



Web-based Instructional Environments: Tools and Techniques for Effective Second Language Acquisition

ESPERANZA ROMÁN*
George Mason University

ABSTRACT

The potential of the Internet and especially the World Wide Web for the teaching and learning of foreign languages has grown spectacularly in the past five years. Nevertheless, designing and implementing sound materials for an online learning environment involves time-consuming processes in which many instructors may be reluctant to participate. For this reason, Web-based course management systems (WCMSs) have begun to flourish in the market, in an effort to assist teachers to create learning environments in which students have the necessary means to interact effectively with their peers, their instructors, and the course material.

This article reviews the nature of WCMSs, their advantages and disadvantages, and their potential for language learning by focusing on key issues that surround the design, implementation, and assessment of Web-based language courses, and by explaining how to integrate WCMSs to increase students' exposure to authentic materials and language-learning related activities, and to motivate them to engage in meaningful communication processes and collaborative activities.

KEYWORDS: Web-based instruction, Web-based course management systems, online learning environments, Web course development tools, online interaction, Web-based communication, assessment of online learning

**Address for correspondence:* Esperanza Román. George Mason University, Virginia (U.S.). Tel: 703 9931232; Fax: 703 9931245; e-inail: eronianne@gniu.edu

I. INTRODUCTION

The Internet has changed the way people interact with each other in their professional and personal lives. Although access to the Internet is not homogenous in every country, let alone in all the world¹, the advantages of the Internet in facilitating communication and in providing access to information are contributing to the rapid expansion of its applications in all professional fields, including language instruction.

Nevertheless, the marriage between technology and language learning originated many years before the creation of the Internet and, for a long time this relationship was independent of the Internet's development (Ahmad, Corbett, Rogers & Sussex 1985; CALICO Journal 1995; Levy 1997; Delcloque, Farrington & Felix 2000; Salaberry 2001). The first applications of computer technology to language instruction occurred in the 30's and involved translation utilities. While the 40's and 50's were not especially significant in the application of computers in the language field, the late 60's and the 70's witnessed important contributions. This latter period of innovation was marked by pioneer computer-assisted language learning programs founded at Stanford University, State University of New York, University of Dartmouth, and University of Illinois. Progress continued in the late 70's and early 80's with the introduction of the microcomputer. By the end of the latter decade, multimedia systems had emerged as a focal point of a new applications and was a driving force in the instructional technology market. It was not until the later half of the 90's that the Internet began to be considered as a suitable medium for learning in general and language learning in particular.

Upon introduction, innovative technologies have always stimulated an intense debate about their instructional effectiveness among advocates and detractors (see for example, Dreyfus 1992; Postman 1992, as quoted in Kearsley 2000, p. 137; Norman 1993; Landauer 1995). The rapidness of the deployment of computers has had a multiple impact on the degree of attendant controversy. On the one hand, it has facilitated the integration of more powerful and less expensive computers throughout the educational system. On the other hand, the continuous introduction of new devices, programs, and authoring tools in the market has left limited time to reflect on the advantages and disadvantages of the old ones, and few opportunities to integrate them at a large scale (Palloff & Pratt 1999; Yu 2000). Likewise, the formal evaluation of each innovation's worth as a didactic tool has been seriously lacking or even non-existent.

Despite these circumstances, Internet-based learning —also known as networked learning, online learning or e-learning, as it has been titled more recently— is here to stay (Inglis, Ling & Joosten 1999; Aggarwal 2000; Chong 2001; Rosenberg 2001). Administrators from all levels of instruction are considering the integration of Web-based curriculum applications in search of a solution to the multiple problems they face, ranging from the lack of qualified teachers, particularly in isolated areas or for less commonly taught languages, to limited resources for building new facilities and hiring new faculty (Daniel 1996; Roberts 2001). Consequently, Web-based courses have begun to flourish (as reported in United States

Distance Education Association 2001) not only in institutions traditionally devoted to distance education, but also in virtually all other education venues.

As teachers face increasing pressure from administrators to incorporate the Internet into instruction, a new challenge arises in their busy schedules. For many education practitioners, integration of the Internet has primarily involved the use of available primary or secondary Web sources. These sources have been used to prepare lectures or to promote critical thinking among students via collaborative activities or research projects (for example, see Crane 2000; Pasch & Norsworthy 2001).

This source-based approach to Web utilization is particularly common and useful in foreign language education, where instructors employ authentic materials to motivate students and help them build the connection between the academic subject matter and real life (García 1991; Álvarez & González 1993). Undoubtedly, the Internet is the most valuable source of up-to-date realia. While the selection of sound and pedagogically-useful Web sites is not an easy task², the integration of Web-based activities can enhance the learning process by promoting creative interaction by students with motivating, culturally appropriate, and linguistically rich educational materials.

Other instructors have enthusiastically engaged not only in the use of existing Web resources, but also in the design, implementation, and testing of materials for the online medium. Nonetheless, the creation of sound materials for an online learning environment is a time-consuming endeavor not always recognized by educational institutions for purposes of faculty appointment, promotion and tenure.

Therefore, it is no wonder that a multiplicity of tools for the creation and implementation of Web courses and ancillary online materials to traditional courses has emerged in the market since the mid 90's. The relative novelty of these tools makes it difficult for teachers to evaluate their strengths and weaknesses, especially since research studies on these topics are still in their infancy. In order to provide some responses to the teaching community, this article reviews the nature of e-learning tools and their potential for language learning, by focusing on the key issues that surround the design, implementation, and assessment processes of Web-based language courses.

II. WEB COURSE MANAGEMENT SYSTEMS

The accelerated expansion that the Internet has experienced—in terms of number of users, content, connectivity, and new technological possibilities—since the creation of the World Wide Web in the early 90's has opened new horizons for the integration of technology into the learning process. Online learning is not the most popular use of the Web, but many Internet analysts consider e-learning as the next “killer app,” agreeing with Chambers³ when he says “the biggest growth in the Internet, and the area that will prove to be one of the biggest agents of change, will be in e-learning.”

In order for the Web-based learning revolution to take place, more sound and state-of-the-art online learning materials have to be developed and implemented at all levels of

instruction. Potential authors of Web materials can use independent authoring tools or employ integrated Web course management systems. These tools and systems are particularly common in academic centers in which a given platform has been purchased or developed institutionally. The following section deals with the definition, features, and development of those tools that allow the creation of integrated online learning environments.

