

E-AUTHORING - DIDACTIC METHODOLOGIES AND MODELS OF E-LEARNING CONTENT DEVELOPMENT

Giuseppe D'ANGELO

Industrial Technical Institute "F.GIORDANI"
Via M. da Caravaggio, 184 - I 80126 Naples, ITALY
giuseppe.dangelo.csi@virgilio.it

Abstract

The contents development for distance training (e-Authoring) is one of the main problems which affect the e-Learning research. The multiplicity of e-Learning typologies (Stand-Alone e-Learning, Assisted e-Learning, e-Cooperative Learning, Blended Learning, info-Learning, small-Learning) and the specificity of the related didactic methodologies make the development of contents supporting the distance teaching-learning processes ('e-Content' or 'e-Learning Content') very articulated, determining the need to individualize specific planning and development models for these contents and specific professional skills necessary for this development.

The intervention analyzes the various forms of an e-Learning Content and the relationship among the different forms of e-Content and the different typologies of e-Learning. Then, the paper describes some efficacious e-Authoring models, paying special attention to the foreign languages distance teaching sector.

Finally, a definition of a new professional profiles - 'e-Author', 'e-Editor', 'e-Publisher' - is introduced.

Because of the limited length of this article, it is supposed that the reader has a general knowledge on the basic principles of Didactics and e-Learning, in order to concentrate the focus on the central subject.

1 Didactic Contents and e-Learning Usability

We start from the general elements that characterize the production of Contents for e-Learning, activity that we define with the term *e-Authoring*.

The change from a Traditional Didactic to a Didactic based on e-Learning sets different problems. One of them is the possibility to use in the new context the didactics materials used in the traditional context. We can define this "transposition": *e-Learning Usability*.

Clarify this important concept. Since the existence of a Didactic Objective implies the existence of Training Services which allows its achievement, then a corresponding e-Learning Service can derive from the possibility to use the components of this Training Service in the e-Learning context, that is to say the possibility to "use", for the "remote didactics" the same existing elements of a didactics "in presence". Obviously, this "use" will generally imply a transformation and/or integration and/or an adjustment. For that we can base the definition of e-Learning Usability on this principle: *in the e-Learning context every strategy, method, tool, material, check criterion for which exists an informatics-telematics technology which allows its remote synchronous and/or asynchronous fruition, is "e-Learning Usable"*.

The concept of *e-Learning Usability* must be explained, since it could be possible to think that the Didactic for e-Learning (that we have defined with the term: **e-Didactics**¹) is a mere "transposition" of the "traditional" Didactics in an e-Learning context. If it were true, there would not exist any e-Learning Teaching-Learning Process without a corresponding Teaching-Learning Process "in presence". This is not true, because Didactics and e-Didactics certainly have a wide superimposition area, but they also have their own specificity. In a few words, there are Didactic Objectives which can become e-Didactic Objectives (i.e.: to be able to drive an ambulance, to make a surgery intervention or to prepare a pizza), and Objectives which, for being efficaciously achieved, must be realized according to e-Learning (i.e. to be able to telework, to communicate in a telematics environment, to be able to chat).

The concept of e-Learning Usability is closely linked to the kind of technologies available in a specific moment: the more "sophisticated" information technology is, the more it is possible to make "efficacious" the e-Learning Service that we have to develop for achieving a specific e-Didactic Objective. By the term *technological sophistication* we mean that a more advanced technology can guarantee the application of more complex didactic strategies and methodologies.

¹ The terms **e-Didactic** and **e-Didactics** was introduced by the author in a Leonardo da Vinci project titled "HeLPS - High e-Learning Professional Skills" (www.helps-net.org).

We know that the success of a Training Service depends on the quality and effectiveness of the strategies and methodologies applied for achieving it. The more they allow enriching the teaching-learning process, the more they are efficacious and the more they can be supported by materials and tools in their turn “didactically rich”, the more they can be applied. The richness of a didactic material or tool is inborn in its ability to make applicable didactic strategies and methodologies more and more refined. All this can be applied also to e-Learning and to its “usability” concept.

Moreover, it is obvious that the concept of e-Learning Usability is not a static concept, but a dynamic concept, since it depends on the technologies’ “state of the art”. Strategies, Methods, Materials, Tools which ten years ago could not be used in remote teaching-learning now can be used. In the same way, we are sure that other Strategies, Methods, Materials and/or Didactic Tools which cannot be used now on the Net, could be used in the future.

