

## MODULE 15

### DIDACTIC METHODOLOGY IN E-LEARNING

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- Tests



#### OBJECTIVES

The objective of this unit is that of providing a series of indications and suggestions to take into account when designing an e-learning course and the methodology for the building of logic in didactic units.

At the end of the unit you will get to know the methods for obtaining information from the client on the subject matters to teach and therefore build an online course tailored to the needs of the company. You will learn how to present the matters and what structure they will take on. You will be provided with the right elements to estimate the amount of time required to build and use the courseware, what material, tools and facilities to use as classroom support.

We will also give you a few examples and practical advice as further contribution for the realisation of the intervention.

## STUDY OF TRAINING NEEDS

Every time a company, an institute, a school commissions a training courseware it is important – for the person designing it – to acquire the necessary information for realising a “personalised” plan that actually responds to the needs of the client.

Designing is a fundamental time where the matters treated are defined as their degree of detail, the type of didactic material and further bibliography to deliver, the teaching methodology and tools. The person drafting the courseware needs to know the type of user involved and the level of knowledge of the subject. This stage proves to be determining for the good outcome of the plan in the case of an e-learning course.

In traditional classroom courses the teacher takes advantage of the speed of feed back. If he/she faces an unknown topic or known by the classroom, he immediately realises the level of difficulty or simplicity of the topic by the type of intervention of the students present or by their looks. He can decide whether to provide further explanations and remain on a rather tough topic, or skim over and move on to the next point in the case of an already documented classroom. Obviously the teacher or tutor of an e-learning course cannot decide to “adjust” the training intervention in progress. The time dilatation does not allow to handle the virtual classroom with the same “speed” as the traditional classroom. Therefore, the study of the training needs becomes essential.

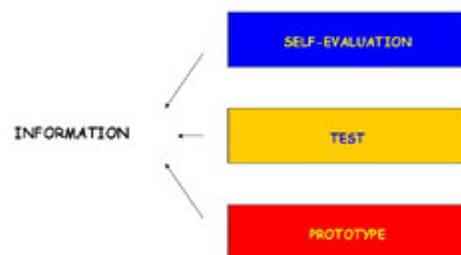
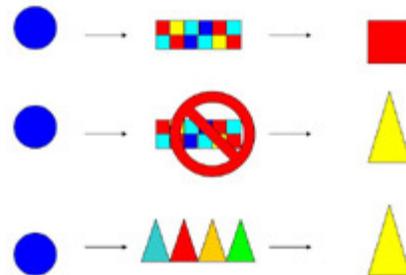
Study of training needs does not “just” mean investigate:

- the working context
- the role carried on by the user base
- the level of knowledge of the matter
- the objectives of qualitative competence
- the objectives of quantitative competence
- the presence of a culture on e-learning
- the communication strategy of the customer’s initiative
- the type of processes, tools and organisation utilised
- the type of intervention sponsorship of the customer

In the conception and implementation phase of the training project similar indications are required to adopt a coherent strategy with company objectives, supported by top management.

Obtaining this information is not always easy. We will provide the following suggestions:

### PERSONALIZED PLAN



- **SELF-CERTIFICATION:**  
The future recipients (or a sampling of them) are required to declare (for example) the level of knowledge of the subject matter, the level of use of the fad tools, the value they attribute to the courses in e-learning modality.  
Being this an “open” communication - unconveyed – information can be obtained around it that underline the company atmosphere. The details of the necessary information risks getting lost for defining the project if self-certifications are too generic.
- **PILOTED STUDY:**  
A questionnaire is set up (usually with closed end questions – easy to fill out) to assess the degree of knowledge of the matter and of the initiative, leaving a scale available (from 1 to 5 for example) for the answer. The questionnaire can be sent therefore by e-mail to make the answers easier. In this case answers are obtained to the questions asked. If something more is wanted some open questions can be inserted (without exaggerating).
- **PROTOTYPES**  
Since this is a new way of training one can make attempts at it. A questionnaire can be drafted and sent off to a small number of users. Based on the answers obtained the questionnaire can be adjusted and sent off again to another small number of persons. When the number of answers satisfies the designer and the questionnaire is definitive it can be sent off to future recipients.

