



FAMT&L
**FORMATIVE ASSESSMENT IN MATHEMATICS FOR TEACHING AND
LEARNING**

Work Package 5 - Development of the web repository

Deliverable D5.2 Web repository (Online Environment)

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Description (limit 1000 characters)			
In this deliverable there is the description of the phases for the design and implementing of an online environment (web repository) and the characteristics of the final product.			

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1. Introduction

The repository is the most important output and tool for the FAMT&L project.

In the phase of designing of the research project the Partners thought to a virtual environment to contain many objects and tool to learn and to have as specific characteristics:

- to collect various kind of teaching aids and research tools used and produced during the project;
- to have at least one device to be used for exchanges and communication (e.g. blog);
- to be managed by all the partners and for this reason English was chosen as official language, but with the possibility to upload materials and contents even in each partners language.
- to be organised with different sections according to the criteria defined together with partners (e.g. Nationality, topics, age, etc.).

Lastly, all the materials have to made easily accessible and usable (for example for easier searching for different materials) and to allow the same to remain available (for example for teachers from different countries) beyond the end of the project.

To design and to implement this environment researcher examined various solutions and followed different stages of development for the product, which are described in this document, as well as the definitive characteristics of the web repository.

2. Development Phases

2.1 *Collection of digital materials*

One of main aims of the project was the design and the test of a training course as a model for Mathematics teachers' training. An important aspect of this course had been the support of a web repository and a platform for the training activities.

During the course researchers used many different digital material as: instructional materials, formative assessment tools (e.g. cards, diagrams, etc..), videos (recordings of situations, teaching situations), extracts of movies with text comments or related activities, specific tools for formative assessment, learning objects (LO) created and used for training of teachers, list-references bibliography, site link, glossary, file of project documentation (draft, reports, notices, meeting minutes, articles, etc.).

These digital materials and tools of formative assessment were imagined as methodological resource for planning and conducting the teachers training paths.

The teaching materials used for the course have been loaded on the e-learning platform (in the Countries that have adopted it) or otherwise used in the presence during each course.

Instead the video analysed had been uploaded in the web repository.

2.2 *Definition of a metadata system and design of the web repository*

To store in the web repository the video collected during the project, researcher defined a metadata system for facilitating the cataloguing, archiving and searching of various brief video sequences collected.

An activity closely related to the definition of the analysis system and metadating video was the planning of architecture for the web repository. Researchers had worked with technical staff to search the best solution according to the project's needs, the characteristics of the materials, their possible use and sustainability.

2.3 *Implementation of the web repository*

By a technician point of view, the FAMT&L Web Repository was implemented following three distinct stages of development.

1. Analysis and specification

In the phases technicians have collect a lot of issue from partner and other stakeholders.

They have organized this issue and discuss with stakeholders during project meetings.

2. Design

They have started from specification to build an application view through UML tools.

The main goal was to match the specification and to meet design solution with specification issue.

The idea at baseline of this kind of work is to track each issue from its definition to its design and to track its contribution to the entire design project.

3. Assessment

In assessment phase technician prepared any indicators related to specification and design solution.

They studied web statistics from server to define if the design was really effective.

The assessment phase open to a design re-thinking based on the measurement and the goal that the project team defined.

Based on the process the following specification issue had been defined:

- a) Project: implementing processes and supporting deliverables
- b) Technician: managing consistent data and information
- c) User: quick access to information and easy exploration

In base of these directions it was decided to use a Content Management Framework Drupal 7 as base platform because it match a lot of the specification.

Drupal allow to create custom content type based on grid analysis, to storage mixed type of data (videos, texts, files, etc).

Using Drupal they had the capacity to build a simple and immediate home page that empower exploration issue for novice users.

The flexibility of Drupal allowed to project team to change and adjust grid analysis without change the entire web repository system.

Drupal 7 is written in PHP5.

We defined a Linux Apache Php environment as virtual machine with this hardware specification:

2 cpu / 3 GB RAM / 200 GB hd

Now, web repo take up over 100 GB for 126 unit loaded into Drupal.

2.4 Loading of materials

Starting by the analysis of videos collected in classroom, each partner had uploaded short videos about formative assessment practices to be used as a methodological resource for teachers' pilot training courses (see deliverables of WP3).

