regional level.

- It will suggest and test a variety of teaching methodologies and pedagogical strategies for using digital learning resources in the classroom, for two particular subject areas: science education and agroecology.

- It will also focus on promoting the creation of a European virtual space for interconnecting school repositories and exchanging/sharing teaching resources.

- It will organise pilot training and validation activities of both teachers and ICT staff (where possible) from schools all over Europe, exploring suggested methods & strategies on how they can take benefit from organising learning resources in personal portfolios and learning repositories, as well as from exchanging resources and teaching strategies with other teachers around Europe.

- It will also involve organisations that are active in school education and that particularly work on the promotion and best use of digital learning resources in the classroom on a European level.

- Finally the METASCHOOL consortium aims to deliver a structured & reusable set of guidelines and recommendations in all project languages (i.e. English, Greek, German, and Czech), which will further support the development and assessment of teacher training programs on the use of digital content and online resources for teaching and learning. The teacher training activities of METASCHOOL will be implemented in selected pilot schools from Greece, Austria, and Czech Republic, during the first year of the project. Their further testing and validation will be achieved through further training activities in other European schools from the participating networks, as well as Germany and Sweden.

2. Background

Recent approaches to e-learning have largely focussed around the reuse of resources to develop economies of scale and thus partially address the low usage of ICT. As Mayes and Fowler (1999) pointed out, one problem in focusing on educational resource reuse is that teachers tend to plan their ICT based activities around ‘instructivist’ learning models, which focus on single learners accessing content. Thus, it does not help bridge the gap between modern pedagogical theory and implementation. Recent developments in technology allow us to go beyond resource reuse and support implementation of recent pedagogy, in particular social-constructivist learning processes. Interoperable, networked technologies have the potential to support students’ collaborative activities, allowing them to source, create, adapt, integrate and store resources in a variety of formats. These new possibilities and affordances of e-learning tools mean that it is becoming easier to use technology to support social-constructivist methods of learning, such as collaborative learning through learning communities (Koper, 2004). These learning methods focus on the process of learning and on the learning activities students carry out in order to gain
knowledge of concepts. There are a number of factors constraining the development of reusable learning activities and based on sharable teaching resources:

a. Teachers frequently do not have the skills to develop activities based on a range of educational models. This results in a gap between application of pedagogy and the effective use of tools and resources. Often teachers and learners view technology in terms of how it will help them manage resources rather than supporting learning (Timmis et al. 2004).

b. Any inability to engage with educational taxonomies through unfamiliarity with the relevant metadata and vocabularies makes it very difficult for teachers to search for generic learning activities from various subject disciplines. Teachers would probably have to browse through resources and activities, accessing and viewing each one of them in order to understand their potential for supporting effective learning. While browsing could be an effective strategy for a single collection of a small number of activities, it would be difficult for wider searching.

c. E-learning practice is moving towards the reuse of generative resources (e.g. resources developed during learning tasks). This means that the outputs from learning activities should also be considered for reuse. However, most teachers do not have the required e-literacy skills (for example to archive activities) to allow for effective reuse of learning resources and activities.

d. Any focus on the development of ‘definitive resources’ can lead to the production of inflexible materials that do not cater for individual learning contexts. There is a need for tools that allow the teacher to customise generic components to provide a tailored learning experience (Thomas and Milligan, 2004). However, there are currently few tools available to allow teachers to support learning activity sharing and sequencing (Britain, 2004).

e. Although efforts for collecting teaching & learning resources in learning repositories have long been deployed (Tzikopoulos et al., 2007) school teachers have yet to prove their competence in taking advantage of their full potential. Partially, this is also due to the fact that only recently a complete initiative aiming at the creation of a common European virtual space for resource sharing and reusing has been deployed (and adopted my Ministries of Education around Europe): this is the Learning Resource Exchange (LRE, http://lreforschools.eun.org) of the EUN. The potential from the way it interconnects various school repositories in order to facilitate the formulation of teacher communities around Europe, and the uploading, sharing and reusing of teaching & learning resources, has yet to be exploited.

Overall, schools and classrooms, both real and virtual, must have teachers who are equipped with technology resources and skills and who can effectively teach the necessary subject matter content while incorporating technology concepts and skills. Interactive computer simulations, digital and open educational resources, and sophisticated data-gathering and analysis tools are only a few of the resources that enable teachers to provide previously unimaginable opportunities
for conceptual understanding. Traditional educational practices no longer provide prospective teachers with all the necessary skills for teaching students to survive economically in today’s workplace.

The METASCHOOL project will be realised from 9 partners from 6 European countries and Ellinogermaniki Agogi (EA, http://www.ea.gr) will lead the project. The R&D department of EA has experience in the coordination of research and demonstration projects focusing on teachers training and professional development. EA runs a certified training center from the Greek Ministry of Education since 2000. In the framework of the project it will act also as a content provider through the use of the educational portals that runs, namely the COSMOS (http://www.cosmos-project.eu), DiscoverySpace (http://www.discoveryspace.net), NEMED (http://www.nemed-network.org), and the Organic.Edunet (http://www.organic-edunet.eu).

3. Main Results & Expected Uses

The METASCHOOL consortium will design, develop, test, implement and disseminate an innovative training framework (modular training curriculum along with online and conventional training materials) that will support the in-service training of (mainly) teachers and ICT personnel of school staff on topics related to digital learning resources and repositories (first level), to educational metadata (second level) and to social metadata and folksonomies (third level), as it is graphically represented in Figure 1. The development of the proposed training framework will be based on the adoption of a user-centred approach. The assessment of the training program will include extended cycles of school centred work. Teachers will continuously give feedback to the academic team about their experiences gained in the classroom. This not only will increase the motivation of the teachers, and give weight to their practical experiences, but also will provide the necessary cross-links between theory and practice. Upon suggestions of the teachers, the academic team will perform the necessary adjustments to the training approach. The school trials are not meant for evaluation purposes only, but involve both teachers and students offering them the chance to provide feedback to the project and its pedagogical aspects. The partnership believes that teachers can gain important professional skills and come to view their involvement in this procedure as a craft that requires dedication and precision but simultaneously encourages creativity, humour, and personal expression.

The participating teachers will be trained, through a user centred approach that includes extended presentations of showcases and best practices, on the methodological approaches on how they can integrate digital content available on the web with core academic content in lesson plans and increase student participation in classroom activities (first level). Additionally the training programme will raise the awareness of teachers on the need for accurate tagging of resources and to provide a user-friendly approach that motivates teachers to quickly and easily add metadata to resources that they have both used and created (second level) and to combine the advantages of traditional metadata with state-of-the-art folksonomy approaches to provide unprecedented
versatility (third level).

**Figure 1: Levels of content enrichment**

METASCHOOL experts will adapt, develop, test, implement and disseminate educational strategies and best practices for organising favourite and useful learning resources into personal portfolios of digital resources, as well as setting up and using learning repositories on a school or regional level. Through this, they will demonstrate to teachers how they can be supported in their everyday work, and at the same time develop competencies throughout life. As METASCHOOL is a small scale pilot project, it will focus on two thematic areas: science and environmental/agricultural education. There are two main reasons for the selection of these thematic areas: a) In both cases that available content and resources (both for formal and informal educational activities) on the web are numerous allowing for a variety of instructional approaches b) science teachers are quite familiarised with the use of ICT in their lessons so for them the organisation of the available resources as well as the creation of communities of practice who share exemplary scenarios of use is a high priority. Additionally environmental and agricultural education – although it is presented as a hot issue in our modern societies – it is not fully integrated in the school curricula and in many cases teachers are using alternative channels (e.g. web, extracurricular materials, educational software and other relative resources) to inform their students on the importance of sustainable development.

METASCHOOL aims to involve to this process teachers and ICT support staff from two kinds
of schools a) members of the European Network of Innovative Schools (ENIS) and b) members of the European Network of Rural Schools (Rural Wings). In both cases there are well identified teachers needs for digital content organisation and use. Through a series of demonstrations of existing best practices the METASCHOOL consortium will try to raise the participating teachers awareness on how they can take benefit from organising learning resources in personal portfolios and learning repositories, as well as how to exchange resources and teaching strategies with other teachers around Europe. Through a systematic dissemination strategy the consortium will also involve organisations that are active in school education and that particularly work on the promotion and best use of digital learning resources in the classroom on a European level.

Finally, METASCHOOL will try to develop a structured set of guidelines and recommendations for the development and assessment of teacher training programs in the use of digital content and online resources in teaching and learning. The whole process of the project will be documented and the outcomes will be described to the main outcome of the project, namely the METASCHOOL Guide of Good Practice.