## **CONTENT STRUCTURE**

Designing and writing an e-learning course is quite different from setting up a traditional classroom course. If the teacher already has a grasp on the subject matter to be used and has printed material on hand, or wants to make the classroom course available on the internet he/she better not think it's as easy as simply adapting text used for other ends to the net. Obviously nothing's impossible, but it still requires considerable effort.

The didactic units should be self consistent (with an exit test) and in addition they should be written in a clear, simple language, above all to the point. The teacher is certainly not there to give further indications like in a classroom. The questions and answers will take up some time. Therefore, it becomes paramount to set up the lessons in the most linear manner possible. Books already on hand cannot be "recopied" and introduced on line.

It becomes necessary to highlight the key concepts (a sort of detailed index – like the one you see on the left of the screen) and create a visible didactic path that shows the route to follow, so the student always knows where he/she is and where to get to (in the course you are taking now you have noticed that the boxes on the left change: from **EMPTY** - unread – to **HALF COLORED** –incomplete – to **COLORED** – complete).

The type of presentation of the topics can be different. The teacher can "leave it up" to the students to decide on the path to follow that better suits him/her or set the priorities to certain didactic units compared to others.

Objectives and content must always be well in sight (as can be seen, the first screen of the didactic unit reassumes the objectives and the subjects that the student will acquire at the end of the lesson).

The virtual classroom uses different tools and means, it is therefore inevitable that the methodology of delivery and of design of the intervention is different from that of a traditional classroom.

The main ways of structuring an e-learning course are three:

- sequential structure
- reticular structure
- heirarchic structure

### SEQUENTIAL STRUCTURE

Sequential structure is a typically linear structure that reproduces the idea of a book. A series of pages that can be browsed one at a time.

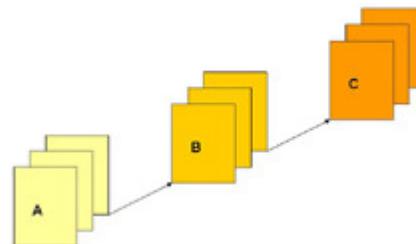
The paper book thus becomes hypertext.

Whoever wrote the course has decided a priori the order of presentation of the subject matter and does not leave it up to the student to “jump” from one chapter to another and change the order of fruition of the concepts.

We strongly advise against setting up an entire course with such a structure because it becomes too monotonous and the student loses interest. Furthermore the presence of hyper textual links risks getting the student lost; at times not even knowing where he/she stands.

The sequential structure is utilised within the didactic units that are made up of more screens and so you must turn page.

SEQUENTIAL STRUCTURE



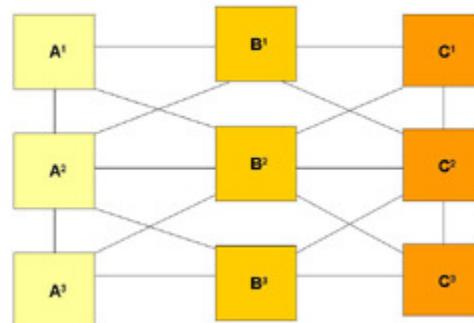
### RETICULAR STRUCTURE

Reticular structure is made up of branched out tracks that guide the students during his didactic track, allowing him to access further in-depth study, to choose the best didactic track, and to change “direction” many times. In this case the student is free to read the didactic units more useful to him for his training needs without restrictions. Obviously, he is not left alone in his “wanderings”, a tutor carefully follows his moves and results ready to step in on the event of dispersion suggesting alternative routes.

The more evolved platforms leave a trace of the type of path used by the student and allow to develop data to obtain statistical information (for example type of path, times, objective reaching).

