Deliverable 11

NETT platform specifications

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Summary

This document describes the main functionalities of the NETT learning platform: entrepreneurship for teachers is the main goal of the project. So, an internet open platform will be set up in the cloud for exchanging contents, tools and methods between teachers on the topics related to entrepreneurship. The platform will support teachers in their teaching activities, enabling them to include entrepreneurship models and approaches in their programs and in their teaching practices.

Scope of this document is to define the NETT learning platform functional specifications. The platform will be able to support the management of contents, to support the management of learning materials and to support communication and networking among teachers.

This document describes the technical specifications of the NETT Platform. Most of the contents are based on the main opensource existing e-Learning platforms descriptions.

Introduction

Scope of this document

Scope of this document is to define the NETT platform technical specifications and describe the first platform prototype.

The document presents the basic architectural outline of the NETT platform. It explains options and substantiates decisions. The proposed architecture is based on general requirements and considerations. It does not express issues of implementation, preferred platform or solution, be it that most functions can be realized with existing software components. Such approach would fit the NETT project as software development if not is main aim, and should be restricted to unique functions only that lack existing solutions.

Before proposing software architecture, this document will first focus on a number of relevant initiatives and technologies that can be scanned for a good ideas, pitfalls and do's & don'ts.

Objectives

The main objectives of the NETT platform proposal should be:

- Identify the proven state-of-the-art technological solutions and to use it for building the architecture. The software components that build on existing standards and specifications can easily be reused
- Define an architecture that is interoperable with different ongoing initiatives in Europe. These include projects that deal with educational repositories (e.g. the OpenScout, Share.TEC eContent+ projects) as well as digital library initiatives (e.g. the European Library). The architecture will support multilingualism and combine the:
  - Repository with educational resources
  - Learning Management System – manually or automatically course creation
  - Environment to support the community of practice of entrepreneurial teachers where they can share ideas and recourses and use the platform as a web 2.0 tool

What makes the NETT platform different?

The NETT learning platform will feature several characteristics that make it different from other learning and repository initiatives. They could be divided in several aspects: technological solutions, Services:

- Technological Solutions:
  - Multi-language. The NETT learning platform will permit to manage contents in different languages.
  - NETT Knowledge Areas will be organized according to the following list, which represents the main topics in the entrepreneurship disciplines :
    - Entrepreneurial Vision
    - Personal Development
    - Communication Skills
    - Economic Skills
    - Technical Skills
  - Advanced features to recommend contents and to help the research. The NETT learning platform will include a recommender system enabling filtering and harvesting of the content by keywords and recommendation from the system according to users' needs and profiles (AI features will be implemented).
- Proposed Services:

- Automated courses generation. The NETT learning platform will create a learning course under user request.
- Metadata harvesting and content transfer. The NETT learning platform itself will contain some materials (for each published material will be sign the Honor code to remain in control of the suppliers or owners of digital content) and rely on metadata present in the participating repositories.
- Implementation of the Open standards and specifications

System Requirements

NETT has undertaken to build an advanced user-focused system that aggregates metadata describing teacher-related digital resources located Europe-wide. The system will offer personalized, culturally-sensitive brokerage for the retrieval of relevant digital content and will seek to nurture a more Europe-wide perspective among those working in and with the entrepreneurial teacher community.

In order to meet these ambitious objectives, the NETT system is endowed with a semantic layer that embraces the main components herein described, namely the Entrepreneurial Teacher Ontology (ETO) and the Common Metadata Model (CMM). This layer is designed to include a multilingual and multicultural dimension.

The basic requirements

The NETT platform combines the Repository with Learning Resources, Community of Practice and Courses automatically created by user request (Figure 1). For courses the platform offers different Learning Activities and Tools for communication among users.

The Repository is dynamically updated by the contributors and authorised users.

