Website Architecture, Information Flows and Cognitive Models [1]

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Abstract. This paper explores the relation between new digital genres configuration and their users' previous knowledge patterns from an interlinguistic perspective. More precisely, first we analyse two models that underlie the formal architecture of websites. For that purpose we introduce diverse pieces of software that allow for visualization of website organization in terms of nodes and links. Then, we show the most entrenched metaphoric models that provide cognitive tools for users to understand website configuration and usage, in an English speaking culture. Finally, we discuss to what extent these models can be transferred and learned by users from other cultures, particularly in Spanish speaking communities.

Keywords. Cybergenre, Information Flow, Idealized Cognitive Models, Cultural Transfer, Vocabulary Learning

1. Introduction

The coming of writing added a whole world of new strategies and competences, both productive and receptive, to natural language human communication. Some centuries ago, that increase in communicative tools and purposes was considerably enhanced by printing. In the 20th century, the mass media revolution in human communication caused an explosion of creativity in message production, mainly addressed to a receptive audience who might interpret messages but, nevertheless, had to remain passive with no chance to questioning, modifying or even providing an answer to them. None of those changes in the past does compare to the present blast of communicative activity through the Internet.

The new virtual reality goes much further by allowing users for remaking and recreating messages, as well as for providing feedback and interaction by means of a multimodal design where traditional genres of written or audiovisual language cannot supply the necessary tools for a full exploitation of the medium (Ruiz-Madrid 2005). The PC screen has become a telephone, a play station, a shop window and a desktop all at the same time, and that fusion has originated the flourishing of new formats, new conventions, new textual functions, and new communicative purposes.

Some authors refer to these new genres as digital genres or cybergenres (Askehave and Nielsen 2005), which in turn demand special abilities from readers or users for the emergent language in the enriched context (Navarro-Coy 2007; Navarro-Coy and Villanueva 2009; Villanueva *et al*. 2008). Messages are not only produced by a writer or received by a reader, but also processed and recreated by the designer and even the users, a usage that defines the recently coined concept of *wreader* (writer-reader). Young generations have developed the capacity to cope with that virtual reality, a formerly unusual set of strategies and skills known as multimodal literacy (Lemke 2002).

Though older generations, educated by means of reading paper books, must also adapt to the new context, both young and old share a culturally fixed common tradition consisting of behavioural schemas, reading scripts and patterns, which build up a store of common experiential domains actually used to conceptualize the new *wreading* context. We refer here

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to what is called previous knowledge in learning psychology. New skills, new strategies and tools are understood first through old schemas and patterns that help build up a notion of the new interactional context.

In other words, the Internet medium demands a new literacy, a different type of writing and reading strategies, a new communicative code that, nevertheless, must stand on previously acquired knowledge patterns, schemas and structures. Otherwise, new literacy learning would not be economical enough from a cognitive perspective. Altogether, both designers and users of cybergenres need a cognitive common ground which they can base their new multimodal literacy on. That shared knowledge is nothing else but the old literacy, plus other kinds of previous knowledge, like experiential knowledge – not only reading, but also telephoning, shopping, advertising, writing, using a desk, that is, the everyday cognitive domains of social life.

We are concerned here with feasible descriptions of the emergent dialogue forms between readers and writers, given that the new media frames of textual organization are causing a change in social-semiotic practices. The evolution of Internet genres allows state the presence of the previously existing genres, their transformations and hybridization processes, and the rise of new generic traits (Navarro-Coy & Silvestre-López, this issue). Lemke (2003) claims that digital environments offer ground for flexible transgeneric constructions, as the result of users' navigation and reading in a given context, according to certain objectives. From a general perspective, websites structural planning has evolved gradually from a vertical hierarchic tree structure to a non-hierarchic horizontal rhizomic structure. This evolution has been gradual and, in order to facilitate usage, hypertextual writing supplies diverse guiding tools: *bread crumbs* that indicate the relative location in the navigation, site maps, search, generic links, etc. The known generic structures blur, and this tendency to genre mixture facilitates intertextual relations and hybridity (Chandler-Olcott and Mahar 2001). Traditional genre theory establishes that genre depends on conventional sequencing patterns. Nevertheless, retaking Halliday's notion of "cohesive harmony", Lemke (2003) points out that, in multimedia genres, text organization phases, syntagmatic units, semantic chains and the semantically connected chain clusters have parallel operation whose constraints do not agree with generic sequences. In genre theory that evolution has been overtly noticed by some authors who signal the existence of emergent genres, dynamism and evolution (Shepherd and Watters 1998; Crowston and Williams 1999), hybrid genres (Villanueva *et al.* 2008) o virtual cyber culture (Finemann 1999). At this point, we should recall Finemann's observation that:

> the relation between printed and electronic texts is a correlation rather than an opposition (coexistence and co-evolution rather than replacement), according to both empirical and conceptual criteria […] that the relation between the Gutenberg galaxies and the Turing galaxies is not one of opposition and substitution, but rather one of co-evolution and integration (Finemann 1999: 7)