Finally, we observe that there exists a concept of “contextual” e-Learning Usability not related to the “absolute” state of the art of the existing technologies, but related to their “availability” in the context in which the e-Learning Services have to be developed: if in the reference context particular informatics-telematics technologies are not available, certain e-Learning strategies, methodologies, materials or tools cannot be applied; for this reason they cannot be “usable” in this context. For example, if we haven’t a specific technological informatics-telematics platform which allows managing the virtual classrooms in synchronous modality through video-conference, we cannot apply, in our e-Learning Service the strategies/methodologies which imply, instead, the need of a specific “proxemics condition” in the didactic action (the proxemics is the role that assume, in the didactic strategies, the physical position between trainer and learners). In our specific case of the virtual communication environments, a “proxemics condition” can be the necessity that e-Trainer and e-Learners are all together in the same time and in the same virtual space with the possibility to see each other

The *Contents for e-Learning* represents one of the three “legs” on which the **e-Learningability**² rests. The other two are: the *functional characteristics of the e-Learning Platforms* and the organization of the e-Learning support. But of these probably the first one is the most important, particularly because all the e-Learning Methods are based, first of all, on the use of Contents that must be furnished and used at distance.

Then the e-Content represents the principal “didactic tool” that an e-Trainer has available to transfer competences, knowledge and ability. Often this tool is unique (think about the Method *Stand-Alone e-Learning*, in which there isn’t communication between who train and who learn).

As much the e-Contents is the only communication means in the e-Learning Teaching Learning Process, as its didactics quality, its auto-consistence and autonomy, its completeness is important to guarantee the success of an e-Learning Performance. Didactic methodologies and strategies must be inserted in the e-Contents, as well as the real contents (texts, pictures, sounds, animations, films, etc.).

Starting from a general analysis of the problem of the production of the Contents for the e-Learning (that we’ll name also *e-Content*) and of the professional skills that operate in the production, we will describe a Model of Materials for a Course and-Learning.

2. e-Authoring, e-Editing, e-Publishing

Content for e-Learning makes up the main component of any e-Learning System (composed of an e-Learning Platform and Organisational System in support of the e-Learners). Whatever is the structure and form that this content must have, the *e-Content production process* is basically the same: (1) Production of the contents (*e-Authoring*), (2) Transformation of the contents into usable formats of the platform (*e-Editing*), Insertion of the transformed contents into the platform (*e-Publishing*). The first phase is achieved by a professional skill we can define, generally, as *e-Author*, the second, as *e-Editor* and the third, *e-Publisher*. Besides, we will call this publishing production process as: *e-Publishing Process*.

Prefix “e-“ helps us to distinguish the publishing process to production e-Content for e-Learning by a generic production process of traditional publishing contents (books, for example).

In particular, the e-Author is *an expert with competences of Planning, Development, Editing, Publishing and Maintenance of e-Learning Contents, with specific competences on the e-Learning Content Developing Systems and on the production techniques. Essentially, he is a “Director” (a ins*

² The term **e-Learningability** was introduced by the author in the cited project HeLPS. With this term we indicate *the possibility to realize a training Service according to the e-Learning modality.* From this concept derives a basic principle which identifies in e-Didactics the Didactic Objectives: the *e-Learningability Principle*, which can be expressed as follows: *a Didactic Objective is an e-Didactic Objective if exists at least one e-Learning Service which guarantees its achievement*

film industry) able “to design” the e-Learning Contents, to plan the production process and to manage the development using all the professional skills that must be involved (authors, graphic, web-design and web-master, e-Content Development System technicians).

In the e-Authoring Process the “author/s” (expert on the thematics), realise the base materials (we will call these intermediate products: *Content*).

In a proper e-Learning Contents Production Process, the Content production is realized by taking into account the foreseen standards on the available Platform and/or defined by the e-Author. Only an “inconsiderate” approach may allow producing content regardless of the constraint imposed by the e-Publishing Process. In a proper process instead, the author will take into account the *forms* and *structures* foreseen on the used Platform. When we refer to *form* of content we do not mean just publishing ones, but electronic ones too (types of documents, types of images, dimensions, etc.). By the same token, when we talk about *structure* we mean those that articulate the different content (hierarchies, conceptual nets, hypertexts, etc.).

