

THE COMPATIBILITY OF COMPUTER-MEDIATED COMMUNICATION SOLUTIONS WITH BEGINNING LEVEL FOREIGN LANGUAGE CURRICULA

Joseph Collentine
Northern Arizona University, USA

Karina Collentine
Yavapai College, Arizona, USA

Abstract: *This paper explores the compatibility of computer-mediated communication (CMC) with two basic objectives of modern foreign language curricula: (1) that students should develop functional (i.e., real world) and pragmatic abilities; and (2) that instructional design and materials should be informed by what is known about the cognitive processes responsible for acquisition. The authors assert that CMC is indeed compatible with these goals, and in many ways CMC environments have greater potential than previous technologies. CMC solutions largely entail input-oriented activities. The CMC environment is particularly compatible with the manner in which acquisition occurs in the early stage. The paper concludes with an outline of an introductory Spanish curriculum, created in conjunction with the Educational Management Group, whose instructional design is informed by these notions.*

1. Introduction: For those who do not follow or participate in the dialogue on technology and the foreign-language (FL) classroom, computer-mediated communication (CMC) solutions have questionable applicability within today's so-called acquisition rich classroom. Such scepticism seems rooted in a tacit belief that architectures cannot, as yet, endow computers with the ability to understand language; CMC environments, therefore, appear not to provide a means for learners to develop communicative competence. Moreover, FL research has achieved an understanding of many of the most important cognitive conditions that affect acquisition, and it is unclear whether CMC environments can properly attend to the psycholinguistic needs of students. Whitley (1993) reviews the present status of the communicative movement

in the classroom, and he concludes that it is a wholly 'incomplete revolution' (p.135). He notes that, although instructors understand the essential assumptions of the communicative movement, they do not have the materials for accomplishing the movement's lofty goals. Conversely, CMC provides learners with materials, such as software and access to international Internet sites. Fischer (1995) contends that the successful incorporation of these materials into the FL curriculum needs a methodological framework.

The present authors examine the tenability of current assumptions about the shortcomings of CMC environments, arguing that these environments have enormous potential for helping FL students to develop functional and pragmatic (i.e., real-life, communicative) FL abilities. Additionally, we consider the type of cognitive conditions that CMC environments can provide learners, concluding that CMC solutions are particularly compatible with the developmental needs of learners in the earliest stages of acquisition. To illustrate such potential, the authors outline and discuss an introductory Spanish course that they recently authored in conjunction with the Educational Management Group of Scottsdale, AZ (<http://www.emg.com>).

2. Communicative competence, the classroom, and computer-mediated communication: Any discussion of communication — be the communication interpersonal or technologically based — necessitates an understanding of the relationship between communication and language.¹ According to Savignon (1997), communication is, apparently, as simple as 'getting our message across' (p.9), or the relaying of a message from one person to another. However, Savignon asserts that communication is, by nature, 'context specific' (p.15), so that the ability to transmit and determine an utterance's message depends not only on the ability to utilize and properly interpret linguistic features but also on an understanding of the associations between linguistic features and language functions (cf. Halliday, 1970).² By extension, what one

¹ See Savignon (1997, pp. 7-56) for an extensive discussion of the notion of communication in the context of foreign language acquisition.

² As Givón (1984, 1993) maintains, the lexical, morphological, and syntactic properties of an utterance are determined not as much by the speaker's intended message (i.e., the utterance's propositional value, or its deep structure) as they are by the task that the utterance will allow the speaker to complete (i.e., the utterance's discourse-pragmatic function). Givón (1984) notes that

learns about a FL depends on its transactional or pragmatic uses in the learning situation. What a student learns to communicate depends on the type of 'tool' the FL is for the student in his or her learning environment. The learner whose communicative abilities are most successful 'uses the foreign language and culture as natural vehicles of communication' (Savignon, 1997, p.34).

