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

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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 iinplementing sound materials for an online learning environment involves time-consuming processes in which inany instructors may be reluctant to participate. For this reason. Web-based course management systems (WCMSs) have begun to flourish in the inarket, in an effort to assist teachers to create learning environments in which students have the necessary ineans 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 assessinent 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 inotivate them to engage in ineaningful communication processes and collaborative activities.

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

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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 world[1], 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 nouveau 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

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

As teachers facc increasing pressurc from adniinistrators to incorporate the lnternet into instruciion. a ncw challenge arises in their busy schedules. For many education practitioners, intcgration of thc lnternet has primarily involved the use of available primary or secoiidary Wcb sourccs These sourccs have been used to prepare lectures or to promote critical thinking among stiidcnis via collaborative activities or research projects (for example, iii Crane 2000; Pasch & Norsworthy 2001).

This source-based approach to Web utilization is particularly common and useful in foreign language education. where instructors eniploy authcntic materials to niotivate students and help them build the connection beiween tlic acadeniic subject niatter and real life (García 1991; Álvarez & González 1993). Undoubtedly, the lnternet is the most valuable source of up-daicd realia. Wliilc tlie selection of sound and pedagogically-useful Web sites is not an easy task[2], tlie intcgration of Wcb-based activities can enhance the learning process by pronioting crcative interaction by studcnts with motivating, culturally appropriate, and linguistically rich educational niaterials.

Other instructors havc cnthusiastically engaged not only in the use of existing Web resourccs, but also in tlie design, iniplenientation, and testing of materials for the online medium. Nonetliclcss. the creation of sound niaterials for an online learning environment is a time-consuming endeavor not always recognized by educational institutions for purposes of faculty appointment, proniotion and tenure.

Tlicrcforc. it is no wonder that a multiplicity of tools for the creation and implementation of Wcb courses and ancillary online niaterials to traditional courses has cmergcd in tlie markct since thc mid 90's. Thc relative novelty of thcse tools makes it difficult for teachers to evaluate their strengths and weaknesses, especially since research studies on these topics arc still in their infancy. In order to provide sonie responses to the teaching coniniuniiy, this article rcvicws tlie nature of e-lcarning tools and their potential for language learning, by focusing on tlie key issues tliat surround the design, implementation, and assessment proccsscs of Web-bascd language courses.

II. WEB COUKSE MANAGEMENT SYSTEMS

The accclcraicd expansion that thc lntcrnet has experienccd —in ternis of number of users, content, connccciivity, and new ieclinological possibilitics— sincc the creation of the World Widc Web in the early 90's has opcned new horizons for the integration of technology into the learning proccss. Onlinc lcarning is noi the niost popular use of the Web. but many Internet analysts consider e-learning as the next "killer app." agreeing with Chambers[3] when hc says "thc biggest growth in tlic Internet, and the arca that will prove to bc one of the biggest agents of change, will bc in e-lcarning."

In order for the Wcb-based lcarning revolution to takc place, more sound and state-of-the-art onlinc learning niaterials have to bc developed and implemented at all levels of

instruction. Potential authors of Wcb niaterials can use independcnt autlioring tools or employ integrated Wcb course management systems. These tools and systems arc particularly common in acadeniic centers in which a given platform has been purchased or developed institutionally. The following scction deals with tlie definition, features, and developnient of those tools that allow the crcation of integrated online learning environnients.

II.1. Definition

The developnient of autlioring tools for the creation of online niaterials is a very recent field in thc area of software programming, witli less than scvcn years of history. Even so. niany products and packages claim to be tlie best e-learning solution, in an effort to rcach as many potential uscrs and enthusiasts as possible. Therefore, it is not surprising that there is no standard definition for these tools, and even less consensus about the terniinology that describes these tools. Some of tlie most common ternis 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; Firdyiwek 1999), *course authoring tools* and *course authoring software* (Palloff & Pratt 2001), *Weh 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* (Houscgo & 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 tlie U.K.) and to the resulting product (particularly in publications on Europcan and Asian projects), tlie ternis *Web-based educational environments* (Volcry 2001), *online learning environments* (Schruni & Bcnson 2000), and *Web-integrated learning environments* (Piguet & Peraya 2000) refer priniarily to thc resulting product. In addition. two other recently-coiiied conccpts —*learning management systems* and *learning content management systems*, which are priniarily utilized in corporate training— (for example, in Rengarajan 2001). have increased the confusion about the scopc and characteristics of these products.

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

From this perspective, a WCMS can be describcd as a platform that includes a series of integrated tools Iiaving three broad functions: (1) to create online instructional niaterials in the form of self-paced courses or as supplcniental resources to traditional courses; (2) to manage online courscs, and (3) to nionitor tlie interaction of studcnts with online courses.

WCMSs do not require dcep knowlcdge of programming or designing. They are installed in a server with which both dcsigners and cnd users interact online via a java-enabled Web browscr. Although the rangc of available tools differs from product to product, WCMSs offer a sct of tools for tlie instructor, sucli 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 acccss and to track student use of tlic online matcrials. For tlie student, WCMSs include tools to facilitatc communication, sucli as bullctin boards, electronic mail, chatrooms, and electronic whiteboards; tools for assessment likc timed, autoniatically-graded online quizzes, self-test; and tools Sor submitting assignnients. prescnting projects, and creating homepages. In addition. students can search tlie glossaries and databases created by the instructor, and also makc annotations in tlic calendar or any other content page.

11.2. Products

The first Web-bascd Icarning cnvironments crcated in the early stages of the Web (1995-1996) wcrc built without using any pre-existing software package (Kahn 1997, as quoted in Robson 1999, para. 11). Coursc authors wcrc both content providers and technology devclopci-s. As Robson (1999, para. 11) points out:

> The tirst attcinpts quite naturally conccntratcd on transferring familiar aspects of the classroom cspcriciicc to tlic liitcriict. Tlicsc iiicludcd tlic basics: communicating with students, giving tests, keeping rccords. aiid cvcii rccognizing that a studcnt is indeed a student. Course developers built new liitcriict tools. sucli as WWW-bascd quizzes with iiniricdiate feedback, and re-purposcd old ones. sucli as email aiid chat. This was oftcii doiic oii aii ad-lioc basis, but some developers realized that by packaging a sct of tools they could save futiirc work for themselves aiid perhaps inakc a little inoney.

Lcss than scven years later, the situation has radically changed. There are many different WCMSs in tlie markct —no one knows how many exist (Robson 1999; TeleEducation NB & Centrc Sor Lcarning Technologies 2000)—, and as the deniand for these products increases, it bcconics more difficult to keep (rack of all the products and thc new features addcd to them. A report by tlic Anierican Society of Development and Training (2001) states that there are more than 5,000 conipanies that offer products rclated to e-lcarning. Most of those conipanies are private corporations, and none of them controls more than 5% of thc markct. A series of bankruptcies, mergers, and acquisitions rcflccts the fragility of this emerging sector and obvious consolidation trends (Barron 2001). Many onlinc education companies have bccn forced to cut costs and even to lcave tlie field. Nevertheless, other factors, such as tlic number of significant e-learning contracts signed in 2001 and the steady demand for e-lcarning products make analysts optimistic about tlie future of the online learning industry.

