A MODEL FOR LISTENING AND VIEWING COMPREHENSION IN MULTIMEDIA ENVIRONMENTS

Debra Hoven
University of Queensland, Australia

ABSTRACT

This paper proposes an instructional design model appropriate for humanistic multimedia Computer-Enhanced Language Learning (CELL) in a self-access environment for second language learning through listening and viewing comprehension. The model is grounded in sociocultural theory, and set against a background of research into the complexities of listening and viewing, individual learner differences and learning styles, characteristics of self-directed and autonomous learning, and user-friendly instructional software design.

INTRODUCTION

Computers give learners freedom to work at their own pace and level, and to receive immediate and personalised feedback. In terms of group dynamics, they enable learners to pool their knowledge in more effective ways and enhance peer correction and language repair work. For this reason, the term CELL is used here in preference to CALL (Computer-Assisted/Aided Language Learning) to recognise the enhancing role that computers play in the language learning process. Humanistic elements of the use of computers in language learning emerge in discussions of types and techniques of learning, where CELL brings the real world into the classroom, makes learning more relevant, develops the learners' sense of responsibility, promotes non-linear and co-operative learning, helps reduce the need for a meta-language, and changes the role of the teacher (Batley & Freudenstein, 1991, pp. 14-16).

From a philosophical point of view, computers have a very different role today than they did in the past. By taking on humanistic principles and shedding the rigidity of behaviourist approaches and associated programmed learning, scenarios for the use of computers in language learning can be greatly expanded. In sharp contrast to the criticisms levelled at language laboratories, both with and without computer technology, a much wider range of interaction models is now available to learners (Davies & Higgins, 1985, pp. 35-36):

1) Learners can choose either to correct themselves or to be corrected by the computer, the teacher, or peers.

2) Utterances need not be fabricated, though they must still generally be pre-recorded for computer retrieval.

3) Communication is possible either between two or more learners at the same terminal, at geographically distant terminals, or in an interactive sense between learner and video and/or audio (Brett, 1995; Chang & Smith, 1991; Doughty, 1991).

4) Learners can actively participate in the delivery of the lessons, their interpretation of meaning during the activity, and the choices they make (Bright, Verano, & Cubero, 1991; Garrigues, 1991).

5) Flexibility is limited only by the foresight of the designers of the learning packages or the providers of the learning materials.

With the extension of the presence of computers in learning environments to include computer-mediated communications (CMC) such as those possible using electronic mail or the Internet, we must now devise models for computer-enhanced pedagogy to encompass these new interlocutors (Chapelle, 1994). In devising such models, it is important that we keep in mind the theories and findings from mainstream second language (L2) pedagogy and modern theories of second language acquisition (SLA).

Although the presence of new technology and new means of using it entail the development of new models, this is no reason to start completely afresh. For example, the addition of multimedia capabilities does not necessarily imply that a whole new set of pedagogical models needs to be devised. Rather, we should look to findings in more traditional areas such as classroom interaction, self-directed learning, and the use of audio and video in language instruction to ground our models of good practice in the areas of multimedia and CMC in language learning. We will look at some of these findings and explore their relationship with newer technology with a view toward developing a sociocultural language learning model that incorporates these features.

This paper is divided into two sections: the first deals predominantly with the application of listening theory in the context of computer technology, and the second with aspects of a sociocultural model for language learning in this context. In the model proposed here, the framework for the allocation of control to learners is provided in the software by presenting the available language learning resources in a manner that is easy for them to navigate, while at the same time providing the information necessary for the learners to make informed decisions about their learning path (Lian & Lian, 1997). In keeping with the principles outlined above, this management of learning choices is improved by enabling learners to make informed decisions relating to their own learning using the resources contained in the software package.