The teacher-centered classroom environment typically 'builds skill and knowledge that allow students to function in school, but often fails to transfer to work, civic, and personal life' (Resnick, 1994, p.491; quoted in Salaberry, 1996). Social-distance variables influence the functional nature of the FL for the student: teachers and students do not communicate with 'solidarity' (cf. Brown & Gilman, 1960). Ellis (1990) argues that classroom communication is essentially 'asymmetrical' (p.70), with instructors controlling the content of discussions and who participates. Pragmatic factors, or the rules that govern conversational interaction, also influence learners' communicative abilities. Gremmo, Holec & Riley (1978) report that classroom teachers are seemingly endowed with various pragmatic 'rights', which include the right to initiate and participate in exchanges, as well as to decide on the length of exchanges and when to close them. Kern (1995) documents a typical teacher-student classroom discussion:

The style and organization of classroom discussion had an important effect on student/teacher dynamics and language production. The instructors occupied a pivotal role..., standing in front of a class of seated students, allocating turns, providing corrections and clarifications, asking guiding questions, validating students' comments, and recapitulating their points. (p.468)

The hierarchical relationship between instructor and students typically forces communication 'to go to and through the teacher' (Oxford, 1990, p.10). Thus, the linguistic abilities with which the classroom provides learners probably do not sufficiently prepare

languages that serve largely transactional functions and whose transmission normally occurs synchronously (i.e., in face-to-face encounters), such as pidgins, tend to be poorly elaborated in terms of lexical variety and grammatical coding. However, language that relates both a transactional and expressive message and whose mode of transmission is asynchronous (e.g., a letter, a newspaper article) tends to contain a variety of lexical items and decidedly complex morphology and syntax; the lack of an interlocutor requires the discourse to be maximally coherent.

them to utilize the FL to achieve real-world functions, or as a tool for surviving and participating in the target culture (TC).

Before examining what students in a CMC environment learn and the degree to which they use the FL as a tool, a definition is necessary. CMC is 'the use of computer systems and networks for the transfer, storage, and retrieval of information among humans' (Santoro, 1995, p.11). CMC entails media that allow for input and output-oriented tasks, with asynchronous, input-oriented media being most common. To be sure, artificial intelligence architectures cannot yet be programmed with the necessary background knowledge to sufficiently contribute to and guide computer/student dialogue (Salaberry, 1996). Consequently, computer-assisted instruction (CAI) provides learners with minimal interactivity *per se*, and it primarily exposes students to written and aural samples of the TL.³ Moreover, media falling within the rubric of informatics — such as live and real audio from foreign Web sites (Collins & Berge 1995) — involve listening to and reading authentic target language (TL) sources. Conferencing, or synchronous and asynchronous media for teacher/student and student/student dialogue (Collins & Berge, 1995), are input-oriented, as these media provide students with fora for expressing (largely in writing) their thoughts and desires and for negotiating meaning (cf. Long, 1983).

To what extent does the FL serve as a vehicle of communication in a CMC environment? Despite Resnick's (1994) claim about the typical classroom, CMC environments have the potential to foment the development of linguistic abilities for completing authentic functions (i.e., as opposed to the characteristic classroom functional tasks) and for completing a wider range of pragmatic functions. Concerning authentic functions, Zhao (1996) reports that informatica such as the World Wide Web (WWW) and content-based solutions impel students to participate (albeit peripherally) as members of the target speech community. Informatica are also compatible with content-based instruction (e.g., a multimedia presentation with which students can explore the geography of a Latin American country where knowledge of Spanish is required to complete the task). Kern (1995) notes that production tasks involving conferencing motivate students to take turns and nominate more topics, in addition to their responding to the questions of others. He presents evidence suggesting that the

³ Students still produce small segments of written input. Oral interaction is almost non-existent.

CMC environment provides students with a larger repertoire of pragmatic abilities (i.e., tools for negotiating for meaning) than does the classroom.

The arguments presented here suggest that CMC can attend to the external (i.e., behavioral) needs of students, whereby learners receive opportunities to develop authentic (as opposed to classroom) functional abilities and a healthy repertoire of pragmatic skills. What about the internal (i.e., cognitive) needs of students? While the sterile interpersonal nature of the classroom presents many obstacles to the goal of promoting the development of communicative competence, much FL acquisition research has provided instructors with information and materials that are psycholinguistically compatible with the manner in which the brain assimilates linguistic knowledge. A CMC environment can be compatible with most cognitive aspects of FL learning; its current media options, however, make it particularly compatible with the elementary stages of acquisition.

3. CMC and learning: a cognitive perspective: An understanding of the compatibility of the CMC environment with the elementary stages of FL acquisition requires a review of the cognitive nature of learning in general.

The basic question to be answered in cognitive modeling is how language knowledge is represented in or acquired by the brain. We are blessed with the ability to learn. In cognitive terms, learning is the ability to adapt, change, or modify connections of the nervous system in the brain so that it will later behave differently.