II.1. Definition

The development of authoring tools for the creation of online materials is a very recent field in the area of software programming, with less than seven years of history. Even so, many products and packages claim to be the best e-learning solution, in an effort to reach as many potential users and enthusiasts as possible. Therefore, it is not surprising that there is no standard definition for these tools, and even less consensus about the terminology that describes these tools. Some of the most common terms include *Web course development tools* (Hazari 1998), *Web-based course support systems* (International Journal of Educational Telecommunication 1999); *Web-based instruction programs* (Fredrickson 1999), *Web-based courseware tools* (University of Manitoba 1997; Firdyiwiek 1999), *course authoring tools* and *course authoring software* (Palloff & Pratt 2001), *Web course management systems* (Mann 2000), *(Web-based) course management systems* (Ansorge 2001), *online educational delivery applications* (Landon 1996), *course delivery systems* (Brusilovsky & Miller 2001), *course delivery environments* (Kearsley 2000), *distance education systems* (Scigliano & Levin 2000), *Web-based learning systems* (Housego & Freeman 2000) or *environments* (Oakey 1999; TeleEducation NB & Centre for Learning Technologies 2000), and *courseware shells* (Norman 2000).

Furthermore, while the term *virtual learning environments*⁴ can refer both to the set of tools' (especially in the U.K.) and to the resulting product (particularly in publications on European and Asian projects), the terms *Web-based educational environments* (Volcry 2001), *online learning environments* (Schröni & Benson 2000), and *Web-integrated learning environments* (Piguet & Peraya 2000) refer primarily to the resulting product. In addition, two other recently-coined concepts —*learning management systems* and *learning content management systems*, which are primarily utilized in corporate training— (for example, in Rengarajan 2001), have increased the confusion about the scope and characteristics of these products.

For the purposes of this article, the term *Web-based course management system* (WCMS) seems to be the most appropriate terminology since the products to be discussed "are customarily grouped together, interact under a course name, and are protected by a password" and therefore, "they can be considered a system" (Mann 2000, p. viii).

From this perspective, a WCMS can be described as a platform that includes a series of integrated tools having three broad functions: (1) to create online instructional materials in the form of self-paced courses or as supplemental resources to traditional courses; (2) to manage online courses, and (3) to monitor the interaction of students with online courses.

WCMSs do not require deep knowledge of programming or designing. They are installed in a server with which both designers and end users interact online via a java-enabled Web browser. Although the range of available tools differs from product to product, WCMSs offer a set of tools for the instructor, such as a syllabus tool, a file manager, a content editor, a glossary tool, a multimedia database creation tool, and options that allow teachers to provide access and to track student use of the online materials. For the student, WCMSs include tools to facilitate communication, such as bulletin boards, electronic mail, chatrooms, and electronic whiteboards; tools for assessment like timed, automatically-graded online quizzes, self-test; and tools for submitting assignments, presenting projects, and creating homepages. In addition, students can search the glossaries and databases created by the instructor, and also make annotations in the calendar or any other content page.

11.2. Products

The first Web-based Learning environments created in the early stages of the Web (1995-1996) were built without using any pre-existing software package (Kahn 1997, as quoted in Robson 1999, para. 11). Course authors were both content providers and technology developers. As Robson (1999, para. 11) points out:

The first attempts quite naturally concentrated on transferring familiar aspects of the classroom experience to the internet. These included the basics: communicating with students, giving tests, keeping records, and even recognizing that a student is indeed a student. Course developers built new internet tools, such as WWW-based quizzes with immediate feedback, and re-purposed old ones, such as email and chat. This was often done on an ad-hoc basis, but some developers realized that by packaging a set of tools they could save future work for themselves and perhaps make a little money.

Less than seven years later, the situation has radically changed. There are many different WCMSs in the market —no one knows how many exist (Robson 1999; TeleEducation NB & Centre for Learning Technologies 2000)—, and as the demand for these products increases, it becomes more difficult to keep track of all the products and the new features added to them. A report by the American Society of Development and Training (2001) states that there are more than 5,000 companies that offer products related to e-learning. Most of those companies are private corporations, and none of them controls more than 5% of the market. A series of bankruptcies, mergers, and acquisitions reflects the fragility of this emerging sector and obvious consolidation trends (Barron 2001). Many online education companies have been forced to cut costs and even to leave the field. Nevertheless, other factors, such as the number of significant e-learning contracts signed in 2001 and the steady demand for e-learning products make analysts optimistic about the future of the online learning industry.

The proliferation of WCMSs is easy to justify if we consider the transformations that the knowledge-based economy is causing on the education milieu. According to Jaffee "the academy is presently facing an unprecedented range of external pressures including changes in student demographics, fiscal constraints, emerging informational and instructional

technologies, skill demands from private sector employers, and conceptions of teaching and learning" (1998, p. 21). In a society where the need for lifelong learning has dramatically increased, the market for educational products is becoming highly competitive and attractive. According to Grimes (2001), the online higher education market is expected grow to \$7 billion in 2003 from \$1.2 billion in 1999. Corporate online training will grow even faster –from \$1.1 billion in 1999 to 11.4 billion in 2003. Not surprisingly, traditional higher education institutions are increasing their online offerings in an effort to cope with competition from new "virtual" educational providers including newly funded virtual universities, corporate universities, professional associations, textbook publishers, and bookstores (Tschang 2001).

Nonetheless, while corporations may have the resources to outsource the creation and management of their training courses⁶, for instance, by contracting Application Service Providers, "traditional" education institutions usually adopt the "self-made" approach when developing online learning materials. Much has been written about faculty not being willing or skilled enough to accomplish the difficult task of producing sound technology-based educational materials (for example, Duderstadt 1997; Murray 1996; Brahler, Peterson & Johnson 1999; Seltzer 2000; Janicki & Liegle 2001; Palloff & Pratt 2001). The list of reasons cited for faculty reluctance to engage in online teaching include lack of knowledge about educational concepts and/or technology, time constraints, and the lack of systems of reward and recognition.

These circumstances notwithstanding, faculty respond positively if awarded with enough support and incentives. Many universities have begun to develop new criteria to assess technology-related work done by scholars⁷. As Boschmann points out, "if rewards are based upon true scholarly activity whose products are shared, peer reviewed, published, funded, adopted, and become the basis of conferences, then sound reward decisions can be made" (1998, para. 11). In addition, other measures have been adopted to grant support for faculty. Examples include centers for teaching and learning and technology resource centers, as well as the adoption of Web course management systems, so instructors can rely on an institutional supported platform.