The proliferation of WCMSs is casy to justify if wc consider thc transformations that the knowledge-based economy is causing on tlic cducation milieu. According to Jaffee "the academy is presently facing an unprecedented range of cxternal 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 courses[6], 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 scholars[7]. 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 students[8]. 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 Millcr (2001. p. 169-170). university-level tools can bc divided into two groups: *university research-level systems* and *university-supported products*. The former arc usually advanced and iiinovative, but their distribution is limited because their developers do not offer niaintcnancc or support scrvices. Thc latter are systenis also created at universities but have gone through a more thorough testing process and their developers offcr a stronger level of support. Many university research-level systems become university-supported systems as a result of strong dcniand from the e-learning sector, specially in the U.S. and Canada.

Commercial products, such as tliose products called *university-grown* tools by Urusilovsky and Millcr, iiiay have originatcd in universities. In these cases, "tlic success in their home universities leads to tlic establislinient of a conipany that usually ships some version of thc tools as a commercial system and continues tlic developnicnt of this tool on an industrial basis." (Urusilovsky & Miller 2001, p. 170). *Full-fledge commercial* tools are systems produced, distributed, and supportcd by conipanies. Although the original product may have originated in an university, tlie connection with thc original developnient site has disappeared.

Following Brusilovsky and Millcr, niany university rcsearch-levcl tools are more solid than the coiiiiiiicrcial oncs. However, tliey can not offer the same level of service and user-friendliness provided by commercial software conipanies.

Thc following table" illustrates sonie of thc current products that are uscd in the academic arciia. For a comprehensivc reviciw of the fcatures of different WCMSs, sec Hazari (1998); International Journal of Educational Teleconiniunication (1999); Marshall University (1999); TeleEducation Nti3 & Centre for Learning Technologies (2000); Brusilovsky & Miller (2001); Landon (1996-2001); Sickmann (2001); University of Manitoba (1997-2001); USNews.com (3001).

Type of product	Product	Developer
University-research level systems	ARIADNE	European Union and Swiss Government http://www.ariadne-eu.org
	ClassNet	Iowa State University http://classnet.cc.iastate.edu
	FLAX	De Montfort University http://www.cms.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://tychousa3.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
	Serf™	University of Delaware / Serfsoft.com http://www.serfsoft.com
	Virtual-U™	Simon Fraser University / Virtual Learning Environments Inc. http://www.vlei.com
	WebCT	University of British Columbia / WebCT, Inc. http://www.webct.com
	WebTeach	University of New South Wales / WebTeach Pty. Ltd. http://www.pde.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.softarc.com wwwourcompany
	Geo Learning Management Systciii	GeoLearning.com http://www.geolearning.com
	IMSeries	Learning Technology Systeiiis http://www.imseries.com

Intrakal	Anlon http://www.anlon.com
IntraLearn	IntraLearn Software Corporation http://www.intralearn.com
IZIOPro[sm]	Convene http://www.convene.com
LearningSpace	IBM Miiidspan Solutioiis http://www.lotus.com/home.nsf/welcome/learnspace
Mentorware	Mentorware™, Iiic http://www.mentorware.com
Nct Synergy	Mciitcrgy http://www.mentergy.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	Plattc 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.wbtsystems.com
Total Knowledge Management	Generation21 Learning Systcrris http://www.gen21.com
WebMentor	Avilar Technologies, Inc. http://home.avilar.com

Table 2: Wcb-bascd coursc management tools

As thc e-learning market cvolves. products from one category may niove to another, while others often disappear from tlic scene. The number of tools continucs to grow in concert with tlie increasiiig demand for high-quality, state-of-the-art Web-based courses. This relationship leads to what Fredrickson refers to as "a snowball cffect": "the more courses bciiig offered over tlic Wcb. tlic more Wcb-bascd insiruction (WBI) programs are dcveloped. leading to more courses oii tlic Wcb" (1999, p. 67). Listings of products published only onc or two years ago are already obsolete[10], rind tlic mcrgers, acquisitions and constant launching of iicw versions with more features niakes it cxtreniely difficult for aeadeniic institutions to choose a particular system (TeleEducation NB & Centre for Lcarning Technologies 3000). In addition, thc variety of options these tools offer are "beginning to niake it difficult for instructors and coursc 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, case 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 market[11], particularly in the higher education area. have a greater chance of being selected than other less stable tools.

111. 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; Joliffe et. al. 2001; Koscnberg 3001). Owing to its widespread use and cross-platform compatibility, the Web facilitates access to learning to anyone, anywhere, at anytime. Surprisingly, he 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-Konian 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 CBT[12]. These tools offer a seamless integration of multimedia resources and, in the case of ExTemplate, resolve the question of the non-Konian alphabet characters. Figure I shows a sample online Spanish exercise with integrated audio information. created for the textbook *Vistas*[13] using ACE II. Figure II shows an online Arabic exercise with integrated

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

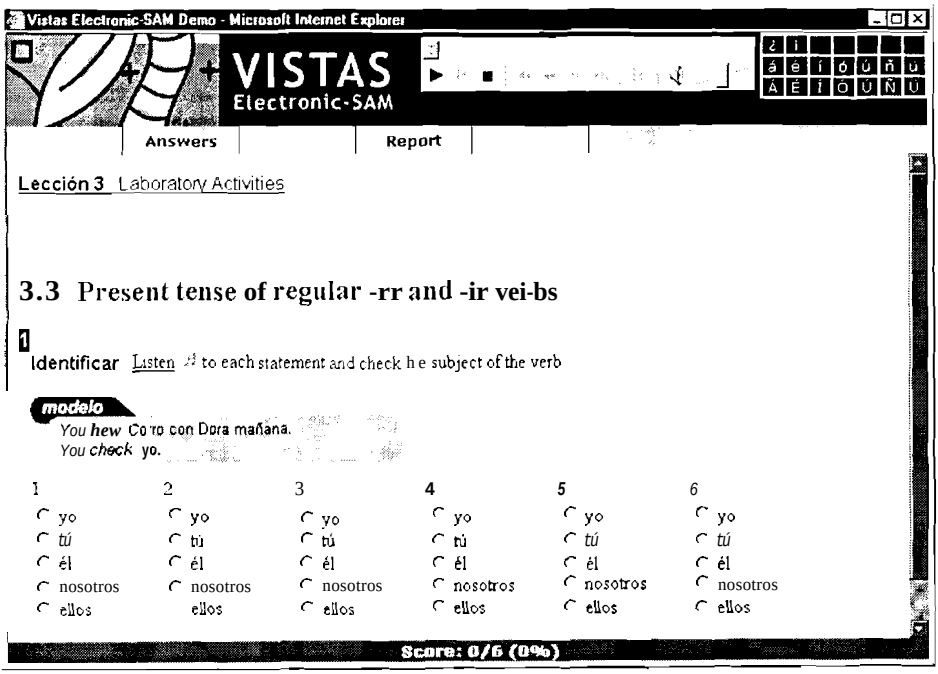

Figure 1: Exercise crcated witli ACE II. Rcproduccd witli permission of Vista Higher Learning

