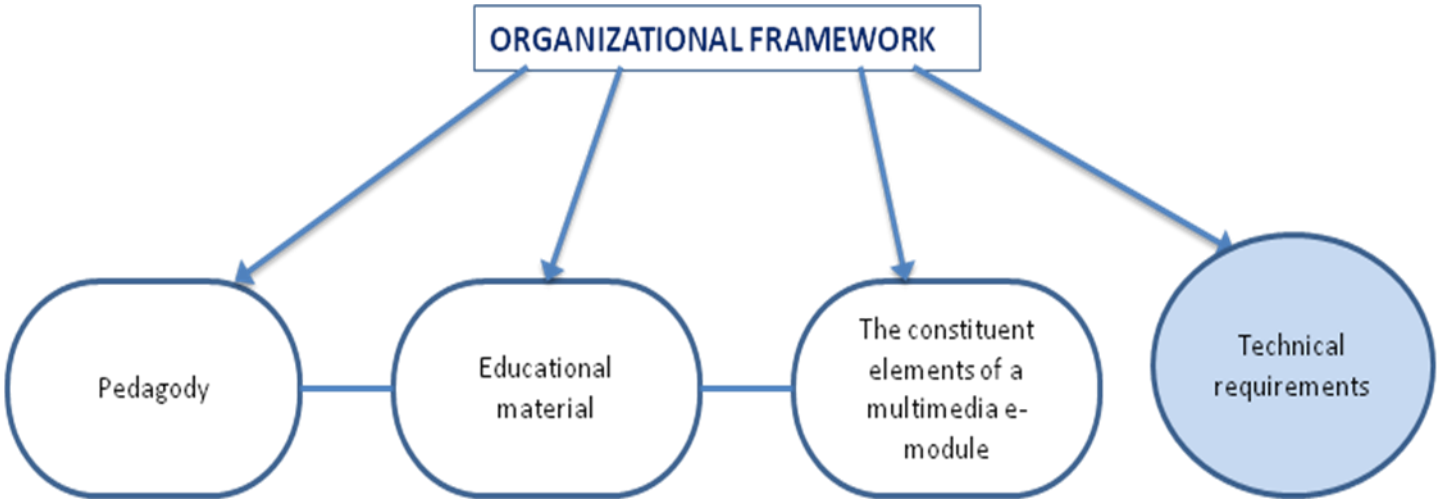
Draft Guidelines and recommendations for the development of CPD teaching e-modules

(to be discussed in the Working Group in Lyon)



1. Organizational framework

To develop an electronic teaching module for continuing dental education, **a team** must be organized, including dental academics and professionals, experts on the subject, distance learning and e-learning experts, adult learning experts, computer programmer and designer.

2. Pedagogy

A. Design of educational material for adults: theoretical approach

How do adults learn?

Key characteristics of adult learners:

• Adults need to know the purpose of their education
• Adults bring with them a set of experiences and values
• They usually come in education with given intentions, which for many may be associated with a specific need
• They have already designed learning models:

Kolb's four basic learning styles:
1. Active (active experimentation, decision making, problem solving and practical applications of theories)

2. Stochastic (observation rather than action. Able to generate hypotheses and ideas, tend to be resourceful, imaginative)
3. Theoretical (reflective observation, inductive reasoning, create theoretical models)
4. Experimental (active experimentation and concrete experience. Doing things, implement projects, solve problems with a trial and error manner)

B. Pedagogical design

It requires decisions on specific procedures and rules in every step of the process, from the choice of the learning objectives to the choice of the assessment strategies

Principles of design of educational material for adult learners

• **Thinking is connected to action**; the link between action, experience, and thinking is an integral part of the process of learning.

• The **focus of the educational process is the learners**, so the educational process should be tailored to their needs and interests.

• The constructivist path to knowledge takes place through the **interaction of learners with the learning 'material'.**

• In the open form of education it is required the **critical thinking**, that leads to the revision of our own actions, thus requiring the trainees to be alert and energetic.

• The material should be such as to promote **interaction with the learner**, creating questions and answering them, providing opportunities for self-**evaluation** with reward and reinforcement, through a clear, consistent and reasoned manner.