Various tools are used in the Content producing, since content may take on different forms. It can go from *word processing* to *Computer Graphics* environments, to those for the *production of brief movies* or *animations*, to those for the *production of hypertext*. Obviously, alongside these we find *informatics production systems of advanced contents* (role or simulation games, virtual laboratory experiences, contents in virtual reality forms, etc.), but, generally, the e-Learning Contents is made up of text and pictures (and/or movies). Then, there are particular contents that we call *In-depth Documents* (or *Deepings*) and others that represent *Follow-up Tests*.

The *Editing Phase* represents the first step for the publishing of content on an e-Learning Platform. In it the e-Editor (that is the *e-Content Editor*) works on the Content provided by the authors and takes care of transforming it into still to be published e-Content. At the same time with this operation the e-Editor checks the structural and formal correctness of the content. This control consists of verifying that the content complies with all the production standards foreseen. In this sense all the *technical aspects* can be monitored (text quantity, picture size, “weight of the films”, correctness of the hypertext links, etc.), as well as the *structural aspects* (compliance with the hierarchical and reticular structures, clarity in defining the connection between texts and multimedia contributions, compliance with the rules for file denomination and of their organisation into folders, etc.).

From a strictly methodological viewpoint, this phase may also affect the linguistic control of the texts (grammar) and on the quality of the other media, but we will ignore this aspect in our discussion and assume the e-Author to be performing this type of control.

The e-Editor will use, for Content control, analogous tools to those used by the e-Author to produce them.

These tools are joined by certain specific ones aimed at the *transformation of the Content into e-Content*. These tools are, usually, already integrated into the e-Learning Platform (they represent one of the modular components) and are defined: *Authoring Management Environments* or *Storyboard Management* or *Content Management Systems*. These environments allow inserting various parts that make up the content within the predetermined and allowed *Layout* (or *Template*) on the Platform, that is, in specific schemes that characterise the interface of supplying-using.

Obviously, at the time of insertion of the e-Content using the Content management Systems, the e-Editor performs a further check on the content in regards to compliance with standards.

The *e-Publishing* is the last phase of the e-Content realisation. With this phase the e-Content is integrated into the delivery system of the same on the network. Therefore, all the general tools available on the Platform for delivery, control, support are associated with it.

3. Standards Characteristics

When we talk about e-Content standards for e-Learning we refer to the structure that the e-Content delivered must comply with. This structure is strictly linked to the delivery and usage methodology used on the e-Learning Platform. The methodologies are very different and correspond to different models of Distance Learning. These are included between two extremes. The first sees a strict tool of administration aimed at complete control of the usage process of the Courses. The other, on the contrary, assumes a complete freedom of e-Content typologies offered where the e-Learner is free to “navigate” with no constraints, but rather building his/her own path in relation to organisational capacities and personal motivations. The latter model is not very functional to the usage control. This technique is denominated “*tracing*” and it consists of recording the navigation of the e-Learner inside the Course. The tracing on the e-Learning Platform is possible only for structured e-Content and not, for instance, in the free web navigation.

The main standards of Platforms for e-Learning retain, instead, the need to monitor the process, in addition to that of the results. For this reason, they tie the delivery of the e-Content to the monitoring of

their usage. This means the opportunity for the System to *record all the actions that the e-Learners carry out in their usage*. In general, it makes possible the tracking of the Learning Objects.

Since a too strict model makes the Platforms for special training typologies inapplicable, the ideal solution is made up by a model, that is the one introduced by TES, which places alongside controllable e-Content (in the sense of process) free e-Content, allowing the e-Learner to "deepen" the knowledge. In order to reach this goal, these Platforms allow the running of *Libraries* that house *free e-Content* for which the control is possible only by using Tests.

4. e-Content Production

The e-Content can have varied structures. The one we suggest is sufficiently complete. In it the e-Contents of a Course is divided into: Modules, Chapters and Paragraphs. To these the Materials of Deepening and the Tests are added .

Each part generally has its own structure and own characteristics of production and implementation. We propose a structure based on the model previously described, in which a balance is respected between Structured e-Contents (with "tracking") and Free e-Content.

Obviously, the first worry of an e-Author is "*how much to produce*". This problem is central in the e-Content development because the concept of "*Time of Fruition*" is linked to this. This "time" is linked to didactic aspects and to considerations about the "level of attention of an e-Learner". On this problem numerous searches and models exist by now sufficiently consolidated.

The Concept of "*duration*" in e-Learning is a very relative concept. Since the e-Learning is a *distance work activity*, there should exist a strong independence from both space (places of the learning) and time (moments of the learning), for which a "Learner" can use a Course in any place and at any time s/he desires. Obviously, the limits of this freedom derive from organisational issues. If, for example, the e-Learner needs to participate in a Forum, a Videoconference, Chat with one's own tutors, one must also find time to be at exact time at the computer. Notwithstanding, it becomes necessary to define a minimal time of use of the Course content and, therefore, of the individual Modules that compose it, so it is clear to the e-Learner how much time is left to dedicate to the training process.