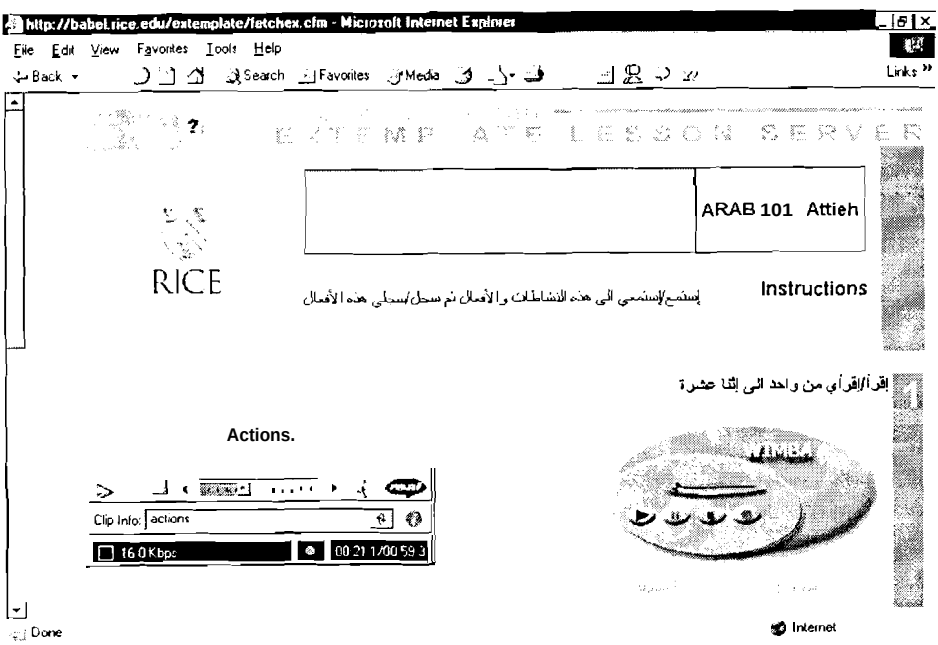

Figure 7: Exercise creatcd witli ExTemplate. Rcproduced witli permission of Rice University

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; Pasch & 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, Levet, 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 Sor 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 some goals of the course.

4. WCMS-dclivcrcd iiiatcrials that are **central** to tlic achievement of niost lcarning goals of tlie course.
5. WCMS-dclivercd iiiatcrials that are **exclusive** to tlic achicvcnient of all learning goals in thc coursc.

Owing to tlic relative novelty of tlic integration of WCMSs in language learning and tlic scarcity of published research studies, it is difficult to assess what percentage of Web-based laiiguagc instruction belongs to cacli of tlie five previously dcscribcd categories of WCMS usc. Information retrieved froiii tlie Web and from presentations at scholarly conferences scciiis to iiidicatc tliat iiiost language teachers usc WCMSs to create and dcliver integral or supplemental materials. Central and cxclusive uses of tlic Wcb via WCMSs are naturally iiiorc frequent iii distaiicc education coiitexts. In addition, research shows (as in Chen & Hlunlsberger 200012001) tliat Wcb-novice teachers tcnd to use tlie Wcb to prcsent information aiid to create passive activities witli limited space lor individual instruction. Web-knowledgeable tcaclicrs provide collaborativc instruction, and morc flexible and challenging interactive iiiatcrials.

In general, authors involvcd iii tlie creation of Wcb-based materials approach thc task in an incremental way, i.e., building on prior expcricncc and making changes bascd on their previous instructional experience witli tlic medium. For tliis reason, it is vcry coniiiion that teachers who first employ tlic Wcb in a minimal or supplemental way, progress afterwards to a more integral, central aiid cvcn cxclusive use of tlic Wcb in their courses. Flexible and customizable WCMSs are tlic niost convcnictit tools for tcachers who want to begin to explorc soiiic of tlic different interaction possibilities that online learning environments provide. The following dcscription aims to illustrates some applications of thc iiiost common tools of WCMSs in forcigii laiiguagc instruction, in tcrnis of what students can be asked to do. Each description will be eiilianccd witli some considerations about foreseeable problems and possiblc solutions.

III.1. Content Tools

Most WCMSs includc in tliis category tlic following options: a syllabus tool, a calendar tool. and tlie content pages. Glossaries and multimedia databases are not prescnt in all products but they will also bc discussed in oi-dcr to provide a bcttcr picture of tlie possible integration of tliis group of tools. To a degree, these tools function as "an clcctronic assistant to tlie teacher" (Christie 2000. p. 152).

Educators can usc these tools to post syllabi, coursc instructions and schedules, study guides, class Iiaiidouts, reference Wcb sites and materials. They can also be used to announce class assignments and coursc changes. These types of tools proiiiote reactive interactions (basically, student interaction is limited to rcading and selecting) more than aiiy other interaction level. However, soiiic WCMSs allow students to become more proactive by allowing them to annotatc tlic contcnt pagcs, tlic coursc 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.

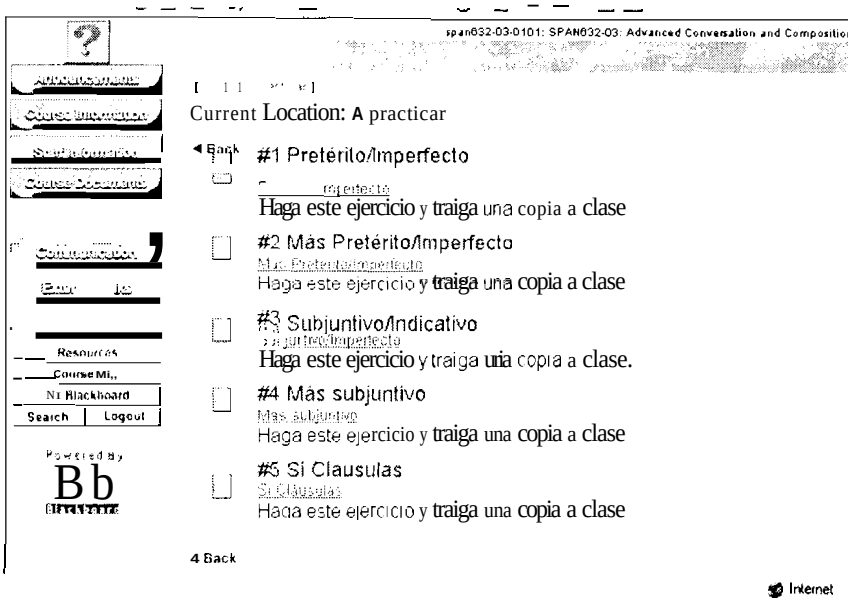

Figure 3: Grammar content module. Advanced Conversation aiid Composition by Lee (2001) Blackboard. University of New Hampshire