The decision to choose one particular Web course management system is generally made at the administration level since it implies a significant investment and a long-term relationship with the selected commercial or non-commercial provider. Institutions may support more than one platform, although the common trend is to have only one in order to ease its adoption by both instructors and students⁸. The following taxonomy of WCMSs by Brusilovsky and Miller (2001, p. 169-171) provides an excellent framework for the study of the existing authoring tools:

University-level tools	University research-level systems
	University-supported products
Commercial tools	University-grown commercial systems
	Full fledged commercial systems

Table 1: Taxonomy of WCMSs by Brusilovsky and Miller (2001)

According to Brusilovsky and Miller (2001, p. 169-170), university-level tools can be divided into two groups: *university research-level systems* and *university-supported products*. The former are usually advanced and innovative, but their distribution is limited because their developers do not offer maintenance or support services. The latter are systems also created at universities but have gone through a more thorough testing process and their developers offer a stronger level of support. Many university research-level systems become university-supported systems as a result of strong demand from the e-learning sector, especially in the U.S. and Canada.

Commercial products, such as those products called *university-grown* tools by Brusilovsky and Miller, may have originated in universities. In these cases, "the success in their home universities leads to the establishment of a company that usually ships some version of the tools as a commercial system and continues the development of this tool on an industrial basis." (Brusilovsky & Miller 2001, p. 170). *Full-fledge commercial* tools are systems produced, distributed, and supported by companies. Although the original product may have originated in an university, the connection with the original development site has disappeared.

Following Brusilovsky and Miller, many university research-level tools are more solid than the commercial ones. However, they can not offer the same level of service and user-friendliness provided by commercial software companies.

The following table⁹ illustrates some of the current products that are used in the academic area. For a comprehensive review of the features of different WCMSs, see Hazari (1998); International Journal of Educational Telecommunication (1999); Marshall University (1999); TeleEducation N3 & Centre for Learning Technologies (2000); Brusilovsky & Miller (2001); Landon (1996-2001); Sickmann (2001); University of Manitoba (1997-2001); USNews.com (2001).

Type of product	Product	Developer
University-research level systems	ARIADNE	European Union and Swiss Government http://www.ariadne-cu.org
	ClassNet	Iowa State University http://classnet.cc.iastate.edu
	FLAX	De Montfort University http://www.ems.dmu.ac.uk/coursebook/flax
	IDEALS-MTS	Consortium of European Universities and Corporations http://ideals.zgdv.de
	Interbook	Carnegie Mellon University http://www.contrib.andrew.cmu.edu/~plb/InterBook.html
	ONcourse	Indiana University http://oncourse.iu.edu
University-supported systems	CyberProf	University of Illinois at Urbana-Champaign http://www.howhy.com/home
	Mallard	University of Illinois at Urbana-Champaign http://www.cen.uiuc.edu/Mallard
	Merlin	University of Hull http://www.hull.ac.uk/merlin
	TeleTOP	University of Twente http://teletop.edte.utwente.nl
	WebAssign	North Carolina State University http://webassign.net
	WebTycho	University of Maryland http://tyehousa3.umuc.edu
University-grown tools	COSE	Staffordshire University / Cambridge Software Publishing. http://www.staffs.ac.uk/COSE
	Luvit	Lund University / LUVIT Corp. http://www.luvit.com
	Scrf™	University of Delaware / Scrfsoft.com http://www.scrfsoft.com
	Virtual-U™	Simon Fraser University / Virtual Learning Environments Inc. http://www.vlci.com
	WebCT	University of British Columbia / WebCT, Inc. http://www.webct.com
	WebTeach	University of New South Wales / WebTeach Pty. Ltd. http://www.pdc.unsw.edu.au/Webteachdemo/welcome.html
Full-fledged commercial tools	Blackboard	Blackboard, Inc. www.blackboard.com
	Docent	Docent, Inc. www.docent.com
	FirstClass	Centrinity http://www.softare.com wwwourcompany
	Geo Learning Management System	GeoLearning.com http://www.geolearning.com
	IMSeries	Learning Technology Systems http://www.imseries.com

Intrakal	Anlon http://www.anlon.com
IntraLearn	IntraLearn Software Corporation http://www.intralearn.com
IZIOPro SM	Convenc http://www.convenc.com
LearningSpace	IBM Miidspan Solutioiis http://www.lotus.com/home.nsf/welcome/learnspace
Mentorware	Mentorware™, liic http://www.mentorware.com
Nct Synergy	Mciitergy http://www.menterev.com
Sabn Learning	Saba http://www.saba.com
Symposium	Centra® http://www.centra.com
SuccessMaker	NCS Systems http://www.successmaker.com
SocratEase	Quelsys http://www.quelsys.com
TBK Tracker	Platte Canyon Multimedia Software Corporation http://www.plattecanyon.com
The Learning Manager	TLM Corporation http://tlmcorp.com
THINQ	THINQ Learning Solutions http://learning.thinq.com/index.htm
TopClass	WBT Systems http://www.wbt systems.com
Total Knowledge Management	Generation21 Learning Systemis http://www.gen21.com
WebMentor	Avilar Technologies, Inc. http://home.avilar.com

Table 2: Web-based course management tools

As the e-learning market evolves, products from one category may move to another, while others often disappear from the scene. The number of tools continues to grow in concert with the increasing demand for high-quality, state-of-the-art Web-based courses. This relationship leads to what Fredrickson refers to as "a snowball effect": "the more courses being offered over the Web, the more Web-based instruction (WBI) programs are developed, leading to more courses on the Web" (1999, p. 67). Listings of products published only one or two years ago are already obsolete¹⁰, and the mergers, acquisitions and constant launching of new versions with more features makes it extremely difficult for academic institutions to choose a particular system (TeleEducation NB & Centre for Learning Technologies 3000). In addition, the variety of options these tools offer are "beginning to make it difficult for instructors and course designers to determine which functions should be used for what aspects of a course" (Kearsley 1998, para. 41).

Nevertheless, descriptive and comparative studies show that the differences among WCMSs that could be of pedagogical concern are very small (Kobson 1999; Siekniann 2001). There are of course variations in the tools available, design capabilities, options for quizzes and data analysis, ease of use, and information management. "Judging from reading newsgroups and from feedback obtained at conferences, perceptions about ease of use, appearance of the interface, recommendations from peers, marketing strategies, and positioning in the market have far more influence over purchasing decisions than pedagogic distinctions" (Robson 1999, para. 21).