Reticular structure is that more often used today.

RETICULARE STRUCTURE

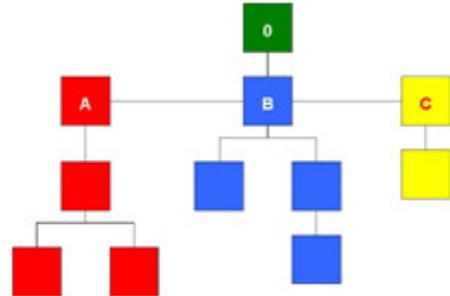


## HEIRARCHIC STRUCTURE

Heirarchic structure, as the word implies, considers certain topics more predominant than others. Therefore a certain order is given in accessing certain lessons. We talk about levels or stages. The units of the same level have the same priority and therefore the student can choose which one to start from first. He cannot however access a unit of the next level unless he has finished using the lesson of the higher stage.

The heirarchic structure is a good compromise for realising an e-learning course.

HIERARCHICAL STRUCTURE



## CONTENT LOGICAL UNITS

We have repeated quite often now that the virtual classroom is far different from a traditional classroom not only for the fact of being “distant” and thus not having an immediate feed back with the interlocutor, but also for the way the lesson is delivered; not an exclusively hierarchic one (the teacher) to many (students) relationship like at school but rather a many to many (teacher, student, tutor, student, student, etc.) interaction. Consequently, the conception of a course in e-learning modality will utilise a logic of presenting the subjects and a methodology different from a similar classroom course.

The programming technique of e-learning courses advises “lively” articulation of concepts in didactic units. Each unit deals with a precise topic, in summary. Generally, it is written as “self-consistent”, that is the comprehension of that unit does not necessitate previous reading of other sections. If instead the designer has the need to create an order in the furition, he/she must request the technician that implements the course the presence of blocks: a phrase such as the following will appear, “ you cannot access this unit unless you have first completed unit X).

In order to assist the student in fixing the concepts in their heads we suggest the presence of figures, drawings and diagrams. Furthermore we also suggest indicating one or more sites where the student can personally take note of the topics dealt with in the classroom “finding out by yourself” and making them their own.

At the end of the unit, according as to what is established by the standards (*link to unit 5*) an exit test should be envisaged that confirms acquisition of the content.

### CONTENTS LOGIC UNIT

A: A<sup>1</sup>, A<sup>2</sup>, A<sup>3</sup>

B: B<sup>1</sup>, B<sup>2</sup>, B<sup>3</sup>

C: C<sup>1</sup>, C<sup>2</sup>, C<sup>3</sup>

### DIDACTIC UNIT

Must be

SYNTETIC

SIMPLE

CONVERSATIONAL

SELF-SUBSTANTIAL

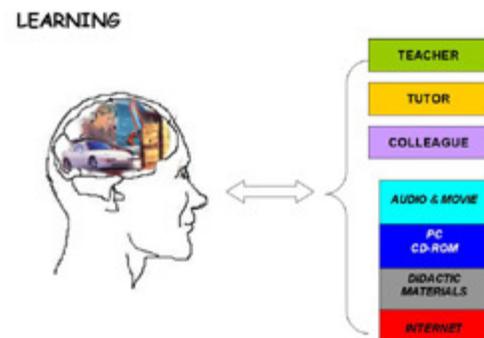
## SYNTHESIS AND MEMORY

We will never tire to repeat this over and over again: write briefly (two/three screens at the most). There actually is the risk of losing the student's attention span, not to count the visual effort of the person reading a page on a PC compared to reading the printed page. Keep to simple talk, focused, possibly with a confidential tone, closer to a "colloquial" form of writing rather than formal.

The teacher can make available to the students more exhaustive material (for example in the library) on the subject matter, that the student can download and print if he/she is interested in further inquiring into the topics.