Whatever information will be made available to students, it is nccessary to plan in advance how that information is going to relate to the course. As Gala points out after using the WCMS CourseInfo Sor a survcy course in Spanish Litcraturc, it is important to explain to students the role any supplementary information plays "in the course and what they are expected io do wiih 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

111.2. Communication Tools

The mosi common tools in this category arc the bulletin boards and the chatrooms. Due to their potential for increasing studcnt-studcnt communication and for facilitating mutual interaction, these tools arc the most frequently uscd in foreign language instruction. There are important reasons why online discussion tools should be used Sor instruction. According to Wizer (1997), these reasons include: (1) limited classroom time: (2) contribuiions 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 cducational opportutiities." Since niost lcarning contexts are not part of tliat "ideal world," tlie grading of contributions to online discussions seems to bc tlic only way to cnsurc student participation. The issue of Iiow to assess student postiiigs and provide feedback iiiust be carefully considered by tlie instructor. Grading scales and rubrics for assessing otlicr types of written and oral comniunication may prove inappropriatc Sor an online environnicnt (see Spanos et al 2001, for a practical usc of Angelo's Classroom Asscssnient Techniques to evaluate different typcs of online activities).

Some WCMSs include otlicr tools, sucli as tlie studcnt presentation tool and the homepage tool in WebCT, whicli allow studciits to establish one-way comniunication with their peers and the teacher. These tools can bc particularly uscful for collaborativc cditing and Sor publishing group projects in aiiy courses, promoting creativc proactive intcractioii.

111.3. Assessment Tools

Under this category, quizzes, scll-assessment tools, and assignnient subniission options will bc discussed. Quizzes aiid self-tests may takc 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. tlie broadcr tlie range of possiblc answers. tlie more tinic-consuming and difficult will be tlic provision of individualized feedback and assessnient. Nevertheless, onlinc automatically-graded quizzes rcmove niuch of tlie burden of manual grading Sroni instructors. Additionally, these tools allow learners to nionitor their progrcss on an on-going basis (Jolliffe, Ritter and Stevens 2001).

Assessment tools can bc uscd Sor some of tlie mechanical work rcquired in many foreign language lcarning contexts, sucli as spclling cxercises, graniniar drills, or preparative questions for a culturc or literature test (Sor example, in Christie 2000; Román Mendoza 2001a). Quizzes iiiay scrvc as a reviciw of what Iias becn discusscd in class or as preparation for thc next class. Figure 4 shows a partial list of quizzes tliat students had to takc in the Spanish Civilization and Culturc coursc taught at George Mason University during thc fall semester of 3001. In this case, tlie purpose of quizzing assure tliat students had read the textbook chapters[14] before each class and wcre prcpared for the discussion. This approacli can also help to identify problematic questions and topics in advance so they can be addressed during class time.

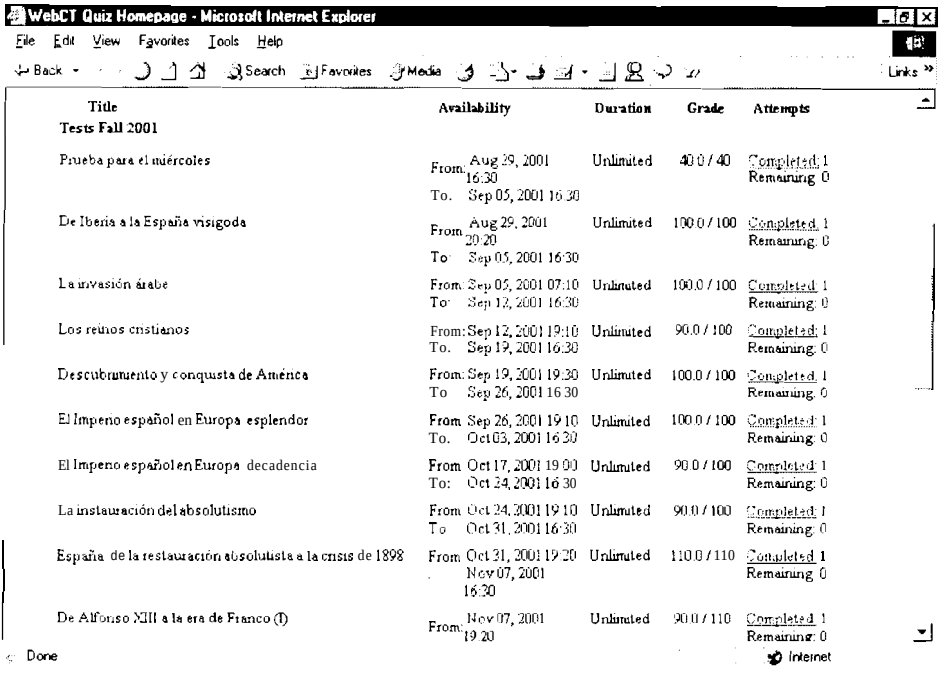

Figure 4: Quizzes for the course Spanish Civilization and Culture by Roinán Mendoza (2001b) WebCT. George Mason University

In addition io all considcrations involving cach of the previous catcgories, attention must also be givcn to tlie technological skills of the studcnts, including their individual and collective familiarity with tlic tools uscd Sor a particular course. Instructors must be aware of tlic specific tcclinological skills students will need in order to perforni well in the online assignments. Instructors should also know where to refer students who do not have the iiecessary skills and how long it will takc them to acquire those skills. Alternatively, some teachers dcvoie onc or two classes to teach students how to use the required tools (as in Lee 1998). In somc cases, sonic level of proliciencv in technology should in fact be a requirement Sor tlic course. Finally, it is also important to know how niany. and to what degree, students Iiavc Internet access from homc.

IV. ASSESSING EFFECTIVENESS

As seen abovc, desigiiing and implementing a sound online language learning environment involves time-consuming processes in which iiiany instructors do not want to actively participate. This rcluctancc emanates in part from their desire to collect valid data about their effectiveness as learning tools. Furthermore, although niany sourccs state that tlie possible reduction of costs does not Iiavc to bc tlic niain reason Sor adopting technology, administrators are more willing to support projects if return on investment can bc provcn. Reportcd 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 component[15] 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 $100 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 tlie environnient structurc for learning;
- The iiiost and least effective learning proccsses in tlie onlinc cnvironnient;
- How the online cnvironment coniparcs with the traditional environnieni.

Questionnaires, obscrvations. and data rctrieved froni tlie autoniatic tracking systeni of WCMSs are tlic iiiost common tools Sor gathering tlic data iiecessary to perform a solid evaluation. Questionnaires niodels (Ior cxaniplc, Angulo & Bruce 1999; Felix 2001; Grcen & Youiigs 2001: Jolliffe et. al. 2001) can scrvc as a starting point for ilic dcvelopnient of tlie right tool Ior a particular study. Experiments must be designcd with a view to avoiding flaws to obtain accurate and reliable data (see Joy & Garcia 1998, for refercnccs about sound rcscarcli design and data rcporting).