Another factor that may influence the acquisition of a given WCMS by an institution is the perception of its long-term stability in the market. Consequently, products such as Blackboard or WebCT, which are considered to be the leaders in the market¹¹, particularly in the higher education area, have a greater chance of being selected than other less stable tools.

11.1. WEB LEARNING ENVIRONMENTS IN FOREIGN LANGUAGE LEARNING

Advances in technology always occur at a faster pace than their integration into the educational field (Cuban 2000). However, there are an increasing number of Web-related research projects and papers being presented at scholarly conferences on language learning (like ACTFL, NECTFL, EUKOCALL, CALICO, IALL, and even the MLA). Thus, it is clear that the Internet, especially the Web, is being enthusiastically integrated by many foreign language teachers as an instructional tool.

The general advantages and disadvantages of using the Web as an instructional tool have been described in many places (Alessi & Trollip 2001; Jolliffe et. al. 2001; Kosenberg 2001). Owing to its widespread use and cross-platform compatibility, the Web facilitates access to learning to anyone, anywhere, at any time. Surprisingly, the disadvantages stem from at least three inherent strengths of the Web: (1) its dynamism and rapid growth, which forces authors to frequently up-date their Web sites' content and layout; (2) the ease by which information can be published, which in many cases leads to quickly and, consequently, poorly designed sites; and (3) its relatively simple navigation interface, which hinders sophisticated kinds of interaction. In addition, the following negative factors, as suggested by Godwin-Jones (1999), are particularly important in the foreign language field: (1) the difficult handling of non-Latin alphabet characters; (2) the constrained quality of multimedia information; and (3) the obstacles to the incorporation of audiovisual materials.

In order to provide solutions to the specific needs of foreign language teachers, some authoring tools for Web-based language learning activities have been developed by universities or commercial companies, such as ExTemplate by Rice University or ACE II by De Wilde CB¹². These tools offer a seamless integration of multimedia resources and, in the case of ExTemplate, resolve the question of the non-Latin alphabet characters. Figure I shows a sample online Spanish exercise with integrated audio pronunciation, created for the textbook *Vistas*¹³ using ACE II. Figure II shows an online Arabic exercise with integrated

audio information and recording capabilities (via Wimba), created at Rice University using ExTemplate.

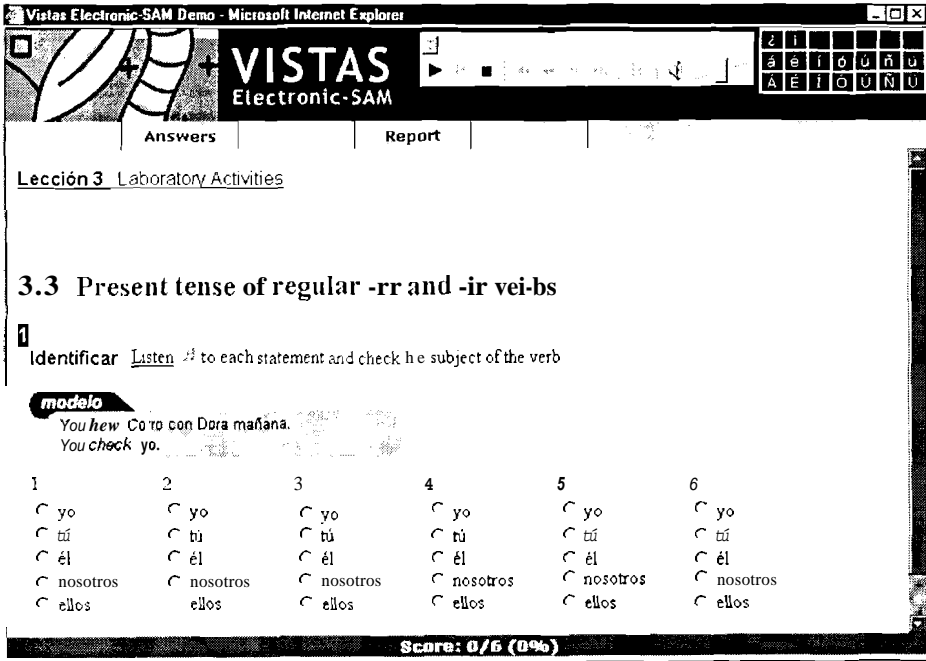


Figure 1: Exercise created with ACE II. Reproduced with permission of Vista Higher Learning

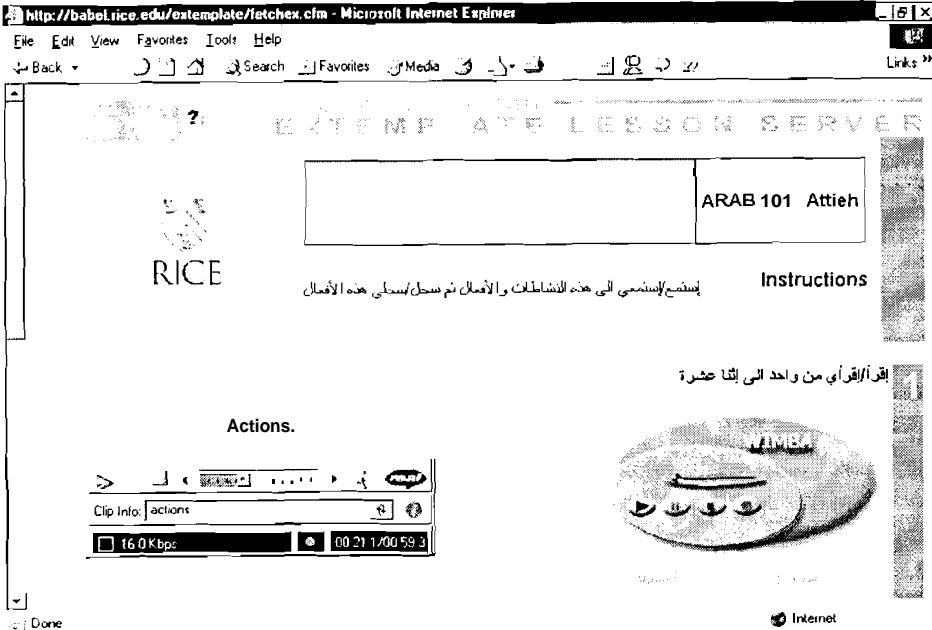


Figure 7: Exercise created with ExTemplate. Reproduced with permission of Rice University

Integration of the Web into foreign language curricula has been fashioned in many different ways. These optional approaches all explore one or more of the Web features as “a revolutionary new medium for organizing, linking, and accessing information” (Warschauer & Kern 2000, p. 12). By using the Web as an instructional tool, teachers try (1) to increase students' exposure to authentic materials and language-learning related activities, and (2) to motivate them to engage in meaningful communication processes and collaborative activities. In a broad sense, Web-based instruction can be defined as a conjunction of different kinds of interaction: interaction with materials, such of those selected or created by the author or other students, and interaction with people, such as class peers, the teacher or the Internet community. The greater the student interaction is, especially in technology-enhanced instruction, the more likely the learning process will be successful. (Schrupp, Bush & Mueller 1983; Palloff & Pratt 2001).