Partners decided common criteria to name every file to upload on the web repository (see the annex "how to name the file").

In this section some classification of data about video uploaded and stored in the web repository until the end of the project.

Long video: n.8

Long Video uploaded by each Partner:

- UNIBO (7)
- UCY (0)
- SUPSI (1)
- UCP (0)

Short Video: n.126

Short Video uploaded by each Partner:

- UNIBO (90)
- UCY (16)
- SUPSI (11)
- UCP (9)

Video classified by Main contents:

- Spaces and shape (49)
- Relations and functions (35)
- Uncertainty and data (21)
- Numbers (15)

Video classified by Main capabilities:

- Reasoning and argumentation (34)
- Using symbolic, formal and technical language and operations (31)
- Representation (25)
- Communication (24)
- Mathematizing (24)
- Devising strategies for solving problems (20)
- Using mathematical tools (9)

Video classified by the time of assessment:

- Ex post (40)
- In itinere (19)
- Ex ante (17)

Note:

To see a description and a list of the video uploaded on the web repository, please see the deliverable D8.4 “Short videos”.

3. Characteristics and functions of the FAMT&L web repository

To access and to see the web repository the login page is <http://famtl.scedu.unibo.it/en/>

Access permission for now is only for the Project partners, but they allowed temporary access to the teachers of the pilot courses.

Credentials for guest that allow the EACEA members to access the repository are as follows:

Username: guest
Password: guest33

The main language is English but the website is organized in 5 sections, one for each partner's language: Italian (for UNIBO and SUPSI), French (for UCP), Dutch (for InHolland) and Greek (for UCY).

FAMT&L web repository is built to host two different type of contents: Training and Context Unit.

The **training unit** is a set of information related to a video analyzed with the analysis grid. It shows a situations in classroom and the related analysis.

It, also, display a set of further data: last modified data, related video, documents that explain and expand the situation.

Training unit are searchable in home page through facets system that allow to select a bunch of filter like partner or abilities and so on.

A group of training unit that describes a more complex problem or situation are grouped in a Context unit.

Context Unit is our second form of content type. It spoke about context in which one or more training unit are developed, group them together and show more data about it.

Some example of data is: short description of the media, creation date, school level target, training unit collected, language and country.

Context unit are listed in Context unit page.

Over the core (training unit + context unit), web repository exposes some static page in which the entire project in presented and explained.

The repository is divided in a front office, in which everyone registered to the site can explore, search and navigate units, contents, page and a back office in which certain role can manage units and contents.

The back office allow to add, edit and remove every type of content through dedicated forms.

So we have an edit menu on the top of the web site from which each partner can manage its contents.

We have defined, also, an administration role that permit to edit all the contents without property limitations.

Now, in the repo are defined the follow role: register user, editor and administrator.

Each of the have specific permission and abilities to read/write certain type of content.

All the repositories are translated into four languages: english, dutch, italian, greek, french. So each type content are submitted in one or more of these languages.

3.1 Functions

The home page contains a brief introduction to FAMT&L project and some link to search video:

- by Context or Training Unit (tab under the logo)
- by the 5 languages in which partners had uploaded files
- by author of the uploading (the 5 Partners)
- by some section of the analysis grid (Contents, capabilities, time of assessment, tools or tasks to assess the students).

In the first page it's possible also explore directly among the list of video uploaded.