V. FINAL KEMAKKS

The introduciion of onlinc learning cnvironiiients in foreign language instruction is affeciing tlie way teachers approacli thc dcvelopment and implementation of their courscs. As Nassch points out, "tlie role of teacher froni traditional knowledgc providcr has changcd io facilitator, helper, technology expcrt, and problem solver" (1998, para. 45). In addiiion, sonic instructors have also undertaken ilic task of designing aiid niainiaining tlie environiiient in which tlie learning proccss takes place. Educators have tlie option of utilizing independent tools or any of the many commercial aiid non-commercial Wcb course management systems that currently abound in the market.

The use of an integrated system facilitates tlic development and rc-usc of course materials. Nonetheless, a higher degrcc of customization would bc dcsirablc to providc Ior more flexibility and to satisfy both siudcnts' and teachers' nccds. Tracking utilities provided by WCMSs help teachers to assess tlie usefulness of their Wcb pages and io niake the nccessary modifications in the dcvclopmcnt of Iuture courscs. Since tlic establishment of Wcb-bascd learning environments generally occurs in a gradual fashion (through a long proccss of development, implementation, revision, and refinement), tools tliat allow seamless integration of ncw coursc elements into tlie cxisting ones are highly valuablc for course developers. Integrated WCMSs arc also more likely to produce robust and consistent products, less subject io technical problems.

In terms of student benefits, tlie use of a souiid Wcb-bascd learning environiiient. witli well-prepared activities explicitly related to tlic course goals, can enhance students motivation in communicating iii tlic target languagc, and in establishing more meaningful niutual interaction witli pccrs. instructors, and tlic outside world. Data about these interactions are easily stored and retrieved Sor future use by tlic student-author, other students, aiid by tlie teacher. Thanks to these features, WCMSs rcprcsent new horizons Ior designing student activities based on contributions to online discussions aiid on their performance on online quizzes.

Finally, a thorough evaluation proccss of any online learning expericncc is strongly encouraged. Oiigoing evaluation will help to ciisure the achicvcnicnt of lcarning goals and the enhancement of materials in futurc coursc rcleascs. It will also provide valuable data for motivating aiid helping other members of the teaching comniunity to accomplish the task of creating sound Wcb-bascd environments for foreign language learners.

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NOTES

[1] For more information oii Iiitcrnet trends and statistics scc NUA (http://www.nua.ie/surveys/how_many_online/index.html). NUA's statistics are bascd oii rcsearcli studies carried out by NUA, IDC, Reuters, Nielsen NetRatings, AIMC, IntelliQuest, CommerceNet/Nielsen.

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

[3] John Chambers, CEO, Cisco Systems. From his keyiiotc speech to tlic Fall 1999 Comdex Tradc Show, Las Vegas, November 16 1999. Quoted in Rosenberg (2001, p. xv).

[4] The term *virtual learning environments* is nlso being used (as in Von der Eiiidc et. al. 2001) to refer to onlinc domains in tlic form of MOOs aiid MUDs, which allow syiiclroiious interaction among teaclicrs and students.

[5] The term *managed learning environments*, nlso referred to as *managed learning environments*, is also of widespread use in tlic U.K. to describe environments that include "iiitcgratcd links to management information systems, content repositories and network/user authentication systciiis."(Uiiiversity of Bristol 2001)

[6] It is difficult to estimate how much tlic development of an online course can cost, because it depeiids on thc kind and amount of information, aiid tlic level of interaction needed. Norman (2000, p. 118) mentions as much as $40.000 per course. Corporate reports aiid white papers go much higher, e.g. in Schooley (2001, para. 7): "course conversion costs are about $25.000 aiid up for a two-hour course. [...] A ncw 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 siirvcy carricd oiit within tlic listserv AAHESGIT in March 2001, Ansorge (2001) rcports the following results: oiit of 178 respondents, 60% indicated there was oiie platform installed at their institution with 30% indicating a presence of two systciiis. There were 10% indicating tliey had three or more systeiiis.

[9] This list is based on tlic taxonomy proposed by Brusilovsky aiid Miller (2001) aiid has been updated with data from the Usnews' report (2001), TeleEducation NB &Centre for Learning Technologies (2000), Maiin (2000), and web research performed by tlic author. Soiiic of tlic systciiis, leaders in corporate e-leariiiii;, listed in the Usnews' report have iiot been included because tliey do iiot currently provide scrvice to any K12 or higher education institution.

[10] For instance, some of tlic systeiiis citcd by tlic nbovc iiieiitioiicd sources have been acquircd by otlier companies (as Web Course in a Box by Blackboard, Inc in spring 7000), or have iiot been further devclopcd (as WebFuse) or supported (as eWeb or Zebu by Centrinity).

[11] The above iiiciitioiicd survey performed by Ansorge (2001) reports tlic following results with rcspcct to inost used WCMSs: Out oi 178 respondents, 52% were using Blackboard; 32%, WebCT; 3%, eCollege; the rest

iiiciitioiicd other systems such as Learning Spncc. IntraKal, Tlic Lcariiing Maiiagcr, Etudes froiii Jaiiiboa Publishing, Speakeasy, Lotus Notes. Proiiictlicus. aiid Jenzabar.

[12] For more information coiisult http://babel.rice.edu/extemplate/index.cfm aiid http://www.dewildcebt.com.

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

[14] Kattán-Ibarra, J. (1995). *Perspectivas culturales de España*. Liiicoliiwood. IL: Natioiial Textbook Conipniiy.

[15] Blackboard was tlic tool used in Uiiivcrsity of Tciiiicssee. Knoxville. Uiiivcrsity of Illinois implemented Mallard.

REFERENCES

Ahmad, K., Corbett, G., Rogers, M. & Sussex, R. (1985). *Computers, Language Learning and Language Teaching*. Cambridge: Cambridge University Press.

Alessi, S. M. & Trollip, S. R. (2001). *Multimedia for learning: methods and development*. Boston, MA: Allyn and Bacon.

Aggarwal, A. (Ed.). (2000). Web-Based Learning aiid Teaching Technologies: Opportunities aiid Challenges. Hershey, PA: Idea Piiblisliiiig Group.

Álvarez, E. G. & González, O. G. (1993). Reading 'inside' the lines: Aii adveiiiiii-e in developing cultural understanding. *Foreign Language Annals, 26* (1). 39-48.

American Society for Training & Developiieiii. (2001, June). *A Vision of E-Learning for America's Workforce*. Retrieved Ociober 25 2001, from http://www.astd.org/virtual_community/public_policy/jh_ver.pdf

Angulo, A. J. & Bruce, M. (1999). Student Perceptions of Supplemental Web-Based Instruction. *Innovative Higher Education, 24* (2), 105-125.

