ABSTRACT

This article considers the use of the World Wide Web in second language learning within a new framework of language learning. Viewing second language learning as peripheral participation, this framework provides a better structure within which the use of networked-based technology can be discussed. The model of new concepts of CALL proposed within the context of the Internet, particularly the Web, is a result of viewing second language acquisition as situated learning. A Web-based project is discussed to illustrate this model. The project, EX•CHANGE, exemplifies the principles of Web-based CALL projects, especially the one conceptualized as Virtual Communities of Language Learners. EX•CHANGE has been in operation for over a year, we have seen much of the expected results – peripheral participation – take place. In the past year, EX•CHANGE has become a leading Web-based project for ESL learners. It is hoped that the prototype community of learners piloted through EX•CHANGE can provide some light for future explorations.

KEYWORDS

Web, learning theory, learning community, legitimate peripheral participation

The issue of appropriate use has been a pivotal one in the application of technology in education in general, and language teaching in particular, because few of the most important technologies, printing, television, radio, computers, used in general education and language teaching had been designed for that purpose. Their uses in education were completely serendipitous, also in the sense that educators had not expected the influence of the technologies before their invention. These technologies thus contain “neither


pedagogical nor content bias" (Means 1994). Their effectiveness is determined by the way they are used. In the short history of CALL, we have witnessed various ways of using computers in language teaching and learning, from "dumb" drill-and-practice to "intelligent" tutoring systems (Jung 1988; Mohan 1992; Stevens 1992).

The appropriate use(s) of technology depends largely on a clear understanding of the features of the technology, a sound learning theory, and a set of well-defined and justified goals to be achieved. In the case of CALL, particularly when the newly emerged and ever-changing World Wide Web (WWW) is involved, such prerequisites are hardly ever met. The growth rate of the Web (over 38,000 times in the last two years in terms of bytes traffic) alone makes it very difficult if not impossible to obtain a "clear understanding." Despite the many proposed Second Language Acquisition (SLA) theories (Judd 1992; Long 1993), "a general language learning theory does not yet exist and probably never will" (Rüschoff 1993; 6). A consensus of goals for foreign language teaching and learning is seemingly impossible (Byram, et al. 1994). However, this should not prevent us from exploring the possible appropriate uses of a new technology based upon what we know so far. In fact, as the history of CALL indicates, explorations as such facilitate our understanding of both the technology and its intended domain (Pennington and Stevens 1992; Scrimshaw 1994).

This paper proposes to investigate appropriate uses of the Web in second language teaching and learning through the analysis of a CALL project on the WWW. This paper is divided into four sections: 1) A brief introduction to the Web; 2) A theoretical framework based on present understanding of language learning, under which the application of the Web will be discussed; 3) A CALL project on the WWW with in the framework constructed in (2); and (4) A discussion of some principles concerning computer network based CALL projects.

THE WORLD WIDE WEB

Features of the Web

It is extremely difficult to reduce the Web to a description, as if it were as a still photograph. Its features change too rapidly. What is described below are some characteristics of the World Wide Web based on the current state and on some proposed changes.

1. The effects of a Web document are determined by a host of factors — the original documents, the Web server, the browser, the helper applications on the local machine, and the connectivity and capacity of the local computer. For example, a document that depends on graphics will lose its effect naturally on a text-only browser, or a slow
connection, or monochrome monitor. An interactive document that needs user feedback will completely fail on a browser that does not support fill-out forms, a Web function to collect input from the user, or a server that does not support Common Gateway Interface (CGI), programs that are used to process user input, or a slow connection. Even the presentation of text is determined by the original document and the browser in that while the original document can specify relative styles, a user decides the fonts and sizes of fonts to be displayed on the local screen.

2. Web documents can be hypertextual. Web documents do not have to be and in fact many existent documents are not hypertextual. There is a distinction between hypertextual and electronic documents. Hypertextual documents are often in electronic form, but they do not have to be. Electronic documents are not all hypertext either. Lin (1989) suggested six major characteristics of hypertext: nonlinearity, discrete information units, links, flexible ordering of information units, random access to information units, and network-like structure.