Network training is not just a different way of acquiring information, but a new creative and interactive process to obtain and process knowledge. This entails a careful evaluation on the changes in mnemonic processes (<http://www.eduscuola.it/archivio/lre/elearnem.html>). The study and acquisition of information interacts with the selection of memories that filter and process relations with the outside. Consider our initial difficulty in using a computer and the amazing ease with which our children or grandchildren can use certain applications on a PC. This is due of course to the logic and technology with which their games are developed and the memory that resides unconsciously. It's therefore possible to utilise new strategies in designing e-learning courseware that is connected to the logical-mental mechanism of memory evoking, that gives way to a different way of understanding and abstraction capable of stimulating a new form of "connective intelligence" conceived as value added given by the union between individual and collective intelligence (result of a research conducted in the USA by Marvin Minsky and Seymour Papert, researchers at the Media Arts laboratory in the sciences of MIT). According to their studies by Roger W. Sperry (Nobel prize winner for Medicine in 1981) the ways of learning act on a continuously evocative restructuring of memories of past experiences, of images connected and of their evocative meaning.

Therefore, given that human learning is a dynamic system, use within the courseware, without hesitation, of images, simulations, film clips, sounds, but also interactive pages and links to similar sites (without overdoing it of course!) may be the winning strategy.

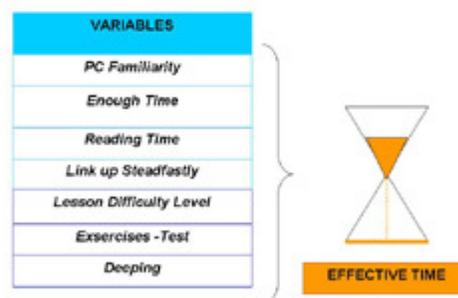


## PERIODS OF A LESSON

It isn't easy to estimate how much time a student needs for the course. There are a lot of variables in play:

- the difficulty of the lessons (if it has to do with a refresher course and therefore easier or if the topics are completely new, or if it is a technical course or of general nature);
- the times available for the student (if management has foreseen the span of time required for training or if it is accomplished on spare time);
- reading times (that is the number of frames read with consequent acquisition of content);
- constancy in connecting (if a person connects on a daily basis for a brief period of time or weeks go by between one connection and the other);
- the type of exercises and the degree of difficulty of the intermediate tests required;
- obligation or not in respecting the intermediate dates (for example participating in a chat or videoconference on topics of the course);
- familiarity with the tool;
- the type of inquiries recommended (quantity and difficulty in acquiring content)

### LESSON TIME



If we want to have an idea we can propose the following hypothesis. A course which lasts 2 days in the classroom translates into approximately 100 frames. A student who connects on an average of two times a week reading about 20/30 frames a week, who must attend a chat and forum and has the exit test at the end of each unit and an exercise to complete, takes approximately a month to complete a didactic track.

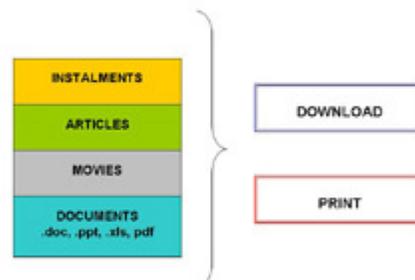
Obviously, this is an indicative estimate.

## SUPPORT MATERIAL

Support material are made up by specific topics that assist the student in the clear comprehension of the subject.

They are lecturer's notes, articles, film clips, documents found on the net in various extensions (.doc, .ppt, .xls, .pdf), that are inserted into the "library" section or – as in our case – in the "inquiries" section. They can be "downloaded" onto your PC and/or printed by the student for easier reading. They occupy this position for their substantial number of pages. The teacher advises or signals the presence of this documentation; in the event the reading is necessary for didactic purposes that will be inserted into the exit test questions relative to the topics dealt with in the inquiries.