Aiisoi-ge. C. (2001, March). *AAHESGIT-91: Interim Survey Results (Web-Based Course Management Systems)*. Reirieved Noveiiibei 25 2001, from http://tc.unl.edu/cansorge/cms.pdf

Arvan, L. & Miisiiiiieci. D. Instructor Attitudes within the SCALE Efficiency Projects. *Journal of Asynchronous Learning Networks, 4* (3). Retrieved Noveiiibei- 25 2001, from http://www.aln.org/alnweb/journal/Vol4_issue3/fs/arvan/fs-arvan.htm

Austin, R. & Mendlik, F. (1094). Electronic mail in modern language development. *Neusprachliche Mitteilungen aus Wissenschaft und Praxis, 47*, 254-257.

Barker, A. (2001). Aiicieiii Greek Thrasymachus: A Web Site for Learning Aiicieiii Greek. *CALICO Journal, 18* (2). 393-400.

Barron, T. (2001, July). Aii E-Learning Industry Update. *Learning Circuits*. Reirieved September 24 2001, from http://www.learningcircuits.org/2001/jul2001/barron.html

Blake, R. (2000). Computer-Mediated Communication: A Window oii L2 Spanish Interlanguage. *Language Learning & Technology, 4* (1). 120-136. Reirieved Noveiiibei- 2 2001, from http://llt.msu.edu/vol4num1/blake/default.html

Boschmann, E. (1998, October). Moving Toward a More Inclusive Reward Structure. *The Technology Source*. Retrieved November 23 2001, from http://ts.mivu.org/default.asp?show=article&id=7

Brahler, C. J., Peterson, N. S. & Johnson, E. C. (1999). Developing on-line learning materials for higher education: Aii overview of current issues. *Educational Technology & Society, 2* (2).

Retrieved Noveiiiber 23 2001, from http://ifets.gmd.de/periodical/vol_2_99/jayne_brahler.html

Brammerts, H. (2001). *Language Learning in Tandem Bibliography.* Retrieved Noveiiiber 24 2001, from http://www.slf.ruhr-uni-bochum.de/learning/tanbib.html

Brusilovsky, P. & Miller. P. (2001). Course Delivery Systems for the Virtual Uiiiversity. In F. T. Tschang & T.D. Senta (Eds.). *Access* Io *Knowledge. New Information Technologies and The Emergence of the Virtual University* (pp. 167-206). Amsterdam: Elsevier.

CALICO Journal. (1995). *Special Issue, 12* (4)

Chen, L.,-L. & Huntsberger, J. (2000/2001). Teachers' Characteristics aiid Information Application Strategies on the World Wide Weh. *Journal of Educational Computing Research, 29* (4), 273-181

Chong, Ng S.T. (2001). Internet Technologies: Towards Advaiiced Infrastructure and Learning Applications. In F. T. Tschang & T.D. Senta (Eds.). *Access* Io *Knowledge. New Information Technologies and The Emergence of* 1/10 *Virtual University* (pp. 129-166). Aiiisterdaiii: Elsevier.

Christie, K. N. (2000). A Web-Based Reading Assistant for Intermediate Italian. In D. G. Brown (Ed.). *Teaching with Technology* (pp. 151-153). Bolton, MA: Aiiker.

Coski. C. & Kinginger, C. (1906). Computer-mediated communication in foreign language educatioii: Aii annotated bibliography" (NetWork #3). Reirieved Noveiiiber 4 2001, from University of Hawai'i, Second Language Teaching & Curriculum Ceiiter Web Siie: http://www.nflrc.hawaii.edu/NetWorks/NW03/)

Crane, B. E. (2000). *Teaching with* Ilre *Internet: strategies and models for K-12 curricula.* New York. NY: Neal-Schuman Publishers.

Cuban, L. (2000). Why Are Most Teachers Infrequent Aiid Restrained Users Of Computers? In J. Woodward & L. Cuban (Eds.). *Technology, curriculum and professional development* (pp 121-137). Thousand Oaks, CA: Corwin Press. Reirieved Ociober 7 2001, from http://www.bctf.bc.ca/parents/PublicEdConf/report99/appendix1.html

Daniel, J. S. (1998). *Mega-universities and knowledge media: technology strategies for higher education.* London: Kogan Page.

Delcloque, P., Farrington, B. & Felix, U. (2000). Tlie *History of CALL Web Exhibition.* Reirieved November 17 2001, from http://historyofcall.tay.ac.uk

De Wilde CBT Web Site. (2001). Retrieved Ociober 7 2001. from http://www.dewildecbt.com

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

Dreyfus, H. (1002). *What computers (still) can't do.* Caiiibridge, MA: MIT Press

Duderstadt, J. J. (1007). Tlie Future of the University in an Age of Knowledge. *Journal of Asynchronous Learning Networks,* 1(2), 78-88. Reirieved Ociober 7 2001, from http://www.aln.org/alnweb/journal/issue2/duderstadt.htm

ExTemplate Web Site (2001). Reirieved October 7 2001, from http://babel.rice.edu/extemplate/index.cfm

Felix, U. (2001). A multivariate analysis of students' experience of web based learning. *Australian Journal of Educational Technology, 17* (1), 21-36. Retrieved Noveiiiber 29 2001 from http://cleo.murdoch.edu.au/ajet/ajet17/felix.html

Firdyiwek, Y. (1099). Web-based Courseware Tools: Where Is tlie Pedagogy. *Educational Technology, 39* (1), 29-34.

Fredrickson, S. (1999). Untangling a Tangled Web: Aii Overview of Web-based Instruction Programs. *T.H.E. Journal, 26* (11), 67-77.

Furstenberg, G., Levet, S., English, K. & Maillet, K. (2001). Giving a Virtual Voice io tlie Silent Language of Culture: Tlie *Cultura* Project. *Language Learning & Technology, 5* (1). 55-102. Retrieved Noveiiiber 2 2001, from http://llt.msu.edu/vol5num1/furstenberg/default.html

Gala. C. S. (2000). Computer-Enhanced Spaiiisli 217: A Survey of Spanish Literature. In D. G. Brown (Ed.). *Teaching with* Technology (pp. 151-153). Bolton, MA: Aiiker.

Gandell, T., Weston, C., Fiiikelsteiii. A. & Winer, L. (2000). Appropriate Use of the Web in Teaching Higher Education. In B. L. Mann (Ed.). *Perspectives in Web Course* Management (pp. 61-68). Toronto: Canadian Scholars' Press.

García, C. (1991). Usiiig authentic reading texts to discover underlying sociocultural information. *Foreign Language Annals, 24* (6). 515-526.

Godwin-Jones, R. (1999). Web Course Design and Creation for Laiiguage Learning. *CALICO Journal, 17* (1), 43-58.

González-Bueno, M. (1998). Tlie Effects of Electronic Mail oii Spanish 12 Discourse. *Language Learning & Technology, 1* (2), 55-70. Retrieved Noveiiiber 2 2001. from http://llt.msu.edu/vol1num2/article3/default.html

Green, A. & Youngs, B. E. (3001). Usiiig the Web in Elementary French and German Courses: Quantitative and Qualitative Results. *CALICO Journal* 19 (1). 89-123.