New formats and text types –hypertexts– occur thanks to the existence of previous knowledge. Both website architecture and usage patterns are determined by previous schemas already grounded on the designers and users' strategic baggage. That is the focus of our interest in this paper. Our aim is to bring about evidence of these behavioural patterns, schemas and cognitive models that exist in the cultural background of both designers and users, and that facilitate the management of new cybergenres by means of mapping the already acquired knowledge structures onto the emergent generic tools. In the following sections we describe two structural principles that underlie website architecture, the mirror model and the fractal model. Previously to that we introduce the graph software tools that may be used in order to visualize those underlying models of website architecture. Then, we show the metaphorical idealized cognitive models (henceforth ICMs) that serve the function of

providing expression, linguistic or otherwise, to interface usage models of websites (Lakoff and Johnson 1980; Johnson 1987; Lakoff 1987; Kövecses 2002). We do that by means of mapping previous knowledge structures onto the management and understanding of websites as new cybergenre (Navarro-i-Ferrando and Silvestre-López 2009). Finally, we show the mismatch between the English schemas and ICMs, as source of terminology, and the sometimes ill translations and misleading calques into other languages (Porto-Requejo 2008, Tokar 2008), which causes the lack of transfer of the previous knowledge from the source culture into coherent models or schemas in the target culture. That fact brings about additional difficulties for users of other languages than English, as far as the acquisition of Internet and digital literacy is concerned. Therefore, the research of digital texts production and reception schemes is highly needed in relation to knowledge and information dissemination in different languages, as well as to the development of foreign language skills in hypermedia environments.

That type of research addresses questions like the following: Which are the cognitive pragmatic model variations that guarantee texts understanding? How do information flows that underlie websites architecture appear in the user's interface? What kind of interaction takes place between hypertexts and both reading and navigation modes?

Our work focuses on the macro-textual and schematic aspects that the learner as *wreader* should be concerned with. In this connection, cybergenre study includes the intercultural dimension as a fundamental key to the development of an integrated multilingual competence that encompasses both a reflection capacity on culture and language learning, on the one hand, and progressively increased learning autonomy on the other (Villanueva *et al.* 2008).

2. Graph software and the description of website architecture and information flows

Graph software facilitates website architecture analysis by providing solutions to the following requirements:

1- The capture of all the pages of a single website, or a set of websites, as well as all the links that connect pages to one another, so that the structural information of the website can be obtained.

2- The graphical visualization of the website structure, including all the links between its pages, for the identification of website type and its possible navigation modes.

3- Users' navigation records (visited pages, visiting time, etc.).

4- Graphical visualization of the navigation record, along with the website structural information, for the identification of particular users' navigation mode.

2.1. Capture of website structure

The first requirement demands for a graph application that captures all the links rather than the contents of the website. Among the products that exist at the moment the following ones provide utilities that could offer acceptable results:

- Offline Explorer – http:///www.metaproducts.com
- WebZip – http://www.sipdersoft.com
- Web Copier – http://www.maximumsoft.com
- Web Sphinx – http://www.cs.cmu.edu/~rcm/websphinx

Offline Explorer, WebZip and Web Copier are Web catchers, i.e. they download a copy of the website to the computer so that it would be possible for it to be locally consulted with no need of connection. We checked whether they could generate contents trees including all the links of a downloaded website, but such functionality was not found. Web Sphinx, on the contrary, is an application that allows obtaining a graphical tree with all the nodes that form a website. Nevertheless, it has mainly two problems. First, it cannot generate a complete view of the website; that is, although it obtains all the nodes (pages) of the website, it does not represent all the links, but only a connection to every page, the first access, as it were. Therefore, information is incomplete (see Figure 1). In spite of offering a graphical interface it is not sufficiently rich for navigation recording purposes.
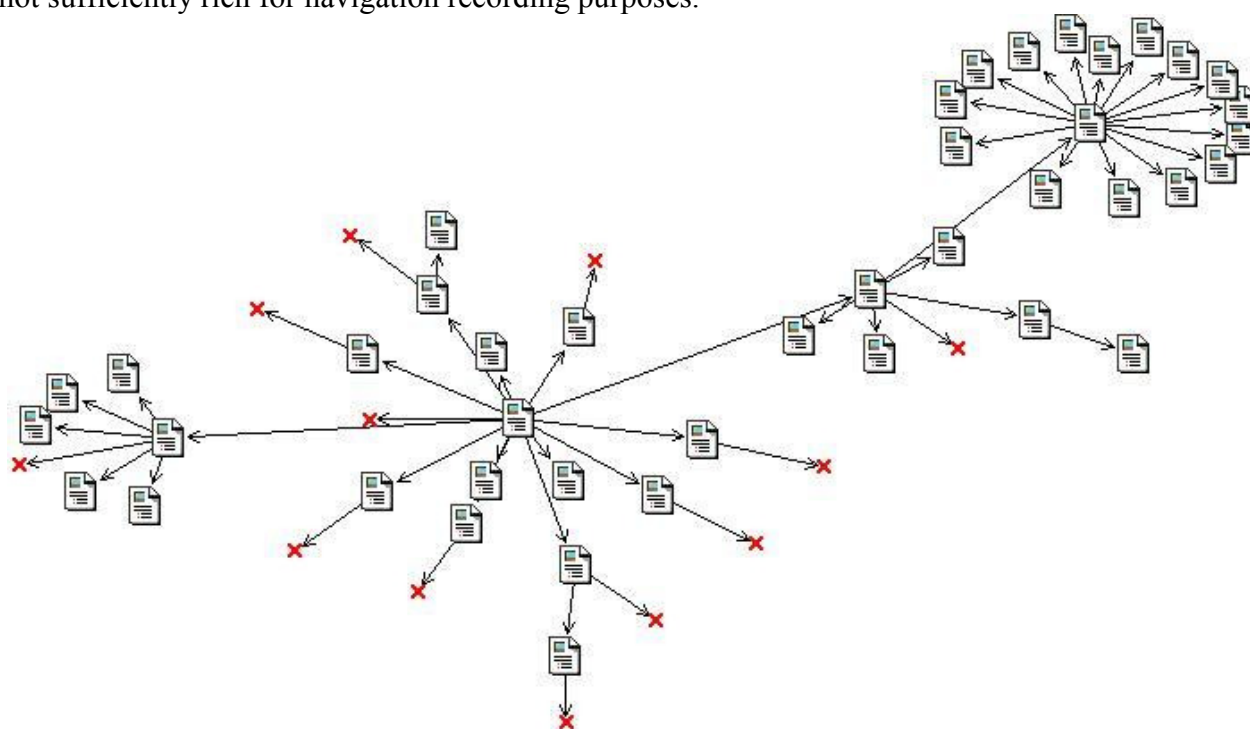

Figure 1. Graph generated by Web Sphinx.