*Figure 2: Areas of Metaschool activities*
4. Conclusions

The METASCHOOL approach aims for knowledge areas’ integration and boosts cross-institutional collaboration and organisational change in the field of both formal and informal education. The main objective of the work is to generate a structured set of recommendations to support the development/deployment of educational digital content services offering enhanced access and reusability. The METASCHOOL Guide of Good Practice, which will documented the whole effort, will include a series of guidelines for the design of Educational Content and Activities, on the appropriate metadata methods needed for their description in respect to both their educational and their domain-related characteristics. The Guide will also offer the guidelines concerning how these templates will be combined and finally it will recommend appropriate processes and benchmarking criteria for quality certification of the educational digital content.

5. Acknowledgment

The work presented in this paper has been funded with support by the European Commission, and more specifically the project No 141942-LLP-1-2008-1-GR-COMENIUS-CMP “Metaschool: Towards Teacher Competence on Metadata and Online Resources” of the Lifelong Learning Comenius Programme.

6. References


Utilising the METASCHOOL approach to develop training modules to use mobile technologies in schools

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Abstract

As devices for mobile communication and mobile computing become increasingly popular there is an apparent need to develop recommended guidelines and practices for use by school personnel to enhance educational practice. This paper proposes the development of a training kit for the METASCHOOL (Towards Teacher Competence on Metadata and Online Resources) training programme and platform. The training kit will consist of several training modules for teachers and ICT staff at schools giving informative, assistive and practical instructions to attain a set of proposed skills. The structure of each module will be well defined conforming to contemporary eLearning standards and will be freely accessible through the METASCHOOL web portal.

Keywords: Learning Resources, Mobile Technologies, Teachers

1. Introduction

Mobile Computing (MoCo) is one of the most challenging future fields in computer science, especially in the eLearning field. However, Mobile Computing is an umbrella term and describes any technology that enables people to access information and supports them in daily workflows independent of location.

In recent years there has been much attention focused on integrating technology with science education to improve the level of science learning and encourage more students to pursue science careers. Software development, improved pedagogical practices and an eLearning focus have contributed to an increased focus on science education. The use of mobile technology has broadened the field of eLearning extensively with its popularity and propensity to extend learning boundaries with informality and a wide range of application.

This paper should give guidelines and practices for the development of a training kit for use by school personnel according to the METASCHOOL training approach. The aim of such training
material is to enhance educational practice by terms of mobile learning and foster the technical and pedagogical skills which arises by using mobile devices in the classroom.

2. METASCHOOL training approach

Teachers in schools need to be empowered in implementing technology enhanced teaching. Therefore classrooms, both real and virtual, must have teachers who are equipped with technology resources and skills and who can effectively teach the necessary subject matter content while incorporating technology concepts and skills.

The METASCHOOL project (www.ea.gr/ep/metaschool) and its services (http://lreforschools.eun.org/METASCHOOL) aim to link available learning content by utilising a user-centered approach through a programme of in-service training of school teachers and school ICT staff. The in-service programme focuses on topics related to the organisation, sharing, use and re-use of digital learning resources that can be accessed through online learning repositories.

The main outcome of the METASCHOOL project is an innovative training programme on the pedagogical approaches teachers can use to integrate web-based digital content with core academic content in lesson plans and thereby increase student participation in the classroom. The programme is based on techniques that teachers can utilise to motivate their students with real world learning activities that develop problem solving, collaboration, and effective communication skills.

3. Training kit for mobile technology

The proposed training kit will include structured examples of good practice demonstrating how teachers integrate and use the dynamics of digital (mobile) learning and content in everyday teaching. The social communication aspect of mobile technology has characteristics that have much potential for collaborative learning. The flexibility, informality and personalisation that mobile technologies offer, can extend the traditional classroom boundaries (Caballé et al., 2010). Using the social aspect characteristics, the learner’s motivation has the potential to increase and users are willing to spend more time both in formal and informal settings with educational content.
# Mobile Flash eLearning Evolution

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<th>Development System/Programming Language</th>
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<td>Flash Lite 1.1</td>
<td>Flash Lite 1.3</td>
<td>Action Script 3 (OOP)</td>
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<td>Online Examples</td>
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The use and deployment of mobile technology within an educational context are the main objectives of the training modules presented in this paper. Creating a constructivist learning environment in the classroom where technology is used in a meaningful way (Kafai, 2006) allows students to engage with and design their learning. Students are then able to see a development in their learning (Maloney, 2006) and are stimulated for further collaboration in this learning/training construct. The training modules are succinct themed units, but they are combined into one training kit called “Learning with mobile devices” as they are all structured around the inclusion and use of mobile technology to improve and increase learning potential.

### 4. Training modules

These training modules are developed around the intended learning for students. The main focus is the pedagogical constructs of constructivism and system approach that provide a rubric to give teachers and instructors a tangible guide to build their learning on. This rubric showcases elements of action learning involving group skills, problem solving and reflection/evaluation. It also provides suggestions on when teachers can use these pedagogical tools.

Enhancing the pedagogy framework is the use of technology which is intended to motivate and provide further challenge opportunities. Technology also provides students with another voice with which to express themselves. Technology enables teachers to provide a diverse learning environment catering to the needs of individual learners and enabling a flexible learning

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<th>Examples for different mobile eLearning Generation</th>
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environment.

4.1 The METASCHOOL Training Framework Structure
A modular approach for designing the METASCHOOL Training Program was chosen in order to take the different levels of experience with online repositories, the different educational backgrounds and national peculiarities of the European countries into account.

First, all modules were designed in English and developed to serve individual learning needs, starting with basic information on metadata and repositories, up to training on very specific applications and tools. Two additional modules focus on best-practice training on the use of certain online applications. Each module follows the same training structure consisting of the “Details” Section, that outlines the main purpose of the module and the corresponding training activities, the “Pedagogical Section” that explains the learning objectives of the respective, the actual “Process, that contains the concrete tasks, the reflection phase and the necessary timeframe. The “Evaluation Section” recommends evaluation activities, the “Follow-up Section” suggests resulting activities, and the module finally ends with a “Link Sections”.

4.2 Sample Module: Introduction to use mobile devices with educational content

Details: In this module the user will become familiar with basic principles of using mobile devices in classroom - Set up mobile devices; upload educational content to a mobile device; navigate through educational content on a mobile device.

Pedagogical Objectives: This module is based on collaborative knowledge building by encouraging teachers to gain familiarity with the technology and then form a support network with other teachers to evaluate and use the educational content on the mobile device.

Process:
1. Check that the mobile device is compatible for Flash (needed for the educational content). Go to the page on the Adobe Website http://www.adobe.com/flashplatform/supported_devices/smartphones.html
2. Check that participants are registered with the LA@CERN site http://www.learningwithatlas-portal.eu/en/user/register
3. To download material to your mobile phone, navigate to http://www.learningwithatlas-portal.eu/en/node/93580

Content:
Introduction to mobile learning, background and why to use it. Short activity about using the functions of a mobile phone using research from people such as Sharples (2005) and Kukulska-Hulme and Traxler (2007) to highlight the versatility of such devices. Participants develop a short
learning activity using their own mobile devices.

Short introduction to the Flash Site operating system.

Participants navigate to the content site and download material on the appropriate devices. Facilitators have to ensure that there is at least one approved device per group.

Each group is given a function of the menu and asked to develop a short summary of the content and suggest how such content may be used in a learning scenario. Participants are also asked to develop links between this mobile application and other subject similar learning applications that may be used to develop a topic.

QR Code usage with mobile Phones

Evaluation/Follow-Up:

Participants are asked to evaluate the material for use in an educational setting and in their schools. Does the mLearning initiative complement their teaching styles and their particular school’s learning practices? Is the device easy to use, is the material easy to obtain and navigate and would it hold sufficient interest for their students?

Links:

http://www.adobe.com/flashplatform/supported_devices/smartphones.html
5. Conclusion

There has been much interest in the development and use of mobile devices for the education sector. The development of modules for mobile applications to be used in schools integrates learning with a technology that students are very familiar with and is intended to further motivate the engagement of students with the study of diverse aspects of the curriculum and in the case of METASCHOOL, science.

The module development also highlights a significant focus on the use of pedagogy with the technology integration. Rather than design the curriculum around the technology, these modules are structured whereby the learning phases are augmented by a technology use and a particular pedagogical construct. Targeting the learning matter as the main intent, focuses student attention on the curriculum and how to engage with the content by the use of technology hence increasing the motivation of the students. The structured use of pedagogy also engages greater cognitive processes amongst students enabling synthesis and analysis of the material leading to a deeper understanding and interest in science. The use of mobile technology with science instruction enhances ubiquitous learning, a trait to be encouraged and nurtured in the learning landscape.