Designing rules

- Follow simultaneously **competences development and knowledge transmission**
- Facilitate **independent content structuring** actions in an effort of synergistic action of controlled and uncontrolled learning
- Choose appropriate manners of issues raising in order to assist independent **productive thinking**
- Anticipate and organize the development and training of effective **thinking strategies**
- Organize content structure so as to vary **mental activity levels**
- Create conditions and elements for teaching and learning **efficient orientation**
- Create **self-control** didactical situations

Characteristics of pedagogical design

- **instructions** on study management and on the inter-connection of the various features (i.e. text with images)
- clear **aims, expected outcomes** and key-words
- **simple texts** and wording
- referrals to **personal experiences**
- **examples** and case-reports
- tests and **self-assessment** activities, providing feedback

- explanatory **images / videos** replacing relevant texts
- **fragmented** content
- **highlighted areas**/ frames for the key points of the content
- **summaries** of chapters
- **learner-friendly** writing
- clear indication of the possible **difficulties**
- list of related literature / internet sites

3. Educational material

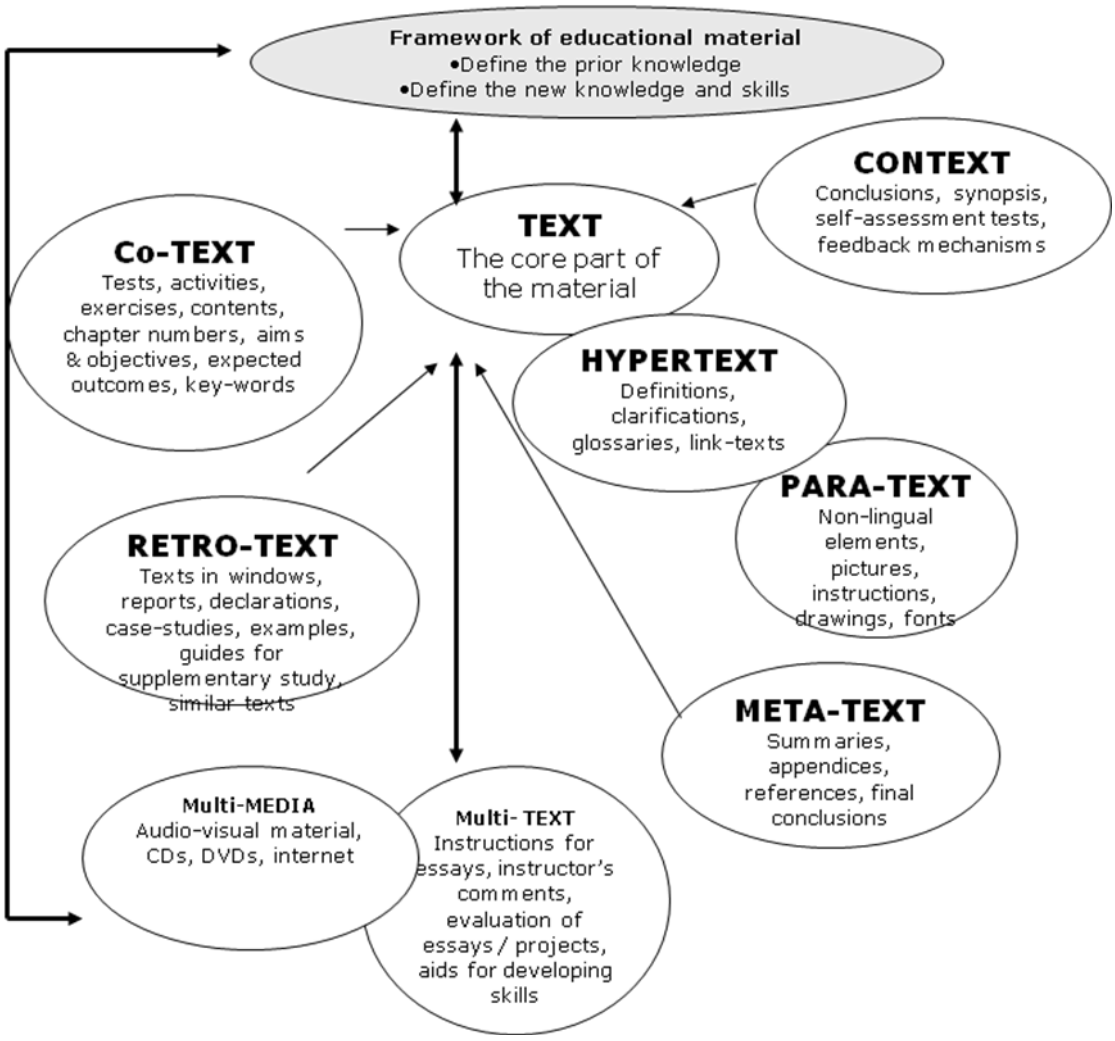
The educational content must be developed by an expert (or a team of experts) on the subject. It must be divided in small sub-units, supplemented by explanatory pictures, videos, tables and self-assessment questions. Effort must be made to limit the reading text to minimum.

