Building Didactic Applications for the Teaching of Practical Content in a Virtual Campus

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Abstract. Distance teaching becomes a tough task when its goal is to explain topics with high practical contents because it is necessary for the student to have the teacher's guidance in order to understand the steps and method to solve a particular problem. On the other hand, theoretical contents adapt themselves more easily to this methodology by the use of tools such as text with hyperlinks, synoptic charts, etc. This paper demonstrates a solution that facilitates the virtual teaching of practical contents by the use of multimedia material specially designed to fulfill this task. This material not only allows the student to learn the practical contents, but also provides him with an overview method and several ways of automatically checking his knowledge and comprehension of content.

Keywords: Distance Learning, ICT, Tutor, Pedagogic Material, Multimedia

1 Introduction

Distance learning can be defined as: "... a no face training which, through technologic platforms, allows and makes access and time more flexible in the teaching-learning process, adjusting it to the skills, necessities and availabilities of each student, also it grants collaborative learning environments by the use of synchronic and asynchronic communicational tools, powering, finally, the skills based management process" [2].

Distance education allows students to learn while managing their available times at their own pace and rhythm, but, to achieve this goal, it is necessary to have discipline and perseverance and arguably, both of these can be encouraged by a good tutor.

The National University of La Matanza, has adopted face-face learning with a requirement of 75% of assistance as one of the conditions for passing a course. Although, being conscious of the benefits that distance learning can bring to students, the university offers, in some courses, the possibility of passing the whole course or

some units of a course by attending distance learning. A research group of the university, projected, developed and implemented the MIEL System, an acronym that stands for Interactive Courses On Line, which incorporates learning material in pdf format. This material is published in a "virtual campus", that allows students to attend distance learning and pass the courses.

In those courses in which almost all the contents are theory oriented, it is very easy to see the advantages that distance learning offers. A virtual campus allows the downloading of material, asking the counsellor questions about the unit that the student is not able to understand and also asking questions to all the other students through a forum, creating debates. However, the idea has now gone beyond the theory oriented content of the course and questions have been generated as follows: Will it be possible to teach practical content, such as: integrals, derivations, function simplification, etc., to the students within a virtual environment? This paper proposes a methodology in which, by the use of the ICT it is possible to teach practical content in a virtual way.

2 Distance Learning Bases

The teacher in a school room has the mission of teaching course content. This mission is based around the transmission of content, allowing the students, based in the development of the teaching – learning processes, to take notes in order to reach new knowledge. However, in distance learning the teacher, called a tutor, only monitors the student. The tutor doesn't have to teach, because the student reaches the knowledge by himself through the learning material. The monitoring requires that the tutor will be able to answer all kinds of questions made in a virtual way by the student. The tutor also has the possibility of contacting his students by email in order to remind them for example, that assignments' due dates are close, because he is the one that controls these assignments. There is no doubt that the tutor's task is a very tough one, and, in a way, the key facts of distance learning success are: how didactic and clear is the provided material added to the tutor-student relationship. The tutor, in a virtual way, goes along with the student through the whole learning process, building an important link between both of them. If a student doesn't deliver a practice task by its expiration date, the tutor is the one who will communicate with the student to ask the reasons why the student has not performed the task. The same tutor can decide to give the student a new submission date according to the kind of problem. The environment where the contents are hosted must allow the students to download these contents and also to communicate with the tutor.

One important fact that was added to MIEL, was the display of the student's last access date in order to monitor each student's activity. Figure 1 shows a part of the list where can be seen a particular student with his last login date and his state.

In addition, the learning environment must give the possibility of:

- Sending emails to the designate tutor
- Taking part in opinion forums.
- Downloading class material.

- Including chat to allow the campus members to communicate.

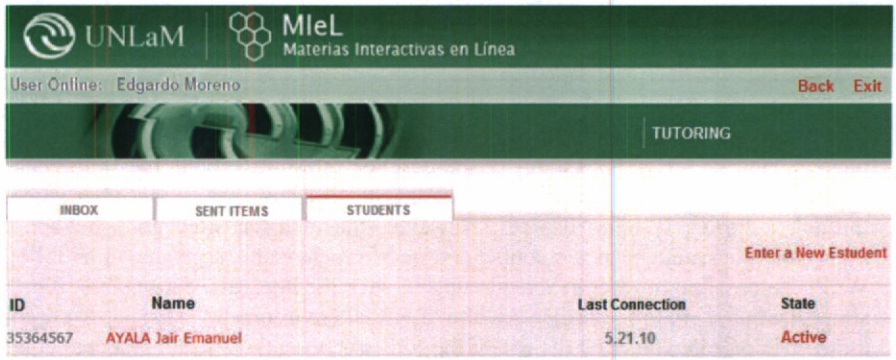

Fig. 1. A student view with date and state of his last connection[23].

Figure 2 shows a logged in student and the courses that are offered in the virtual campus. Each of these courses includes different content. It can be seen that some of them have implemented more resources than others.