We decided to use the base of Web Sphinx, making some modifications to obtain complete maps of nodes and links of websites. It was necessary to add a programme that allowed the graphical visualization of all the information obtained by means of Web Sphinx.

2. 2. Graphic visualization of a website structure

The second requirement consists of graphic visualization of all the information gathered by means of Web Sphinx. Diverse solutions were analyzed, among which the following were selected:

- Graphviz: http://www.graphviz.com

- JGraph: http://www.jgraph.com
- yEd: http://www.yworks.com/products/yed

The three programmes offer very good functionalities. Particularly, yEd offers the most interesting algorithms of visualization arrangement to help study the generated graphs. That is highly relevant, because a same graph can be displayed in very different layouts, and yEd provides the possibility to chose between the various algorithms, and thus to interpret the graph structure in diverse forms so that more accurate conclusions can be drawn (see Figure 2).
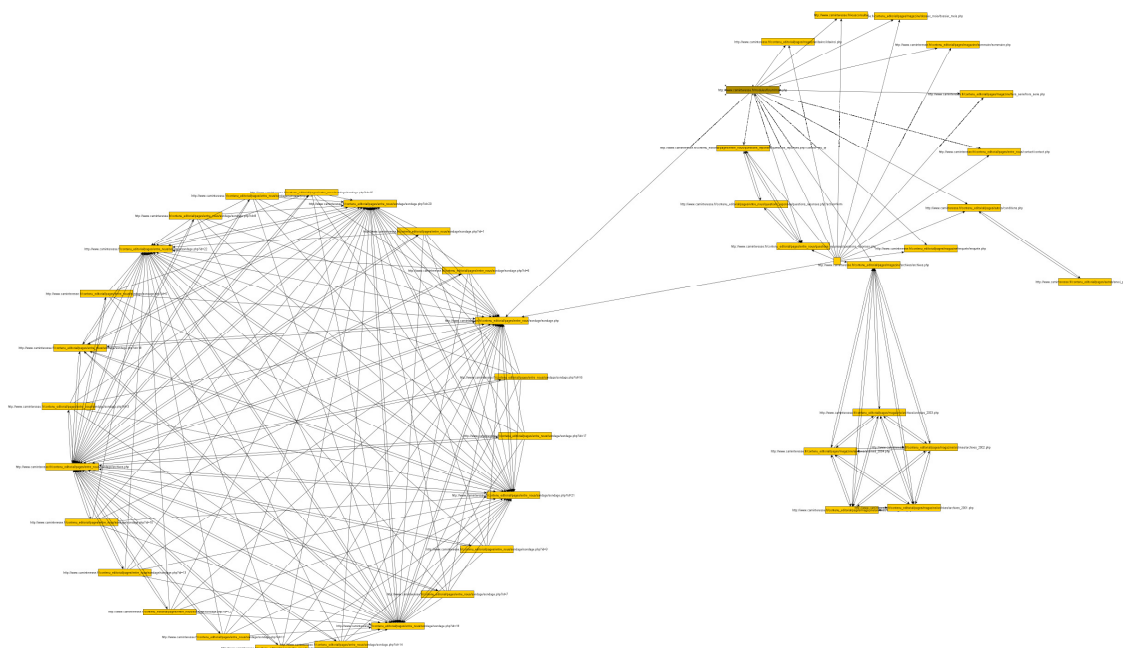

Figure 2. Website structure graph generated by yEd.

The yEd programme needs an original file (graphml) in XML format to represent the graph nodes and links. By means of the abovementioned tool, which used the base of Web Sphinx to analyze all the content of a website, that original file is generated to later be visualized with the yEd application.

2. 3. Users' navigation records

Individual users' navigation records can be obtained by means of a proxy squid configuration (http://www.squid-cache.org/). Users' navigation patterns can be related to the previously obtained website structure. Proxies allow for control of users' navigation. Access to particular pages can be permitted or denied by means of a set of rules. The programme also registers the pages that a user has activated. This kind of software is used by companies in order to restrict their employees' access to certain pages, as well as to obtain a record of the visited pages and the time allotted to the use of the Internet during the working time. As for each page, the record shows:

- The time when the page was activated
- The IP that visits the page

- The user who visits the page (if previously logged in the proxy)
- The URL of the visited page
- Possible errors, i.e. attempts to access pages that do not exist, or accessing restricted pages without access permission.

Users should configure their browser, so as to use the configured proxy. Thus, every time the user enters a page, this fact is registered and the proxy is able to record the navigation process.