Fig. 3.1.1. Homepage screenshot

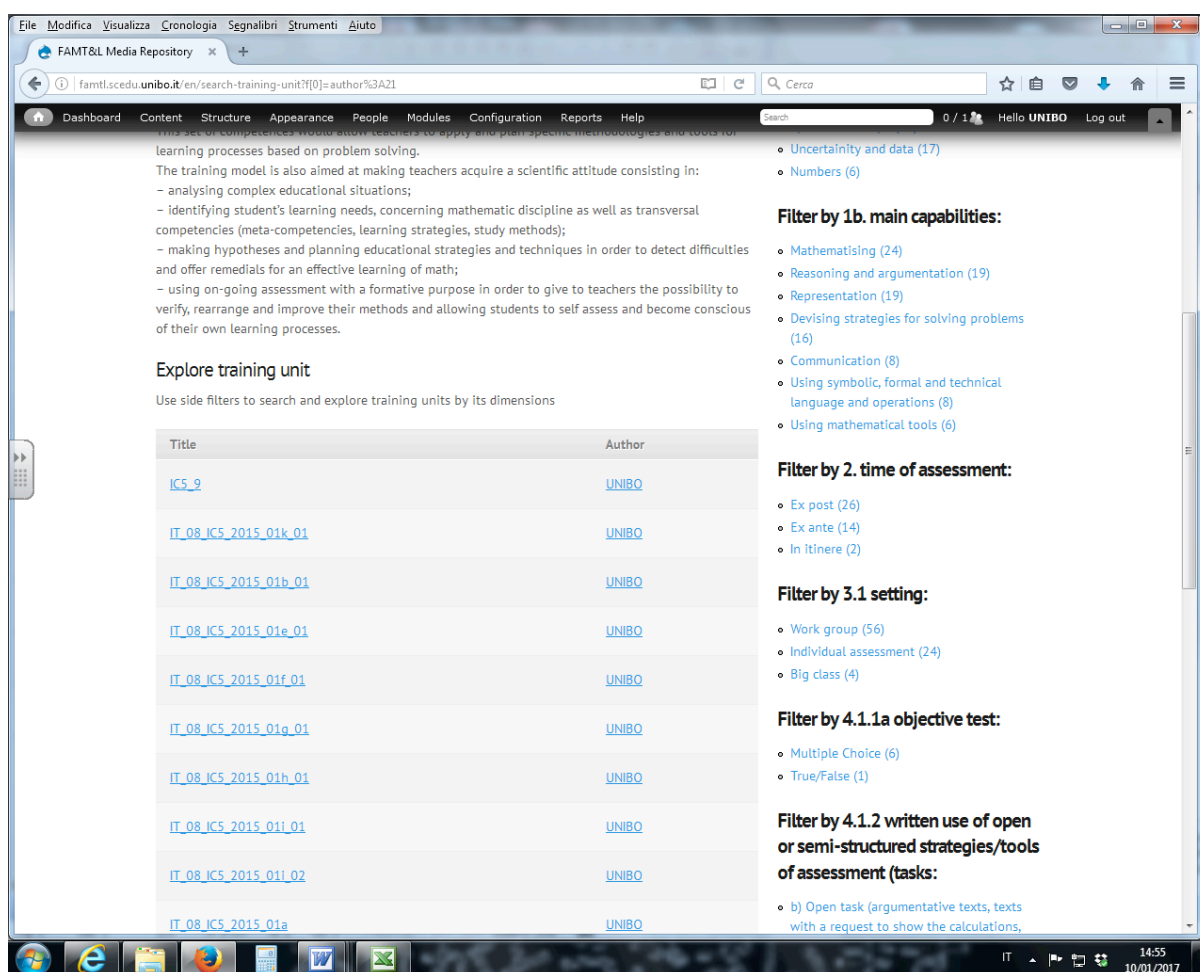


Fig. 3.1.2. Homepage (second part) screenshot

The screen of the single unit (see fig.3.1.3) , however, is characterized by having, at the top, the video's identification name (named according to the shared criteria that allows immediately to understand provenance, grade, school, recording year).

In the left part of the screen is the video frame and below a brief description of what it contains. In some cases you can also find materials used by the teacher for the assessment (correction grids, forms to be filled, observation grid).

On the right side of the screen there are all indicators of the analysis grid observable in the video: the individual actions that the teacher and the pupils do at different stages of an assessment process.

Following there are also other information grid that allow to understand what content and what skills are object of the specific assessment practice.

An important repository functionality is the possibility to select through the individual voices of the grid all Training Units that contain videos in which the same indicators were identified. This, for example, is useful for searching, by a teacher, starting from the mathematical content or skill to be assessed.