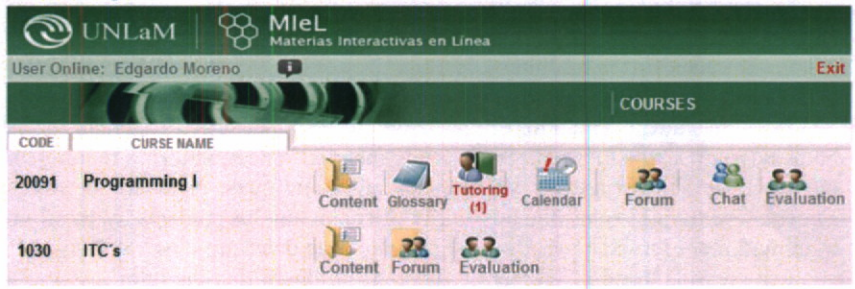

Fig. 2. Distance learning offered courses

Although several authors point that "this kind of learning is based strongly in the independent learning, where the student takes an active and independent behavior to face the learning" [3], the goal pursued by our research is to decrease the student's independent behavior making him feeling more supported by his tutor and his university. Experience has shown that forums can really allow the idea interchange among distance learning students, however it has proved to be an important initiative to include a chat feature, in which each student logs in with a registered username, preventing anonymity and involving the students with the serious use of the academic chat. This chat can be used as a communication channel among tutors and students who can fix a date and build a dialog space.

[23]Screenshots have been translated from their original language (Spanish) to English.

3 From Face Class to Virtual Class

The teachers had attended courses about their role as tutor and training with MIEL. The courses led them to understand the main difference between face and distance learning. As was explained before, the tutor's task is very tough and it is necessary to use a trained teacher to perform the task. The second key that leads to distance learning success is the kind of material provided by the virtual campus. This material must have all the theoretical content and must be available to be downloaded by the students in pdf format files. The material must include too, a reading list or bibliography for those students who wish to go deeper into the content encountered in the virtual classes.

However the practical content that requires the student to be able to see the steps that the teacher would traditionally write on the blackboard to solve an exercise, can't be given expression in a comprehensive way by means of written plain text, as the student would not be able to understand the contents in the same way as with face-face learning. This leads to the necessity of including other methods to achieve the goal of reaching the student with material with added value, that is, the material would not only transmit the content's concept, but it must be equally dynamic as the methodology that the teacher would use in a face-face situation way. It means that the perception that plain text is enough for the student to understand only by the reading of text guides or text lessons is changing, especially when the content is practical and of a certain level of difficulty. There is a move towards considering the incorporation of multimedia content into the teaching-learning processes

The proposal begins by choosing those practical contents that have any comprehension difficulty and require the didactic presence of the teacher in order to be understood by the students. The first instance that is evaluated as an alternative of implementation is: filming the lesson given by a teacher and uploading it into the virtual campus providing the students with the possibility of downloading the video (this alternative is mentioned as a technologic tool in [1]).

This alternative allows the students, with their own schedule and also within the comfort of their own home, to listen to and watch the lesson. It is important to highlight that this methodology is not capable of being applied due to the following reason: a good quality video, with quality enough to read what is written on a blackboard, although it is compressed with advance compression techniques such as "divx codecs", will take approximately 700 MBytes for a 120 minute long class. In addition, the time that is taken in downloading the video classes, although the students have broadband connections, is very high indeed. Streaming seems to be the solution; nowadays we can post a video with good quality to youtube or another streaming service, but the problem with streaming is that the student loses the possibility of carrying the material with him, for example in a laptop, because a permanent high speed connection is required, and if the connection is lost the student will not be able to see the material,

Based on that first proposal, the research team begins to consider the possibility of generating multimedia contents in which, by the use of animations it would be possible to underline, highlight and gradually add parts of information. That means, removing the filmed blackboard and turning it into animated information that is

gradually shown, while the teacher's voice explains the content. This way, the written text will not be very long and it will be possible to hear the teacher's explanations multiple times as per the student's own requirements.

4 Multimedia Environment

All these alternatives become reality by the development of multimedia applications that can be accessed by the students within the virtual campus. The inclusion of these applications transforms distance learning into a pleasant way of studying. The goal is to allow the student to choose the content that he wants to see and download it alone instead of downloading a complete lesson. This option allows file sizes to be decreased making their download faster.

The virtual campus offers a file list, where, as in a face-face class, the student is supposed to have understood the previous contents. The student is the one who is able to choose the contents he wants to download. This way of working allows the student to choose his own learning level according to his requirements. In addition, the virtual campus offers exercises and more detailed materials about the learning content, which is recommended to be read after he has studied the introductory material and the virtual class. If a student considers that his or her own knowledge allows him to access the material without seeing the virtual class, he or she is free to do it. Each virtual class shows the time that would spend the student while participating in it, so he/she can plan his or her time. This was added to allow each student to download several classes and to build his or her particular schedule for learning them because he or she can then know how much time he or she has to spend with each class.

Figure 4 shows the list of contents that can be downloaded. A team of experienced tutors guides new teachers in the development of multimedia content.

Fig. 4. Virtual classes list

Some practical content of the course "Introduction to Information Technologies" has been uploaded to the website. During the year 2006 text material was incorporated in the virtual campus with the contents of Unit 3: Logic Circuits and Unit 8: Networking. 50 students for Unit 3 and 48 for Unit 8 enrolled in distance learning during that year. This proposal was offered only to repeating students.

During 2007 new students (that haven't attended the course yet), were invited to join the proposal with the possibility of attending one or both of the units uploaded. These students didn't have previous knowledge of the content, and distance learning would an additional support for face-face learning. 62 and 63 students respectively joined the proposal. During 2007, 2008 and 2009 multimedia content was added to the virtual material, in particular, practical content. It is important to highlight that the new students that attended virtual classes that included multimedia materials didn't need to attend face-face classes because they said that they had understood all of the content by watching and working with the multimedia resources.