3. Web documents can be multimedia. The Web provides the possibility of viewing and retrieving multimedia documents, but that does not mean all documents on the Web are multimedia, nor do they have to be. Whether a document can be viewed as multimedia again depends on a number of factors. For instance, in order to view a video clip on the Web, a video file must exist in the proper format on a Web sever. Then a full-feature Web browser is needed. A helper application or plug-in that will eventually play the video must be loaded on the local machine and recognized by the browser. The local computer must have enough memory, a color monitor, and some type of audio output device. Absent any one of the above, the multimedia feature will not be fully realized.

4. The Web can be interactive. Through CGI, a Web server can interact with the user. It can act upon the feedback from the user.

5. The Web has enormous amount of information. The growth rate of the Web has been incredible since the first version of NCSA Mosaic was made available to the Internet community in 1993. In January 1993, WWW ranked 127 and 117 among all the services traffic on the NSFNET in terms of packets and bytes counts, the rank became 1 and 2 in March, 1995. In 1995 about 20 percent of the NSFNET backbone traffic is WWW-related while two years ago the percentage was 0.002. The growth is even more impressive when compared with the growth of the Internet. While the total traffic (in terms of packets and bytes in and out) on NSFNET is four times as much as it was two years ago, the number of total packets and bytes used by WWW increased by 38,000 times in these two years. In October, 1996, Lycos, a popular Internet catalogue, claims to have over 20 million Web sites in its database.
6. The cost/benefit ratio of using the Web is highly favorable in terms of both publishing and accessing information. Although unlike Gopher, a popular Internet protocol before the Web, which uses plain text files, Web documents need to be in Hyper Text Markup Language (HTML), with the help of HTML editing programs (e.g., Adobe PageMill, Netscape Gold, HTML Editor, BB Edit, HTML Assistant) and newer versions of common word processors (e.g., ClarisWorks and MicroSoft Word), writing Web documents requires a minimum level of computational expertise. Accessing the Web has been made more accessible by the ease of point-and-click browsers. Integrated software that has the capacity of both producing and accessing Web documents is already appearing (e.g., Netscape Gold).

A THEORETICAL FRAMEWORK

A body of knowledge has been assembled from which some basic principles of second language acquisition can be generated (Kempen 1992; Rüschoff 1993). This section highlights some of the more widely accepted principles and proposes a theoretical framework based on these principles and recent advancement in general learning theories.

Three commonly accepted statements about SLA

1. Learning culture is an integral part of foreign language learning. Studies in SLA suggest that cultural factors play an important role in the acquisition of a second language (e.g., Lambert et al. 1968; Schumann 1978). As Seliger (1988) points out:

   Since language is used in social exchanges, the feelings, attitudes, and motivations of learners in relation to the target language itself, to the speakers of the language, and to the culture will affect how learners respond to the input to which they are exposed. In other words, these affective variables will determine the rate and degree of second language learning (30).

Learning the target culture does not only facilitate the development of linguistic competence, but, more importantly it enables one to communicate effectively with native speakers of the target language (Cortazzi and Jin 1987; Odlin 1989; Preston 1989). Studies of cross-cultural communication suggest that "lack of shared schemes in interaction are more likely to lead to communication breakdown than differences and difficulties at the level of linguistic code" (Cortazzi and Jin 1987, 24).
The learning of culture, however, should not be viewed solely as an instrument for acquiring communicative competence. It also promotes cognitive and moral development. It is further suggested that cultural learning produces prosocial behavior and positive attitude towards other peoples. It enables learners to stand back from their preconceptions as well as to learn about another way of life (for a detailed argument of this point see Byram, Morgan, et al. 1994).

2. Comprehensible input and authentic materials are crucial to second language learning and acquisition. Despite the controversy over the exact meaning of Krashen's term (Ellis 1985; McLaughlin 1987), few would disagree that the learner must be exposed to data in the target language. The need for authentic material is very well stated in Little, Devitt and Singleton (1989). Authentic texts, according to Little et al., build bridges into the real world of communication, are more interesting than invented texts, more likely to have acquisition-promoting content, and can provide learners with a "language bath" (Oller 1996).