6. Acknowledgment

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7. References


METASCHOOL project Portal: http://lreforschools.eun.org/METASCHOOL

METASCHOOL project site: http://www.ea.gr/ep/METASCHOOL/

Abstract
Supporting agricultural education comprises a significant issue for modern economies so as to ensure a sufficient, quality and affordable food production. To this end, the plethora of available ICT tools should be taken into account as they raise new opportunities and challenges. Thus, this paper focuses on supporting agricultural education through the use of digital learning repositories and learning objects. A learning object is any entity, digital or non-digital, that may be used for learning, education or training. Learning objects should include some learning objectives and outcomes, assessments, and other instructional components, as well as the object itself. Digital learning repositories are used for storing, reusing and sharing learning objects. Concerning agricultural learning repositories, a few have been developed till today, such as the Rural e-Gov Observatory (rural-egov.eu), the Bio@gro (bioagro.gr), the CG-Online Learning Resources (learning.cgiar.org) and TrAgLor (traglor.cu.edu.tr). The impact of such repositories in agricultural education depends on the tutors’ skills to use them and incorporate their resources in their educational activities. Therefore, the paper gives an overview of the METASCHOOL project, a new European initiative for supporting the in-service training of tutors on learning objects and learning repositories. In particular, it presents the training of agricultural tutors in using, sharing and tagging Organic Agriculture and Agroecology resources. Special emphasis is given on adding agricultural metadata and organising agricultural learning resources in personal portfolios and learning repositories and exchanging resources and teaching strategies with tutors around Europe.

Key Words: Digital learning resources, digital learning repositories, agriculture, training

1. Introduction
Supporting agricultural education comprises a significant issue for economies so as to ensure a sufficient, quality and affordable food production, as well as the conservation of natural resources, the competitiveness and sustainability of agricultural businesses and the welfare of rural communities. Agricultural education is considered as the community of scholarship between
agriculture and education; it is the scientific study of the principles and methods of teaching and learning as they pertain to agriculture (Barrick, 1988). In broad terms, it is the instruction on various aspects of agriculture such as crop production, livestock management, and soil and water conservation. It includes several subjects such as needs assessment, formal and informal teaching methods, curriculum and program development, instructional and program delivery approaches, educational technology application, program and instructional evaluation, appropriateness of education, related policy issues, institutional organization and management of agricultural institutions in domestic and international settings (Williams, 1991).

Agricultural education can be distinguished into elementary, vocational, college and general. Elementary agriculture is taught in public and private schools, and deals with subjects such as plant and animal production and cultivation techniques and soil conservation. Vocational agriculture regards training in occupations relate to areas such as agricultural production, marketing, and conservation. College agriculture involves training on teaching, conducting research, or providing information to advance the field of agriculture and food science in other ways. General education agriculture informs the public about food and agriculture (Wikipedia, 2010).

Also, agricultural education addresses particular audience, namely the agricultural learning society. This society comprises of target groups, which can be identified as: (a) academia (professors, tutors, researchers etc.): producing new knowledge; (b) agricultural stakeholders (farmers, growers, agricultural co-operations): practicing new knowledge; and (c) extension employees (agronomists): connecting academia and agricultural stakeholders by transferring the knowledge from the former to latter; (d) public (students, entrepreneurs, citizens): having interest in acquiring agricultural knowledge. Thus, agricultural knowledge and its diffusion comprise the basis and common point of reference of the target groups.

Nowadays, the plethora of available Information and Communication Technology (ICT) tools raises new opportunities and challenges for knowledge creation and sharing introducing electronic education (e-education) or electronic learning (e-learning). Respectively, agricultural e-learning societies should be developed. Nonetheless, this is not achieved in practice, as different types of ICTs play an important role in agricultural value chains having different strengths and weaknesses and tutors are not aware or familiarized with current ICT developments due to lack of training. Therefore, this study focuses on supporting agricultural education through training in using digital learning repositories and learning objects. The impact of such repositories in agricultural education depends on the tutors’ skills to use them and incorporate their resources in their educational activities.

In this context, this paper gives an overview of the METASCHOOL project, a new European initiative for supporting the in-service training of tutors on digital learning repositories. In particular, it presents the training of agricultural tutors in using, sharing and tagging Organic Agriculture and Agroecology resources. Special emphasis is given on adding agricultural metadata and organising agricultural learning resources in personal portfolios and learning repositories and exchanging
resources and teaching strategies with tutors around Europe.

The next section provides definitions of the concepts of learning objects and digital learning repositories and gives some good relevant examples for the agricultural case. Also, an overview of the METASCHOOL project, as well as a detailed description of its training framework focusing on Organic Agriculture and Agroecology is given. In addition, short reviews of the state of the art of ICT use in the Greek educational system and of the agricultural education in Greece are apposed. In the third section, results from METASCHOOL training for teachers in agricultural education in Greece are analyzed. Lastly, the conclusions of the paper are given.

2. Material And Methods

Background

A learning object/recourse is any entity, digital or non-digital, that may be used for learning, education or training. Learning objects should include some learning objectives and outcomes, assessments, and other instructional components, as well as the object itself. Digital learning repositories are used for storing, reusing and sharing learning objects. Focusing on agriculture, some examples of agricultural learning repositories are the Rural e-Gov Observatory (rural-egov.eu), the Bio@gro (bioagro.gr), the CG-Online Learning Resources (learning.cgiar.org), TrAgLor (traglor.cu.edu.tr) and Organic.Edunet (organic.edunet.gr).

In particular, Organic.Edunet is a multilingual federation of learning repositories with quality content for the awareness and education of European youth about Organic Agriculture and Agroecology. It aims at facilitating access, usage and exploitation of related digital educational content. It deploys a multilingual online federation of learning repositories, populated with quality content from various content providers. In addition, it deploys a multilingual online environment (the Organic.Edunet Web portal) that facilitates end-users’ search, retrieval, access and use of the content in the learning repositories. It studies educational scenarios that introduce the use of the Organic.Edunet portal and content to support the teaching of topics related to Organic Agriculture and Agroecology in two cases of formal educational systems, i.e., high-schools and agricultural universities. Furthermore, it evaluates project results in the context of pilot demonstrators in pilot educational institutions, as well as through open validation events where external interested stakeholders will be invited. Moreover, Organic.Edunet focuses on achieving interoperability between the digital collections of Organic Agriculture and Agroecology content that has been developed in various European countries, as well as facilitating publication, access, and use of this content in multilingual learning contexts through a single European reference point. In this way, digital content that can be used to educate European Youth about the benefits of Organic Agriculture and Agroecology, will become easily accessible, usable and exploitable.
Overview of the METASCHOOL project

METASCHOOL is a European project aiming at improving the in-service training of tutors and school ICT staff through the effective use of digital content. METASCHOOL focuses on organisation, sharing, use and re-use of digital learning resources that can be accessed through online learning repositories. Analytically the aims of the project are the following: (a) adaptation, development, testing, implementation and dissemination of a training framework regarding metadata, learning resources, and learning repositories. The framework will include a curriculum, training activities with good in-school practices and supporting material; (b) development and implementation of strategies/best practices for organising favourite/useful learning resources into personal portfolios of digital resources and setting up learning repositories at school or regional level; (c) proposal and testing of teaching methodologies/pedagogical strategies regarding the use of digital learning resources in the context of the educational process for the subjects of Science and Agriculture; (d) promotion of a European virtual space for interconnecting school repositories and exchanging/sharing teaching resources; (e) organization of pilot training and validation activities for teachers/ICT staff to develop methods/strategies for taking advantage from organising learning resources into personal portfolios/learning repositories and exchanging resources with teachers around Europe; (f) involvement of European organisations activating in school education and working on the promotion and best use of digital learning resources in the classroom; and (g) development of a structured and reusable set of guidelines and recommendations for supporting the creation and assessment of relevant teacher training programs.

METASCHOOL consortium comprises of nine partners with expertise and experience in various areas from six European countries, namely Greece, Belgium, Sweden, Austria, Germany and the Czech Republic. The project improves teacher practice and propels new knowledge on Agriculture and Science based on the experience gained from the successful projects of Organic.Edunet (http://www.organic-edunet.eu) and COSMOS (http://www.cosmos-project.eu) respectively. As far as agriculture is concerned, the particular project can support it in many ways. As mentioned above, environmental/agricultural education is one of its thematic areas (Sotiriou et al., 2009). The particular area has been chosen because from one side numerous agricultural content and resources are available on the Internet allowing for a variety of instructional approaches, and from the other environmental/agricultural education has not been fully incorporated in the school curricula despite its significance to sustainable development.

Training framework

Regarding the METASCHOOL tutors’ training, it is distinguished into three levels. The first level refers to digital learning resources and repositories and involves training on integrating online content to core academic content in lesson plans. The second level concerns educational metadata and training on accurate tagging and adding metadata to resources that tutors have used/created. The third level regards social metadata and folksonomies and involves training in developing skills on combining the advantages of traditional metadata with state-of-the-art
folksonomy approaches.