5 Virtual Class Development

The product Flash by Adobe, was chosen for the creation of the virtual classes. Its main advantage, over PowerPoint, is the possibility of generating an executable file that includes sound, allowing a better use of the different elements to be displayed during the presentation. The audio is recorded using a microphone plugged into the computer. Later, it is necessary to reduce, using specific software, the audio file's quality in order to obtain a "lighter" file

The different scenes are made using Flash. Each one of them represents a "slide" of Power Point. Each scene must have, at least, three layers:

1. Animation: It will include the elements that will appear in the presentation (text, graphics, equations, etc.).
2. Buttons: basically includes all the elements that are going to remain in sight during all the content explanation (buttons, content title, content length, etc.).
3. Sound: includes the audio with the teacher's explanation that will last during the whole scene presentation.

Afterwards, each element that must be animated is recorded specifying the time at which it must appear. Then, the action that must be performed by the code (action script) must be added to each button. Figure 5 shows the three layers (Sound, Buttons, and Animation) on the top left. The column on the right shows buttons sounds and graphic elements that are included in the scene. In the image's lower side, one of the button scripts included in the scene can be seen.

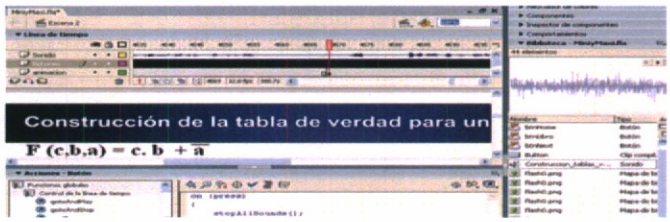

Fig.5. Part of a screen built with Flash

6 Didactic Question Papers

With the unique goal of providing the students with a tool to check their own comprehension of the content, Flash executable files with question papers were created. They don't represent an evaluation tool as such. Simply, once the student, guided by his tutor, has studied the whole unit and has fulfilled the written practice, he/she is then able to use the question papers as a review tool.

Each question is presented with different answers. The student chooses the answers, in a didactic way (clicking over an answer, dragging a graphic, or linking concepts by arrows or lines). Then, the student clicks the validation button to check if his answer was correct. If the student answered in an incorrect way, he would be able to review the content or even contact his tutor. The question paper is only one more tool provided to the student, that's why it is not given a grade. The question papers are executable files, so the student has to download them only once, and can use them as many times as he wants to, without being connected to Internet.

The questions included in the question papers, were developed according to the following methods:

- By several options using multiple choice (the student can select all the options he wants). Figure 6 shows an example.

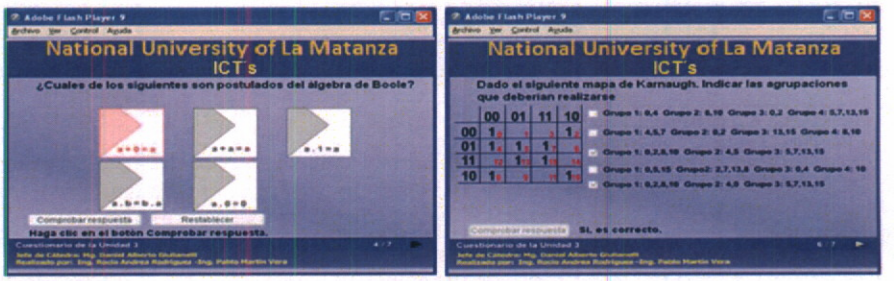

Fig. 6. Screen captures where the student answers are selected by multiple choice

- By simple choice. The goal is that the student selects only one possible answer, among several options. For example: which is the best method for…? The options include all the methods but the student has to select only one.
- Typing by keyboard the requested word (the student can write the correct word using uppercase, lowercase, or using a synonym; all of them are taken as a correct answer). Figure 7 shows a circuit and the student must provide its name. The correct answer "half adder" can be written in Spanish or English, using uppercase or lowercase, capital letters, spaces between words, etc. All of them will be taken as correct answers.

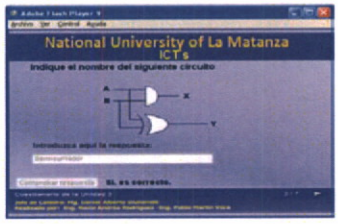

Fig. 7. Screen capture where it can be seen that the answer must be typed by the student using the keyboard.

- Using the mouse to drag an element from a set to other set. This method is used to check several concepts. To answer correctly the question, it is necessary to join related concepts by dragging them with a mouse. Figure 8 shows an example of captured screens. The student's goal is to link the logic gate's name with its distinctive shape. It can be seen on the left screen the proposed question and on the right screen the answer selected by a student where each name has been dragged over a logic gate.