Many factors affect *Usage Time*, among which the following: *e-Learner's work plan, Continuous time dedicated to usage, Level of concentration, Level of motivation*. In order to carry out a measurement of time duration of a module it is necessary to make assumptions, and these will affect, obviously, the same development of e-Content. An e-Learner, in the ideal condition:

- *dedicates from one to two hours a day to training*
- *is capable of holding a session of one hour at the computer without distractions*
- *must always be knowledgeable of having reached, at the end of an activity, a certain knowledge*
- *is motivated in learning*
- *is constant*

The other central problem is "as to represent the contents and the services in the Platform). This aspect, that is faced by the e-Editor and by the e-Publisher, it is resolved using specific forms of the screen-pages, that operates like "interfaces" between the e-Trainer and the e-Learners.

The interface for the delivery of content, which is made up of the frame that is "read" and "studied" by the e-Learner, takes on a paramount importance to foster not only learning, but also a positive and concerned approach to study. Generally, these interfaces are made up of various areas where a page is divided and by a series of "hot" buttons (both graphic and textual) capable of "guiding" the e-Learner within the Course area. The structure of these pages is defined by training draftsmen designing the "form" and the components of all the *Page-Layout* (or *TEMPLATES*) that make up the Courses. Obviously, the opportunity to build new forms is practically unending, being able to change colours, text arrangement, pictures, buttons, navigation criteria, etc.; but always in compliance with the structuralities determined by the platform that we may define as *Production Ties*.

A Template generally individualizes Areas whether to set *Titles and Tools of Navigation* and *Areas that contain Textual and Multimedial Contributions* related to the topic/themes treated.

5. Articulation of an e-Learning Course

A *Course* can be composed of *Modules*. The modular structure of the courses allows for the re-utilisation of a same Module within more multiple courses. Of course, the individual courses may be referred to different Objectives, for this reason a same Module may not be suitable to different Objectives of different courses. But the Modular set-up allows to act more structurally and correctly on the content, since the adaptations are referred to individual Modules and not the entire Course.

Being this set-up as it is, the problem of developing e-Content can be referred to the Module. For this reason all the *Production Rules of e-Content in our Standard* will be referred to an individual Module.

A *Module* represents a basic element for the designing and developing of a complete e-Content. It is a closed informative unit that provides a complete competence/knowledge on a specific topic. It can be detached from a Course and used within other Courses, with due adaptations and connections, if necessary.

A Module is set up into *Chapters*, and in turn divided into *Paragraphs* that contain the actual content of the Module. The Chapters of a Module have at least one *TEST*. The Test Chapter has its own specific structure, different from the content Chapters.

The structure of the e-Content of a Module is therefore hierarchic, but a series of free e-Content falls alongside it that represent the *Deepings*.

The identification of the Chapters in a Module allows setting up the content in a flexible manner for usage. Usually the *Chapter* is assigned with duration, as we will see further on, that corresponds to a complete session of the Trainee, without interruption. For this reason the set up into chapters is not only linked to debatable aspects and development of the Module theme, but even to methodological aspects regarding the delivery/usage modalities.

The concept of *Paragraph* is different from what we are usually accustomed to when thinking of a *book*. The Paragraph, in the e-Content, is a single frame of the Module. As such, a paragraph is not made up of multiple frames, but of a single frame where the multimedia contributions, as well as textual component, are displayed. The latter must, generally, comply with a series of constraints, that will be described later on. We can, however, advance the notion that a significant tying element is the length of the textual contribution. This tie is linked to specific aspects of methodological nature determined by the usage dynamics that a typical Trainee activates and is necessary to guarantee the maximum effectiveness of the training action of the content, minimising the risks that may derive from fatigue, habit and boredom.

As we have had the opportunity to observe previously, the role of *In-Depth Analyses (Deepings)* is crucial to guaranteeing breadth and depth to the learning process. In-depth analysis represents all the content that can be used off-line, or in any event, outside the standard environment of e-Content delivery. Therefore, in addition to guaranteeing discussion extension referred to the topic dealt with in the Module, it represents an element of communicational variety for the Trainee. With the In-depth Analyses the Trainee completely changes the usage environment, going to a traditional area, in the event the analyses are of textual nature (in the case of manuals, guides, text, bibliographies, exercises, etc.) or different multimedia field (hypermedia, web sites, etc.).