(Hatch & Yoshitomi, 1993, p.68)

The most successful learners utilize their background knowledge of the world and their knowledge of the TL (i.e., their pre-existing 'connections') to complete tasks. To build on previously existing knowledge structures one must use those structures as a point of reference. Evoking relevant schemata ensures the proper cataloging of new information, or specifically that the appropriate linguistic associations, for example, the past tense, will accompany one's general ability to narrate (cf. Kintsch, 1988).

CMC environments have enormous potential to work in conjunction with (rather than against) the cognitive mechanisms responsible for learning. Warschauer, Turbee and Roberts (1996) argue that, since learning with CMC is often self directed (e.g., in

distance-learning contexts), computer learning networks empower the FL learner and so 'the teacher's visibility decreases as students gain control of the communication' (p.10). How does the learner succeed under these conditions?

[Students] are no longer passive learners, attempting to mimic what they see and hear from expert teachers. They become participants, collaborators in the creation of knowledge.

(Collins & Berge, 1995, p.6)

As Fischer (1995) puts it, the creation of new knowledge in many CMC environments involves attaching information about the TL with what he terms 'experiences from inside' (p.10). That is, learners must modify pre-existing, internal cognitive connections with that incoming 'data'.

CMC does not appear to lend itself to collaborative learning activities. Curricula that emphasize the use of CAI and informatics emphasize input-oriented activities, such as activities involving CAI and informatics. However, reading and listening require 'active' participation on the part of the learner. FL research into tasks involving the so-called receptive skills during the 1980s showed that successful comprehension results from a student's 'interaction' with the text (Grabe, 1988). Lee (1997) defines reading as 'the activation, application, and interaction of decoding, encoding, and comprehension processes that result in knowledge gain from something written or printed' (p.152). The comprehension of a text requires the learner to utilize linguistic knowledge, knowledge of the world, and knowledge of the discourse-pragmatic functions of individual sentences (Alexander, Schallert & Hare, 1991; Collentine, 1997). The comprehension process invariably requires learners to reconstruct the written or aural text cognitively, using their own knowledge sources and experiences as points of reference (Kintsch, 1988). Carefully constructed reading techniques such as the 'The Model for Teaching Interactive Listening and Reading' (Swaffar, Arens & Byrnes, 1991) provide students with pre- and post-reading/listening activities in which they are to integrate the text with (i.e., think, speak, and write about) what they already know about the topic of the passage. Thus, even though most CMC entails input-oriented tasks, it does not limit learners' opportunities to connect with the data. Nonetheless, this input-oriented bias of current CMC technologies probably means that

such environments are most compatible with the early stages of acquisition.

In general cognitive terms, FL acquisition at the early stages requires that the learner should receive generous amounts of aural and written data (Karmiloff-Smith, 1985). Krashen (1982) hypothesizes that proper development of one's FL abilities (i.e., the development of so-called acquired knowledge) stems primarily from comprehensible input. And, while the particulars of Krashen's theory have been widely disputed, Long (1990) observes that there is, nonetheless, not a single documented case in which a student successfully acquired an FL without exposure to an abundance of input. VanPatten (1993, 1995) maintains that it is the psycholinguistic foundation of communicative competence that input-oriented activities (e.g., via processing instruction) establish. Researchers such as Swain (1985) surmise that acquisition necessitates conversational interaction (i.e., the Output Hypothesis). He qualifies this claim by proposing that production is necessary to develop chiefly complex (morphosyntactic) abilities.

To summarize, the type of cognition that is likely to occur when students learn an FL in CMC learning environments is highly compatible with the manner in which the new neural connections (i.e., learning) are established in the brain. By all accounts students have numerous opportunities to explore the TL in a self-directed fashion, creating associations between what they read and hear and their previously existing knowledge of the TL. Nonetheless, most currently available media for CMC (e.g., CAI and informatics such as the WWW) best lend themselves to the creation of input-oriented activities. Since the achievement of advanced stages of acquisition seems to require oral production (and therefore an interlocutor) and since the foundation of communicative competence derives from input-oriented activities, we have argued that CMC environments are most compatible with the FL instruction process at the earliest stages of acquisition.