LISTENING AND VIEWING COMPREHENSION: THEORY AND APPLICATIONS

Learners and L2 Listening Comprehension

Earlier discussions and examinations of listening as a discrete component of language learning focused mainly on classifying and grading listening tasks in terms of difficulty (Fish, 1981; Nunan, 1989; Richards, 1983; Ur, 1984). The perception of difficulty usually resided in the difficulty of the material used as the content for the comprehension activities, and was often borrowed from readability measures for written texts. Concepts of the readability of texts, in turn, were based on word counts and the frequency of occurrence of discourse features such as nominalisation, redundancy, and ellipsis (Grellet, 1981; Nunan, 1991; Swaffar & Bacon, 1993). These readability measures were transferred to the listening environment as the basis for determining the comprehensibility of listening texts. Other measures of difficulty in listening comprehension (LC) relied on some undefined and unspecified inherent qualities of the tasks. The listening passages were often created, or at least simplified, for teaching purposes, and the determination of levels of difficulty was often arbitrary or subjective (Lynch, 1988, p. 178).

As changes in the focus of language teaching and learning have moved from content- or teacher-centred to more learner- or learning-centred approaches, the focus in LC has also shifted. The social dynamics of listening have become a much stronger force in the investigation and use of LC for language learning (Lynch, 1988; Rost, 1990; Rubin, 1994). Progressively less emphasis is now being placed on listening as a cognitive process internal to the hearer, while the processes of interaction and meaning-negotiation are being extensively investigated (Doughty, 1991; Dunkel, 1991b; Pica, Young, & Doughty, 1987; Robinson, 1991).

Researchers are also refining their understanding of the essential differences and similarities between reading and listening (Canale, 1984; Hoven, 1991; Lund, 1991; Swaffar & Bacon, 1993). This has lead to the recognition that there are aspects of LC, in addition to those mentioned above, that contribute to learners' difficulty in successfully completing LC tasks, and increasing their proficiency in this area.

Where previously the content material was graded, structured, or specially created in keeping with the authors' perceptions of ease and difficulty, it is now being suggested that the tasks themselves be graded, particularly in the context of increasing use of authentic texts (Hoven, 1991; Lund, 1990; Lynch, 1988; Mendelsohn & Rubin, 1995; Nunan, 1989).

Background to Listening Comprehension Research

Recently, the focus of the examination of factors contributing to successful LC has shifted toward formulating theories which define the features involved in the L2 listening process (Anderson & Lynch, 1988; Byrnes, 1984; Dunkel, 1991a; Rubin, 1994). As Rost (1990) asks,

> Is understanding a mental phenomenon recoverable through the mind of the hearer or is it a social phenomenon recoverable through examination of subsequent behaviour by the listener? (p. 1)

However, except for examinations of L2 pronunciation and auditory perception using computers, the implementation of LC in a computer-assisted environment has not yet been attempted within a coherent theoretical framework (Craven, Sinyor, & Paramskas, 1990; Higgins, 1995; Kenning & Kenning, 1990; Pennington, 1989, 1996).

With a shift to more meaning- and communication-oriented teaching approaches starting in the 1970s, much has been published on the nature of the listening process and techniques for teaching LC (Boekaerts, 1981; Boyle, 1984; Buck, 1992; Faerch & Kasper, 1986; Long, 1989; Lund, 1990; Richards, 1985; Taylor, 1981; Wipf, 1984). Research into the interaction between speaking and listening (Anderson & Lynch, 1988; Brown, 1986, 1989; Brown & Yule, 1983; Byrnes, 1984; Dunkel 1986; Nunan, 1990) has led to the construction of information processing models of listening (Cook, 1985), and, more recently, to investigations of various aspects of the listening task and participants (Bacon, 1992a, 1992b; Herron, 1994; Rubin, 1994).

In addition, with increasingly more sophisticated visual media, a perception is emerging of the intimate relationship between viewing comprehension (VC) and LC. This applies particularly in L2 and foreign language (FL) learning, where teachers and cross-cultural researchers are focusing on the meanings conveyed by gesture, expression, and body language (Armstrong, Stokoe, & Wilcox, 1995; Fidelman, 1994, 1997; Hurley, 1992; Kellerman, 1992). Since the introduction of video players into L2 language classrooms, and more recently with the advent of interactive multimedia applications for L2 learning, paralinguistic features have been receiving more attention in teaching and in learning applications (Brett, 1995; Fidelman, 1994, 1997).