2. 4. Graphic visualization of navigation records and website structure information

As for interpretation of the proxy log, an application was developed, such that, given a particular user, their initial and final time of navigation, as well as the pages activated, produced a graph, analogous to the one in Figure 2. That graph includes information on the user's navigation, so that it turns out easy to determine the mode of navigation. In Figure 3, we see an example of navigation graph.
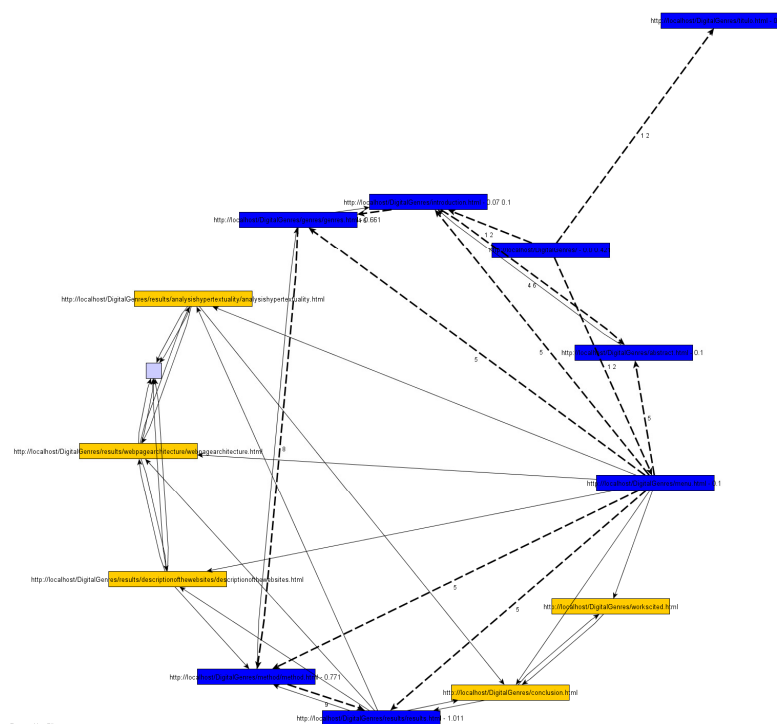

Figure 3. Example of navigation analysis.

If a website contains a high number of pages, the information provided by this type of graph may not be adequate. In such case, the high number of nodes in the graph makes it too complicated for the researcher to carry out a precise monitorization of the pages visited. For that purpose, another report can be created that includes data from the proxy squid log (one per each user), which generates a list including all the pages activated by each user. For each page, we obtain the period of time a user has been reading it. Each page, in turn, is assigned a background colour, so that the user's navigation mode in that page can also be determined (navigating, browsing, reading). As each user has a different language level of proficiency,

the time spans that represent different navigation modes cannot be constant values. For that reason, the reports allow for diverse time spans representing each of the navigation types, according to the user's proficiency level.

Figure 4. Example of a user's navigation report.

3. Graphs and determination of possible hyper-textual writing models

The study of the architecture of websites by means of the software described above allowed us to identify the following two models:

A) The *specular model***:** Nodes are displayed and linked around a core node and, in turn, mirror each other
B) The *modular reproduction fractal model***:** A node germinates into a bunch of independent nodes.

In the website *Island Ireland*, both models are somehow represented in different sections. The website establishes relations based on reflections and intertextuality. Island Ireland is an Internet directory to Irish art, culture and environment with hand-picked links to Irish history, architecture, music, news, genealogy, travel, literature, folk culture, archaeology, and the Irish language. Island Ireland is sponsored by Island Ireland Marketplace.
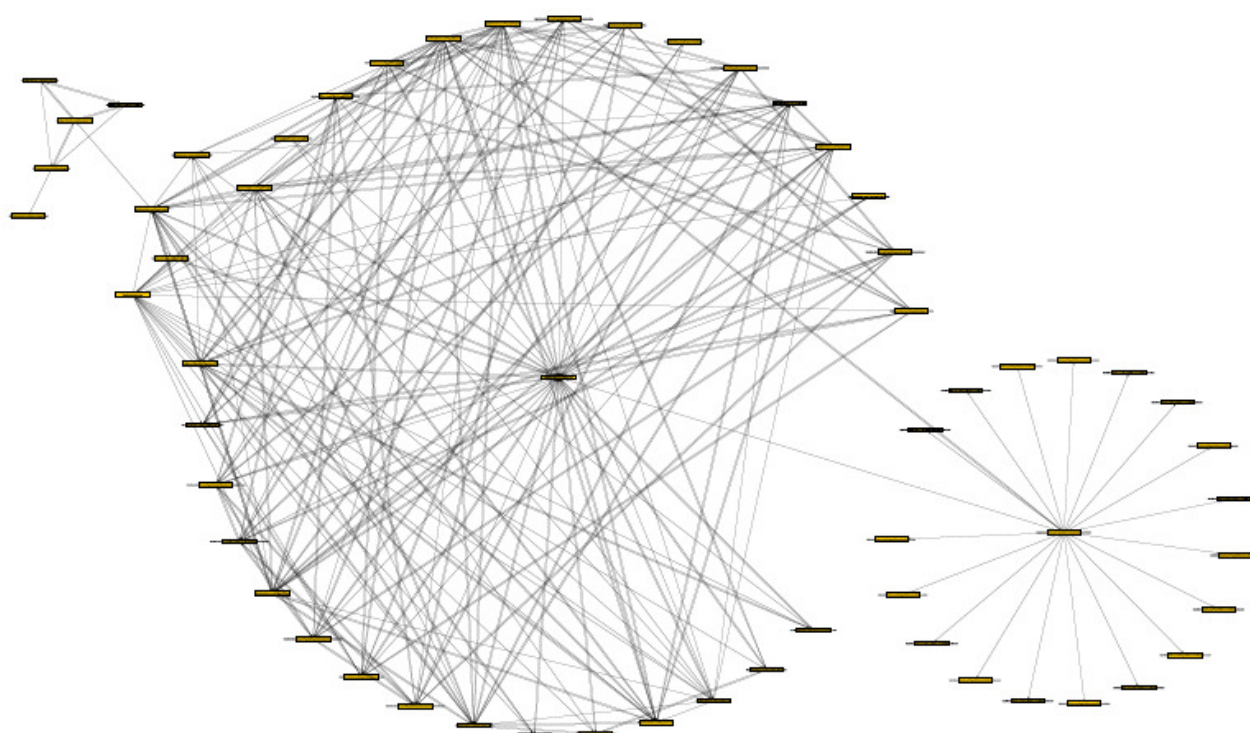
Figure 5: yEd graph of Island Ireland website.