4. The Solutions: Spanish I project: An Internet-based, introductory high-school Spanish curriculum has provided learner interaction with the TL primarily through CMC. The curriculum was designed in conjunction with, and with the financial backing of, the Educational Management Group (EMG) of Scottsdale, AZ. The course was designed primarily to be delivered in a distance-learning environment. The audience was schools lacking funds for Spanish

staff (or that want to provide additional support for staff) and students learning in a home setting.

Consistent with the communicative and cognitive notions described above, the authors designed the course so that students would acquire fundamental, real-world functional abilities in the FL. The authors also attempted to capitalize on the potential cognitive advantages of a CMC learning environment. Learners are presented with activities whose completion requires the use of exploratory and self-directed strategies; these activities also provide students with generous amounts of comprehensible input, both written and aural. Before describing how the curriculum purports to achieve these goals, we will describe its essential technological components.

Both for cross-platform compatibility and ease of connecting to EMG's server, the software component of the program is accessed through Netcape's WWW browser. All in all, there are three principal sources from which students access their materials for the course: (1) Netscape browser-based software, residing on CD-ROMs; (2) a connection to the EMG server; and (3) a satellite link to EMG's television services.

Most of the materials students used in the course are on the CD-ROM. All materials are presented to students in various 'chapters' (twenty in all, designed for a year-long course). For dual-platform compatibility (i.e., for students and schools with either Macintosh or Windows operating systems), students access these materials through the Netscape browser. JavaScript operations manage links between various software components. Instruction centers around the software, providing students with grammar, vocabulary, and cultural lessons and exercises. With Macromedia's Shockwave and Director technologies, the software programs are high in multimedia content and interactivity. The Netscape environment also facilitates the use of various QuickTime movies and sound files, which students can prompt via HTML links. Included in the curriculum is a ninety-six-episode mystery (filmed by EMG exclusively for this course) utilizing simulated-authentic spoken language. Apart from its potential entertainment value, this QuickTime series serves as an important source of comprehensible aural input for learners. Finally, the Netscape browser also allows learners to link to ClarisWorks slide shows, which contain vocabulary and grammatical explanations, and to ClarisWorks documents, containing group-work and writing activities.

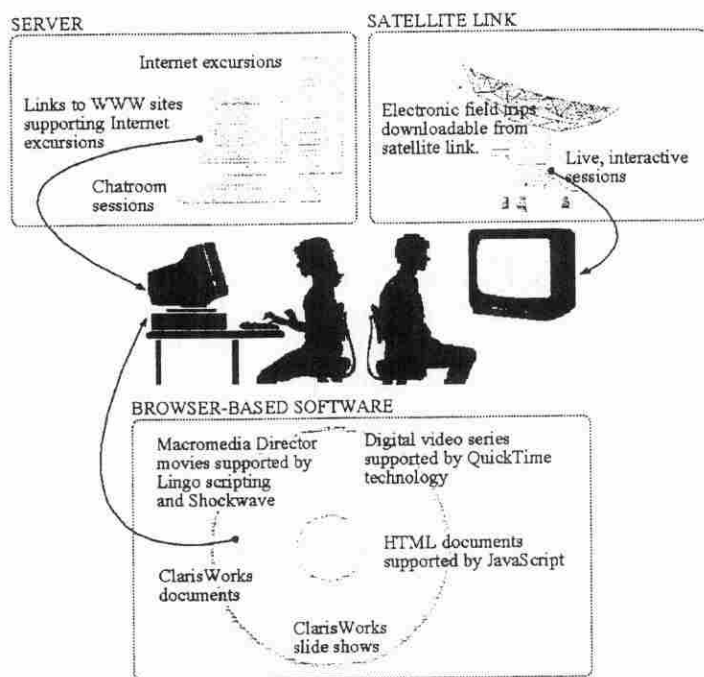


Figure 1. A CMC environment for an FL program

The browser environment also facilitates the student interface with EMG's server. The server contains various sources of information about upcoming events in the course which are filtered through EMG's server and satellite solutions. More importantly, the browser environment allows students to link to the server and access the WWW. Students find on the server various 'Internet excursions' and links to specific sites in Latin America and Spain. The excursions are essentially reading activities and content-based lessons. Through the server, students can also log on to EMG's chatroom facilities and interact with students, teachers, and people knowledgeable about various aspects of Hispanic culture.