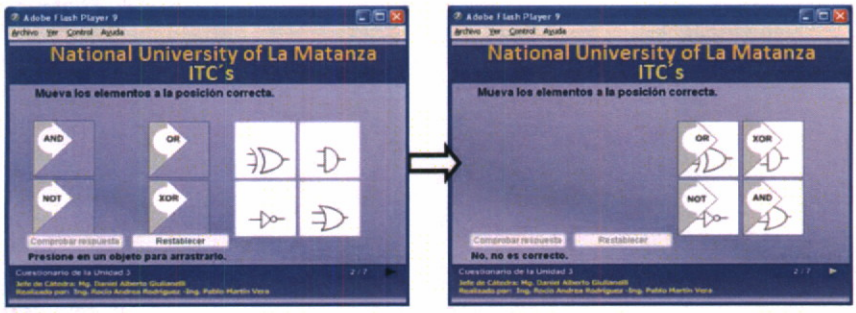

Fig. 8. Proposed question where it is necessary to drag the logic gate's name over its distinctive shape

When a student has answered a question he or she has two options: "restore" which means to erase the answer and return to the question's initial screen, or the second option "check the answer" (see Figure 8). When this option's button is selected, a message appears by the button saying if it is a correct or wrong answer (see right Figure 8). Each time an answer is checked, the next question is available and displayed. Once the student has finished all the questions paper, a new screen informs him or her how many questions had been answer correctly, and how many were wrong. Also, the percentage of correct answers is shown (Figure 9).

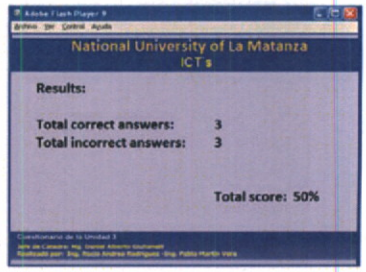

Fig. 9. Question paper's results

7 Research Results

In order to evaluate the proposal's effectiveness, an anonymous survey was circulated to the distance learning students that took the courses at the end of 2009. A list of the more relevant questions is shown and the results are displayed. Figure 10, shows the obtained results corresponding to the following question: "Understanding the themes through virtual classes has been…"

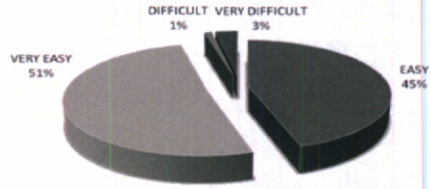

Fig. 10. Difficulty level of understanding virtual lesson themes

On the other hand, one of this proposal's advantages is that the student is able to see, hear and repeat the class and its didactic content the quantity of times that he wishes and needs. Figure 11 shows the results of asking the students the following question: Which was the highest number of times that you needed to repeat a part of a virtual class?

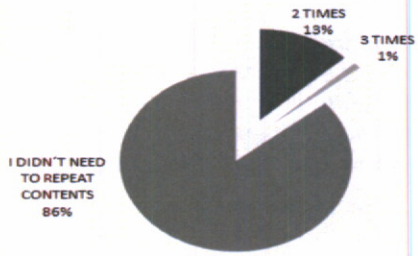

Fig. 11. Necessity of repeating some contents of the virtual classes

Figure 12 shows the obtained percentages when asking: "Did you need to consult the tutor about virtual classes' contents?"

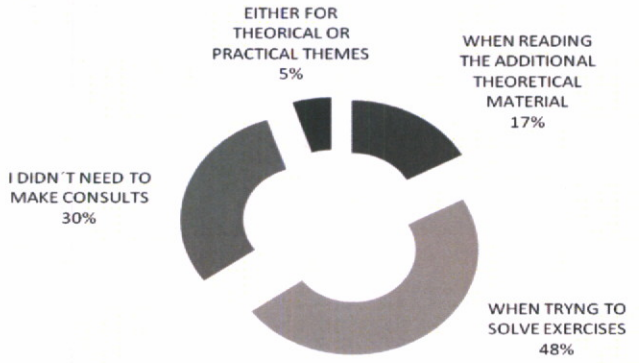

Fig. 12. Difficulty of understanding the virtual lessons' level

8 Conclusion and Future Works

Distance learning requires a good tutor who achieves the goal of building a strong link with his or her students. It also requires special pedagogic materials for this way of learning. For content with a higher difficulty level, these materials must not be just simple text, on the contrary, all the technological resources provided by technology must be used to build the materials. Undoubtedly this kind of material will be more attractive for students. Logically, the effort of building multimedia material is higher than writing a textual explanatory guide. In spite of this, we believe that the effort is worth making.

The results obtained through the anonymous polls presented to students who participated in this methodology show that only 4% of them considered that it is difficult or very difficult to understand the practice issues virtually and 96% considered it to be easy or very easy to understand them. These results widely exceeded our expectations. Virtual classes provide the possibility of taking a course as many times as it is necessary. This applies also for a single theme, unit or several themes or units within a course.

From 2007 to 2009 a huge effort has been made to include more didactic content, especially regarding those practice topics that are difficult to understand by reading a plain text.

This research showed, according to the research team criteria, that it is possible to explain practical topics, regardless of their difficulty level, in a virtual way. By preparing a clear set of examples and enriching the questions and answers interchange among students and tutors, it will be possible to achieve a fundamental tool as a proposal for future technological learning.

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Copyright for Interactive Systems: Stratagems for Tourism and Cultural Heritage Promotion

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Abstract. We present a series of strategies followed from the interactive design for the realization of a hypermedia system aimed at promoting in an original, simple and universal way the cultural and tourism heritage of a wide rural area in two Italian regions: Emilia Romagna and Lombardy. Besides, the main stratagems followed are disclosed to overcome the existing hurdles when it comes to copyright for the free diffusion of the tourism view of the area, such as can be photography or video, for instance. Finally, we present the first vademecum to be considered before making on-line and off-line interactive systems in Italy.