In order to assess whether the aforementioned goals are feasible and centered to the target groups (tutors and ICT staff) there has been a study on their needs. According to the needs analysis, the tutors participating had more ICT skills than the average and were more motivated to learn. They are mostly using PowerPoint, Moodle and linked repositories, Google and GoogleMaps and have restricted knowledge in Web 2.0 tools, but are willing to learn more since they are widely used by their students. They would like to be capable of (a) finding structured material (e.g. videos, images, lesson plans) relevant to their subject in their language and with their country cultural focus; (b) using and accessing systems/ scientific repositories easily; (c) publishing their own learning content; communicating via various tools (e.g. chats); and (d) ranking material.

Also, the European state of the art regarding the available equipment in schools and teachers’ attitudes towards ICT has been studied and particular recommendations have been derived for the training (D2.1, 2009). It should be flexible, allowing for different levels of ICT competence of teachers; carried out in their home language; taking into account the different levels of hardware provision in schools; including case studies related to the teachers’ interests and meeting their needs. The case studies regard the use of specific applications, tools and repositories, such as the COSMOS repository for sharing information about Science, the Confolio system for sharing information for Organic Agriculture and Agroecology from Organic.Edunet repository, and the Naturnet Redime URM repository for sharing spatial and non spatial context.

In this light, the training has been designed mainly on non-technical and technical aspects. Analytically, the non-technical dimension concerns issues such as evincing the value of sharing educational material, using social networks in education, informing on Intellectual Property Rights protection and Creative Commons Licence. The technical dimension concerns issues such as interconnecting repositories, localisation of concrete learning resources, using the Internet in educational activities, introducing learning repositories, objects/resources and communities. It must be mentioned that the training will also include broader issues regarding the lack of teachers’ time and ensuring the high quality of educational material. According to the aforementioned requirements, a framework comprised of 21 self-contained modules has been designed. The modules are distinguished into three types: (a) teaching and learning; (b) ICTs in teaching and learning; and (c) technical training.

Currently, the modules are in English but by the end of 2010 they will have been translated into local languages. They are self-contained, offering flexibility and individual learning paths and taking into account different levels of ICT competence and experience with metadata and repositories. There are various ways of interconnecting the modules. There are modules providing introductory information that apply to teachers with little ICT experience, whereas others build on previous knowledge. Other modules refer to the most frequently mentioned application. One or two modules present good examples of practice to motivate teachers to use them directly in their classrooms (D2.1, 2009). The modules are presented in Table 1.
<table>
<thead>
<tr>
<th>Topic Area</th>
<th>Topic</th>
<th>Beginner</th>
<th>Average</th>
<th>Expert</th>
<th>Trainees</th>
<th>Pedagogically focused</th>
<th>Generic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>1 WWW and educational uses for teachers</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>2 Strategies for searching information online</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>3 Introduction to the concept of learning objects</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Learning resources and</strong></td>
<td>4 Practical demonstration of learning objects and their classroom use</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>repositories</strong></td>
<td>5 Introduction to learning repositories</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>6 Review &amp; demonstration of popular learning repositories with school resources</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Metadata</strong></td>
<td>7 Intro to metadata, educational metadata, and metadata-based searching, educational metadata schemas (DC-ed &amp; IEEE LOM)</td>
<td>✓</td>
<td></td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td></td>
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<tr>
<td></td>
<td>8 Intro to the COSMOS and Organic.Edunet tools for describing resources with metadata</td>
<td>✓</td>
<td></td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>9 Social metadata and Web 2.0 tools (folksonomies &amp; social tagging)</td>
<td>✓</td>
<td></td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Social web</strong></td>
<td>10 Web 2.0 tools in education</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11 Popular social tools (e.g. Flikr) and scenarios for their use in the classroom</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Hands on Sessions</strong></td>
<td>12 Intro to share learning resources</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13 Intro to preparing, uploading and sharing learning resources (use of lemil, xplora, discoveryspace, curriculumonline, nemed)</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14 Pedagogical strategies and best practices for using digital teaching &amp; learning resources in the classroom</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>15 Supporting teachers in sharing resources though social tagging in LRE</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>Teacher</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16 Searching school’s resources through the LRE portal</td>
<td>✓</td>
<td>~</td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17 Hands-on session working on resources related to organic agriculture &amp; agroecology (use of Organic.Edunet)</td>
<td></td>
<td></td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18 Hands-on session working on resources related to science (use of COSMOS, xipora)</td>
<td></td>
<td></td>
<td></td>
<td>Teachers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19 Intro to setting up a portfolio and connecting to the outside world</td>
<td></td>
<td></td>
<td></td>
<td>Teachers, ICT Staff</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Technical session (for ICT staff or teachers)</strong></td>
<td>18 Setting up a repository (e.g. using Confolio tool) in the school’s server</td>
<td></td>
<td></td>
<td></td>
<td>ICT Staff</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19 Connecting educational repositories, e.g. Confolio and LRE as an example</td>
<td></td>
<td></td>
<td></td>
<td>ICT Staff</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

✓ = directly applicable
~ = also applicable
METASCHOOL training will help tutors and ICT stuff to increase their digital competence and in particularly succeed certain goals (concerning tutors and ICT stuff), regarding: understanding the educational benefits of the World Wide Web, being able to search effectively using the World Wide Web, understanding the concept of learning objects, understanding the concept of sharing resources, becoming familiar with the concept of learning repositories and communities, knowing how different learning repositories work and what they contain, understanding the concept of metadata, becoming familiar with COSMOS, understanding the concept of social metadata such as tags, understanding how Web 2.0 tools are used in education, becoming familiar with popular Web 2.0 applications, appreciating the benefits of using digital resources in the classroom, grasping how learning objects can be used in teaching and learning, being able to add metadata to learning resources and upload them to a repository, being able to use Organic.Edunet, becoming able to use COSMOS, becoming familiar with searching school resources through the Learning Resource Exchange (LRE) portal, being able to share resources through tags, becoming familiar with Confolio, becoming familiar with e-portfolio, being able to set up the Confolio system (for ICT stuff) and becoming familiar with the technical interconnection between Confolio and LRE (for ICT stuff).

2.1 Greek educational system and ICT readiness

The Greek Ministry of National Education and Religious Affairs (YPEPTH-www.ypepth.gr) has the overall responsibility for education, namely the provision of human and technical resources (e.g. computer labs, software) and the implementation of the National Curriculum. Also, 58 regional centres (KEPLINET) are providing educational and technical support of primary and secondary education. The National Curriculum is formulated by the Hellenic Pedagogical Institute at national level and includes all the EU key competencies except for learning to learn. Digital competence is a cross-curricular subject. A new National Curriculum has been issued, incorporating new subjects (such as environmental education, health education, cultural affairs) and boosting interdisciplinary learning and open methods of teaching and learning. A good example is the “Flexible Zone” (2 to 4 teaching hours) that has been included into the primary school schedule for extending interdisciplinary project work among students through collaborative teaching and learning (D2.1, 2009).

The subject of Informatics is instructed at all educational levels. Setting the integration of ICTs in educational process as one of the educational policy priorities, efforts for improving the infrastructure (e.g. broadband networks, personal computers) and digital material and services (e.g. educational software, portals), as well as supporting teachers’ training have been done in the context of the Information Society Framework Programme (http://en.infosoc.gr). In the same context the Greek Schools’ Network (GSN - www.sch.gr) has been developed. It comprises the educational intranet of YPEPTH for the creation of educational communities through the connection of primary and secondary schools, teachers, students, administrative staff and libraries across Greece. Concerning in-service teacher training, through the Information Society
Operational Programme teachers get familiarized with basic computer applications and ICT use in daily classroom activities. Already, 76% of Greek teachers have attended these courses. Although teachers believe that the use of ICTs in educational activity is very beneficial and that it makes students more motivated and attentive to the lesson, Greece is among the European countries with a very high percentage of teachers that do not use computers in their classrooms. Teachers attribute this fact mainly to the lack of computers in their schools, their lack of necessary skills to use them and the persuasion that their subject is unsuitable for instruction through personal computers.

Currently all schools have personal computers, but the rate is only 7 computers per 100 pupils. Also, all have Internet but only 13% use it via a broadband connection, which puts Greece among the last EU member states. The low level of infrastructure and personal computer usage shows that Greece has still a long way to go to reach other Western European countries and even several new member states (EC, 2006). Nonetheless, teachers feel that the number of computers and the speed of Internet connection are satisfactory. Most of them are capable of using the email service and a text editor, but are not comfortable with downloading and installing software or preparing presentations.

Moreover, teachers who use computers prefer to find information from various sources in their lessons, and mostly material from offline sources (e.g. from compact disk) (83%), much from online sources (68%) and less from school networks and databases (55%).