The satellite-link component of the course provides students with access to what are termed 'electronic field trips'. These are essentially four- to six-minute documentaries that a school can download for in-class viewing. The authors specifically targeted these documentaries for content-based instruction. While many of the documentaries are culturally rich (e.g., one depicts a trip to a

CD store in Salamanca), many explore themes such as astronomy (e.g., a 'tour' of the solar system) and biology (e.g., a visit to a computer modeling lab) in the TL. The satellite link also gives students opportunities to participate in live, interactive television sessions with a Spanish instructor in the EMG studios. Students 'attend' lessons and have the chance to ask questions about things that they have learned or about which they are curious.

Does the *Solutions: Spanish I* curriculum provide students with communicative opportunities? This program provides a variety of opportunities for learners to develop abilities both to experience and achieve real-world functions in the TL. The Internet excursions allow the students to be essentially participants — 'peripheral', as Zhao (1996) proposes — in the TC. A visit to a site in Latin America or Spain — for the completion of a particular task — places learners on the same level as a native speaker. The authors of these authentic resources assume, presumably, that visitors are largely from the same (international) speech community as they and that visitors are operating with approximately the same type of background knowledge. Admittedly, the learners in this program are not of the same speech community and do not share much of the presumed background knowledge; yet, to succeed in completing their tasks (i.e., their reasons for visiting a site), students must at once learn and be able to use the TL to complete the same types of functions that native speakers would (i.e., successfully manoeuvre through the site and its links). Students have to use the same buttons and links to request the information that they need. They also need to answer the same sorts of questions that native speakers would in their interactions with the sites.

This program also provides numerous opportunities for learners to receive content-based instruction, which also requires students to comprehend and utilize the TL as a vehicle or tool for the more meaningful goal of learning about the content. Many of the Director pieces in the program require students to learn about geography and math while they are simultaneously learning new vocabulary. Of course, this is not novel in comparison to the classroom. Yet, we made two concerted efforts to include content-based elements throughout the course. The electronic field trips — videos downloadable from EMG's satellite services — incorporated footage from EMG's library relating to such topics as biotechnology, space exploration, and health and fitness. The dialogue of narrators in these mini documentaries was written specifically for the beginning

language learner. More importantly, however, while Spanish is the vehicle of communication, the student's reason for viewing these videos is not so much to learn Spanish as it is to reinforce what they might be learning in their science and geography classes. We also designed the students' Internet excursions so that they contain content-based elements; for instance, students might visit a site in Spain that teaches students about computers or Internet commerce.

The curriculum also provides students with the communicative opportunities to develop a variety of pragmatic skills. Of course, students undoubtedly have numerous opportunities to develop abilities to respond to questions and the like, as they would in a classroom environment. Yet, the conferencing component (the chatroom) provides students with the types of opportunities that Kern (1995) provided his learners — students can ask questions, take the initiative to take turns, and nominate topics of their own. Students utilizing the *Solutions: Spanish I* curriculum as a classroom supplement can print from the CD-ROM various activities in which they are to negotiate for meaning with a classmate (e.g., role play that they are asking someone out on a date, or that they are ordering a meal in a restaurant). Finally, as with most simulated-authentic dramas (cf. Collentine, 1997), the conversational nature of the QuickTime mystery provides models for students, models of speech acts which they will need in order to be successful in their immediate future and beyond (i.e., in the later stages of acquisition).

Does the *Solutions: Spanish I* curriculum create the favorable cognitive conditions that CMC environments typically provide learners, namely, the psycholinguistic conditions that are particularly compatible with how students acquire the FL during the beginning stages of acquisition? First, this program's design assumes that learning involves the creation of connections between incoming data and pre-existing knowledge structures, such that learners must 'interact' (cf. Grabe, 1988; Lee, 1997) with the TL. The lexical and especially the grammatical presentations given in the Director pieces prompt students to learn structures from a decidedly inductive approach, whereas first learners must create their own hypotheses about the meaning and features of a structure and only then do they receive explicit explanations. Initially, students are provided with written and aural examples of a structure. Carefully utilized fonts draw attention to a structure's features to guide and assist in hypothesis formation. For instance, in the introductory lesson on adjective agreement, students might read

a description of a family, which is supported by audio and graphic media (i.e., so as to draw on a variety of senses — or information processing resources — and therefore make numerous connections with the data). The textual support for the description might highlight grammatical relationships, as in the following.⁴

1. Esteban es **UN** muchach**O** muy alt**O**.

(Esteban is a tall boy.)