Following the taxonomy of interaction for instructional media developed by Schwier (1992), there are three levels of interaction: reactive, proactive, and mutual. Reactive interaction in Web-based instructional environments occurs when students respond to a given stimulus, for example, study materials or any other information. Proactive interaction takes place when “the learner goes beyond selecting or responding to existing structures and begins to generate unique constructions and elaborations beyond designer-imposed limits” (Schwier 1992, p. 2). In Web-based environments, this type of interaction occurs when students use retrieved information to accomplish certain goals or when they create something, for example, Web-based projects. Mutual interaction occurs in computer-mediated communication, when both sender and recipient have to adapt themselves to each other in order for communication to take place. These categories are hierarchical in that one category subsumes the characteristics of the inferior levels.

Research published on the use of Web-based instructional materials for foreign language teaching includes examples of each level of interactivity described above. Reactive models of interaction include the use of Web sites with course syllabi, study materials, and quizzes created by the instructor or by other authors (for example, in Godwin-Jones 1999; Barker 2001; Román Mendoza 2001a). Nevertheless, most studies, including those previously cited, also report activities that require proactive interactions, such as the use of Web realia to solve certain problems and develop critical thinking (as in Lee 1998; Osuna & Mckill 1998; Christie 2000; Crane 2000; Green & Youngs 2001; Pash & Norsworthy 2001; Windham 2001). Proactive interaction has also been promoted in other creative fashions, such as the webportfolios reported by Spanos, Hansen and Daines (2001), the student Web pages project included in Labrie (2001), and the projects for the virtual study abroad described by Pertusa-Seva and Stewart (2000). Finally, mutual interaction has also been extensively employed in foreign language online instruction as a means to extend the communication beyond classroom limits (for example, in Warschauer & Kern 2000). Studies on computer-mediated communication have been performed on interactions among peers (for example, in Coski & Kinginger 1996; Lee 1998; Lamy & Goodfellow 1999; Blake 2000; Sheaffer-Jones 2000); among students and teachers (as in Coski & Kinginger 1996; González-Bueno 1998); and among students and the outside world (for example, in Austin & Mendlik 1994; Coski &

Kinginger 1996; Blake 2000; Brammerts 2001; Furstenberg, Lcvet, English & Maillet 2001; Knight 1994; Lunde 1990; Soh & Soon 1991).

Under ideal circumstances, a Web-based language learning environment would integrate activities corresponding to all these categories, especially if the environment targets distance learners with no "traditional" classroom contact. Also, authors of Web-based environments may emphasize one interaction type over the others depending on the content and learning objectives of the course, the Internet literacy of the course audience, and the technology available to both students and instructors.

As mentioned above, in order to create a Web-based learning environment, instructors may use independent tools or an integrated WCMS. The use of independent tools and programming languages offers more freedom and customization possibilities for both the instructor and the student. In addition, Godwin-Jones observes that the use of WCMSs may cause educators to believe that what the system "offers is all the Web can do and may not explore innovative options" (1999, p. 57). Therefore, it is not surprising that one of the most common items in the "wish list" of WCMS users is more flexibility in the potential for integrating other learning modules and tools. Such flexibility would allow for a deeper degree of customization and for a higher adaptability to the teacher's instructional approach.

The use of WCMSs has many advantages, especially for the novice author of Web-based instructional materials. Following is a list of additional benefits that characterize WCMS-based learning:

- Ease in publishing online materials without extensive knowledge of HTML.
- Ease in creating quizzes, surveys, and other activities with immediate scoring and feedback without knowledge of programming.
- Easy registration for students.
- Ease of management of password-protected access to the course
- Ease in creation of asynchronous fora.
- Automatic recording of synchronous chats.
- Layout consistency throughout the course.
- Integrated tracking and monitoring capabilities.

WCMSs are currently being used to deliver different modalities of online materials: totally-developed, dependent, supplemental, and informative (Román Mendoza 2001a). The conclusions of Gandel, Weston, Finkelstein and Winer (2000) of Web use are useful for categorizing the impact of WCMS on student learning:

1. WCMS-delivered materials with **minimal** impact on learning.
2. WCMS-delivered materials that are **supplemental** and not necessary to the achievement of course goals.
3. WCMS-delivered materials that are **integral** to achieving course goals of the course.

4. WCMS-delivered materials that are **central** to the achievement of most learning goals of the course.
5. WCMS-delivered materials that are **exclusive** to the achievement of all learning goals in the course.

Owing to the relative novelty of the integration of WCMSs in language learning and the scarcity of published research studies, it is difficult to assess what percentage of Web-based language instruction belongs to each of the five previously described categories of WCMS use. Information retrieved from the Web and from presentations at scholarly conferences seems to indicate that most language teachers use WCMSs to create and deliver integral or supplemental materials. Central and exclusive uses of the Web via WCMSs are naturally more frequent in distance education contexts. In addition, research shows (as in Chen & Hunsberger 2001) that Web-novice teachers tend to use the Web to present information and to create passive activities with limited space for individual instruction. Web-knowledgeable teachers provide collaborative instruction, and more flexible and challenging interactive materials.

In general, authors involved in the creation of Web-based materials approach the task in an incremental way, i.e., building on prior experience and making changes based on their previous instructional experience with the medium. For this reason, it is very common that teachers who first employ the Web in a minimal or supplemental way, progress afterwards to a more integral, central and even exclusive use of the Web in their courses. Flexible and customizable WCMSs are the most convenient tools for teachers who want to begin to explore some of the different interaction possibilities that online learning environments provide. The following description aims to illustrate some applications of the most common tools of WCMSs in foreign language instruction, in terms of what students can be asked to do. Each description will be enhanced with some considerations about foreseeable problems and possible solutions.