In finalised and monitored e-Learning, *Tests* represent a fundamental component both for the Trainee as well as the training system. The Tests affect the comprehension follow-up of the topics treated in the Module and allow the Trainee to check her/his own level of comprehension. Furthermore, it allows the Training System to monitor the effectiveness of the training action on the Trainee. Through the Tests one can define what support actions are needed for the Trainee who does not meet the determined minimum levels. In addition, the Tests are an essential component in any Certification system of competencies. Obviously, it cannot be the only component, for the obvious limits of certainty determined by the virtuality of the training environment, but are certainly a non disposable component of the test process.

The types of *Tests* vary and we will describe them in the following chapter as used by our Standard.

6. The designing of the e-Content of a Module

When the e-Content of a Module must be created, the e-Author must first of all design them and plan their development. This design entails not only attention to the fundamental content, topical and communicative aspects, but also, as we will see later on, the technical aspects of the operational realisation of the Content and their organisation to guarantee a correct e-Editing of the same.

The phases of design/planning of the e-Content of a Module are, generally, the following: (1) *Structural design of the Module*, (2) *Design of the Textual Content, Multimedia Content, Tests and Deepings (Documents, Glossaries, Hypermedia and Web Site)*, (3) *Publisher Design of the Documental In-Depths*.

Phase 1 includes the following activities:

- *definition of the module time-length*
- *planning of the module in chapters and chapters in paragraphs*
- *definition of the multimedial contributes forms*
- *definition of the in-depths publishing forms*
- *definition of the test form*

Phase 2 includes the following activities:

- *design of the Textual Contents, Definition of the documental fonts*
- *definition of the time production, planning of Production of the Multimedial Contributes*

- *design of the Tests Typology*
- *definition of the In-Depths Typology, definition of the link techniques to Web Site and other Hypermedial Contents*

Phase 3 involves the following activities:

- Publishing design of the Documental In-Depths
- Definition of the Technical Format of the Documental In-Depths
- Protection Criteria of the Copyright

7. The e-Authoring in the Language Training

The models, methodologies and techniques of e-Authoring we have introduced before have a general value, but obviously it is necessary to affect specific specializations regarding a different application of the e-Learning to the education and training. This is worth in general for the e-Didactis that must be specialized in the different disciplinary context. The e-Learning for the mathematics is necessarily different from the e-Learning in physics or in chemistry. In every disciplinary context there can be necessity new e-Didactis methodologies or strategies, or new types of e-Content and/or e-Learning Systems and Technologies.

In the case of the linguistic teaching-learning processes the specific needs are tied, particularly, to the teaching-learning of the spoken language, rather than of written language. For this last what described in the previous paragraphs is correctly applicable, as the teaching-learning of the spoken language presupposes the use of new and/or different informatics-telematics technologies and environments. These are essentially two; the first one is constituted by the technologies for the spoken distance communication (telematics audio-communication platform and audio-conference platform, telematics video-communication and video-conferences platforms), while the second is constituted by platform for the digitalization of the spoken language (able to compare sentences expressed by an e-Learner using a microphone, with digital sentences memorized in specific date base, or to affect the spelling of sentences expressed by an e-Learner using a microphone).

Usually the developed computer environments of the last type of e-Content permit the production of e-Content in the form of exercises that allow the e-Learner to practice her/his own pronunciation in the language studied. The same environments and the same technologies can be used, for the production of Test.

References

- [1] LetS e-Learning Courses: "*Introduction to e-Learning*" and "*Development of e-Learning Materials for Language Learning: Methodologies and Techniques*" (<http://lets.pixel-online.org/> or www.silabo.it).
- [2] G. D'Angelo (Edited by), "FROM DIDACTICS TO E-DIDACTICS - Paradigms, Models and Techniques for e-Learning", 404 pages, 2007, Naples, LIGUORI EDITORE, downloadable in e-Book format, at the web-address: <http://www.liguori.it/schedanew.asp?isbn=4067>.
- [3] G. D'Angelo (A cura di), "DALLA DIDATTICA ALLA E-DIDACTICS - Paradigmi, Modelli e Tecnologie per l'e-Learning", 404 pagine, 2007, Napoli, LIGUORI EDITORE, scaricabile in formato e-Book all'indirizzo web: <http://www.liguori.it/schedanew.asp?isbn=4065>.