A. Formulation of learning objectives!

The formulation of learning objectives is important because it gives distinct and clear goals to the learners. The learning objectives are usually expressed in terms of expected behavior and knowledge at the beginning of the chapter. The usual format is occurring as follows: «at the end of the chapter you will be able to describe / define / naming / design / select / perform ...».

B. General methodological framework of educational material for distance adult learning

➔To define a systematic and analytical approach of the elements that make up the distance polymorphic educational materials and to highlight the necessary factors for the final quality product



C. Visual – perceptive learning

…is a reading activity (different from traditional reading; a complex reception of the visual content)

- The particularities of visual perceptive learning in technology-based learning environments emerge from the **characteristic of learning materials**, which should include all the means that ensure the **transfer of knowledge**.
- The use of visual perceptive language in learning should aim to achieve the following **main objectives**, expressed in behavioural terms:

− Acquire **pertinent information** in respect to its objective
− Distinguish **the informative** elements from the connotative ones
− Analyse and capitalize means to uncover **the intention of the message**, separating symbolic means from non-symbolic ones
− Achieve a **critical stand** in treating the symbolic information received
− Develop its capacity to **select new sources**
− **Integrate** received information into personal experiences

− Recognize the ideology and inner intention of **symbolic messages**, offered by means of non-specific visual languages expressions

Those who use the Internet frequently do not read web pages word by word.
Their eyes scan the text, skim, stopping on some words or sentences.
This behaviour is characteristic of approximately 79% of the Internet users.

4. The constituent elements of a multimedia e-module

A. THE TEXT

The text is displayed in various formats and might be one of the most important components of the e-module. A text may have the following forms:

• keywords that can be combined with symbols in order to designate the button hyperlinks
• short texts, which may operate in order to explain the operation of an illustrative image
• extensive texts that serve as the primary means for information
In hypermedia the features of the text may be expanded via a hyperlink. It can be combined with other media.
In the structure of mixed electronic text, the elements that affect it include **the way to navigate** and the **form of its presentation**.
Research shows that when the electronic document is in a printed page (page format), it facilitates the reader than the process of scrolling. Furthermore, the use of windows that open and close in the text (embedded text) does not distract the reader from what he studies. The use of signs and images that act as symbols and are easily identified can serve as hyperlinks.

Elements such as:
• the length of the text
• the density of lines
• font size
• combine text with image
should be taken into account
Additionally, in the hypermedia material *(and this differentiates it from the printed form):*
• the time of a text on the computer screen
• its introduction on the computer screen, and
• how it is combined with media, such as video and audio

Text design principles

Text design must enable the visual-perceptive learning: knowledge organization and navigation, semiotic process, communication and content interaction:

- ❖ Clarity and elegance
- ❖ Predictability and regularity
- ❖ Standardisation and consistency in the use of style
- ❖ Good sense of direction in the content
- ❖ Unity and simplicity

- ❖ Position based on importance
- ❖ Grouping elements based on their significance
- ❖ Including lists and tables to structure the content
- ❖ Spacing
- ❖ Highlighting text units
- ❖ Balance and symmetry

Text designers should provide text that can be scanned using:
− **highlighted key words** (bold characters, colour variation, size, distinctive position, in a group of elements clearly separated). A good way to highlight text is **to mark significant words as links**, and the reader can be sent from these words to explanatory information.
The word should appear underlined and in blue in the page (an association of indicators which is relevant to an Internet user)
− **significant inter-titles** to label content;
− marking lists with symbols **(bullets**) for every item;
− a **single idea in a paragraph**.