Grimes, A. (3001, March 12). Tlie Hope... and the Reality. *The Wall Street Journal*. Retrieved September 24 2001, from http://interactive.wsj.com/public/current/articles/SB984067378945390493.htm

Guidelines for Evaluating Faculty Research, Teaching and Community Service in the Digital Age (2000). Retrieved Noveiiiber 4 2001. from Mount Holyoke College Web Site: http://www.mtholyoke.edu/committees/facappoint/guidelines.shtml

Hazari, S. I. (1008). *Evaluation and Selection of Web Course Management Tools.* Reirieved Noveiiiber 19 2001, from http://sunil.umd.edu/webct

Housego, S. & Freeman, M. (2000). Case studies: Integrating tlie use of web based learning systems into student learning. *Australian Journal of Educational Technology, 16* (3). 258-282.

Inglis, A., Ling, P. & Joosten, V. (1999). *Delivering digitally: managing the transition to the new knowledge media.* London: Kogan Page.

International Journal of Educational Telecommunication (1999). *Special Issue: Systems for World Wide Web (WWW)-Based Course Support: Technical, Pedagogical, and Institutional Options.* 5 *(4).* Retrieved Noveiiiber 25 2001, from http://www.aace.org/pubs/ijet/v5n4.htm

Janicki, T. & Liegle, J. O. (3001). Development and Evaluation of a Framework for Creating Web-Based Learning Modules: A Pedagogical and Systems Perspective. *Journal of Asynchronous*

Learning Networks, 5 (1), 58-84. Retrieved October 29 2001, from http://www.aln.org/alnweb/journal/Vol5_issue1/Janicki/Janicki.htm

Joliffe, A., Ritter, J. & Stevens, D. (2001). *The online learning handbook: developing and using web-based learning.* London: Kogan Page.

Joy, E. H. & Garcia, E. G. (2000). Measuring Learning Effectiveness: A New Look at No-Significant-Difference Findings. *Journal of Asynchronous Learning Networks, 4* (1). Retrieved November 25 2001, from http://www.aln.org/alnweb/journal/Vol4_issue1/joygarcia.htm#11

Kahn, B. (Ed.). (1997). *Web-based instruction.* Englewood Cliffs, NJ: Educational Technology Publications.

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

Kearsley, G. (1998). *A Guide to Online Education.* Retrieved October 13 2001, from http://home.sprynet.com/~gkearsley/online.htm

Kearsley, G. (2000). *Online Education. Learning and Teaching in Cyberspace.* Belmont, CA: Wadsworth/Thomson Learning.

Kearsley, G. (2000). *Learning and Teaching in Cyberspace. Supplement to the text published by Wadsworth/Thomson Learning.* Retrieved October 13 2001 from http://home.sprynet.com/~gkearsley/cyber.htm

Knight, S. (1994). Making authentic cultural and linguistic connections. *Hispania*, 77, 288-294.

Labrie, G. (2001). Student Web Pages in Advanced French. *The French Review, 74* (5), 976-89.

Lamy, M-N. & Goodfellow, R. (1999). Reflective Conversation in the Virtual Language Classroom. *Language Learning & Technology, 2* (2), 43-61. Retrieved November 2 2001, from http://llt.msu.edu/vol2num2/article2/index.html

Landauer, T. (1995). *The trouble with computers.* Cambridge, MA: MIT Press.

Landon, B. (2001). *Online Educational Delivery Applications: A Web Tool for Comparative Analysis.* Retrieved April 28 2001, from http://www.ctt.bc.ca/landonline

Lee, L. (1998). Going Beyond Classroom Learning: Acquiring Cultural Knowledge via On-Line Newspapers and Intercultural Exchanges via On-Line Chatrooms. *CALICO Journal, 16* (2), 101-120.

Lee, L. (2001). *Spanish Advanced Conversation and Composition.* Retrieved December 4 2001, from University of New Hampshire Web Site: http://blackboard.unh.edu/courses/span632-03-0101/

Levy, M. (1997). *Computer-assisted language learning : context and conceptualization.* Oxford: Clarendon Press.

Lunde, K. (1990). Using electronic mail as a medium for foreign language study and instruction. *CALICO Journal, 7* (1), 68-78.

Mann, B. L. (Ed.). (2000). *Perspectives in Web Course Management.* Toronto: Canadian Scholars' Press.

Marshall University's Center for Instructional Technology. (1999). *Comparison of Online Course Delivery Software Products.* Retrieved October 7 2001, from http://www.marshall.edu/it/cit/webct/compare/comparison.html

Murray, T. (1996). From Story Boards to Knowledge Bases. tlie First Step in Making CAI 'Intelligent'. In P. Carlson & F. Makedon (Eds.). *Educational Multimedia and Hypermedia, Proceedings*, (pp. 509-514).Charlottesville, VA: AACE.

Nasseh, B. (1998). *Training and Support Programs, and Faculty's New Roles In Computer-Based Distance Education in Higher Education Institutions.* Retrieved Noveiiiber 75 2001, from http://www.bsu.edu/classes/nasseh/study/res98.html

Norman, D. (1993). *Things that make us smart.* Reading, MA: Addison-Wesley.

Norman, K. L. (7000). Desktop Distance Education: Personal Hosting of Weh Courses. In A. Aggarwal (Ed.). *Web-based learning and teaching technologies: opportunities and challenges* (pp. 117-134). Hershey, PA: Idea Publishing Group.

NUA. (7001). *How many online?* Retrieved Noveiiiber 1 7001, from http://www.nua.ie/surveys/how_many_online/index.html

Oakey, D. (1999). *An EAP module via the Merlin internet learning environment.* Paper given at ITMELT OO. Retrieved November 25 2001, from http: /elc.polyu.edu.hk/conference/abstracts.htm

Osuna, M. M. & Meskill, C. (1998). Using tlie World Wide Weh to Integrate Spanish Language aiid Culture: A Pilot Study. *Language Learning & Technology, 1* (2), 71-02. Retrieved November 2 2001, from http://llt.msu.edu/vol1num2/article4/default.html

Palloff, R. M. & Pratt, K. (1999). *Building Learning Communities in Cyberspace. Effective Strategies for the Online Classroom.* San Francisco, CA: Jossey-Bass.

Palloff, R. M. & Pratt, K. (2001). *Lessons from the Cyberspace Classroom. The Realities of Online Teaching.* San Francisco, CA: Jossey-Bass.

Pasch, G. & Norsworthy, K. (2001). *Using Internet primary sources to teach critical thinking skills in world languages.* Westport, CT: Greenwood Press.

Piguet, A. & Peraya, D. (3000). Creating web-integrated learning environments: Aii analysis of WebCT authoring tools in respect to usability. *Australian Journal of Educational Technology, 16* (3). 302-314.

Pertusa-Seva I. & Stewart, M. A. (2000). Virtual Study Abroad 101: Expanding the 1lorizons of tlie Spanish Curriculum. *Foreign Language Annals, 33* (4), 438-442.