2.2 Agricultural education in Greece

From the 19th century till 1950’s agriculture constituted the basis of Greek economy. Thus, the evolution of agricultural education has been closely related with the political and social situation that era. In that period, agricultural production has remained at medium level due to lack of infrastructure, suitable equipment, farming methods and relevant educational infrastructure. Till the beginning of the 20th century, farmers ploughed with animals and used traditional farming methods existing from ancient and medieval times. Many reasons (e.g. war, economic crisis) forced farmers to migrate to urban cities or other countries. Early enough, the need for systematic agricultural education has been identified so as to solve the remaining food problem, the agricultural agency reform and the increase of agricultural production. The first “Agricultural School” has been founded in 1829 in Nafplio. It provided elementary agricultural education to children of poor farmers. Lack of resources and bad economic situation led to the closure of the School in 1873.

During the next years, there has been intense cogitation regarding whether there should be higher agricultural education or only agricultural stations and farms, where courses with general agricultural background would be provided and practical solutions would be given for problems locally. In 1887, three Agricultural Schools named after their donor Triantafillidis were established by the Greek state in Athens, Tirynth and Volos, which will comprise a turning point to the development of agricultural education. The last one operated till 1914.
The Agricultural University of Athens (AUA) is the third oldest university in Greece. Since 1920, it has been making valuable contributions to Greek and European agricultural and economic development, by conducting basic and applied research in the agricultural sciences, and by producing high quality graduates as well as cutting edge scientific knowledge. Its sixteen buildings comprise of auditoriums, 41 fully equipped laboratories, a modern library, computer rooms, and extensive agricultural facilities (arboretum, vineyard, experimental fields, flower garden, greenhouses, cowshed, sheep pen, chicken coop, dairy installations and aquaculture tanks). AUA has seven departments, namely Crop Science, Animal Science and Aquaculture, Agricultural Biotechnology, Agricultural Economics and Rural Development, Food Science and Technology, Natural Resources Management and Agricultural Engineering, and General Sciences. Formal learning and practical training has been and remains embedded within groundbreaking research addressing major current challenges. In the past century, academic staff and graduate students firmly established Greece as an equal EU partner by fostering: the distribution of arable land to landless farmers; refugee resettlement after the tragic events in Asia Minor; eradication of hunger in Greece by remarkably increasing farm production; initiation of export of quality agricultural products. For many years now AUA has been an advisor of the Ministry of Rural Development and Food and public agencies, as well as to the European Commission and other international organizations. Also, it has undertaken rural development projects on various areas such as diet and environmental protection, food quality and safety, water resource conservation, biological farming, alternative energy sources, biotechnological applications in agriculture (AUA, 2010).

In 1904, the American Farm School (AFS) in Thessaloniki has been founded. It is an independent, non-profit educational institution serving the rural population of Greece and the Balkans. It has been serving the sectors of food and agriculture providing theoretical and practical education on farming and business practices that are economically viable, ecologically sound and socially responsible (AFS, 2010). It consist of the Secondary School, offering high school education with an additional practical focus on a full range of agricultural and technical subjects, the College of Agricultural Studies providing a BSc degree focusing on agribusiness, tourism, and environmental protection and the division of Lifelong Learning for transferring knowledge and skills on sustainable rural development through short courses, seminars, workshops and conferences.

The current status of the Greek education system and agricultural education has led to a set of statements and recommendations that have to be taken into account for deploying a successful training framework for Greek teachers in the context of the METASCHOOL project. The statements are the following:

- Greek government supports the incorporation of ICTs in schools.
- School reform provides individual autonomy which will probably promote uneven development.
- Access to personal computers and broadband Internet connections is less than adequate, particularly the latter.
- ICT funding is low.
• Teachers are generally not ICT-ready.
• Teachers use sources and networks in Greek, though some are competent in English.

The proposed recommendations are the following:

**Recommendation I:** Training should be initiated after ensuring the access to ICT infrastructure.

**Recommendation II:** Training should be more thorough than in other countries of the project and not make assumptions about access, competence and motivation.

### 3. Results

In the context of the METASCHOOL training for agricultural tutors’ in Greece a workshop at the premises of AFS on 23rd March 2010 has been organized. The aim of the workshop was to provide advanced training in using online repositories and metadata. Eleven persons participated in the workshop, representing academic administration, in-service teachers, and library and computer resource staff. Although the audience was of different background and interests, the workshop was very well received, the faculty was quite engaged and enthusiastic and the level of commitment was pretty high. The workshop has been based on the module entitled “Hands-on session working on resources related to Organic Agriculture & Agroecology (use of Organic Edunet)” and consisted of four phases. In the first phase the participants created educational scenarios on environmental topics. Then in the second, they searched the Internet and the Organic Edunet portal to find online resources for supporting their scenarios. In the third phase, they had to upload their scenarios in Confolio. In these three phases the participants worked in groups of 2-3 for enhancing collaboration.

The fourth phase regarded a twofold evaluation, namely evaluation of the workshop and the presented module. Also, two personal interviews have been taken. According to the evaluation, the majority of participants believe that the METASCHOOL workshop has much value for them and that it is useful for their future instructions. An outstanding part considers that the workshop can improve much or very much their future instructions and most that it will enrich them. Also, the smashing majority is willing to attend another workshop. Participants have no doubt that the workshop could be beneficial and all agree that it is an important activity. More than half believe that the workshop was average to very good. Regarding the workshop leader’s explanations, a big part believes that they were satisfactory to very good. The majority seems to have enjoyed the workshop. The majority believes that the knowledge presented was averagely known by them and they did not have much difficulty in using the tools/techniques shown.

The overall procedure was smooth and in a good rhythm. In addition, there was little or no difficulty in following the content, since it was average or just much unknown. The participants estimate
that their teaching practice will change after the workshop from average to much. The motivation of the majority regarding using educational portal in teaching is higher than before attending the workshop and their motivation for using techniques and tools is much higher. The workshop has succeeded in adding very much to the motivation of participants in uploading learning objects or scenarios to an educational portal in comparison before the workshop. They found no difficulty in understanding content in the English language. The majority will introduce to their colleagues the knowledge they received. Overall, the workshop has fulfilled the participants’ expectations and more than half have increased their digital competence. Also, they feel more competent in metadata and the use of online resources. The METASCHOOL portal is considered much to very much user friendly.

The quality of the presented module has been considered as very good. All participants have understood from average to very well how the particular tools are used in education. In general, the module has met the participants’ expectations. The majority found that the use of the module is much easy. The description of the module presented in the METASCHOOL portal, as well as the slideshow helped a lot to understand the content of the module. The description and the slideshow matched much. Not important difficulties were encountered during the hands-on session. Most of the participants would recommend the module to a friend or colleague.

Among the remarks and suggestions regarding the presented module were that it is a very innovative open source but has some navigation problems. Also, the user friendliness should be enhanced. It has been noted that the workshop can bring people with similar objectives and ideas together and help them in sharing them. The hands-on session was the most stimulating part of the workshop. The participants are willing to exchange at least some of their learning objects through Confolio, LeMill and Slideshare. There was a lot of willingness from people to contribute to the workshop. Minimum technological problems have been encountered that did not affect the flow of the workshop. In general, the feeling of satisfaction has been achieved.

4. Conclusions

Agricultural education can contribute to the improvement of quality of life by helping farmers to increase production, conserve natural resources, and provide nutritious food. The advent of ICT revolution has provided many ways for supporting successfully the agricultural e-education. Therefore, training tutors in using these technologies is an imperative need.

In order to cover this need various initiatives have been taken, such as the “e-Agriculture” (www.e-agriculture.org). This paper has presented the METASCHOOL project that supports the in-service training of tutors on digital learning repositories. The project gives emphasis on organising agricultural learning resources in personal portfolios and learning repositories and exchanging resources and teaching strategies with tutors around Europe. The paper has focused on the
METASCHOOL training for agricultural tutors in Greece. Thus, an overview of the METASCHOOL training framework taking into account the capabilities of the Greek educational system and Greek tutors has been given. The overview has evinced that the Greek government supports the incorporation of ICTs in schools. However, the access to personal computers and broadband Internet connections is not adequate and teachers are not ICT ready yet.

Afterwards, the results from agricultural tutors’ training in using online repositories and sharing and tagging Organic Agriculture and Agroecology resources have been apposed. According to the participating tutors, the workshop has increased their digital competence and particularly in using online resources. Also, the workshop has helped them to improve and enrich their instructions and has increased their motivation for using ICTs and uploading learning objects to educational portals. Overall, it has brought agricultural tutors together so as to enhance and share their learning resources and knowledge.

5. Acknowledgment

The work presented in this paper has been funded with support by the European Commission, and more specifically the project No 141942-LLP-1-2008-1-GR-COMENIUS-CMP “Metaschool: Towards Teacher Competence on Metadata and Online Resources” of the Lifelong Learning Comenius Programme.