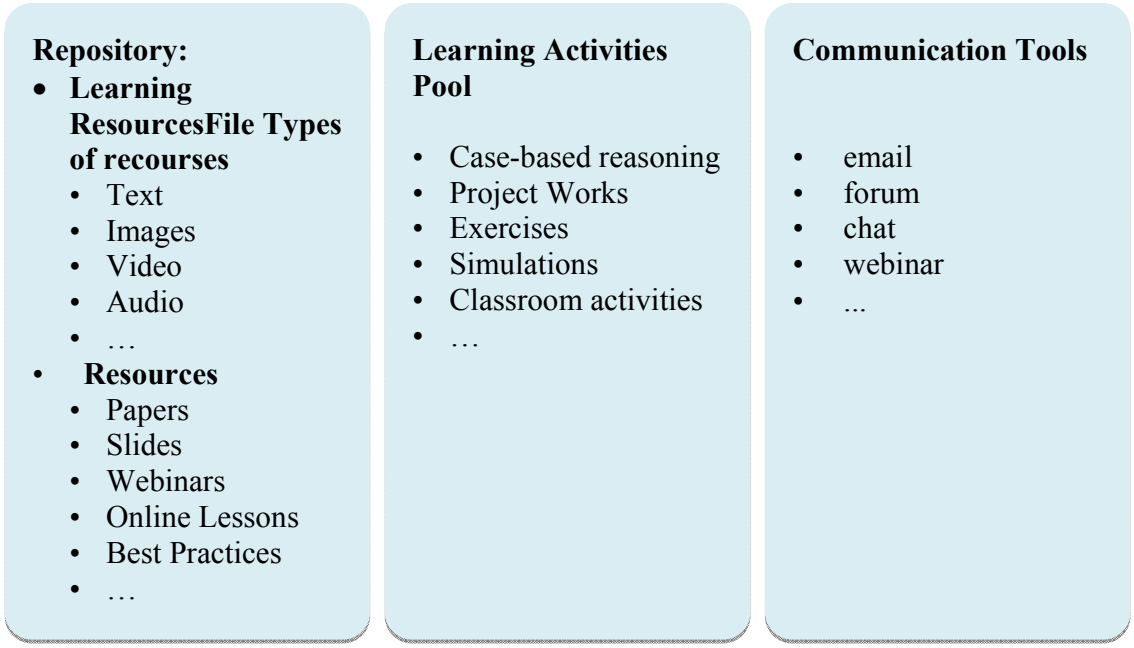

Figure 1 Main component blocks of the NETT platform

The Repository is mainly structured by knowledge area using ontology, Materials for developing different competencies according the European Qualification Framework and type of recourses (Figure 2).

Each knowledge area will include the following sub-levels: Modules, Courses and Content Units.

Content Units are the basic entity of the NETT platform and it could be represented by learning materials as simple definition, lessons, examples and learning activities: discussion forums, tasks and so on. All they

are represented by different kind of files and authoring materials into the system. Contents will be accessed, managed and created according to an Access Control List.

Figure 2 Main repository metadata

The Courses developed in the platform are created by the user request. There are two possibilities – automatically and manually selection of the recourses and activities and communication tools (Figure 3). The users should search and filtering the repository information using the metadata.

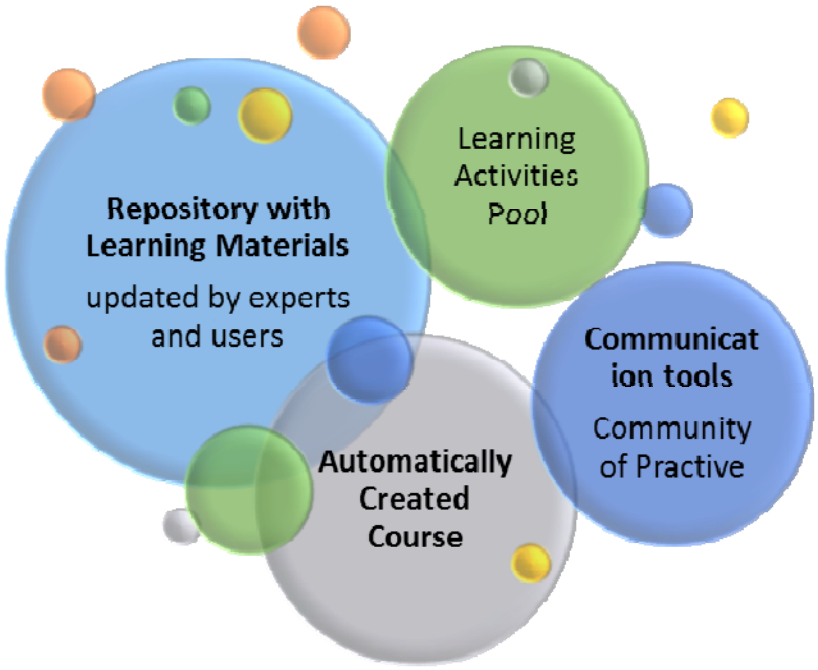

Figure 3 NETT platform content structure

The third part of the platform – Community of practice is based on the communication tools.