### SUPPORT MATERIALS



Working on line

The distance work typologies that a teacher finds himself following are mainly two:

- on line (the course is used exploiting a platform,

- connecting to internet to visualise the pages and participate in the chats and forums);
- off line (the course is used without the need to connect to the net – via cd-rom – with less costs in connecting)

In the first case the teacher must try to keep up with their own students for monitoring them, intervening during the chat sessions in the forums, responding to their mail and correcting the homework assigned. The teacher knows clearly the progress of each student and knows just how to intervene. Obviously, the work is accomplished by connecting to the net, with consequent connection costs involved.

In the second case the teacher does not intervene on the work of the student that follows the course in the back office from their own workstation. The teacher's job is that of reviewing the material that the student sends or respond to their emails. The time at their disposal for studying the documentation sent and the correction of the tasks is certainly longer than the previous typology. Even the connection costs are obviously less. The risk is that of losing contact with the individual students that it is possible to understand their emotional state (enthusiasm, doubts, boredom).

Final feed back can be obtained with appropriate tests that evaluate the proper proceeding of the lesson by the student.

### **MULTIMEDIA**

By "multimedia" we mean the set of:

- content,
- images,
- sound,
- type of graphic,
- interactivity and
- sensorial communication

that contains a network course for the net or a CD.

A good multimedia is given by the combination of all these points with the proper balance.

### **CONTENT**

The person designing the courseware carries out a careful research of the material available on the net– that is always a lot but not always of good quality – analyses the content, makes it consistent, filters, inserting something new. Decides on how to present the topics, chooses the hypertext links and the links to interesting sites to give the reader greater points of views on the subject matter under hand.

### **GRAPHICS IMAGES AND SOUND: SENSORIAL COMMUNICATION**

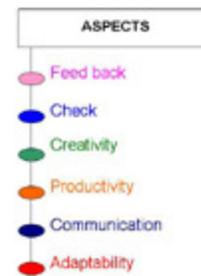
Sensorial communication lies in the use of various communication means such as audio and video. For the audio part we are dealing here with sounds that comment a video or of a voice that talks with the student while he/she follows the course. Static or dynamic images, such as film clips, are chosen to make the product more appealing. Usually, they are recited by actors, there is an exact choice in the range of colours and graphics in relation to future recipients of the product.

## INTERACTIVITY

Interactivity breaks down into many small aspects of which the good use of the product contributes greatly. Here is a list, where we insert a brief explanation on the side.

- **feed back:** the system must be able in some way to control the acquisition of knowledge by the student (ex. Verification, exit test).
- **acknowledgement:** the student must always know where he is, where he can go and if he can exit from the programme.
- **inventiveness:** the material and the media must stimulate the creativity of the student.
- **productivity:** the student must be able to utilise the course constructively (print some of the frames or the files in the “library” section, easily access all information, quickly load film clip films).
- **communication:** the logic with which the training plan is created is centred on the relation between participants that must communicate, establishing a collaboration report.
- **adaptiveness:** the platform acknowledges the student and shows what he has already accomplished and what units remain to be read.

## INTERACTIVITY



## FAD ESSENTIAL COMPONENTS

In the design phase of the structure of a training plan three sections must be scheduled that we believe are indispensable for reaching the result of:

- Exercises and verifications
- Classroom library
- Frequently asked questions

## EXERCISES AND VERIFICATIONS

As in any deserving classroom even in a virtual one “homework” is envisaged. These are theme exercises on precise indications by the teacher that are then sent to the students by email and corrected by the teacher or tutor. If the platform allows it you can find (even if their designing is not run of the mill) certain simulations (with more or less evolved graphic displays) that can be envisaged with sound and graphic effects, error messages, up to the more evolved and sophisticated simulations that technology can offer (consider flight simulators for example).

Research, at times, are given to groups and therefore becomes necessary to use chat or forums to carry out or share the homework and relate to other students.

Every FAD courseware deserving mentioning (according to compliance with standards) must propose at the end of the didactic unit an exit test that has the goal of verifying the correct acquisition of the content.