The screenshot shows a web browser window displaying a training unit page. The browser's address bar shows the URL 'famti.scedu.unibo.it/en/node/24'. The page has a navigation menu at the top with options like 'Dashboard', 'Content', 'Structure', 'Appearance', 'People', 'Modules', 'Configuration', 'Reports', and 'Help'. The main content area is titled 'IT_08_IC5_2015_01k_01' and includes a video player with subtitles. Below the video, there is a text block describing the final phase of a group work activity. To the right, there are several expandable sections containing assessment phases and classroom observations.

Video Sub:

Yes, but since I wrote
 "Probability odd", "probability even"
 "Si, però visto che di fianco avevo già scritto
 "probabilità pari", "probabilità pari", era già corretto. Secondo me"

Last modified: 10/11/2016 - 11:04

Il filmato mostra l'ultima fase del lavoro di gruppo finalizzato alla valutazione delle competenze argomentative e comunicative degli studenti. In questa fase il docente dà un primo giudizio sul lavoro svolto, dicendo che la modalità di lavoro ha funzionato. Durante questa fase agli alunni è stata restituita la scheda corretta dai compagni e quindi il dialogo si concentra sull'argomentazione dell'alunno che difende la propria posizione, spiegando perché ritiene di aver risposto in maniera corretta ed esaustiva e i compagni che hanno fatto la correzione, i quali devono giustificare la propria correzione. Il docente indirizza e guida la discussione ed evidenzia un caso importante in cui una dimostrazione può avvalersi anche dei casi particolari: il caso in cui si esauriscono tutti i casi possibili. Successivamente invita una studentessa a cercare il modo di incorporare tutte le informazioni che ha utilizzato nella spiegazione (l'esempio, il disegno fatto a lato) in un testo argomentativo e l'aiuta a costruire il ragionamento corretto, evidenziando i passaggi necessari affinché esso sia coerente ed esaustivo. Il docente, inoltre, richiama di nuovo l'attenzione sull'obiettivo del lavoro: la preparazione all'esame finale e quindi anche sulle modalità di valutazione degli elaborati della prova INVALSI, evidenziando il fatto che non possono

5. Phases of assessment

5.1.1 Sharing the correction and/or assessment criteria with the class: [The teacher recalls the criteria](#)

5.2 Administration of ORAL tests/tasks:
[The teacher asks questions to a single student](#) [The teacher asks a new question based on the previous](#)

5.3.1 Collecting data on student performances:
[The teacher uses a structured tool of observation](#) [The teacher takes some record of the behavior](#)
[The teacher takes some record about how much the students have achieved to handle the content](#)

5.4.2 Giving back the results for written tests:
[The teacher corrects the test/task analytically, showing the right way to do it and explaining the process](#)
[The teacher asks the student to do the corrections among themselves \(cross-correction\)](#) [The teacher](#)

5.5.1 Informal interaction:
[The teacher shows to the students the aims of the task \(for which the teacher has built proposed tests\)](#)
[The teacher asks student to compare/contrast other's idea \(How is your idea different from Joe's idea\)](#)
[The teacher incorporates student's comments into the ongoing classroom conversation \(summarize\)](#)
[The teacher repeats for the class a formulation of a student \(repeating or paraphrasing student's words\)](#)
[The teacher contrasts student idea \(you say that, in this point, is so... but in another case how you](#)

0. Additional observations about the classroom relational mood

La comunicazione si svolge principalmente tra due studentesse, con l'intervento del docente, il resto degli alunni ha un atteggiamento passivo. Questa situazione richiede l'intervento frequente del docente non soltanto per fare il punto della situazione e per richiamare l'attenzione sui punti focali dell'argomento, ma anche per evitare che il confronto degeneri verso una difesa sterile del proprio punto di vista.

1. Contents of mathematics

1a. Main contents: [Uncertainty and data](#)

1b. Main capabilities: [Reasoning and argumentation](#)

1d. Secondary capabilities: [Communication](#)

Fig. 3.1.3. Screenshot of a Training unit

4. Sustainability of the repository

FAMT&L's objectives are aimed at the training of teachers. On a higher level it also contributes to national and international (EU) policies and priorities.

The project contributed towards the development of high quality lifelong learning by providing a methodological model and valid materials for a quality training model for teachers in Europe. In particular, the training model, in a lifelong learning perspective, is addressed to in-service mathematics teachers in order to significantly enhance their assessment abilities.