NETT Access Control List

The NETT platform is intended both for teachers' actually teaching entrepreneurship and for whom is only interested in it, or who wants to find its application in his/her taught subject. Access Control List will be including the following roles:

- guest
- authorised user
- contributor
- expert
- admin
- master

The table below presents the roles' permissions in the different parts of the platform.

Table 1 Roles and Permissions

	Guest	Authorised User	Contributors	Expert	Admin	Master / Host
Repository						
Read published information	X	x		x	Manage the platform and users	
Upload information		x		x		
Approve published				x		
Community of Practice						
Read the Common Community Forum	X	x	x	x	x	x
Publish		x	x	x	x	x
Participate to the community		x	x	x	x	
Courses						
Participate in the courses		x	x	x	x	x
Creating the courses			x	x	x	x

Ontology

The internal structure of the ontology entity could be designed with a minimalistic approach in mind – the simplest structure that facilitates all required functionality. Each ontology entity is represented as an individual node that (a) is interconnected with other nodes through relations and (b) contains a list of translations of the concept represented.

Metadata encoded according to the Common Metadata Model (CMM) will be available in the NETT harvested metadata cache, where it is accessible for the metadata migration facility. They will automatically (re-) harvest this metadata and will migrate it to instances that conform to the Entrepreneurial Teacher Ontology (ETO).

Metadata

There are a number of initiatives that are relevant and can be drawn upon for various purposes like design, architecture, code and modules. Some of these are open source; others are closed source but can still be useful in the design phase if design and architecture documents are public. Some of these are:

- Learning Object Discovery and Exchange (LODE)
  An IMS group that aims to facilitate discovery and retrieval of digital resources. LODE's goal is to examine, select and adapt existing specifications.
- ADL's Cordra (Cordra)
  A repository registry allowing metadata searches.
  Cordra is not open source but design documents are available.
- Fedora Commons (FedoraCommons)
  A repository capable of federation.
- TENCompetence (TENCompetence)
  A European project about lifelong competence development.
- ARIADNE
  The ARIADNE knowledge Pool System features an open source, standards-based set of reusable components for setting up repositories, federated search engines and harvesting.
- Meresco Suite (Meresco Suite) (Meresco Suite) (Meresco Suite)
  A metadata repository with a harvester/crawler and a search engine, used by Lorenet. The Meresco crawler is also capable of generating automatic metadata.
- LODE (IMS)
  Federations, Query Languages
- Metadata for Architectural Contents in Europe (MACE)
  An eContentPlus project that aggregates and enriches contents relevant for teaching in the domain of architecture.

NETT Repositories

Wikipedia gives a very simple explanation of what a repository is. Repository commonly refers to a location for storage, often for safety or preservation. So for NETT, a repository is used as a storage place for content. Different repositories often specialize in a specific type of content. However some repositories can handle all or multiple content types (Audio, video, text). As some repositories come from a generic document management background and some from a content management background, they have different feature sets.

Harvesting framework

During the project, a harvesting infrastructure will be set up that serves multiple purposes:

- Getting a better understanding of the diversity of resources and metadata available in the NETT.
- Setting up a central repository that provides search access to all resources in the network.
- Set up the repository infrastructure important for the components.

The important for harvesting components are:

1. A NETT content repository that offers access to its metadata.
2. A metadata validation component that given a set of validation rules and a metadata instance for indicating whether a metadata instance is valid/complete or not.
3. A repository cache that offers write-access.
4. A harvester component validate metadata instances using the validation service.