III.1. Content Tools

Most WCMSs include in this category the following options: a syllabus tool, a calendar tool, and the content pages. Glossaries and multimedia databases are not present in all products but they will also be discussed in order to provide a better picture of the possible integration of this group of tools. To a degree, these tools function as “an electronic assistant to the teacher” (Christie 2000, p. 152).

Educators can use these tools to post syllabi, course instructions and schedules, study guides, class handouts, reference Web sites and materials. They can also be used to announce class assignments and course changes. These types of tools promote reactive interactions (basically, student interaction is limited to reading and selecting) more than any other interaction level. However, some WCMSs allow students to become more proactive by allowing them to annotate the content pages, the course glossary and the calendar. Figure 3

shows a sample use of the widely-used WCMS Blackboard for delivery of supplementary grammar handouts and exercises for a Spanish Conversation and Composition course taught during the fall semester 2001 at the University of New Hampshire. This course also made extensive use of the synchronous communication tools to encourage student communication outside the classroom.

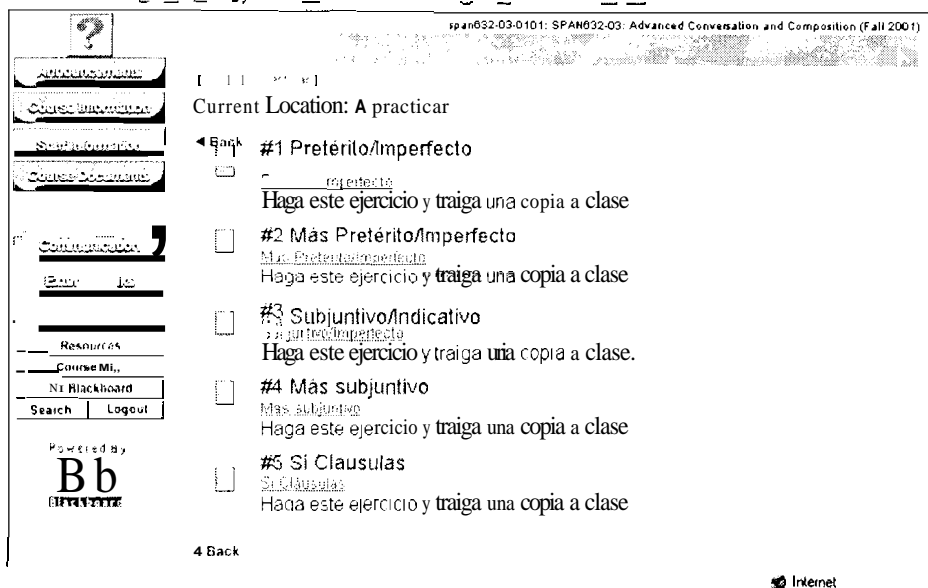


Figure 3: Grammar content module. Advanced Conversation and Composition by Lee (2001) Blackboard. University of New Hampshire

Whatever information will be made available to students, it is necessary to plan in advance how that information is going to relate to the course. As Gala points out after using the WCMS CourseInfo for a survey course in Spanish Literature, it is important to explain to students the role any supplementary information plays "in the course and what they are expected to do with it" (2000, p. 158). This is important in order that students do not feel overwhelmed or confused by the amount of materials accessible in the online learning environment.

11.2. Communication Tools

The most common tools in this category are the bulletin boards and the chatrooms. Due to their potential for increasing student-student communication and for facilitating mutual interaction, these tools are the most frequently used in foreign language instruction. There are important reasons why online discussion tools should be used for instruction. According to Wizer (1997), these reasons include: (1) limited classroom time; (2) contributions to the

discussion can be stored for further analysis; (3) learners have more time to reflect on their own answers and their peers' answers; (4) teachers have more time to reflect on students' answers; (5) the process of learning becomes more active and learner driven; (6) discussions tend to be more open and less restrained; (7) group members may participate more equally; and (8) discussions take place in an individualized, interpersonal, and interactive environment. While the first four reasons are generally accepted without any further objections, the last four advantages depend on how well online activities are designed and integrated into the course.

Before implementing online discussion tools into a course, it may be very helpful to consider a series of issues related to: course topics, student participation, teacher participation, and student assessment. The following paragraphs contain a list of issues that are not intended to be a comprehensive guide, but rather a preliminary guide for faculty use of online discussion tools in their courses.

- *Course topic.* Instructors have to plan in advance how online discussions are going to relate to specific course topics. Activities may include reading or commenting on postings before, during or after the class. In addition, online discussion tools are very useful in carrying out group work because they allow students to use private bulletin boards or chatrooms to prepare and brainstorm for their projects without being tied to a particular place.
- *Student participation.* It is important to specify in the course syllabus if student participation in online discussions is going to be required or simply encouraged. Instructors have to be very clear about the frequency with which students will have to participate in discussions. Activities should be set up so that they promote both student-student and student-teacher mutual interaction. To this end, script-based activities—exercises in which students have to gather information from previous online discussions or chats in order to perform the task (such as the “chain comments” reported in Spanos et al. 2001)—are extremely successful in ensuring student involvement in the discussions, and in after-discussion activities.
- *Teacher participation.* It is very important for instructors to be aware of the amount of time they are going to be able to spend reading the postings of students. Depending on the class size, instructors will decide what kind of feedback they are going to give their students. The clearer the instructions on how and why to use the selected discussion tools are, the less time the instructor will spend answering individual questions on those issues. Feedback can be provided individually via e-mail through a draft/revision approach, or in-person to the whole class, focusing on the most frequent problems encountered.
- *Assessment of online contributions.* As Gala states (2000, p. 159), “in an ideal world, students would engage freely in these exchanges and not view them as mere

homework but rather as educational opportunities." Since most learning contexts are not part of that "ideal world," the grading of contributions to online discussions seems to be the only way to ensure student participation. The issue of how to assess student postings and provide feedback must be carefully considered by the instructor. Grading scales and rubrics for assessing other types of written and oral communication may prove inappropriate for an online environment (see Spanos et al 2001, for a practical use of Angelo's Classroom Assessment Techniques to evaluate different types of online activities).