Users overlook any additional idea if it is not contained in the first words of a paragraph

-- the **"inverted pyramid"** style, in which the first paragraph (named "lead") succinctly presents the essence of the information; the next paragraphs elaborate on what has been already presented, bringing in complementary information.
− **half** (or even less) of the number of words used in a printed material.

B. GRAPHICS AND COLORS

The graphics
In graphics we include all elements which define the **aesthetics** of a page of hypermedia, such as:
• color
• type of letter font
• pictures
• graphs
• the composition of the desktop

The graphics of a hypermedia application contribute to the:
• understanding;
for example, the choice of letter font contributes to the readability of text

• attractiveness;
for example, color graphics enliven the screen

The colors:
- at the text level
- at the illustration level
- for background

1. At the text level:
The precision and the rapidity with which information is perceived and memorised increase by 40-50% compared to simple white-black contrasts.
2. At the illustration level:

- the use of colors may **increase** the significance value of the information presented as **iconic representations**.
- The reader receives processes and interprets a coloured illustration much **faster and more efficiently** than an illustration in grey tones.
- Moreover, **the symbols which act as visual signals** of a particular type of content (questions, self-assessment topics, course objectives, content to be remembered, etc.) are more able to ensure **sense of direction** if colors are **consistently** used and with consideration of their conventional meanings (yellow - precaution, red – attention, etc)

3. Using different colors:
...for each section and topic can be very useful for a general **sense of direction** in the learning material.
But the most important aspect in the use of background colors refers to their function of **influencing behaviour** by triggering emotions, intentions, and attitudes.

C. THE SOUND

The sound has a strong place in a multimedia e-module; it may contribute to the development and enhance the capabilities of the other media.

The sound effects can make use of graphics more efficiently. Certain sounds can be combined to mark specific functions. For example, repeating a sound effect when you drag the cursor over the icons hyperlink, it links this to the sound functioning of the hyperlink. In this way, it facilitates the learner's understanding of the capabilities and functionalities of a hypermedia application.

D. THE ANIMATION AND VIDEO

The animation and video in an e-module can contribute in many areas such as:

• attracting interest
• effectively present information using animated symbols, diagrams and animated graphics.
• presentation of phenomena changed over time, such as a plant growth and decomposition of a fruit, using the animation technique of describing a phenomenon in successive images and their composition in video format.
• the visualization of invisible forces and laws of natural sciences, for example the visualization of the waveform of sound.

The above and their combinations might be complementary or main source of information. The problem which can occur with the use of images, animation, video, is the possible impairment of a multimedia application, if their transmission size is very large. However, there are ways to create aesthetic video and animation, with relatively small size.

E. SIMULATIONS AND GAMES

Simulation can be used in order to describe situations very close to realistic conditions of an event or phenomenon. The simulations in hypermedia may refer to:

- exploring a virtual environment
- procedures of discovery learning

The games in digital media contribute to creating an attractive and fun learning environment. They are divided into two categories, 'fun games' and 'strategy games'. The 'fun games' include:

- puzzles
- quizzes
- crosswords
- labyrinths

They are important in the educational process and they lead - with a pleasant manner - to the activation of cognitive skills such as comparing, classifying and categorizing. Such games can accompany and enrich the main "body" of information in hypermedia. When they are given as either assessment exercises / comprehension activities or as content or as a simple interesting game, they may contribute to the understanding the content.

In strategy games, the player is involved in a "virtual (potential) adventure." In the beginning usually the data are given of the mission and goals. The user must choose a strategy, as well as the tools and instruments available to him from the game in order to achieve its objectives and carry out its mission that he has undertaken. The data of the mission are given either through a video or through a text, combined with graphics and narration.

Strategy games in educational multimedia can act as a simulation of problem solving or conflict or communication issues.

5. Technical requirements

- The development of the e-module (interactive website) should be based on Web Design Standards established by the W3C.
- Interoperability can be achieved by using XHTML and CSS technologies
- Unicode character encoding for worldwide use