3. Learners must have the opportunity to experiment with the target language. There are a variety of views regarding the process between input and output in language learning, i.e., what do the learners do with the input and how does that lead to the development of the linguistic system? (Ellis 1985; Judd 1992; McLaughlin 1987; Van Patten 1991) But most agree that engagement in meaningful communicative activities in the target language facilitates the process.

SLA as legitimate peripheral participation (LPP) in a community of practice

This paper's emphasis is not on formulating a comprehensive SLA theory but on constructing a framework or a theoretical context in which the appropriate uses of the Web can be discussed. The proposed framework is not intended to account for all aspects of second language acquisition, nor is it meant to be an all-purpose pedagogy for second language instruction. Based upon a general learning theory proposed by Jean Lave and Etienne Wenger (1991), rather than asking what kinds of cognitive processes and conceptual structures are involved in SLA (Ellis 1985; Laurillard and Marullo 1993), the proposed framework asks what kinds of social engagements provide the proper context for learning to occur and how technology can be used to create such social engagements.

Learning as legitimate peripheral participation

Growing out of the tradition of social constructivism initiated by Soviet psychologists such as Lev Vygotsky, Lave and Wenger (1991) argue that learning is to be viewed as situated activity which takes place in a process they call legitimate peripheral
participation. According to Lave and Wenger, "learners inevitably participate in communities of practitioners," and "the mastery of knowledge and skill requires newcomers to move toward full participation in the sociocultural practices of a community" (29). "Rather than learning by replicating the performances of others or by acquiring knowledge transmitted in instruction, we suggest that learning occurs through centripetal participation in the learning curriculum of the ambient community" (100).

In this view, central to the success of learning is legitimate access to participation in the community’s activities. Since learning is not the internalization of the outside world or knowledge transmitted or discovered from others, the locus of learning is no longer viewed as in the mind of the individual but distributed in activities, in co-participation. Opportunities to be engaged in activities with experts thus become crucial for learning.

By definition, participation is characterized by two variables: legitimacy and peripherality. First the learner must have legitimate access to the community of practice. In other words, in order to learn, the learner needs to have direct involvement in the community’s productive activity. But that participation should be peripheral: the learner participates in real activities, "but only to a limited degree and with limited responsibility for the ultimate product as a whole" (Hanks 1991, 14).

The need for access, as well as the control and selection for it, are inherent in communities of practices, making access liable to manipulation. Thus, according Lave and Wenger, legitimate peripherality has an "ambivalent status: Depending on the organization of access, legitimate peripherality can either promote or prevent legitimate participation" (103). Schoolchildren, for example, are legitimately peripheral, so argue Lave and Wenger, but they are kept from peripheral participation in the social world more generally.

A form of LPP that is familiar to many readers is apprenticeship in traditional societies where if one wants to become an expert in a profession, be it seamstering, butchery, or witchery, one follows a master to gain legitimate access to the community of practice in that profession. Together with other apprentices, one participates on the peripheral of that community by helping the master with the final product. One’s participation moves from the peripheral to the center as one’s participating capability increases. Responsibility for the final product increases as well as one gains fuller membership. A tailor apprentice, for instance, may start from taking care of the master to greeting customers to preparing materials for the master to sewing to designing and cutting less precious material for less important customers to finally completing a piece of precious clothing independently, which often signals that complete membership in the community has been obtained.
Second language learning as legitimate peripheral participation

Applied in second language learning, the theory of legitimate participation outlined by Lave and Wenger provides a theoretical framework within which SLA can be better understood and thus technology can be more effectively used. While it is tempting to elaborate the significant implications the theory has for SLA, that is beyond the scope of the present paper, and its focus is on the major components of the framework and their implications for CALL.

Community of practice

To apply the theory of LPP in SLA, the first task is to identify the community of practice. "[B]ecause the place of knowledge is within a community of practice, questions of learning must be addressed within the developmental cycles of that community" (p. 100). Traditionally the community of practice within which language learners participate or are expected to participate have been identified as the one of linguists or grammarians. Language learners are treated as "apprentices" to linguists. Therefore classroom activities most often focus on linguistic analysis rather than communication. More recently, as the ideas of communicative competence became more widely spread, the community of practice started to be redefined as that of the native speakers. Language learners are expected to become "native-like" or achieve "near-native" proficiency.