6. References


Barrick, R.K., 1988. The Discipline Called Agricultural Education. Agricultural Education Department, Ohio State University, Columbus, Ohio.


Abstract
The METASCHOOL project aims to improve the training of school teachers and school ICT staff on topics related to the organisation, sharing, use and re-use of digital learning resources that can be accessed online through learning repositories. For Web 2.0 technologies is main focus on active using Wiki based principles. For geospatial technologies there are two selected cases. First use case is focused on utilization of GeoGame for educational purposes. Second use case is focused on utilization of GeoPortal technology for access to off er access to teachers and students to public geospatial data from different Czech institutions and governmental bodies and also offer tools for managing, visualization and analysis of geospatial data.

Keywords: Education, Web 2.0, GeoGame, URM Geoportal

1. Introduction
The METASCHOOL project aims to improve the training of school teachers and school ICT staff on topics related to the organisation, sharing, use and re-use of digital learning resources that can be accessed online through learning repositories. The overall objective of the project is not only to improve teacher practice, but also to raise the awareness of teachers across Europe on the need for accurate tagging of resources. It achieves this through a user-friendly approach that motivates teachers to quickly and easily add metadata to resources that they have both used and created. Czech use case is focused on support for training of Web 2.0 technologies and geospatial technologies on basic and secondary schools. For Web 2.0 technologies is main focus on active using Wiki based principles. For geospatial technologies there are two selected cases. First use case is focused on utilization of GeoGame for educational purposes. Second use case is focused on utilization of GeoPortal technology for access to offer access to teachers and students to public geospatial data from different Czech institutions and governmental bodies and also offer tools for managing, visualization and analysis of geospatial data.
2. Objectives

The main objective of Metaschool project are:

• To develop, test, implement and disseminate a new training framework (including an appropriate curriculum, training activities that include good in-school practices, as well as a variety of supporting material) that will support the in-service training of (mainly) teachers and (also) ICT personnel of school staff on topics related to metadata, learning resources, and learning repositories.

• To adapt, develop, test, implement and disseminate strategies and best practices for organising favourite/useful learning resources into personal portfolios of digital resources, as well as setting up and using learning repositories on a school or regional level.

• To suggest and test a variety of teaching methodologies and pedagogical strategies for using digital learning resources in the classroom, for two particular subject areas: science education and agro ecology.

• To promote the creation of a European virtual space for interconnecting school repositories and exchanging/sharing teaching resources.

• To organise pilot training and validation activities of both teachers and ICT staff (where possible) from schools all over Europe.

• To involve organisations that are active in school education and that particularly work on the promotion and best use of digital learning resources in the classroom on a European level.

Specific objective for Czech pilot was to be focused on utilisation of Geospatial tools in education.

3. Methodology

The Metaschool framework for teacher training in Czech Republic was defined on the base of workshops organised with teachers from more than twenty schools. In order to achieve maximum impact from our initial interaction and consultations with the teachers, we proposed as general the following four-step process:

Figure 1. User requirements methodology
Building of initial scenarios

To stimulate demand of teachers for new methods of using on line context and sharing data in on line repositories there were prepared scenarios, which was later demonstrate on vision building workshops and was tested by users. This gave to teacher’s better overview about new possible tools and it will stimulate new requirements. The scenarios for every workshop were focused on two parts: on line tools and on line metadata repositories.

Vision building workshops

During these workshops the teachers were given an introduction to use of interactive tools and educational portals. A series of examples was presented and then the available tools, which are for example for geography, astronomy and science education were discussed. After this was demonstrated metadata tools as for example repository of Cosmos, European Schoolnet and NaturNet Redime Uniform Resource Management repository. The aim was to build a community of interested teachers that we can leverage later on the project. During these workshops, very simple but engaging educational scenarios were presented to the teachers (and the teachers were asked to implement this simple scenario within their classes (typically a 1 Month process). Furthermore, the teachers were asked to fill out the draft survey and possibly provide feedback on its structure.

Testing of initial scenarios

The teachers, with the support of the partnership, implemented this scenario in class.

User requirements collection workshops

After the implementation, the teachers are re-united in user requirements workshops. During these workshops the experiences of teachers were presented, there will be organized brainstorming and new use cases were defined.

The last step towards the development of educational tools in the Metaschool portal was the definition of use case scenarios which described the potential services the Metaschool Portal should be providing to its respective users or user groups. For the future work of both content designers and technical developers it is essential to define such scenarios. Clear definitions and a clearly documented step-by-step approach are essential in order to achieve success.

Selected scenarios for Czech Pilot case

During Czech workshops and training session next user scenarios were identified:

• Using Common Repositories and Metadata System based on NaturNet Redime URM for
Sharing of Educational Materials by Teachers

- Using Repositories and Common Metadata System based on NaturNet Redime URM for Publishing of Student Works
- Using Geospatial Repository, tools and Metadata System based on NaturNet Redime URM for Students Work with Geospatial Information
- Using GeoGame for Education
- Teachers are defining GeoGames
- Students are defining GeoGames

Non technological constrains

The non technological constrains define part of training priorities for Metaschool. To overcome non technological constrains teachers need to be trained about the topics, which could be limitation about future utilisation of metadata and online repositories. There are next main non technological constrain, which could limited usability of Metaschool solution:

- Existence of other existing initiatives, which usually crash in early stage mainly due missing content. Teachers are not interested to tested new solutions.
- Problem that different providers of educational content repositories are not willing to share their metadata with others.
- Language and cultural barriers, which are limitation for reuse of educational materials from other countries.
- Teachers often use for their lecture non authorise or copied resource from Web, without solving IPR for original materials, which is not problem for usage this materials in education, but, which is limitation for publishing and reuse of this materials.
- Missing educational concept for better utilisation of educational repositories.
- Some teachers don’t want to give their knowledge for free usage.
- Time problem of teachers to participate on project activities.
- Financial problems for schools to invest into new technologies.

Technological constrains

Technological constrains define technological problems for teachers:

- There will be necessary training for teachers and also for technical staff, how overcome these technological constrains and how to support better utilisation of utilisation of metadata
repositories.

• There are big differences in used educational context, on one side some repositories are focused on complete curriculums, and on opposite side some repositories collect mainly basic pieces of content, which could be composed into curriculums so it is necessary, explain different approaches for learning content management.

• There exist a lot of solutions for education, which don't support any integration with other systems. There is need to show examples, demonstrate how to use this solutions and also prepare training for selected platforms.

• There exist different metadata profiles, which are used in different repositories, it is necessary explain, how to deal with this problem.

• There exist different protocols implemented in different repositories for on line exchange of metadata (catalogue services) or for harvesting of metadata or this functionality is completely missing. This topic is mainly important for IT staff, to be possible understand, how to interconnected different repositories.

• There exist different vocabularies or thesaurus (or this functionality is missing), the methods of work with these vocabularies are necessary to explain.

4. Technology Description

The basic technologies for implementation of Czech metaschool solution are:

• Uniform Resource Management [3]
• Geohosting [4]
• GeoGame [5]

**Uniform Resource Management (URM)**

URM is set of tools supporting description, discovery and validation of relevant information sources. The basic elements of URM are:

Metadata catalogue system Micka supporting ISO19115 and ISO19119 and Dublin core profile
Metadata extractors supporting publishing of non spatial information
Tools for access to spatial information
Geohosting

GeoHosting offers services supporting the creation of a spatial data sharing system with possibility to publish data for any user having access to Web. The system is based on open formats and is open for interaction with other SDI platforms.

The system is developed as OpenSource platforms and contains both common visualisation and data sharing and metadata and catalogue functionalities. This system allows:

- Data and metadata publishing
- Usage of existing data sets for data processing
- Integration of spatial data from different sources
- Data input to user-defined structure
- Connection system to other special purpose devices supporting data collection.
- Connection to map servers – query system and update systems.

Module architecture allows building different applications from the simplest (for example visualisation) to applications with maximum functions like data model transformations.

GeoGame

Geo-game was designed as application for common web-site visitor, who wants to check his/her knowledge of this north bohemian region. The web page is split into two parts: in the left part, some phenomenon photographs, such as natural monument (cave, rock, lake, ...) or human imprint (church, castle, ...) are shown and in the right part, interactive map of Liberec region is displayed and user has to place marker on the position, he/she things, the phenomenon is located. Then the right location is displayed together with user set location and geographical distance is between set and real position is calculated. The users have to place up to ten marks and at the end, mean value of distances between reality and users guess. User can then store his/her name into table of best results.
5. Developments

Technological solution is based on technologies developed previously in NaturNet Redime project. Metachool.cz portal was implemented and it is fully accessible for all Czech schools. Currently intensive test are provided with three schools. The solution are fully integrated into education, the test willrud till end of this year. During next year we expect large enlargement of users.