Metadata encoded according to the Common Metadata Model (CMM) will be available in the NETT harvested metadata cache. Both the "Harvesting & validation framework", and the "Metadata Migration Facility" constitute the NETT architecture.

The ability to have search access to all resources will be a starting point for further developments in the network. Validating the metadata that can be retrieved and will enable further identification of gaps and opportunities for further enhancements.

Content Management Workflow

The authorised users can publish the content into the NETT platform.

Content status is: published, approved, reject.

Once published the content could be reviewed by an expert. (S)He can approve or reject the material. After the review publisher receive the expert opinion. The rejected content should be deleted.

User - Publisher sign the authoring hart if publish the files or use authoring tool of the system to create learning recourses or activities. If the user insert a link to the existing online material the approval procedure is not necessary.

Features of the integration with NETT

Types of Integration options

This section discusses the types of features that the integration with NETT can offer; what they do and don't do. It also includes the four headings for how this integration can manifest itself in NETT.

It would be fair to say that the features mentioned could be further split into sourcing content and management of content. However, as most repository integrations do not provide management of content features through the integration interface I felt that keeping them together was the best approach.

Browse repository

This feature is based on being able to browse the repository content and structures from inside NETT. The browsing through the ontology (ETO) have been set up.

Search/ filter the repository

The searching / filtering into the NETT repository is based on the keyword and metadata.

NETT Private Files

One of the repository types in NETT is the Private Files. This is a private files are provided to each user for uploading and managing some files.

This is a feature that once enabled is made available to all users, students, teachers, admins and managers.

Users can perform a few tasks such as:

- Upload & Download files
- Create directories
- Zip directories
- Rename Files

Mobile App – Student Usage

The emergence of the native iPhone app for NETT (My NETT) will probably lead to a lot more usage. If you enable the mobile web services to allow users use the app, users will be able to upload images, video and recorded audio directly into their Private Files repository space in NETT.

With this feature, there can be a lot of types of courses where students may be encouraged to take a photo, or video or something, or record audio and upload it and link into a forum, wiki, or assignment in NETT. There might be also the case where a student can participate to a course discussion conversation inside a forum in NETT, adding his/her posts also from a Mobile Phone.

Mobile App – Teacher usage

A teacher assessing assignments which are created / delivered offline (paper, or physical things), can record the audio feedback on his/her phone, directly upload and when back at his/her computer fill in the assignment grade and link in the audio file.

NETT learning management system

- The NETT platform offer the LMS. NETT Platform will be used also for course creation: manually and automatically -on request. Training areas for teachers use will be activated and made available upon their request in order to be used in their classroom and on their daily teaching practice. Once created the teacher can open to course for the learners.
- The Learning & teaching philosophy of the NETT platform will recall the Social Aspects of the platform and it will integrate them into the system according with a WEb 2.0 approach and the Recommender System of the platform described in the next section.
- In the Learning & teaching area resources, forum, links, content will be used and shared in each cohort with the support of a dedicated tutor. The online teaching and learning activities and assessment will be based on an interactive, collaborative and peer to peer approach to learning. Hence the presence of the tutor will foster both a formative and summative assessment works.
- Teaching and Learning will be organized in this first stage according with the five main Areas identified in the initial NETT project research questionnaire, namely:
    - Entrepreneurial Perspective
    - Personal Development
    - Communication Skills
    - Economic Skills
    - Technical Skills

NETT Social Aspects

According with the main goal of the NETT project, NETT platform should enhance all the possible social aspects creating and supporting linkage and relationships among its participants coming from all over the world not only in the Training course area, but also in the Community Area.