Both definitions, however, need to be reexamined because "[C]laims about the definition of a community of practice and the community of practice actually in process of reproduction in that location may not coincide" (Lave and Wenger 1991, 99). Worldwide, the bulk of second language learners are schoolchildren, who learn the language because it is a required course. What is being reproduced is neither native speakers nor linguists, but the community of learners. For even those who will eventually become linguists or join the community of the native speakers, participation at this stage differs in many ways from that of a professional linguist or native speaker. For the relatively small portion of people who are learning the language so as to participate in the target culture, the community of practice being reproduced is that of the bilingual/bicultural, which is essentially different from the mainstream monolingual community.

In summary, the community of practice that is reproduced in second language learning is the one of other second language learners who have already achieved a level of proficiency in the target language and are "practicing" the language. Full members in this community use the target language to communicate among with native speakers of the
target language. Learning a second language is thus a process in which the learner develop skills and knowledge necessary for becoming a full member through participating in the practices of the multilingual community.

**Participation**

In this framework, participation does not only mean being engaged in activities, it also requires that the activity to be productive, i.e., leading to certain products in the community of practice. In the context of SLA, it is very easy to confuse *participation* with *exercising*. In second language classrooms that follow either the traditional ALM or the more current communicative approach students are engaged in a variety of learning activities: from mechanical drill-and-practice to role-playing scenarios. But these activities do not lead to any real product that is used in the community of practice. They are only classroom activities that have little use beyond their face value. The learning or knowledge that occurred in these activities is that of learning a second language, not of using the language. The result of such learning is at best classroom foreign language, which differs in many ways from the language used in real communication. To learn to use a language, the learner needs to participate in real communicative activities.

**Legitimacy and peripherality**

As discussed before, participation is characterized by two variables: legitimacy and peripherality. The application of this concept in language learning is a tricky one because language use itself signifies status of membership in a certain community. "Speaking the language" is often the key to legitimate participation in many communities. For most second language learners legitimacy is not a problem, but many times, it is the legitimate status that prevents them from participating in the practices of the target community. For example, recognizing the learner status and organizing them into classrooms often alienates learners from the real practices of the community. What second language learners encounter is often artificially abstracted uses of language instead of authentic communication.

The other dimension of participation is peripherality. Although learners need to be directly involved in community practices, their participation should be limited in degrees, on the "periphery" of the community because of their limited knowledge and skills. In other words, they are only partly responsible for the ultimate product of the activity. For example, in a translation project, while the learner should participate by looking up new words and even completing the first draft, the expert or the teacher should be the one responsible for the final version.
The theory of learning as legitimate peripheral participation has great implications for second language acquisition. It emphasizes the social nature of learning, which has been ignored by many SLA theories. Although many have realized the social nature of language use (Hymes 1971), language learning, particularly second language learning, has been still investigated as an individual process in which the learner internalizes "input" from the outside world. Language learners are treated as independent information-processing machines rather than social beings. Language teaching is then to facilitate the internalization process by providing "comprehensible input" and opportunities for the learner to practice. Viewing language learning as legitimate peripheral participation brings a shift of focus both in SLA research and practice. Within this new framework, language learning occurs in the co-participation of the learners and expert users of the target language. Knowledge is not transmitted or discovered from an outside source but constructed by the learner in an improvised fashion while directly participating in productive activities of the community. Teaching is then not to provide input but to make available the access to the target community of practice.¹

Within this framework, many fundamental issues in SLA are better understood. The general failure of practices in SLA for instance, can be explained by the lack of legitimate peripheral participation in the appropriate community of practice. First, (mis)perceiving the community of practice for second language learners as the community of linguists engages students in such activities that analyzing and eventually, memorizing the linguistic features dominate the whole experience.