6. Results

The experiences from Metaschool project demonstrated, that new Web 2.0 technologies could bring new quality into education, but that also require large effort from the side of teachers. The adoption of Web 2.0 technologies by teachers is critical. The metadata systems and geospatial technologies are usually new for teachers and there is necessary prepare special curriculum for teachers, to be possible adopt such solution and also there is need to modify educational methods,

Spatial gaming, which is based on interaction between digital maps, description of objects and photos of objects is easier adopted by both groups, students and teachers Students has possibility to search imaged objects in maps and compete, who will have best results, which are measured on the base of distance between real object and object signed by students. Second part of system is already for more advantage users, which offer possibilities to students to form their own content. Current experiences demonstrate that mainly this second possibility is very attractive for young people.
7. Business Benefits

New Web 2.0 offer new technologies for education. Due the fact, that this type of services doesn’t require any investment into software, this approach could be adopted also by developing countries. The key issue is internet accessibility, but every year more and more schools in all countries in the world are connected to the Internat.

Important aspects of this technologies is, that this Web 2.0 technologies offer possibilities for the cooperation and collaboration of teachers and students around the world and that they help to overcome cultural and social barriers.

8. Conclusions

Experiences from Czech and currently also form Latvia demonstrate new possibilities of Web 2.0 technologies. There is need to establish wider cooperation among the schools from different countries to increase potential of new technologies.

9. Acknowledgment

The work presented in this paper has been funded with support by the European Commission, and more specifically the project No 141942-LLP-1-2008-1-GR-COMENIUS-CMP “Metaschool: Towards Teacher Competence on Metadata and Online Resources” of the Lifelong Learning Comenius Programme.

10. References


www.naturnet.org
www.metaschool.cz
Online Educational Repositories for Promoting Agricultural Knowledge

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Abstract
Towards promoting sustainable agriculture and economic growth, the development of the agricultural workforce and setup of innovative agricultural systems are required. Agricultural educational repositories are systems used for storing, reusing and sharing agricultural learning resources. They contribute to agricultural education at different educational levels and target groups. Thus, this paper firstly provides an overview of Institutional Repositories (IRs) and Open Access Archives (OAAs) in Greece and agricultural repositories worldwide. Also, it describes the agricultural repositories that provide access to educational content in Greek and presents experiences from the establishment of Agricultural University of Athens' (AUA) repository.

Keywords: agricultural education, Institutional Repositories, Open Access Archives, open source software

1. Introduction
Nowadays, the educational process for tutors and pupils has been greatly facilitated by giving access to learning resources through educational repositories. Online learning repositories are Web based repositories used for storing, reusing and sharing learning resources. An Institutional Repository (IR) is a digital collection of the intellectual output of an institution, accessible to users both within and outside of the institution (i.e. universities, research organizations, NGOs, government agencies and private institutions. Also, Open Access Archives (OAAs) are digital learning repositories of submitted material that the authors or their institutes wish to make publicly available without financial or technical barriers. The major difference between IRs and OAAs is that IRs can be closed access, while OAAs are always open to outside users.

In European Union, there is a great variety of learning/educational repositories. Although, the majority includes digital content and a brief description (metadata), there are also repositories that are only catalogues of learning resources. Educational repositories include any type of resource from ‘traditional’ texts books to digital materials. Nonetheless, the trend is in favor of the latter type for promoting teachers’ uptake of innovative materials and learning style and making
resources available and visible to the users (EDRENE, 2009).

Towards promoting sustainable agriculture and economic growth, the development of the agricultural workforce and setup of innovative agricultural systems are required. Concerning agricultural repositories, they focus on agricultural education and training. Either providing elementary, vocational, college or general education, they should address particular target groups, namely farmer communities, agricultural policy makers, agri-business and industry communities, public communities, research and development communities and agricultural education communities.

Thus, the aim of this paper is to present a new initiative for establishing an agricultural educational repository by the Agricultural University of Athens (AUA). During a century of operation, AUA has produced a great amount of information and knowledge, and now possesses an enormous collection of rare books, magazines, photographs and other educational material. The main objectives for developing an IR in AUA are to preserve the cultural and scientific heritage of the university, provide open access to grey literature, and promote scientific research and education.

The structure of the paper is the following: in the next section IRs and OAAs in agriculture and those providing Greek content, as well as the current status of IRs and OAAs in Greece are presented. Section 3 presents DSpace, a widely known mechanism, upon which many IRs have been built. Section 4 describes lessons learnt from establishing the AUA repository. Section 5 introduces the Metaschool project, regarding the training of tutors in agricultural repositories. Finally, some conclusions and discussion on further work are apposed.

2. Background

2.1 Agricultural IRs and OAAs

A number of initiatives have been established for the development of online educational repositories related to agriculture using semantic technologies, envisioning a one stop shop for all kinds of information related to agriculture. Such initiatives include the following: the National Agricultural Library of the United States housing one of the world’s largest and most accessible agricultural information collections; AGLINET, which is a voluntary association of large agricultural libraries in Italy; AGRIS (International System for Agricultural Science and Technology) referring to a global public domain Database with 2.6 millions structured bibliographic resources; and Organic Eprints regarding an international open access archive for papers related to research in organic agriculture. Table 1 analytically shows good examples per country.
Moreover, there have been established agricultural repositories that provide learning resources in Greek. Up till now, there number is restricted but provide useful information for students, teachers and farmers. These are: the American Farm School Repository, where users can find material from the American Farm School archives; the Rural e-Gov Observatory, which provides training content about e-government services of SMEs in European rural areas; the Bio@gro platform, which aims at providing a multilingual single point of information access on organic farming and products to all interested parties of the Organic Agricultural community; and the Organic.Edunet Web portal, which provides educational content about Organic Agriculture and Agroecology.

### 2.2 IRs and OAAs in Greece

According to recent surveys, there is a rapid growth of academic IRs, showing that 15 out of 33 institutions run their own repositories. Although authors are skeptical about releasing their work to the eyes of the wider public, mainly due to copyright infringement, open access is gaining ground and fans all over Greece (Chantavaridou, 2009). Also, academic IRs or smaller ones at

<table>
<thead>
<tr>
<th>IR/ OAA</th>
<th>Country</th>
</tr>
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<tbody>
<tr>
<td>National Agricultural Library</td>
<td>USA</td>
</tr>
<tr>
<td>AGLINET</td>
<td>Italy</td>
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<tr>
<td>AGRIS</td>
<td>International</td>
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<tr>
<td>Organic Eprints</td>
<td>International</td>
</tr>
<tr>
<td>Centre National de Recherche Agronomique</td>
<td>Cote D'Ivoire</td>
</tr>
<tr>
<td>CGIAR On-line Learning Resources</td>
<td>USA</td>
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<tr>
<td>COTR’s e-training site</td>
<td>Portugal</td>
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<tr>
<td>EcoLearnIT</td>
<td>USA</td>
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<tr>
<td>FAO Capacity Building Portal</td>
<td>Italy</td>
</tr>
<tr>
<td>Lao Agriculture Database</td>
<td>Lao Democratic Republic</td>
</tr>
<tr>
<td>Network of Aquaculture Centres in Asia-</td>
<td>Pacific - Thailand</td>
</tr>
<tr>
<td>Rural-eGov Observatory</td>
<td>Greece</td>
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<tr>
<td>SANREM CRSP Knowledge Base</td>
<td>USA</td>
</tr>
<tr>
<td>Turkish Agricultural Learning Object Repository</td>
<td>Turkey</td>
</tr>
</tbody>
</table>

*Table 1. Agricultural IRs and OAAs globally*
department level are growing. Dissertations and undergraduate theses, reports, conference papers, and postprints comprise the core material. For a small country like Greece the problem of knowledge dissemination has been resolved via HEAL-link (www.heal-link.gr). The use of open source software for creating IRs in Greece has facilitated the operation of “openarchives.gr”, a private initiative for searching across Greek IRs. Currently, it is the only search engine that searches simultaneously across a collection of Greek IRs via OAI-PMH protocol. Moreover, IRs have been developed mainly using open source software, such as Dspace (http://www.dspace.org), Greenstone (http://www.greenstone.org), Dienst (http://www.cs.cornell.edu/cdlrg/dienst), and Flexible Extensible Digital Object and Repository Architecture (Fedora) (http://www.fedora.info). The most commonly used is DSpace.

3. DSpace platform

DSpace is an open source software platform that enables organizations to capture, describe and preserve digital assets. It is designed to support the long-term preservation of the digital material stored in the repository. Provides support for a variety of digital formats and content types including text, images, audio, and video and distributes it over the web. DSpace allows contributors to limit access to items in DSpace - at the collection and the individual item level. DSpace provides long-term physical storage and management of digital items in a secure, professionally managed repository including standard operating procedures such as backup, mirroring, refreshing media, and disaster recovery. It is typically used as an institutional repository. It has three main roles regarding facilitating: (a) capture and ingest of materials, including metadata about the materials; (b) easy access to the materials, both by listing and searching; and (c) the long term preservation of the materials.