Basically Social Aspects are not only stressed by the introduction of Social Networks as links in NETT but also creating in NETT some typical features of the Social Networks themselves. Hence basically the main purpose here is to creating a new Social Network called NETT Community providing also a range of free or paid services of useful for Entrepreneurship teachers mainly

This means that:

In the Community area: features like forum, chat, email and so on are at the basis of the NETT Platform. A repository of resources will be designed together with the creation of tools that will help users to easily get in touch to each other namely:

- the possibility for each user to access his/her own board where latest postings from other connections and from NETT platform administrators are visible
- the possibility to create discussion group and sub-discussion group
- the possibility to upload, download and sharing some learning material (with a sharing feature for example)
- the possibility to subscribe to NETT updates through an RSS function

- the possibility to create “connections” or “friendship” with other users in the platform so that each users board can be shared and accessed
- the possibility to access an area where new training courses are published and at the same time the possibility to subscribe for them
- the possibility to access Job opportunity area with new job postings of teachers ‘interest
- the possibility to have an “history “ on each user board according with their action on the platform
- the possibility to receive email message outside the NETT platform updating the users with the new published news of interest
- the possibility to see the users online and to immediately connect with them through chat facilities
- the possibility to access the News area of the Community where free and updates information on events, conferences, new projects on entrepreneurship education may be easily available to users.
- the possibility to subscribe to a four monthly newsletter from the NETT community
- the possibility to contact “experts” in specific domain areas through a public list

In the Training area: features like forum, chat, email and so on are at the basis of the NETT Platform. There a repository of resources will be designed for each specific Training Purpose together with the creation of tools that will help users to easily get in touch to each other namely:

- the possibility for each user to access his/her own board where latest announcement from the teachers are visible
- the possibility to create discussion group and sub-discussion group in order to exchange views and opinions in line with the activities of the course
- the possibility to upload, download and sharing some learning material (video, audio, pdf, doc, ppt and so on), with a sharing feature for example, where it is possible to share this material immediately with others
- The possibility to receive email message outside the NETT platform updating the users with the new published news of interest

Advanced features: recommender system

The NETT platform should include a **recommender system** to present users a suggested path to improve specific skills, according to their profile, personal interests, usage history and evaluation check-lists.

These features may foreseen the possibility for the user to:

- visualize all the new uploaded learning material or published material in line with their professional interests
- visualize new registered users working in their professional field of work
- visualize any event/news in line with their professional field

- visualize any more recent training offer in line with their professional field
- visualize those people who tagged similar content/items of their own
- as the main existing social networks, the NETT Platform should suggest not only linkage or friendship with other people but also with particular group of interest...
- …

Advanced features: gaming

The NETT platform should include a business game based on ranking and user generated evaluations on the quality and re-use capability of available material in order to stimulate participation and reward best contributors.

For example some games may provide a simulation of a classroom teaching and the user may be asked to select some learning materials and their usefulness in line with the class learning and teaching goals. The system will provide different options and routes to users according with their answers and this will help in evaluating the online learning materials.

The same game can be built in relation to “building entrepreneurship” and so in simulating an enterprise for their students.

Appendix 1 – List of criteria

Actual repository feature

- Web Upload/Download
- WebDAV/FTP/CIFS
- Check-in/out
- Version Control
- Workflow
- Metadata
- Categories/ Structures
- Taxonomies / Tagging
- Organisational Structures
- Audit Controls

Integration feature through NETT interface

- Browse Through Categories
- Search via keywords/tags
- Copy File into NETT
- Public link to file in repository
- Dynamic link to pull file from repository on -demand
- Private link to secure file in repository
- Upload File into repo
- Replace File in repo
- Delete File in repo
- Appears in File Picker
- Has a Custom Resource
- Has an Assignment Type
- Has a specific Block Options

Appendix 2 - Sources

The information gathered for this paper was taken from the various websites and documentation for each of the different services and the integration module as a best effort to detail the features and functionality. The following are tables of information with the links to the primary websites for each of the services. Where possible, confirmation of the features of the custom repositories was sought from the specific organisations and companies, most responded with clarification, not all did.

- Share.TEC - http://portal.share-tec.eu/
- OpenScout - http://www.openscout.net/
- External Systems Repositories Description
- Alfresco repository http://www.alfresco.com
- Box.net http://www.box.net
- Dropbox https://www.dropbox.com/
- Flickr http://www.flickr.com/
- Flickr Public http://www.flickr.com/
- Google Docs http://docs.google.com/
- Merlot.org http://www.merlot.org
- Picasa Web Album http://picasa.google.com/
- Amazon S3 http://aws.amazon.com/s3/
- WebDAV repository n/a
- Wikimedia http://www.wikimedia.org/
- YouTube Videos http://www.youtube.com

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