The high number of internal links allows the user to access both the website contents and information related to other sites. This dynamism paves the way for the generic hybridity of the website. Several conclusions can be drawn from the analysis of the graph (see Figure 5):

(i) the top part of the graph to the left reflects a growth of the core that consists of a prolongation of some of the links.

(ii) the dense central part of the graph corresponds to a core of links, in which management functions as well as information and help functions are included; that central core is structured on the base of a specular model, where most of the nodes mirror one another, and there is a collective reflection effect.

(iii) the bottom section to the right can be viewed as a reproduction of the core on the basis of a germinative process.

Interactive aspects and external links are present in the three sections of the graph. The internal relationship between the central and bottom section is complex and interactive. Furthermore, the way it is distributed brings to light the interrelationship existing among the processes of information exchange or information flow. The analysis of this graph confirms both the specular model hypothesis (see Figure 6) and the fractal model hypothesis (see Figure 7). These are two models that can represent the writing models for information flow usually followed by website designers. The multiple reflections of information presented on the website result in a significant presence of intertextuality and genre transversality phenomena.
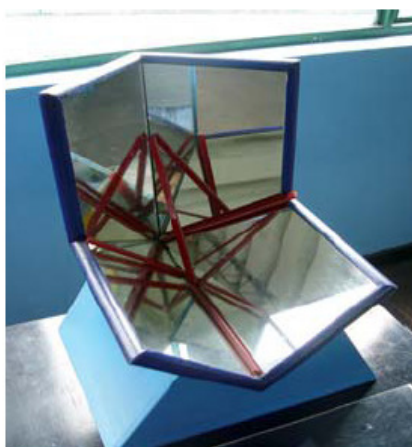
Figure 6. Information flow strategies in *Island Ireland* core: Mirroring, reflections, depth.

The frame set of the site helps navigation in two ways: contents are very clearly separated by means of frames and the frame set is repetitive. All the pages are built out of the same modules, which both makes the work of the website developer easier and helps the reader who accesses different pages in it. The graph (see Figure 7) illustrates the fractal design. A fractal (e.g. a fern) has the same structure on different levels. The site hosts several sites (which correspond to different branches), each of which was designed with the same frameset. Each of the secondary sites forms a separate module, with its own identity. At the branches, existing modules can be eliminated and new modules can be added. Each of these modules consists of smaller-scale objects which are assembled together to make up the website, but have their separate identity.

Figure 7. Island Ireland information flow strategies. Prolongation, growth, reproduction, fixation, germination.

At this point, considering these results of website graph analysis, two questions arise:

- Are there any hints in the web lexicon that help the reader activate certain cognitive models or schemes?
- What role do metaphoric expressions and mappings play in the construction of such models?

4. Metaphoric Cognitive Models

Websites are hypertexts rather than texts in a traditional sense. As such, hypertexts imply a different architecture and different processing strategies. At this point, the issue of conceptualization based on previous knowledge is highly relevant for determining which models are implemented in the conceptualization of digital genres, so that the designer and the *wreader* share a common conceptual ground. Our aim here consists in presenting these cognitive models, as well as describing their conceptual mappings in order to assess to what extent these models work interlinguistically. In a previous work we have analysed the linguistic expression of cognitive models in a set of websites in English (Navarro-i-Ferrando and Silvestre-López 2009). Our findings show regular patterns in the use of everyday ICMs in digital genres like the feature website. It is shown that the metaphorical models inserted in hypertextual websites play a significant rhetorical role in displaying interactive hyperdiscourse. Toms and Campbell (1999: 2) put it this way:

> System designers use a metaphor at the point of interaction to teach the user how to manipulate the interface. The user "loads" the metaphor into the working memory […] and the similarity between the structure of the metaphoric image and the structure of the interface enables the user to exploit prior knowledge to understand the system and work with it.

In the first place, these authors refer to prior knowledge rather vaguely; secondly, these authors consider that the user "loads" the metaphor employed by the system designer; and finally, they point at similarity between domains as the factor that enables users to exploit prior knowledge. We claim that, even though the designer triggers off the use of a metaphor, previous knowledge about the metaphor source domain is already shared by designers and users. That shared knowledge is not vague but rather well structured into conventional models based on social and individual experience (Ponterotto 2000; 2005). Moreover, rather than similarity between the structure of the interface and prior knowledge, in our view prior knowledge is mapped onto the conceptualisation of the interface structure. In other words, actual similarity between domains is not necessary. It is the users and designers' minds where the mappings between domains are performed, so that the target domain –web environments– is conceptualized in terms of the source domain – book, travel, or house.