Some WCMs include other tools, such as the student presentation tool and the homepage tool in WebCT, which allow students to establish one-way communication with their peers and the teacher. These tools can be particularly useful for collaborative editing and for publishing group projects in any courses, promoting creative proactive interaction.

11.3. Assessment Tools

Under this category, quizzes, self-assessment tools, and assignment submission options will be discussed. Quizzes and self-tests may take different forms, such as multiple choice, fill-in-the-blanks, matching, short paragraphs, or long answers. As with any other kind of computer-assisted evaluation tools, the broader the range of possible answers, the more time-consuming and difficult will be the provision of individualized feedback and assessment. Nevertheless, online automatically-graded quizzes remove much of the burden of manual grading from instructors. Additionally, these tools allow learners to monitor their progress on an on-going basis (Jolliffe, Ritter and Stevens 2001).

Assessment tools can be used for some of the mechanical work required in many foreign language learning contexts, such as spelling exercises, grammar drills, or preparative questions for a culture or literature test (for example, in Christie 2000; Román Mendoza 2001a). Quizzes may serve as a review of what has been discussed in class or as preparation for the next class. Figure 4 shows a partial list of quizzes that students had to take in the Spanish Civilization and Culture course taught at George Mason University during the fall semester of 2001. In this case, the purpose of quizzing was to assure that students had read the textbook chapters¹⁴ before each class and were prepared for the discussion. This approach can also help to identify problematic questions and topics in advance so they can be addressed during class time.

Title	Availability	Duration	Grade	Attempts
Tests Fall 2001				
Prueba para el miércoles	From: Aug 29, 2001 16:30 To: Sep 05, 2001 16:30	Unlimited	40.0 / 40	Completed: 1 Remaining: 0
De Iberia a la España visigoda	From: Aug 29, 2001 20:20 To: Sep 05, 2001 16:30	Unlimited	100.0 / 100	Completed: 1 Remaining: 0
La invasión árabe	From: Sep 05, 2001 07:10 To: Sep 12, 2001 16:30	Unlimited	100.0 / 100	Completed: 1 Remaining: 0
Los reinos cristianos	From: Sep 12, 2001 19:10 To: Sep 19, 2001 16:30	Unlimited	90.0 / 100	Completed: 1 Remaining: 0
Descubrimiento y conquista de América	From: Sep 19, 2001 19:30 To: Sep 26, 2001 16:30	Unlimited	100.0 / 100	Completed: 1 Remaining: 0
El Imperio español en Europa: esplendor	From: Sep 26, 2001 19:10 To: Oct 03, 2001 16:30	Unlimited	100.0 / 100	Completed: 1 Remaining: 0
El Imperio español en Europa: decadencia	From: Oct 17, 2001 19:00 To: Oct 24, 2001 16:30	Unlimited	90.0 / 100	Completed: 1 Remaining: 0
La instauración del absolutismo	From: Oct 24, 2001 19:10 To: Oct 31, 2001 16:30	Unlimited	90.0 / 100	Completed: 1 Remaining: 0
España: de la restauración absolutista a la crisis de 1898	From: Oct 31, 2001 19:20 To: Nov 07, 2001 16:30	Unlimited	110.0 / 110	Completed: 1 Remaining: 0
De Alfonso XIII a la era de Franco (I)	From: Nov 07, 2001 19:20	Unlimited	90.0 / 110	Completed: 1 Remaining: 0

Figure 4: Quizzes for the course Spanish Civilization and Culture by Román Mendoza (2001 b) WebCT, George Mason University

In addition to all considerations involving each of the previous categories, attention must also be given to the technological skills of the students, including their individual and collective familiarity with the tools used for a particular course. Instructors must be aware of the specific technological skills students will need in order to perform well in the online assignments. Instructors should also know where to refer students who do not have the necessary skills and how long it will take them to acquire those skills. Alternatively, some teachers devote one or two classes to teach students how to use the required tools (as in Lee 1998). In some cases, some level of proficiency in technology should in fact be a requirement for the course. Finally, it is also important to know how many, and to what degree, students have Internet access from home.

IV. ASSESSING EFFECTIVENESS

As seen above, designing and implementing a sound online language learning environment involves time-consuming processes in which many instructors do not want to actively participate. This reluctance emanates in part from their desire to collect valid data about their effectiveness as learning tools. Furthermore, although many sources state that the possible reduction of costs does not have to be the main reason for adopting technology, administrators are more willing to support projects if return on investment can be proven. Reported results

from two pilot projects founded by the Sloan Foundation at the University of Illinois at Urbana-Champaign and by the Pew Program in Course Redesign at the University of Tennessee, Knoxville, (Arvan & Musumeci 2000; Roberts 2001) are very encouraging with respect to the achievement of cost reductions through the integration of technology into the curriculum. In both cases, demand for intermediate Spanish courses exceeded the enrollment capacity. Consequently, an online component¹⁵ was added to the regular courses, thus decreasing the number of weekly class meetings, and increasing the number of sections offered. Therefore, by using technology, the University of Illinois was able to double its enrollment, and the University of Tennessee offered one-third more courses, with a cost-per-student reduction from \$109 to \$30.

Studies on the effectiveness of online learning environments are very scarce. Regarding the use of WCMSs, Robson reported in 1999 that "there are practically no data at all, meritorious or not" (para. 21). Two years later, the situation has not significantly changed. Although there has been an increase in publications about the development and implementation of WCMSs in foreign language instruction (for example, Godwin-Jones 1999; Christie 2000; Gala 2000) and about students' attitudes toward them (for example, Felix 2001; Román Mendoza 2001a; Yang 2001), there is still a lack of definitive and reliable results on the effectiveness of WCMSs as instructional tools. Even if more research demonstrating the enhancement of student achievement through online instruction were available, it would have to be carefully reviewed due to the inherent difficulties of studies concerning pedagogical approaches, treatments, and solutions. As Joy and Garcia (2000) report, design flaws (e.g., sample size, selection of control groups, control of prior knowledge, ability, learning style, teacher effects, time on task, instructional method, and media familiarity) are very frequent in studies involving the use of technology.

Nevertheless, there are other factors that appear to indicate that the use of Web-based learning environments can be beneficial for the learning process. These alternative factors are particularly more evident in situations where enrollment limitations or geographical conditions impede student interaction with their instructors, their peers, and course materials. As Alessi and Trollip suggest, many advantages of Web-based learning are related to logistics since the online learning environments "are more convenient, inexpensive, efficient, accessible, reproducible, or maintainable" (2001, p. 378).