2. Inés es **LA** chic**A** más list**A** de su clase.

(Inés is the smartest girl in her class.)

Furthermore, some 'activities' teach structures as a student works with the program. Using the same notion of adjective agreement, a student might be asked to construct some sentences based on a story they have heard or read, thus focusing their attention on meaning more than on form. However, the construction of such sentences involves choosing words from a pull-down menu, and only particular combinations are possible. Thus, if a student chooses 'chica' from one menu, and if he or she selects 'alto' to modify the noun, the Director piece asks the student to make another choice. Once the appropriate response is made, the student may continue. ClarisWorks slide shows (an uncomplicated presentational solution) promote the development of lexical and grammatical abilities in the same fashion, although they do not allow the same degree of interactivity and aural input as Director do applications. It is important to note that detailed explanations for all concepts are also available to students; these explicit explanations may be found at the end of a presentation or be accessible by way of a link.

The ability to interact with other students and teachers via chatroom conversations allows learners to make interpersonal connections, as they may negotiate for meaning or collaborate on a problem-solving task. Written materials encouraging such interaction are also made available throughout the course, which students using the curriculum as a supplement could utilize. Finally, the activities surrounding Internet excursions (i.e., found on the EMG server and which also contain the links that send students to a URL in Latin America or Spain) are informed by the interactive reading model of Swaffar *et al* (1991). Students must complete 'pre-reading' activities (i.e., before they visit a site) that prompt them to

⁴It should be noted that the unnatural appearance of texts in explanations such as this is normally offset by the auditory support for the text, which would utilize authentic suprasegmental features.

evoke their general background knowledge relating to a site's content; 'post-reading' activities ask them to write an essay or complete a project that integrates what they learned at the site with their own lives. If, for instance, a learner visits a site containing a restaurant menu, he or she is might be asked to write a list of the things he or she would like to eat and determine the total price (e.g., in pesos).

Second, this Spanish curriculum also takes advantage of the input-oriented solutions that CMC offers, providing students who are beginning the acquisition of Spanish with numerous opportunities to interpret written and aural texts. The curriculum employs a myriad of media to provide students with comprehensible input. Director pieces contain generous amounts of written and aural input. Video documentaries and live interactive sessions downloadable from EMG's satellite solutions provide opportunities to hear the TL. Additionally, even short grammar, lexical and cultural explanations in an HTML environment contain links to QuickTime sound-track files so that they can listen to the TL as they read the text. The most important source of comprehensible input, however, is presumed to be the QuickTime video, a mystery series students view throughout the course. Moreover, as researchers such as Collentine (1997) and Garza (1996) have noted, technologies such as QuickTime movies allow students a degree of control and manipulation of the input in ways they cannot receive in the lab or classroom.

5. Conclusion: This paper raises a variety of issues relating to CMC and FL instruction. The authors propose that CMC provides students with opportunities to be participants in the TC and to develop skills for interacting with others. They also maintain that the type of cognition that CMC environments encourage and CMC's input-oriented nature is particularly beneficial to learners in the earliest stages of acquisition. To demonstrate such compatibility, they have outlined a curriculum whose instructional design is highly informed by these assumptions.

References:

Alexander, P., Schallert, D. & Hare, V. (1991) 'Coming to terms: how researchers in learning and literacy talk about knowledge', *Review of Educational Research*, 61 (3): 315-43.