By supporting in-service training, the project aims to improve mathematics teaching strategies for pupils. In particular the focus on formative assessment methodologies in the classroom is crucial to make teachers really able to improve students' mathematics skills and promote equity and quality in learning for European citizens.

Improving the quality of mathematics and science education (and therefore the level of basic skills of students in mathematics and science), also by keeping the focus on metacognitive skills such as self-control of learning, can also motivate students to choose technical and science professions in their future.

In this perspective, through the design and implementation of a web repository (to store and analyze video), we have made an important contribution to the teacher training. In particular, to the training of Math teachers who wish to improve their teaching through the use of formative assessment.

The web repository is an innovative product to be used as an online resource for the training of mathematics teachers and also in national teacher trainings systems. In particular national and international organizations were involved to promote the FAMT&L training model in other contexts. For example in Italy two national agencies of research in education were involved: INDIRE, National Institute for Documentation, Innovation and Educational Research and INVALSI, National Institute for the evaluation of the system of education and training. At international level, the network WiTEC, The European Association for Women in Science, Engineering and Technology was involved to analyze the potential impact of gender gap on the training of mathematics teachers.

At the end of the Project, the web repository can continue to support the training of mathematics teachers (pre-service and in-service), in particular with regard to the use of formative assessment in the classroom.

In the last project meeting Partners discussed all the choices regarding the exploitation of the FAMT & L project in the near future and its potential effects on initial and in-service teacher education.

It has been also specifically discussed on:

- All contacts with public and private institutions involved with the impact of the project in the various countries;
- How to ensure sustainability - technical, economic and scientific - web repository in the near future.

In relation to this last point, the staff decided to sign an agreement in relation to a first internal use only "for training" of the web repository, under the scientific supervision of the project team.

During the pilots courses, we have verified that the use of the web repository (and thus the video analysis in classroom) is more effective when there alternating phases in presence and

distance phases. In addition, the web repository worked best when the video analysis was associated to reflection and self-evaluation tools for teachers.

National agencies and the various teachers who have been involved in the pilot courses as critical friends have provided useful contributions to hone the training model and thus ensure optimal use of the Web repository.

At the time, in all five countries, actions are taking place to agree the continuation of the training courses in the coming years.

Together with national agencies, we are discussing ways to maintain and develop the web repository.

Eventually, the video analysis are a key data base to develop interdisciplinary research in each country and to deepen the training needs of Math teachers in the field of formative assessment. In this historic moment, we think that this point is very Important. In fact, the last students' results of International surveys (Pisa, TIMSS) reveal that, in the countries involved in the FAMT&L Project, the achievements in mathematics have to be improved. For this reason, the outcomes of FAMT&L may provide a useful contribution to the training of teachers and to better analyze the problematic situations in the various countries.

5. Annex _ Criteria to name video file and fill the grid in repository.

1. Name conventions for video title in web repository

Long video (Context unit): <country code>_<grade of school>_<code or name of school>_<year>_progressive number of video>

eg: IT_8_IC15_2015_01

Short video (Training unit): <country code>_<grade of school>_<code or name of school>_<year>_progressive number>_<progressive number of short video>

eg: IT_8_IC15_2015_01_01

***GRADES:**

Grade	AGE	IT	CH	CY	NL	FR
6	11-12	I scuola secondaria di I grado	Classe I		VWO	I College
7	12-13	II scuola secondaria di I grado	Classe II	I grade (Gymnasium)	VWO	II College
8	13-14	III scuola secondaria di I grado	Classe III	II grade (Gymnasium)	VWO	II College
9	14-15	I scuola secondaria di II grado /FO	Classe IV	III grade (Gymnasium)	VWO	III
10	15-16	II scuola secondaria di II grado/FO				IV

2. Advises to fill some fields in web repository short video form

Title: name of file as naming convention

Description: *a brief description of what is included in the video to highlight the most important things and have immediately clear what you can see. It answers the questions: What is the activity? What does the teacher do? What do the students do?...*

Summary: a brief abstract of description

Level O: any notes/observation about the class relational mood

In each section of the column 5 of the grid "Phases of assessment" there will be a field to fill with notes on relevant or important issues (optional).