Metaphorical linguistic expressions like *bookmark, link, map* or *visitor* elicit the existence of underlying metaphors that offer both the designer and users a scheme for conceptualising, structuring and giving coherence to website discursive organisation. These metaphoric models guide the users' reading and navigation, that is, they help at decision making along the process of meaning construction.

We look for metaphorical expressions and identify the domains they literally express. Then, we analyse the configuration of such domains. The users' navigation is guided by such models, to the extent that they contribute to the users' representation of their own navigation. For instance, the expression "visit our site" is a linguistic manifestation of the metaphor 'USING A WEBSITE IS VISITING A PLACE'. Once a metaphor is identified, more expressions of the same metaphor, like "come in", "back to", "discover more", "look around", etc. are also detected. Thus, to what extent the metaphorical model 'USING A WEBSITE IS VISITING A PLACE' is part of the users' previous knowledge? Or, to what extent is it ingrained in the users' conceptualisation of their own navigation? Finally, how does the model help users – consciously or unconsciously – to make decisions on their reading or navigating process?

The metaphors are facets of website genres, since they contribute to hypertextual coherence. Particular metaphors are idiosyncratic of cybergenres, and they presumably characterize navigation strategies and modes.

Navarro-i-Ferrando and Silvestre-López (2009) classify metaphorical linguistic expressions that appear recurrently in feature websites and show the metaphors that give coherence to website structure. The authors identify and characterize source domains that map onto the target domain "feature website", analyse the mappings, and investigate the entailments of the metaphorical model for the users' understanding of the target domain.

Table I: Source domains and their central elements (from Navarro-i-Ferrando and Silvestre-López 2009)

SITE	HOUSE	TRAVEL	BOOK	NET
Visitors' book	Logging	Home	Image of a book	Links
Site	Sign in	Navigation	Bookmark	External Links
Map	House	Navigate	Page	Net
"You are here"	Visit	Navigation Menu	Contents	
Invitation	Enter	Back to…	Index	
Sign in	Welcome	Links	Browse	
Logging	Come in		Find (Dictionary)	
Visiting	Message board			
Visitors	Back to…			
Back to ….	Visitors' Book			
Welcome	Browse			
	Chat room			
	Housemaster			
	Password			
	toolbox			

The domain used in the House Model is that of a *house* that is *visited* by people mainly because it *hosts* some social activities, events or objects. Thus, by *entering* the house we may be required a *password* or *signing in* a reception book so that our visit can be *logged*. There may be someone, the *house master*, who *welcomes visitors* and *invites* them to *come in*. Once in the house, people *go around* and may *go back* and *forth* visiting different *rooms*. Within the rooms users may *browse* among the objects or materials, or even may be allowed to use diverse devices or appliances, for instance a *toolbox* or a *message board* where they can *post* their messages for other people. Other less central elements may be a *visitors' book*, where *visitors* are invited to write down their comments. Further elements may be added as long as the general logic of the model is maintained, for example special rooms devoted to particular purposes, like a *chat room*.

In the Site Model, a *site master* welcomes and invites *visitors* to *go around*, and they can be requested to *sign in* a reception book so that their *visit* is *logged*, or they may *move back* and *forth* a *path*. Visitors arrive at a *site*, which may be a rather large area, and therefore they might need a *map* – the site map – and possibly some *directions* to find their way in the site, for instance a panel with "*you are here*" indications. Some sites may have a *shop*, and an *info desk* where visitors get answers to frequently asked questions.

The Travel Model is constantly active through the concept "home", which is the place where a journey begins and ends. The *home* is also the place that indicates the point of departure to any destination. Once *en route*, travellers use instruments with choice *menus* for *navigation*, i.e. finding their way to a destination. In the Travel Model the destination is not constrained by the master or maps, but users find their own way and choose their own course freely. *Links* make it possible for travellers to go from one place to another.

The Book Model is reminiscent of the traditional representation of the reading process as associated to paper formats. Thus, the website contains *pages* that users may *browse* through. One can go from one page to the *next page* and *back to previous pages*. There is an *index* or a *contents* table, predominantly in those sites defined as dictionaries or encyclopaedias. We can *bookmark* an interesting page, so that we can easily find it in our PC later on. In dictionaries, lexical entries can be found, and information can be *searched* for in encyclopaedias. Browsing is a useful concept in order to refer to casual searching.

The Net Model is active through the use of the expression "link", in order to refer to activation labels. Nets are extended works where *nodes* are linked to each other, so that the unity of the whole is guaranteed as far as nodes are connected to each other.

Source domain expressions actually appear in websites. Contexts make it apparent that the thinking process is based on the source domain rather than the target domain. It may also occur that a particular linguistic expression does not coincide exactly with those displayed in Table I, which shows that the metaphor is a conceptual mechanism, rather than just an idiom or a single isolated form.

In the case of the Site Model, the most usual expressions are the words "site" and the expression "site map" or, alternatively, "sitemap". The metaphor is fully deployed in the following example where the master's expressions mark textual coherence according to the metaphorical model:

(1) *You are very welcome to Island Ireland... hope you enjoy your visit! ...*
We always feel pleasure at visiting a site ...
Visitors should feel free to recommend sites ...
...we have a special fondness for local sites all around the country ...[2]

The Site Model is reinforced in the argumentative discourse by its structural elements. Thus, visitors are welcome and invited to enjoy their visit, and can recommend the experience to other potential visitors. Finally, sites are metaphorically conceived of as places scattered geographically "all around the country".