Quality issues, however, are not to be forgotten. Following Jolliffe et al., evaluation of online instruction should focus on the following three pedagogical aspects: "the learning that has taken place, the learning materials, and the learning environment" (2001, p. 262). The exact scope of the evaluation methodology depends, also according to Jolliffe et al., on the goals of the evaluation, which can be any of the following (2001, p. 270):

- The learning gains of the students;
- How effective learners found the online environment;
- The changes that may have to be made to the learning materials;
- How effective learners found the learning support;
- The advantages and disadvantages of online delivery;

- The appropriateness of the environment structure for learning;
- The most and least effective learning processes in the online environment;
- How the online environment compares with the traditional environment.

Questionnaires, observations, and data retrieved from the automatic tracking systems of WCMSs are the most common tools for gathering the data necessary to perform a solid evaluation. Questionnaires models (for example, Angulo & Bruce 1999; Felix 2001; Green & Youiis 2001; Jolliffe et. al. 2001) can serve as a starting point for the development of the right tool for a particular study. Experiments must be designed with a view to avoiding flaws to obtain accurate and reliable data (see Joy & Garcia 1998, for references about sound research design and data reporting).

V. FINAL REMARKS

The introduction of online learning environments in foreign language instruction is affecting the way teachers approach the development and implementation of their courses. As Nassch points out, "the role of teacher from traditional knowledge provider has changed to facilitator, helper, technology expert, and problem solver" (1998, para. 45). In addition, some instructors have also undertaken the task of designing and maintaining the environment in which the learning process takes place. Educators have the option of utilizing independent tools or any of the many commercial and non-commercial Web course management systems that currently abound in the market.

The use of an integrated system facilitates the development and re-use of course materials. Nonetheless, a higher degree of customization would be desirable to provide for more flexibility and to satisfy both students' and teachers' needs. Tracking utilities provided by WCMSs help teachers to assess the usefulness of their Web pages and to make the necessary modifications in the development of future courses. Since the establishment of Web-based learning environments generally occurs in a gradual fashion (through a long process of development, implementation, revision, and refinement), tools that allow seamless integration of new course elements into the existing ones are highly valuable for course developers. Integrated WCMSs are also more likely to produce robust and consistent products, less subject to technical problems.

In terms of student benefits, the use of a sound Web-based learning environment, with well-prepared activities explicitly related to the course goals, can enhance students' motivation in communicating in the target language, and in establishing more meaningful mutual interaction with peers, instructors, and the outside world. Data about these interactions are easily stored and retrieved for future use by the student-author, other students, and by the teacher. Thanks to these features, WCMSs represent new horizons for designing student activities based on contributions to online discussions and on their performance on online quizzes.

Finally, a thorough evaluation process of any online learning experience is strongly encouraged. Ongoing evaluation will help to ensure the achievement of learning goals and the enhancement of materials in future course releases. It will also provide valuable data for motivating and helping other members of the teaching community to accomplish the task of creating sound Web-based environments for foreign language learners.

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NOTES

¹ For more information on Internet trends and statistics see NUA (http://www.nua.ie/surveys/how_many_online/index.html). NUA's statistics are based on research studies carried out by NUA, IDC, Reuters, Nielsen NetRatings, AIMC, IntelliQuest, CommerceNet/Nielsen.

² For selection criteria for primary web sources for foreign language learning see Pasch & Norsworthy (2001).

³ John Chambers, CEO, Cisco Systems. From his keynote speech to the Fall 1999 Comdex Trade Show, Las Vegas, November 16 1999. Quoted in Rosenberg (2001, p. xv).

⁴ The term *virtual learning environments* is also being used (as in Von der Eiide et. al. 2001) to refer to online domains in the form of MOOs and MUDs, which allow synchronous interaction among teachers and students.

⁵ The term *managed learning environments*, also referred to as *managed learning environments*, is also of widespread use in the U.K. to describe environments that include "integrated links to management information systems, content repositories and network/user authentication systems." (University of Bristol 2001)

⁶ It is difficult to estimate how much the development of an online course can cost, because it depends on the kind and amount of information, and the level of interaction needed. Norman (2000, p. 118) mentions as much as \$40,000 per course. Corporate reports and white papers go much higher, e.g. in Schooley (2001, para. 7): "course conversion costs are about \$25,000 and up for a two-hour course. [...] A new course of similar length costs more than \$65,000."

⁷ See, for example, Coppin State College's guidelines: http://www.coppin.edu/oit/tech_fluency.asp or Mount Holyoke College's at <http://www.mtholyoke.edu/committees/facappoint/guidelines.shtml>

⁸ After a survey carried out within the listserv AAHESGIT in March 2001, Ansorge (2001) reports the following results: out of 178 respondents, 60% indicated there was one platform installed at their institution with 30% indicating a presence of two systems. There were 10% indicating they had three or more systems.

⁹ This list is based on the taxonomy proposed by Brusilovsky and Miller (2001) and has been updated with data from the Usnews' report (2001), TeleEducation NB & Centre for Learning Technologies (2000), Main (2000), and web research performed by the author. Some of the systems, leaders in corporate e-learning, listed in the Usnews' report have not been included because they do not currently provide service to any K12 or higher education institution.

¹⁰ For instance, some of the systems cited by the above mentioned sources have been acquired by other companies (as Web Course in a Box by Blackboard, Inc in spring 2000), or have not been further developed (as WebFuse) or supported (as eWeb or Zebu by Centrinity).

¹¹ The above mentioned survey performed by Ansorge (2001) reports the following results with respect to most used WCMs: Out of 178 respondents, 52% were using Blackboard; 32%, WebCT; 3%, eCollege; the rest

other systems such as Learning Space, IntraKal, Tlic Learning Mailagcr, Etudes froiii Jaiiioa Publishing, Speakeasy, Lotus Notes, Proiecticus, and Jenzabar.

¹² For more information consult <http://babel.rice.edu/external/index.cfm> and <http://www.dowildcctb.com>.

¹³ Donley, P. M., Dellinger, M. A., García, M. I., Blanco, J. A. & Horwitz, E. K. (2000). *Vistas*. Doston, MA: Vista Higher Learning.

¹⁴ Kattán-Ibarra, J. (1995). *Perspectivas culturales de España*. Lincolnwood, IL: National Textbook Company.

¹⁵ Blackboard was the tool used in University of Tennessee, Knoxville. University of Illinois implemented Moodle.

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