Second, second language learners, particularly those in foreign language classrooms, do not have the access to a community of native speakers or masterful nonnative users of the target language. On the one hand, for obvious reasons, most second language learners have little chance to be directly involved in productive activities with native speakers. On the other hand, the perception that the community of practice for SLA should be the linguists' or native-speakers' prohibits teachers from making available the actual community of practice for many foreign language learners: the community of other learners of the target language. By struggling to provide "standard native speakers model," the teacher, and sometimes the learner, missed the opportunity to participate in the community of learners. In this case, the legitimate peripherality prevents legitimate peripheral participation.

Third, for those who have the physical contact with the community of native speakers (immigrants, for example), psychological and or social factors may prevent them from participating the activities of the community. Shumann's Acculturation Model (1978) and Lambert and Gardner's socio-educational theory, which essentially argues that SLA is determined by the degree of social and psychological distance between the learner
and the target-language culture and different types of motivation for learning a second language, very well explained the same thing in a different framework.

Finally, the participation of learners is often either not peripheral or not real participation in the community of practice. For example, second language learners are very often asked to practice in artificially created situations where the participation is hardly real or they are thrown in a situation where their participation becomes central instead of peripheral in that they themselves have to be responsible for the whole product (communication and its possible consequences).

DESIGNING CALL ON THE WEB: EX•CHANGE AS AN EXAMPLE OF VIRTUAL COMMUNITIES OF LEARNERS

In light of the theoretical framework of SLA discussed in the previous section, this section examines the design of CALL on the Web. Obviously traditional concepts of drill-and-practice exercise, as well as intelligent tutoring systems, do not accord with theories of legitimate peripheral participation in providing second language learners the type of participation conjectured as requirement for successful learning. Nor do the traditional concepts of CALL design as yet fully exploit the capacity of the Internet in general and the Web in particular. Consequently, new concepts for the design of an Internet-based CALL project are required. These new concepts should facilitate legitimate peripheral participation while taking full advantage of the Internet.

One of these new concepts is the Virtual Communities of Language Learners (Zhao 1995). Within this conceptualization, the Web is used to create a global community of learners, within which numerous subcommunities are interlinked. Members of these communities develop language skills through participating in real communicative activities legitimately and peripherally. This concept is further illustrated in the following report of a Web-based CALL project intended as a prototype of the virtual community of learners.

EX•CHANGE\(^2\) is a Web-based CALL magazine designed to promote the learning of English as a second and foreign language (ESL/EFL) by engaging learners and expert English users (native speakers, ESL/EFL professionals, advanced learners, etc.) in authentic communicative activities. Currently it has four sections: Learning Resources, News/Events, World Cultures, and Stories. A new section of cross-cultural experiences will soon be added. While the Learning Resources section publishes contributions from native speakers, ESL/EFL professionals, and advanced learners and provides links to other resources, the other three sections only publish writings of English learners.
Contributions are submitted to the Coordinator or section head via electronic mail or the built-in Submission Forms. Each contribution is reviewed and edited by an editor (a native speaker or advanced learner). There is often at least one cycle of revision between the editor and the author before an item is published. EX•CHANGE does not follow the conventional concept of issue: an item is published when it is ready. To avoid confusion, a New Since... section is updated biweekly to include only new items. Besides, frequent users of EX•CHANGE are informed of the updates weekly via electronic mail.

EX•CHANGE exemplifies the following principles, which are essential in the design of Web-based projects:
1. Making the community of practice for ESL/EFL learners accessible. For many reasons, the community of practice for second language learners are not accessible in conventional learning situations. Learners are exposed to products of native speakers at the best, or artifacts of the teaching culture at the worst. By publishing writings of English learners, EX•CHANGE makes it possible for ESL/EFL learners to participate in the culture of nonnative speakers of English.

2. Exposing ESL/EFL learners to the culture of native speaker in its authentic form. Although the reproducing community of practice in second language learning is not that of the native speakers, a large portion of the practices in the community of expert nonnative speakers involve dealing with the community of native speakers. It is therefore necessary to understand that culture. But due to physical distance, many learners do not have access to the native speakers’ culture. By linking to other Web servers in the U. S. and other English speaking countries, the learner will have an opportunity to observe the target language and culture in operation.