Keywords: Interactive Systems, Copyright, Globalization, Design, Photography, Tourism, Cultural Heritage, Human Factors

1 Introduction

Without any doubt, one of the main problems deriving from the current era of expansion of communicability is the information copyright, whether it is in an analogical media or in a digital one. These problems have their origins in the first hand-made copies of the great works of art, such as can be painting, until the introduction of the Xerox machine. In the following figure 1 we can see how two professors of the XXI century have totally photocopied computer science handbooks, in front of the Law and Economics faculties, for instance. The inexistence of the tutelage of the copyright in the face of a law college inside the alleged European economic engine, such as the Lombardy (Italy).

An example of this kind renders meaningless all those associations who claim to tutor the copyright and intellectual property in Europe. In contrast to this reality we have some curators of castles, parks, gardens, etc., who claim to be the owners of the images and cash in for the rights of photographing buildings, streets, squares, statues, rivers, plants, etc. Between both there is the on-line and/or off-line hypermedia systems designer, who without economic resources or local, provincial, regional,

state, European, etc. subventions intends to carry on with creative solutions to spread internationally the cultural and/or natural heritage of some regions of the Old World [1–4].

Fig. 1. Professors of the XXI century have totally photocopied computer science handbooks, in front of the Law and Economics faculties in Bergamo city

Therefore, before designing the interactive system a long bureaucratic process must start to determine whether the images, music, etc., that he has available can be used in the multimedia project. Once all these permits have been obtained and the copyright has been paid, the work of elaborating the interactive process may begin. Now it is advisable that a beta version of the system is always made and it is deposited in the offices to tutor the authorship of the work being made. The reason why the massive production of the interactive systems is not advisable is that sometimes these permits lack validity in some places in Europe. They have to be collated and approved for another or umpteenth time by the competent authorities of the territory, for instance, the city hall, the province, the region, etc. Territorial bodies that little by little wish to take up power in cultural heritage matters with profit purposes, through the payment of rights and taxes. In other words, the greater the territorial division of the competence in the cultural heritage, the lesser the possibility of carrying out quickly an interactive system and, furthermore, the costs are so high that the projects are given up, and everything that is left is just a sketch. In contrast, a lesser division of the territory in regard to cultural heritage may generate binary situations, that is, a quick negative answer, without the possibility of appealing to higher instances, or also the quick approval, after having paid for these permits. Moreover, since there is no complete catalogue of the European cultural heritage in a free access database, for instance, one doesn't know beforehand whether the illustration material to be used has copyright or not.

At the start of the boom of the hypermedia systems in the Iberian Peninsula the approval of the heirs, owners or chief curators of the museums and cultural institutions was enough to set in motion the project. The designer's main problem was to create an original solution in each one of his/her interactive systems in regard to the volume of the dynamic and static images, sounds, music, texts locution, etc. With the momentum of the internet, the copyright problem has grown in an exponential way [5–8].

2 The Globalization of Copying and Pasting

In the 90s many Spanish artists, for instance, quickly developed an interest for the multimedia, specially the possibility of combining static or animated images, sounds, architecture, etc. One of them is Javier Mariscal author of the Barcelona Olympic Games mascot) with a style of his own and which prompted interest in some Asian countries because of the richness of its colours or the curves of its figures. For centuries, the Dutch merchants settled down in the natural seaport of Japan, Nagasaki. In that same place, the denizens decided to set up a copycat replica of a Dutch village. "Nagasaki Holland Village". It was in this way that a park for children entertainment was created, an aquatic labyrinth called "Aquarinto" [9]. In this park there was a central character named Nina (a kind of Dutch relative of Cobi), which moved in a 2D and 3D animation environment (figure 2).

Fig. 2. Acuarinto (Javier Mariscal): 2D and 3D computer animation

The characters were animated in 2D, following the traditional canons of draughtsmanship in order not to lose their expressivity. The 3D was used to make the backgrounds, objects, textures, lightening and the camera movement. Besides, plants and shapes were made in bronze statues, so that they could be taken to the computer with a scanner. Now that work published in a specialized magazine of limited circulation [9] may serve to those designers, university professors and other professionals of multimedia communication who devote themselves to copying and pasting, as if it were something natural. Nowadays these very same shapes and style created for Acuarinto are to be found in many shops in the Balearic Islands. As a rule, the love of plagiarism may be part of the associations which protect copyright and it will even be tutored through the copyright of a part of these figures, such as can be creating cyclopean characters (figures 3 and 4), but instead of using a circle, resorts to a ellipsis, divided by a vertical line and two dots as eyes inside the big eye.

Fig. 3. Cyclops or thief's mask

Fig. 4. Updated version and not legally registered in the case of a robot on-line

In this description we have the copying and pasting of the style, without the need of resorting to last generation software, because computer animations originate from the storyboard, made in paper sketches and using a simple pencil. Besides, it is the case of copying previously existing designs. Evidently, these issues in the context of painting, sculpture, architecture, etc. require specialists in art history to understand when something is original or not. Now the Web 2.0 with practically all the information from the users on-line, may automatically generate the cloning of people [10]. This is a usual practice in some university education centres of the Mediterranean. As a rule, in order to quickly promote inside the group some people just arrived to the professors team, the areas of knowledge, interest and even of research of those people who are going to leave said education centres are photocopied. This is very simple for them, since they have the financial resources and they can carry out the same heuristic research on the use of the computer in their leisure time, even in the incorrectly defined virtual spaces because of using such applications as Facebook. If the outgoing professor worked with his/her students and volunteers inside a multimedia publishing and communication lab, sometimes transformed into a usability or communicability lab, the plagiarizing professor can widen the universe of study to a province, region or even a state [10] [11] [12]. That is, the subjects are always the same as those of the professor to be plagiarized or imitated; multimedia communication, usability, quality, heuristics, descriptive statistics, etc. Evidently, these works are mere strategies that the dynamic persuader (specialist in copying and pasting, for instance [10]) has to draw the attention to himself and/or his/her collaborators in the work they make. Moreover, it is a way to justify the huge money sums that are invested from the universities. Instead of generating techniques and/or methodologies that allow saving money. From the point of view of the presentation in the audiovisual media, these experts in "copying and pasting" have a kind of isotopy in their look. Schematically, we can depict both situations in the following way:

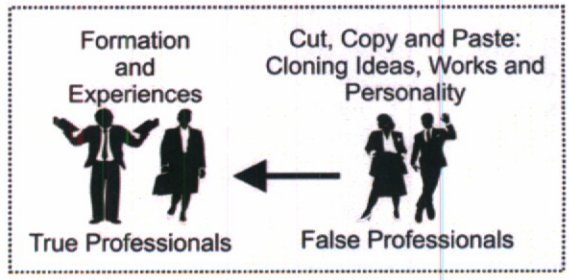

Fig. 5. New technologies –cloning professionals

Some isotopies that disclose and imply the presence of dynamic persuaders, such as can be the use of glasses with thick black frames, in the professor of mathematics, phisics or astronomy style. The interested reader may look up the following bibliography to go deeper into the dynamic persuaders and their negative influence in the development of the internet [10] [13].

In the figure 2 we see how the "copying and pasting" references the design of the computer animations but whose economical consequences are huge with the passing of time since the plagiarizer settles down in the institutions that allegedly tutor copyright. In the figure 6, the copying and pasting of a CV of a professional in new technologies does not only generate a cloning of the plagiarism, but it slows down in decades the progress of the community that consents and admits that modus operandi in issues of the new technologies related to the safeguard and promotion of the cultural and natural heritage as it is the case of our study. The above mentioned examples clearly show the harm that may be caused with fake professionals of multimedia communication in the tourism issues, especially in the economically developed countries. In the promotion of the heritage of the small localities, when the available economical resources are few, sometimes the original ideas in tourism subjects can be quickly imitated by those localities which, among themselves, keep a continuous competition loop to attract tourists. In other occasions the limitations derive from those who hold the copyright ownership, because they have gone through the registration and patents office asking heavy money sums to use images in small logos or labels of artisan products. Fortunately, the digitalization of the information allows that instead of a copyright drawing you can use the frame of a film, as it happens when there are no agreements between the interested parties. Another alternative may even be the 2D and/or 3D reconstruction of the characters of the film. Evidently, the costs may be higher because of the production time, instead of using a frame or a drawing. However, sometimes this may be the only possible solution.

3 Digital Photography versus Copyright

One of the advantages of digital photography is the speed with which one can create several guided tours [14] or scene reconstruction [15] inside an interactive system by presenting several alternatives to the users at the moment of the interaction, that is, with the purposes of tourism information, pastime, etc.

In our case we have joined several towns and villages from inside the regions Emilia-Romagna and Lombardia, following the texts by the writer Guareschi, in a special way in the creation of the portal "Little World of Guareschi" (www.mondopiccologuareschi.com). Once the legal permit from his inheritors for the project was obtained, the wide area of the north-centre of Italy was photographed, during springtime, which entailed touring those places for two years in a row until getting a sufficiently wide images bank (around 5.000 including indoors and outdoors) to pick those that had to go in the different formats of the on-line and off-line hypermedia systems: web portal, CD and DVD. Aside from being a writer, Guareschi was a draftsman, and he himself illustrated his texts. Therefore, these photographs had to be accompanied by a selection of those illustrations (300

approximately), after a self-edition of said photos because of the sorry conservation state. The self-edition of these illustrations entailed generating images in vector and bitmap formats. Later on, the damp stains were wiped out, paper folds, the yellowish colour, the author's jottings or by the typographers at the moment of making the print tests, etc. A work that implied almost three months of post-production, until obtaining an excellent quality of those images in the vector and bitmap formats. Consequently, the main idea was to balance the author's illustrations with the current images of the rural landscape, mainly. However, the authorization obtained later on for the reproduction in off-line format did not cover the whole bank of images on which it had been worked, but rather a small sample of it which did not reach 5%. Obviously, an unthinkable situation in the Spain of the 90s, with the boom of the multimedia systems in CD-ROM media to promote the works of Dali, Goya, Picasso, etc. or museums such as Orsay, National Gallery, State Hermitage, etc. As a stratagem in this case it was decided to place the illustrations on the on-line portal and that the same were the bait to draw the attention of the potential users to the title "Little World: Virtual Postcards". This was the first hurdle to be overcome and theoretically a written authorization was available before setting in motion the interactive project.

The other legal hurdle to be overcome was the issue of the monuments, castles, etc. which were located in small villages. These brick constructions –mainly– and stone, which reveal the strong Spanish presence in that area have been very well kept in some cases through the centuries and in others not so well, because the bricks have been used for other constructions after the Second World War. Besides, it is a kind of cultural heritage that is usually private. Consequently, the outdoor pictures do not require special permits. In contrast, the indoors pictures, including the vegetation in the shape of gardens or artificial lakes, etc., need an authorization. In the case of indoors whose ownership is held by the public authorities, it is necessary to request the permit to the public bodies who tutor that heritage. In the museums managed or under the tutelage of the associations named "Pro Loco", which fulfil an important mission of safeguarding and promoting the Italian territory, there were practically no problems to get the necessary permits to take the pictures. Many of these museums constitute the real engine of tourism (figure 6) as compared with the scarce activity that is carried out in castles —Little World area— which have works of an extremely high artistic value such as can be the frescos, hangings, sculptures, etc.