The House Model structural elements also appear fairly frequently. The expressions "sign in" and "log in" occur independently of co-text, because they are usually found as a label at an activation box, where users must enter their names for the system to log their usage. The *Treasure House of Indian Culture and Heritage*[3] shows a few expressions of that metaphor that do not appear in other sites, like "house", or "enter" as an invitation to activate the site. Most sites show a *back to* command, in order to activate previous screens. An interesting metaphorical extension consists of the addition of structural elements like the "chat room" or the "visitor's book", which includes visitor's comments on the house. In example (2) the house master welcomes visitors and develops the metaphor in his introductory text:

(2) *Welcome* to the Scots *Language Centre*
on line. Please *come in* and *have a look*
round. The site *contains* lots of
interesting information […]
[…] Just move
between the two languages if there are
Scots words that you don't understand.[4]

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[2] http://islandireland.com/index.html
[3] http://www.culturopedia.com/
[4] http://www.scotslanguage.com/

In the example we find several expressions of structural elements of the metaphor, the house master invitation, the conception of a place as a Centre with several dependencies, and the possibility to use two paths for motion –English or Scots.

We have shown some examples of linguistic expressions that occur as evidence of the existence of conceptual metaphors in websites. The metaphors help users interact and "read" the hypertexts. Moreover, users' minds need to import models from previous experience in order to process, structure, and reason about the new domain. The mental mechanism that allows for that process is called mapping. Mappings are projections from a source domain onto a target domain, so that the topology and the logic of both domains are maintained. However, not the whole structure of the source is mapped onto the target, nor the target domain adopts its entire structure from a single source domain. Each source domain contributes only certain aspects which are useful for understanding particular aspects of the target domain.

Table II shows the structural correspondences between the source domain *house* and the target domain *feature website*.

Table II: House Model Mapping

SOURCE: HOUSE	maps onto	TARGET: WEBSITE
House		System
Logging		Activation Record - Log in
Sign in		Registering one's identity
Enter		Activating the system
Visit		Read/use the system
Visitors		Users
Invitation/Welcome		Making the system overtly available
Come in		Begin to use the system
Back to…		Activate previous screen
Message board		Screen for communicating with other users
Visitors' Book		Screen to record the users opinions
Browse		Casual screen activation
Chat room		Screen for on-line communication
Housemaster		Website designer
Password		Code for activation permission

As illustrated in table II, given that source domain models rely on users' experience of known concepts and interaction patterns, they contribute some structural elements that make it easier for users to conceptualize target domains. Some source domains map onto sequential aspects of website use. For example the Travel Model makes us think in terms of how to reach destinations, define routes and find connections between places. The Book Model maps onto informational aspects, like storing, finding or classifying information. Finally, the Site and House Models both map onto interactional aspects of websites, so that users understand interaction with web systems in terms of a visit to a house or site, and therefore interact cognitively using the behavioural patterns they are familiar with.

Some elements of the target domain may receive a projection from more than one source domain. For instance the list of sections can inherit the features of a site map or a table of contents, depending on the kind of source domain. As a consequence, each source domain will provide a set of entailments for reasoning about the target domain. In fact, we do not

think in the same way if we imagine a map on a poster or a contents table on a book page. That is why each source ICM contributes different reasoning patterns.

The mappings are cognitive guidelines that each source model contributes to our understanding of websites as discursive organizations. Consequently, each model will prompt its own inferential patterns when users grant it cognitive priority in the process of using a website. If users prime the House Model, their first decisions might focus on the home page in order to become familiar with the webmaster's background and purpose. Secondly, if the Travel Model is preferred by the user, the first option might possibly be to click on external links, or try to find out where the navigation can lead to. Thirdly, if the Book Model prevails, the user could look for concrete information in the page, and presumably would activate the site map or contents table as a first option. The reading mode prompted by the Book Model might consist in using a page at a time and going from each page to the next one.

Not all the websites are configured in the same fashion, and some use a particular model more frequently than other models. The designers' interests and representations can grant more weight to a particular model, depending on what they expect from the website user. Thus, online dictionaries and encyclopaedias may display a higher frequency of Book Model expressions. On the other hand, sites that display the House and Site metaphors more profusely show an overt intention to attract and gain fans with interactive purposes.

5. Interlinguistic validity of metaphoric models

Many studies about the language and terminology in the Internet have appeared in recent years, but only very few address the influence of English terminology on other languages or linguistic communities. The fact that the Internet is practically an American invention that was exported to the world in the last decade of the 20th century caused that the majority of concepts and models coined by the American digital community had to be adapted, translated or just calqued into the rest of languages and cultural communities. These started to use the web only several years after the medium had been operative in the U.S. The expressions that other cultures use to refer to the Internet are the key to understand how it is conceived and experienced and will therefore affect the way in which those cultures interact with and reason about it. Digital genres are already generalized in our daily life and we know as users how to interact with them. However, the models we use as members of a particular culture may be somehow different to the models of the English speaking culture, where most of the digital genres originally emerged. A few authors have already called attention to this issue (Porto-Requejo 2008, Tokar 2008).

Porto-Requejo (2008) describes several major metaphors in English for the conceptualization of the Internet such as the INTERNET IS A CONTAINER (download, upload, search), THE INTERNET IS AN ENCYCLOPAEDIA (webpage, browse, browser, bookmark), or THE INTERNET IS OUTER SPACE (cyberspace, internaut, navigation). Nevertheless, according this author, the most productive metaphor in English is THE INTERNET IS A CITY. That is the metaphor that has mostly contributed to the conceptualization of the new medium and, therefore, to the generalization of thinking and behavioural patterns for interaction with that medium. The city metaphor facilitates reasoning about the Internet in terms of a place where "we find *online shops*, *online banks*, *online libraries*, *online education…* besides *e-business* and *e-commerce*, just the same as in a big city" (Porto-Requejo 2008: 201). In addition, the metaphor is constantly reinforced by the use of metaphorical expressions like, *build a site, site under construction, address, virtual tour, traffic, build site protection, Internet citizens, Internet community, sites hosted in a server, visit a site*, etc. For English speaking users this metaphor provides a comfortable model that makes it easy to see the Internet as a city where people

move around, visit sites and go shopping, rather than imagine a flow of data at high speed along the wires that link millions of interconnected PCs all around the world.