3. Facilitating participation. Unlike classroom exercises, writings published on EX•CHANGE are read by a large audience, conceivably the whole world. The primary purpose of the writing is not to practice a sentence structure but to communicate with a diverse audience (native speakers, expert nonnative speakers, beginning learners, etc.).

4. Encouraging peripheral participation. EX•CHANGE utilizes three different ways to encourage peripheral participation. First, it accepts writings from beginning speakers as well as advanced learners. The learners are not alone in producing the writing. Once an idea is submitted, editors (experts) are assigned to work with them to make that piece publishable. Second, in the Stories section, learners, regardless of their proficiency, are invited to write stories collaboratively. Theoretically, the final product will be the result of co-participation of experts and beginners. Third, authors are encouraged to work
together and/or with their instructors on potential articles. A number of articles published on EX•CHANGE were co-authored by a learner and the teacher.

5. *Encouraging multilevel and diverse forms of participation.* Members in a community have different interests, varying capabilities, and multiple goals. Thus there should be a variety of activities in which they can participate. EX•CHANGE provides a variety of opportunities for learners to participate in the community. First, the different sections allow them, as authors, to write in different styles and about a variety of topics, while the hypertextual organization allows them, as readers, to "create" their own reading. For example, those who want to know how birthdays are celebrated in different nations can do so following the link of nations under Birthday celebration or they can follow the link of celebrations under a nation if they wish to know what is celebrated in a particular country. The multimedia feature of EX•CHANGE allows learners to participate via different media. They can contribute not only writings, but also audio documents, even video clips. Certainly they can choose to listen to a sentence or read the text. It is also possible for the learner to use on-line dictionary while reading or writing for EX•CHANGE.

6. *Allowing local adaptation.* Due to the nature of the Web, there are two distinct types of design for Web-based CALL projects: server-end and browser-end. Server-end projects creates Web documents, thus providing materials to be used by browser-end projects. The relationship between the two types of designs, however, should not be understood in terms of traditional CALL concepts — software vs. user. At least in the framework of this paper, the relationship between the two is interactive: server-end projects publish materials for browser-end projects while browser-end projects provide materials to be published on the server. Therefore, the server-end project should allow local adaptation.

The conceptualization of communities of learners underlying EX•CHANGE provides the operational framework for local adaptation. While EX•CHANGE views all its users as members of a community, it encourages the establishment of subcommunities. Subcommunities can adapt EX•CHANGE to fit their own contexts. For example, an ESL writing class in school can decide to publish their own version of EX•CHANGE. So they contact EX•CHANGE for its technical and content support. They then work on a local project (e.g., writing a local history book) and put it on-line. After that they decide to work out an abstract or introduction for EX•CHANGE. They then submit the introduction and get it published in EX•CHANGE. EX•CHANGE can also provide a link to that local server.
To summarize, EX•CHANGE was designed to promote language learning as legitimate peripheral participation by taking advantage of the World Wide Web. What is envisioned by the designers of EX•CHANGE can only be achieved with the Web for its worldwide connectivity, hypermedia presentation and easy-to-use software.

CONCLUSION

In this paper I have tried to consider the use of the World Wide Web in second language learning within a new framework of language learning. While I could not discuss the framework in total detail, I hope I have made it clear that this framework provides a better structure within which the use of networked-based technology can be discussed. The model or new concepts of CALL proposed within the context of the Internet, particularly the Web, is a result of viewing SLA as situated learning.

The project, EX•CHANGE, exemplifies the principles of Web-based CALL projects, especially the one conceptualized as Virtual Communities of Language Learners. EX•CHANGE has been in operation since April, 1995, we have seen much of the expected results — peripheral participation — take place. It is hoped that the prototype community of learners piloted through EX•CHANGE can shed some light for future explorations.

REFERENCES


NOTES

1 I use the target community of practice instead of the target culture because not all (in fact most) second language learners do not intend to join the target culture but they will join other communities of practices which utilize the target language.
(The second note is missing and the following was misprinted in the original issue of journal.)
and commented on an early draft of this article. I also wish to thank the Editors and the three anonymous reviewers for their insightful and considerate comments on an early version of this article.

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