- Brown, R. & Gilman, A. (1960) 'The Pronouns of power and solidarity', in T. A. Sebeok (ed.), *Style in Language*. Cambridge, MD: MIT Press.
- Collentine, K. (1997) 'The Effects of Authentic and Simulated-authentic Video Materials on the Listening-Comprehension Abilities of Foreign Language Learners of Spanish.' Doctoral Dissertation, University of Texas at Austin.
- Collins, M. & Berge, Z. (1995) 'Introduction: computer-mediated communication and the on-line classroom in Higher Education', in Z. Berge & M. Collins, *Computer-mediated Communication and the On-line Classroom* (Volume 2). Cresskill, NJ: Hampton Press.
- Ellis, R. (1990) *Instructed Second Language Acquisition*. Oxford: Basil Blackwell.
- Fischer, D. (1995) 'It's not the distance: It's the design', *CALICO Journal*, 13 (4): 5-17.
- Garza, T. (1996) 'The message is the medium: using video materials to facilitate foreign language performance', *Texas Papers in Foreign Language Education* 2 (2): 1-18.
- Givón, T. (1984) *Syntax: A Functional-Typological Introduction* (Volume 1). Oxford: Basil Blackwell.
- Givón, T. (1993) *English Grammar: A Function-Based Introduction*. Philadelphia, PA: John Benjamins.
- Grabe, W. (1988) 'Reassessing the term interactive', in P. Carrell (ed.), *Interactive Approaches to Second Language Reading*. New York: Cambridge University Press.
- Gremmo, M., Holec, H. & Riley, P. (1978) 'Taking the initiative: some pedagogical applications of discourse analysis', *Melanges Pédagogiques*, CRAPEL.
- Halliday, M. (1970) 'Language structure and language function', in J. Lyons (ed.), *New Horizons in Linguistics*. Harmondsworth, England: Penguin.
- Hatch, E. & Yoshitomi, A. (1993) 'Cognitive processes in language learning', in A. Omaggio Hadley (ed.), *Research in Language Learning: Principles, Processes and Prospects*. Chicago: National Textbook Co.
- Karmiloff-Smith, A. (1985) 'Language and cognitive processes from a developmental perspective', *Language and Cognitive Processes*, 1 (1): 60-85.
- Kern, R. (1995) 'Restructuring classroom interaction with network computers: effects on quality and characteristics of language production', *Modern Language Journal*, 79 (4): 457-76.
- Kintsch, W. (1988) 'The role of knowledge in discourse comprehension: a construction-integration model', *Psychological Review*, 95 (2): 163-82.
- Krashen, S. (1982) *Principles and Practice in Second Language Acquisition*. Oxford: Pergamon Press.
- Lee, J. (1997) 'Non-native reading research and theory', in K. Bardovi-Harlig & B. Hartford (eds), *Beyond Methods: Components of Second Language Teacher Education*. New York: McGraw-Hill.
- Long, M. (1983) 'Native speaker/non-native speaker conversation and the negotiation of meaning', *Applied Linguistics*, 4 (2): 126-41.
- Long, M. (1990). 'The least a second language acquisition theory needs to explain', *TESOL Quarterly*, 24 (4): 649-66.
- Oxford, R. (1990) *Language Learning Strategies: What Every Teacher Should Know*. Boston: Heinle and Heinle.

- Resnick, L. (1994) 'Situated rationalism: biological and social preparation for mapping', in L. Hirschfeld & S. Gelman (eds), *Mapping the Mind: Domain Specificity in Cognition and Culture*. New York: Cambridge University Press.
- Salaberry, M. (1996) 'A theoretical foundation for the development of pedagogical tasks in computer-mediated communication', *CALICO Journal*, 14 (1): 5-36.
- Santoro, G. (1995) 'What is computer-mediated communication?' in Z. Berge & M. Collins (eds), *Computer-mediated Communication and the On-line Classroom* (Volume 1). Cresskill, NJ: Hampton Press.
- Savignon, S. (1997) *Communicative Competence: Theory and Classroom Practice*. New York: McGraw-Hill.
- Swaffar, J., K. Arens & H. Byrnes. (1991) *Reading for Meaning*. Englewood Cliffs, NJ: Prentice Hall.
- Swain, M. (1985) 'Communicative competence: some roles of comprehensible input and comprehensible output in its development', in S. Gass & C. Madden (eds), *Input in Second Language Acquisition*. Rowley, MA: Newbury House.
- VanPatten, B. (1993). 'Grammar teaching for the acquisition rich classroom', *Foreign Language Annals*, 26 (4): 435-50.
- VanPatten, B. (1995) 'Cognitive aspects of input processing in second language acquisition', in P. Hashemipour, R. Maldonado & M. van Naerssen (eds), *Studies in Second Language Learning and Spanish Linguistics (In honor of Tracy D. Terrell)*. New York: McGraw-Hill.
- Warschauer, M., Turbee, L. & Roberts, B. (1996) 'Computer learning networks and student empowerment', *System*, 24 (1): 1-14.
- Whitley, M. (1993). 'Communicative language teaching: an incomplete revolution', *Foreign Language Annals*, 26 (2): 137-54.
- Zhoa, Y. (1996). 'Language learning on the World Wide Web: toward a framework of network based CALL', *CALICO Journal*, 14 (1): 37-53.