The verifications can be the following:

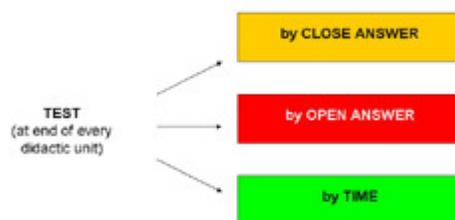
- **closed end question:** the student can choose the answer from a range of possible solutions. In some cases the correct answer can be more than one and the weight – in terms of evaluation – can change according to the choice made (for ex. +2 in the case of a correct answer, +1 if the answer is close, 0 if no answer is given, -1 in the case of a wrong answer, -2 if the choice is absolutely wrong);
- **open end question:** the student must write in his own words the answer to the question (having available – at times – a preset number of characters). In some cases a FORM is set up – a form in ..... format – that shows fields where you can write and others where you can choose among the options offered (consider for example the FORMs for filling out one’s own Curriculum Vitae scattered on the various sites on the net);
- **timed questions:** the student has a preset time for providing the answer, after a while you go to the next frame even if no answer is given. In this case you can not change the answer.

In the first case the result can be obtained if the teacher or the system produce the list of correct answers with their evaluation (similar to tests in popular magazines).

In the second case it is necessary to send the questionnaire to the teacher or to the course tutor and wait for the answer.

In some cases, NOT passing the didactic unit does not allow to access other lessons and forces to “repeat” reading the section and take the test again.

## TYPOLOGIES OF TESTS



Obviously the **verification** – especially in the case of certified courses – differentiates from the exercises since it represents the moment in which the training leader and the teacher, that is those who certify the reaching of the knowledge level of the topics and the level of competence required, officially evaluate the student.

In the case of certified course (courses that issue a recognised certificate from the outside), even if issued on informatic support, the tests are administered in the presence of a commission that guarantees the correct processing of the test.

### **CLASSROOM LIBRARY**

The classroom library takes on different names depending on the development tools (for example “we” call it “inquiries”) but represents the environment where all the documents in support of the training plan are inserted. Given that the frames are summarised at times the need arises to go deeply into a certain topic. The teacher chooses therefore between the material available among articles, publications, lecturer’s note, graphics and other judging useful for deeply studying in depth the topics treated in the didactic unit. This material is inserted on line and can be downloaded from each participant or advised directly on line.

The library is then enriched – during the course – by the students, that in their navigating on internet (especially when they work in group on the exercises) find interesting material that they indicate to the animator. If the tutor considers this documentation useful for the entire class he/she can insert it into the library, notifying all the participants via email.

### **FREQUENTLY ASKED QUESTIONS**

FAQ Frequently Asked Questions represents a section dedicated to the answers to questions asked most frequently in the ambit of a net courseware. The teacher sets up this section thanks to his/her experience trying to avoid future doubts of the user. He/she usually tries to answer in a structured manner to render the comprehension by the student the most linear as possible. He sets up a section – named in turn FAQ – where the questions are filed and the relative answers, the tutor will suggest to the students to consult the file to verify if there already exists an answer to the problem that one wanted to ask.

### **CREATING A COMMUNITY**

Following an e-learning course does not mean being alone with their own PC. The computer turns out to be the only means where one accesses information and where one talks with the other participants. Each student is part of a class. He can talk with his own classmates – as stated many times we have chats, email, forums, videoconferences – and work together with them in their research and exercises given by the tutor. Oftentimes ties and friendships are born – among people who have never even seen each other – but that continue even after the end of the training plan.

The knowledge acquired by the classroom is not that of the individual, or that given by the teacher, but the sum of all the contribution of the participants, teacher, tutor, but not only, of the mistakes and solutions discovered together, of research and discoveries that give way to the added value to the intervention and give a sense of life to the class, that proves to be a real community of creative individuals.