The DSpace submission process allows for the description of each item using a qualified version of the Dublin Core metadata schema. Digital items are made up of a bundle of digital files and the system allows for the creation, indexing, and searching of associated metadata to locate and retrieve the items and provides distributed access to these items through a search and retrieval subsystem. DSpace repository uses Apache Lucene as search engine. Lucene is an open source search engine and is used by DSpace to implement indexing and searching facilities. Lucene provides stop word removal, stemming, and the ability to incrementally add new indexed content without regenerating the entire index. The two software products are based on Java language and are highly extendible. Summarizing, DSpace includes the following features:

a. User Interface
b. Workflow
   • Enables differing submission workflows for communities

c. Open Archives Initiative (OAI)
   • Is OAI-PMH 2.0 compatible and uses the OCLC OAICat

d. Persistent Identifiers (Handles)
   • Implements CNRI handles as the persistent identifier associated with each item

e. Access Control
   • Allows contributors to limit access to items at both the collection and the individual item level.

f. Metadata Schema
   • Utilizes qualified Dublin Core (DCMI, 2008).

4. AUA repository

AUA is one of the oldest universities in Greece and the major one among those serving the agricultural sector. During its almost a century operation, it has produced a huge amount of information and knowledge, and now possesses an enormous collection of rare books, magazines, photographs and other educational material. To preserve this valuable property the university decided to investigate the most appropriate way to collect and disseminate it to the university community, the agricultural sector and the Greek society. For this purpose, a committee has been established consisted of librarians, archive experts and information technology specialists, having as a main objective to find the most appropriate way to preserve and disseminate AUA’s intellectual property, provide open access to grey literature, and promote scientific research and education, using the emerging Information Technology tools.

The committee initially decided to adopt the creation of an IR as a means to accomplish its task. There are several software tools that can be used to develop and run an IR. The appropriate tool should fulfill several criteria set by the committee. Among these criteria are the easyness of access, support of several storage formats, handling of copyrights, enhanced storage and search capabilities, extendibility and flexibility and support of metadata harvesting standards, such as OAI-PMH.

The investigation process considered mainly open source software and checked as serious
candidates DSpace, Greenstone, Dienst, and Fedora. Finally, the committee selected DSpace as the most appropriate tool, since it fulfills the main selection criteria and provides easyness of installation and low maintenance cost and has the ability to define a work-flow for material submission.

In the first stage of its operation the IR includes electronic theses and dissertations. Its access is realized through the AUA library or the link: http://dspace.aua.gr/. In order to fulfill the liabilities for their degree in agricultural sciences, students have to elaborate a dissertation. The same applies to the post graduate and doctoral students. Each year almost 500 new theses and dissertations are produced. In the future, it is scheduled to incorporate a collection of rare books and agricultural magazines that exist in the archives of the university. Long term plans include the incorporation of the majority of grey literature produced at the university, with emphasis on the research papers and reports.

At the present stage of development (Fig. 1), the content of the IR can be searched through its metadata. It is harvested using OAI-PMH protocol by “openarchives.gr” and is indexed in Directory of Open Access Repositories (DOAR), the Registry of Open Access Repositories (ROAR) and the Greek Digital Resources Index. In the future, the activation of the full-text searching capability of DSpace and the connection of IR with a federated searching mechanism to all heterogeneous resources available at AUA (Digital Library collections, OPAC, IR, etc.) is planned.

Some representative metadata elements used in AUA’s repository are the following: author name, university department, editor name, student id, date of copyright, date or date range that the item became available to the public, date of publication or distribution, recommend for theses/dissertations, abstract or summary, degree title, number of pages.
5. Metaschool project

Since the majority of Greek authors are still skeptical about providing their work to the wide public due to copyrights, AUA is making efforts to promote open access to learning repositories. In this direction, an initiative has been launched from October 2008. Metaschool is a European project aiming at improving in-service training of tutors and school Information and Communication Technology (ICT) staff through the effective use of digital content. Metaschool focuses on organization, sharing, use and re-use of digital learning resources that can be accessed through online learning repositories. Analytically, the main objectives of the project are the following: (a) adaptation, development, testing, implementation and dissemination of a training framework regarding metadata, learning resources, and learning repositories; (b) development and implementation of strategies/best practices for organizing favorite/useful learning resources into personal portfolios of digital resources and setting up learning repositories at school or regional
level; (c) proposal and testing of teaching methodologies/ pedagogical strategies regarding the use of digital learning resources in the context of the educational process for the subjects of Science and Agriculture; and (d) organization of pilot training and validation activities for teachers/ ICT staff to develop methods/ strategies for taking advantage from organizing learning resources into personal portfolios/ learning repositories and exchanging resources with teachers around Europe.

As far as agriculture is concerned, the particular project can support it in many ways. As mentioned above, environmental/agricultural education is one of its thematic areas (Costopoulou et al., 2010). The particular area has been chosen because from one side numerous agricultural content and resources are available on the Internet allowing for a variety of instructional approaches, and from the other side environmental/agricultural education has not been fully incorporated in the school curricula despite its significance to sustainable development.

Regarding the Metaschool tutors’ training, it is distinguished into three levels. The first level refers to digital learning resources and repositories and involves training on integrating online content to core academic content in lesson plans. The second level concerns educational metadata and training on accurate tagging and adding metadata to resources that tutors have used/ created. The third level regards social metadata and folksonomies and involves training in developing skills on combining the advantages of traditional metadata with state-of-the-art folksonomy approaches (D2.1, 2009).

The training has been designed mainly on non-technical and technical aspects. Analytically, the non-technical dimension concerns issues such as evincing the value of sharing educational material, using social networks in education, informing on Intellectual Property Rights protection and Creative Commons Licence. The technical dimension concerns issues such as interconnecting repositories, localisation of concrete learning resources, using the Internet in educational activities, introducing learning repositories, objects/resources and communities. It must be mentioned that the training will also include broader issues regarding the lack of teachers’ time and ensuring the high quality of educational material. According to the aforementioned requirements, a framework comprised of 21 self-contained modules has been designed. The modules are distinguished into three types: (a) teaching and learning; (b) ICTs in teaching and learning; and (c) technical training.

For promoting the effort of open access to learning repositories, a training session for agricultural tutors in Greece took place at the premises of the American Farm School on March 2010. The aim of this session was to provide advanced training in using learning repositories and metadata. Eleven persons participated in the session, representing academic administration, in-service teachers, and library and computer resource staff. Although the audience was of different background and interests, the session was very well received, the faculty was quite engaged and enthusiastic and the level of commitment was pretty high.

The session also regarded a twofold evaluation, namely evaluation of the session and the presented training module. Also, two personal interviews have been taken. According to the evaluation, an outstanding part considers that the session can improve much or very much their future instructions
and most that it will enrich them. Also, the smashing majority is willing to attend another session. Participants have no doubt that the session could be beneficial and all agree that it is an important activity. More than half believe that the session was average to very good and the majority seems to have enjoyed it. Most of them believe that the knowledge presented was averagely known by them and they did not have much difficulty in using the tools/techniques shown. Also, they feel more competent in metadata and the use of online resources.

The participants estimate that their teaching practice will change after the session from average to much. The motivation of the majority regarding using educational portal in teaching is higher than before attending the session and their motivation for using techniques and tools is much higher. The session has succeeded in adding very much to the motivation of participants in uploading learning objects or scenarios to an educational portal. Overall, the session has fulfilled the participants’ expectations and more than half have increased their digital competence.

6. Conclusions

Agricultural education without limits can contribute to the improvement of quality of life by helping farmers to increase production, conserve natural resources, and provide nutritious food. In Greece open access to agricultural knowledge is gaining ground every day. In this context, AUA supports the knowledge dissemination through its evolving repository. In parallel, it participates in an even greater effort that has been started towards the development and cooperation of IRs for all Greek universities. The initiative is funded by European Union and Greek Government in the context of the National Strategic Reference Framework (NSRF) 2007-2013. The main purpose of this effort is to digitize a major part of the material held by the libraries and the archives of the universities in order to preserve this cultural and scientific heritage, providing open access to grey literature, and promoting scientific research and education. The material is consisted of rare books, magazines, photographs, research papers, theses, dissertations and other educational material. Moreover, AUA is contributing to the promotion of open access to learning repositories and the effective use of digital content via in-service training of tutors and school ICT staff in the context of the Metaschool project. Future work will concern the study of interoperability issues of agricultural repositories with Greek content, supported by academic institutions and related organizations, in order to build a national harvesting service.

7. Acknowledgment

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8. References