Postman, N. (1992). *Technopoly.* New York, NY: Knopf

Rengarajan, R. (3001, August). *LCMS and LMS. Taking Advantage of Tight Integration.* Whitepaper. Retrieved October 28 2001, from http://home.click2learn.com/en/downloads/lcms_and_lms.pdf

Roberts, L. (Ed.). (3001, June). Redesigning Learning Environments * It's Not Just For Math and Science: University of Illinois at Urbana-Champaign and University of Tennessee-Knoxville Tackle Foreign Languages. *The Pew Learning and Technology Program Newsletter, 3,* (2). Retrieved Noveiiiber 7 3001, from http://www.center.rpi.edu/PewNews/PLTP8.html

Robson, R. (1999). WWW-Based Course-siipport Systems: The First Generation. *EdMedia Preconference Seminar.* Retrieved Noveiiiher 4 7001, from University of Twente Web Site http://education2.edte.utwente.nl/edmedia.nsf/$DefaultView/A1377FD1D7C2B98D412567C90021E41E/$file/Robson.doc

Román Mendoza, E. (2001a). La incorporación de plataformas virtuales eii la enseñanza: evaluación de la actitud del alumnado. *Conference Proceedings. Virtual Educa 2001* (pp. 176-133).

Madrid: Ediciones UNED. Retrieved December 1 2001, from http://www.educaweb.com/esp/servicios/monografico/virtualeduca/ponencia1.asp

Román Mendoza, E. (2001b). *Spanish Civilization and Culture Web Site.* Retrieved Deceiiiber 4 2001, from George Mason University Web Site: http://www.gmu.edu/departments/fld/SPANISH/461/461f.htm

Rosenberg, M. J. (2001). *E-Learning. Strategies for Delivering Knowledge in the Digital Age.* New York, NY: McGraw-Hill.

Salaberry, M. R. (2001). The Use of Tecliiiology for Second Language Learning and Teaching: A Retrospective. *Modern Language Journal, 85* (i), 39-56.

Scigliano, J. A. & Levin, S. (2000). One-Stop Shopping in an Oiiliiie Educational Mall. *T.H.E. Journal, 16 (6).* 72-80.

Schooley, C. (2001, October 23). Taking tlie first steps iii e-learning. *Cyber India Online Limited.* Retrieved Noveiiiber 7 2001, from http://www.ciol.com/content/news/trends/101102301.asp

Schrum, L. & Benson, A. (2000). Lessons to Consider: Oiiliiie Learning from Student aiid Faculty Perspectives. In R. L. Mann (Ed.). *Perspectives in Web Course* Management (pp. 225-237). Toronto: Canadian Scholars' Press.

Schrupp, D. M., Bush, M. D. & Mueller, G. A. (1983). Klavier im Haus —An interactive experiment in foreign language instruction. *CALICO Journal, 1* (1), 17-21.

Schwier, R. (1992). *A Taxonomy of Interaction for Instructional Multimedia.* Paper presented at the Annual conference of the Association for Media aiid Tecliiiology in Education in Canada. ED352044. Washington D. C.: Educational Resources Information Clearinghouse.

Seltzer, R. (2000). Why Didn't the Walls Come Tumbling Down? Aii Outsider's View of Oiiliiie Distance Education. In R. L. Mann (Ed.). *Perspectives in Web Course* Management (pp. 81-86). Toronto: Canadian Scholars' Press.

Sheaffer-Jones, C. (2000). Designing a community learning environment using a Bulletin Board System: A trial with advanced French written communication. In T. Lewis aiid A. Rouxeville (Eds.). *Technology and the advanced language learner* (pp. 108-124). London: Centre for Information on Language Teaching and Research.

Siekmann, S. (2001). Which Web Course Management Systeiii is Right for Me? A Comparison of WebCT 3.1 and Blackboard 5.0. *CALICO Journal,* 18 (3), 590-617. Retrieved Noveiiiber 7 2001, from http://astro.ocis.temple.edu/~jburston/CALICO/review/webct-bb00.htm

Soh, B. -L. & Soon, Y. -P. (1991). English by e-mail: creating a global classroom via tlie medium of computer technology. *ELT Journal, 45,* 287-292.

Spanos, T., Hansen, C. M. & Daines, E. (2001). Integrating Tecliiiology aiid Classroom Assessment. *Foreign Language Annals, 34* (4). 318-324.

Technology Fluency Plan. (2000). Retrieved Noveiiiber 4 2001, from Coppin State College Web Site: http://www.coppin.edu/oit/tech_fluency.asp

TeleEducation NB & Centre for Learning Tecliiiologies. (2000). *The Design, Development and Delivery of Internet Based Training and Education.* Industry Canada Report. Project # U5251-9-5325. Retrieved Noveiiiber 25 2001, from http://teleeducation.nb.ca/content/pdf/design_development_delivery/reportddd.pdf

Tschang, F. T. (2001). Virtual Universities aiid Learning Environments: Characterizing their Emergence aiid Desing. In F. T. Tschang & T. D. Senta (Eds.). *Access to Knowledge. New Information Technologies and The Emergence of the Virtual* University (pp. 167-206). Amsterdam: Elsevier.

United States Distance Learning Association. (2001). *Research Information and Statistics.* Retrieved Noveiiiber 4 2001, from http://www.usdla.org/04_research_info.htm

University of Bristol. (2001). *Virtual Learning Environments (VLEs).* Retrieved October 7 2001, from http://www.ltss.bris.ac.uk/resources_vle.htm

University of Manitoba. (2001). *Tools for Developing Interactive Academic Web Courses.* Retrieved November 7 7001. from http://www.umanitoba.ca/ip/tools/courseware/index.html

U.S.News. (2001, Noveiiibei.). Learning Management Systems. *Usnews.com.* Retrieved Noveiiiber 4 2001, from http://www.usnews.com/usnews/biztech/elearning/rankings/ranklms/nfranklms.htm

Volery, T. (2001). Online Education: Aii Exploratory Study into Success Factors. *Journal of Educational Computing Research, 24* (1). 77-92.

Von der Emde, S.. Schneider, J. & Kotter, M. (2001). Technically speaking: transforming language learning through virtual learning environments (MOOs). *The Modern Language Journal, 85* (3). 210-225.

Warschauer, M. & Kern, R. (Eds.). (2000). *Network-based language teaching: concepts and practise.* New York, NY: Cambridge University Press.

Yang, S. C. (2001). Language Learning oii the World Wide Web: Aii Investigation of EFL Learners' Attitudes aiid Perceptions. *Journal of Educational Computing Research, 24* (2), 155-181.

Yii. C. (2000). Technology aiid Language Learning: Contexts, Issues, Promises. In R. M. Terry (Ed.). *Agents of Change in a Changing Agc. Northeast Conference Reports* (pp. 141-168). Lincolnwood, IL: National Textbook Company.

Windham, S. (3001, November/December). Computer-Based Technologies in Foreign Language Education. *The Technology Source.* Retrieved Noveiiiber 12 2001, from http://ts.mivu.org/default.asp?show_article&id=892

Wizer, D. (1997). *Diversity Issues in Teacher Education via Online Discussions.* Retrieved Noveiiiber 30 2001 from http://www.towson.edu/~wizer/da.html