Fig. 6. Peppone and Don Camillo Museum & logo

As months went by, the legal details concerning the copyright and royalties were better known. Valid or logical in some cases, while in others the transparency in these issues was equal to nil, even in those animations that had the necessary permits available. All of this had a direct repercussion on the dynamic and static means that would be used for the final project, since the initial plan for the contents of the several on-line and off-line interactive systems was being modified. For instance, one of the consequences of this continuous to-and-fro between the use or not of the images implied that the texts of the interactive works would be totally unpublished before (six languages: Italian, German, Portuguese, French, Spanish and English) and clearly aimed at the cultural and natural heritage, excluding the writer's literary aspect, for instance.

In the case of the cartography of the past centuries and which is currently stored in the museums, the pertinent permits were requested to photograph the maps. Here it was also necessary to carry out a self-edition work of the images. These images, joined to the illustrations of the writer, were the only ones that existed previous to the project we are describing. All the rest if a long process of photographing the territory with its natural and cultural resources, always in the same time of the year. Although the digital camera, the software and the hardware, for instance, are of low economic cost. The financial resources available to carry out the hypermedia project such as can be trips, lodging facilities, etc. were equal to zero. The financial resources and time available are very important for the local and global turism promotion [16]. Here is the main reason why the strategies in the design of the interactive systems, whether from the point of view of communicability [17] and usability [18], are important.

4 Communicability and Interactive Design

Applying the notions, quality attributes and communicability metrics excellent results can be got in short time. Communicability is present in each one of the interactive design areas, regardless of the hardware platform and the software that is used in the creation of the on-line and off-line interactive systems [17]. In the following graphic we can see how communicability is the core of the intersections area:

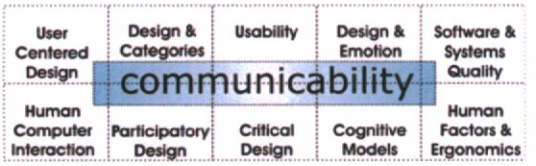

Fig. 7. Communicability in the interactive design

In the case of the "Little World: Virtual Postcard" interactive systems [14] and the difficulties presented from the point of view of the necessary adjustments to the changes of the contents of those systems in a fast and accurate way, without causing strains inside the work team. The strategy followed was to split the contents into

several modules and medias in relation to the potential users and following two central axes: universality and simplicity. In the beta version of the CD-ROM it was decided to create a virtual postalcards of "Little World" in six languages and with 300 photographies (figure 8). This product would be marketed in two formats: one to be sent by mail in a carboard envelope and inside it the CD and the other in the classical format with a plastic case of CD-DVD for collection.

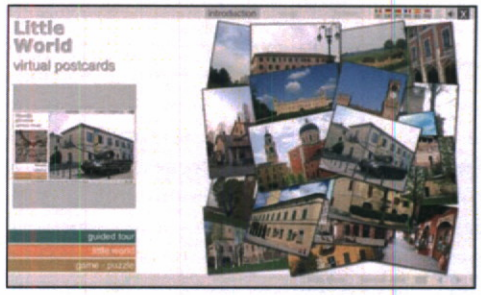

Fig. 8. Home page Little World

The interactive system had to be aimed at all those people who had read some of the works by the author or watched the films of the "Don Camillo" series and who wished to make first a virtual updated tour of the area described in those landscapes, characters, etc. through the photography. Consequently, the potential user was supposed not to have physical impairments for accessibility to the contents and 6 languages were set up, leaving for a second stage other languages such as Chinese, Japanese and Russian. Once the pictures were chosen, the texts made, playing applications, etc., the first version or beta of the product was finally made in Portugal.

The content of the off-line interactive system is split into three great collections: guided tours, Little World and game –puzzle (figure 9). In the first collection of links each one of the villages is visited (alphabetically ordered) with their matching explanations. In the second, an interactive map allows direct access to the locality they wish to visualize. Finally, a puzzle was inserted as pastime. The readers interested in other details of the design of "Little World: Virtual Postcards" can look up the following bibliography [19] [20].

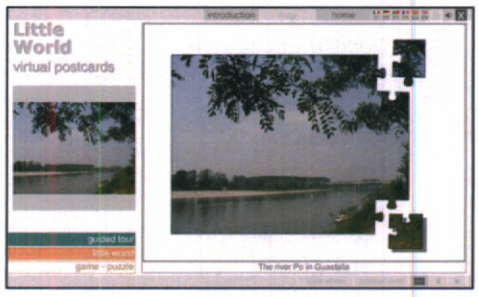

Fig. 9. Communicability in the interactive design

Simultaneously, the DVD was designed where there were indoors pictures of the main constructions visited inside these regions and which entailed a significant consumption of time for getting the permits, outdoors pictures as in the case of the CD but with a greater wealth of details. Besides, special studies had been made for the implementation of special algorithms in the panoramic view of the halls and the open spaces, with possibilities of increasing the sunlight, or switching off the enlightening, changing the colour of the constructions, etc. Also the drafts were made to animate in 3D the central characters of the writer's works Peppone and Don Camillo (www.mondoguareschi.com) and the reconstruction of the virtual stages where the author's illustrations, the photographs, the films and some texts of the literary works would be combined. Because of economic reasons of the copyright and royalties and last minute human factors this could not be implemented.