If we look at the terms used in Spanish or other languages, it becomes apparent that the metaphors have not been transferred as wholes to the host culture, but each linguistic term has found its own particular translation (Tokar 2008). As a result the original metaphors, which help English users as effective cognitive tools for reasoning about and interacting with the Internet as new medium, are only partially at work in the minds of users from other cultures. For several reasons THE INTERNET IS A SEA has emerged as a Spanish metaphor for the Internet. The word "navigate" has been translated into Spanish as "navegar", which means "sail" and "hacker" is equivalent to "pirata" (pirate). The fact that these terms are used and entrenched in the Spanish culture makes it easy for the community to adopt the metaphor and add more structural elements from the source domain. Thus, terms like "internauta", "navegador", "surfear", "portal", cause Spanish users to build a different script for using the medium and, as a consequence, to reason about and interact with it in a rather different way to English speaking users.

> Whereas for English speakers, the Internet is a familiar place, a city full of services to wander around and search for anything they may need, a community of citizens that follow the rules, for Spanish speakers, it is a foreign place, a dangerous, unknown sea that must be explored to find what you want, but where you must be aware of pirates and other dangers with foreign, untranslated names.
> Given such contrasting conceptualizations of the Internet in English and in Spanish, the question arises if the construction of so different mental pictures of the concept can affect the interaction of English and Spanish speakers with the Internet, especially for beginners, who learn about the Internet before actually using it. (Porto-Requejo 2008: 205)

It has been shown (Oster 2009) that vocabulary acquisition both in a foreign and a native language implies the existence of conceptual interconnections and that meaning is defined in terms of multiple semantic relations among concepts that very frequently imply cultural connotations. On the other hand, frequent coocurrence with other lexical units may cause reciprocal influence on the semantic change of particular items (Oster 2009: 47). Thus, the coocurrence of certain hints like "pirata", "navegar", "internauta", "rumbo", etc. may cause the emergence of a model for digital environments which was not entrenched in the original cultural community.

6. Conclusions

We are living an era of new literacy that demands cognitive pragmatic model variations which guarantee our understanding of new forms of texts. In that connection, behavioural patterns, schemas, and cognitive models that exist in the cultural background of both designers and users facilitate the management of new cybergenres. Users achieve that goal by means of mapping the already acquired knowledge structures onto the emergent generic tools. In spite of variations in cognitive pragmatic models across texts and cultures/languages, the essentials of several basic models seem to prevail, like the house or book models.

We suggest that particular information flow types that underlie websites architecture, like the specular model or the fractal model, are reflected in the user's interface as metaphorical expressions that, in turn, activate mappings like the house model or the travel model. The rhizome structure is maintained by means of a series of interrelated links among which outstanding ones (which coincide with key vehicles in each of the models, for example "map",

"back to", "home", "menu", "bookmark", "contents", "sign in") are always present in every page of the website. The two structural schemes that underlie website architecture, the mirror model and the fractal model, can be visualized with graph software tools. We have shown some of the ICMs that serve the function of providing linguistic expression to interface usage models of websites. Metaphorical linguistic expressions are the hints in the web lexicon that help the reader activate certain cognitive models or schemas. In view of the study presented in this paper, it seems quite safe to state that users constantly find hints in the web lexicon that allow for the triggering of rather common previously acquired cognitive models which are pervasively extant in our everyday activities. This paves the way for a felicitous and continuous flow of information in both ways (codification and decodification). In terms of specifics, for example, hints like "visitors", "discover", "enter", or "leave" trigger basic everyday frames (Fillmore 1982). These expressions become the vehicle of metaphors like USING A WEBSITE is VISITING A PLACE. Then, they activate the roles of their "real-life" counterparts and hence their ordinary functionality, ready to be used in a virtual environment.

Apart from endowing website discourse with the coherence and organization necessary to process information, metaphorical ICMs build our idea of a particular cybergenre, and of the way such a genre is configured. ICMs may show different ways of representing a cybergenre, and may also signal different modes of wreading.

Nevertheless, English schemas and ICMs, as a source for international terminology, may sometimes lead to ill translations and misleading calques in other languages. Such mismatches may cause the lack of transfer of previous knowledge from the source culture into coherent models or schemas in the target culture.

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List of websites

1. Offline Explorer [http:///www.metaproducts.com]
2. WebZip [http://www.sipdersoft.com]
3. Web Copier [http://www.maximumsoft.com]
4. Web Sphinx [http://www.cs.cmu.edu/~rcm/websphinx]

5. Graphviz [http://www.graphviz.com]
6. JGraph [http://www.jgraph.com]
7. yEd [http://www.yworks.com/products/yed]
8. *Squid* [http://www.squid-cache.org/]
9. *Treasure House of Indian Culture and Heritage* [http://www.culturopedia.com/index.html]
10. *Scots Language Centre* [http://www.scotslanguage.com/]
11. *Island Ireland* [http://islandireland.com/Pages/res.html]