In the on-line version the portals were created with the combination of the CD images and of the eventual DVD, where the author's illustrations were included. All of them in high resolution. The same was made in Flash and as the Internet broadband expands, the time of access of the users to these images decreases.

One of the main reasons why usability may decrease with the passing of time is the impossibility of keeping the portals on-line updated because of the cost this entails from the point of view of the webmaster, webdesign, webcontent, etc. However, it has been seen how portals made at the beginning of the new millennium where the main principles of communicability were applied still draw the attention of thousands of users of the whole world, as is the case of "Mondo Guareschi" website (www.mondoguareschi.com). Obviously a website belonging to the Web 1.0 but which demonstrates once again the importance of the contents in the diverse dynamic and static means.

5 Vademecum

The current vademecum is the result of a series of practical experiences for the execution of a multimedia project where it was intended to elaborate several interactive systems. Some of these systems had to include mobile phones or the PDA, for instance. It serves for the stage design of the on-line and off-line interactive systems divided into three sections: copyright, design and strategy. The contents are related to tourism, cultural and natural heritage the elaboration of E-learning training courses, whose goal is the design and/or study in Italy and the design of interactive systems. This vademecum or set of guidelines for design can be used as a binary heuristic evaluation tablet. Its successive step is to define a set of quality attributes and metrics in the on-line interactive systems to detect the presence of stratagems in the promotion of cultural heritage for copyright reasons. Next the first listing, whose content is presented in alphabetical order (C=Copyright, S=Stratagem D=Design):

- To request in writing the authorization of the heirs of the copyright of the works (paintings, books, films, music, etc.) on which the interactive design will be made (C).

- To establish the number of authorized copies for the off-line multimedia supports, including paper, for instance, books, leaflets, magazines, etc. (C-S).
- To make a beta version and register it with the proper authorities to obtain a registration number or intellectual property (C-S).
- Submit this beta version to the final approval of the inheritors of the copyright (S).
- To establish financial damage clauses in the case that the multimedia project was suspended once the beta version was made or the process of massive production of the interactive systems started (S).
- To request in writing the authorization of the local authorities to photograph, film, record sounds, etc., inside museums, castles, workshops, rooms and/or houses of historical characters , etc., and also the nature that is to be found in those places, artificial lakes, forests, rivers, etc. (C-S).
- Verify that these authorizations are true and issued by the competent authorities in the tutoring of the cultural heritage. (C).
- To create analogical or digital models of those architectural areas for which no authorization has been obtained, for instance, the façade of a building, the vault of a church, the frescos of a castle, etc. (S-D).
- To generate with computer graphics 2D, 3D and/or computer animations all those elements for which there is no authorization and which can be made with a computer on the basis of pictures, drawings, sketches, etc. such as the objects of the inside parts of the buildings and constructions, the characters from the films, books, etc. (D).
- To activate the collaboration with the local bodies which foster tourism, especially those known as "Pro Loco" (S).
- To compile the greatest possible information in the local and state files on the territory from the cartographic point of view, the customs, the traditions, etc. since they can help identify the potential users with the digital characters or environments recreated through the computer (S-D).
- To carry out all the necessary operations for the transformation to the digital support of those works in analogical support and their matching corrections such as can be a self-editing process of the scanned images (S-D).
- To establish the role of each one of the members of the realization team of the interactive system, bearing in mind the advices received from the person responsible for the management of the copyrights and royalties. (C-S)
- To use the principles of communicability in the work team. (a common language of the members of the design categories, a set of quality attributes, inference of the potential users, etc.) to cheapen the costs in the case last minute changes had to be made because of authorization motives. (S-C-D)

5 Conclusion

The promotion of cultural heritage in certain areas of the EU is not easy, even if the latest technological breakthroughs in the ICT context are available (Information and Communication Technology). The main problem is that there is no complete catalogue of cultural and natural heritage in Europe. At the same time, there are in some member states laws and regulations still in force since the beginning of the last century in copyright and royalties issues. If we add to this state of the art the human factors and their deviations generated inside the main institutions which should tutor copyright, such as certain European universities, the future does not look very promising for the tourism sector. An analysis which excludes the overall situation from the current economic point of view. In order to let the interactive systems spread easily in this adverse context it is necessary that the communicability specialist has the necessary knowledge in legal technical matters for the circulation of the cultural and natural heritage in on-line and/or off-line in interactive systems, or that he is guided or advised by experts in these legal issues. However, constantly resorting to the communicability principles can spare production costs in the multimedia systems, since there is a set of strategies in interactive design which allow to solve quickly the changes deriving from the copyright sector or intellectual ownership. The strategies that make up the first presented vademecum are the fruit of a long preparation process for the realization of several interactive systems that were supposed to go with the evolutions deriving from the dynamic, static means and multimedia telecommunications. Consequently, not having reached all the goals scheduled in the original project of the multimedia systems does not mean a failure. Quite the opposite, it has been an enriching experience to know the reasons why the diffusion of cultural heritage and tourism are continuously slowed down inside a country in the European basin of the Mediterranean sea, with a cultural equivalent which is tantamount to a third of the whole now existing in the world.

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