Changing Complexion of Issues and Factors in L2 Listening Comprehension

Increasingly, research is attempting to establish the role of the learner as an active interpreter and negotiator of the meaning of messages (Jonassen, 1992; Lantolf & Appel, 1994). Research energy is turning away from *mental phenomenon* towards *social phenomenon* models. As Rubin (1994, p. 199) summarises it, the on-going dialogue among researchers about the nature of learners' interaction with oral input revolves around the characteristics of (a) text, (b) interlocutor, (c) task, (d) listener, and (e) process (see also Hoven, 1991). In addition, technological advances have made available to teachers and learners certain forms of visual media, such as television and videos, to expand LC to encompass VC as well (Kellerman, 1992; Schmidt-Reinhart, 1994). Therefore, it has become essential to incorporate a discussion of the impact of VC on listening and listening tasks into the new language learning models.

Many of the factors listed by Rubin (1994), such as task and process characteristics, relate to general learning and language learning rather than exclusively to listening. However, certain aspects of these factors, such as acoustic variables, are inherently specific to listening and viewing. This paper will deal with those specific aspects.

The Complementarity of Listening and Viewing

The increasing focus on multimedia in CALL necessitates a renewed examination of the complementary nature of the visual and auditory channels in listening and viewing comprehension. This is particularly the case in the current context of an expanding emphasis on non-verbal channels of communication in which video and other multimedia resources are becoming prevalent in L2 learning contexts (Brett, 1995; Felix, 1995; Kennedy, Tiziana, & Murray, 1995; Liou, 1995; Staddon, 1990). Areas of study include the following:

- The importance of visual context (Hanley, Herron, & Cole, 1995; Herron, 1994; Secules, Herron, & Tomasello, 1992)
- The role of non-verbal aspects of communicative competence (Kellerman, Ammerlaan, Bongaerts, & Poulisse, 1990; Meyer, 1990; Neu, 1990)
- Cross-cultural effects of non-verbal communication (Hurley, 1992)
- Messages conveyed through the visual channel (Herron, Morris, Secules, & Curtis, 1995; Herron & Seay, 1991; Kellerman, 1992; Neu, 1990)
- Strategies used with audio-visual material (Mueller, 1980; Vogely, 1995; Wolff, 1987)
- Skills developed through the use of computer-assisted multimedia (Brett, 1995; Dalgish, 1987; Fidelman, 1997; Hoven & Farquhar, 1996; Linquist, Rowekamp, & Stenson, 1991; Meskill, 1991)

Examination of the role of the visual channel leads to a discussion of the complementary nature of visual to auditory cues in LC involving video and multimedia resources, such as in CELL packages (Graham, 1990; Hurley, 1992; Kellerman, 1992; Neu, 1990). In expanding this discussion of LC to include paralinguistics, the focus is not solely on these aspects, but rather the importance of including these critical aspects of listening and viewing comprehension in the language learning process. Here, paralinguistic features encompass kinesics, proxemics, and prosody. The term kinesics refers to communicative movements such as facial, hand, and other body expressions or gestures that accompany, complement, or replace verbal utterances. Proxemics refers to the "degree of physical distance between interlocutors which is acceptable in a culture, including touching" (Hurley, 1992, p. 261). Following Arndt and Janney (1987, pp. 234-235) and Gassin (1992), prosody comprises the varying "*accent* (articulatory force, emphasis, stress, pitch prominence), *intonation* (tune, melody, pitch contour, pitch direction), and *rhythm* (speed, duration, pause, tempo)" of speakers (Gassin, 1992, p. 97).

As the studies by Beebe & Takahashi (1989), Kasper (1989), and Lörscher (1986), indicate, attention to and practice in paralinguistic aspects of L2 communication can and should be implemented in language classes and materials, particularly through activities in which the learners themselves control and direct the interaction. Kellerman (1992) and Hurley (1992, p. 274) advocate the use of target language audio-visual material containing a range of different interaction types to enhance awareness of the verbal, prosodic, kinesic, and non-verbal features used by members of the speech community.

Thus, studies of the relationship between kinesic information and verbal communication have shown the importance of kinesics in conveying and interpreting meaning at a number of levels. These findings have considerable impact on the uses of multimedia in a CELL environment. Therefore, not only should the visual channel be incorporated into CELL materials, but also explicit efforts must be made to provide learners with information on the kinesic aspects of messages and how to interpret and produce them. These should include information on how kinesic messages are conveyed in the particular language being studied or materials being used, in order to raise learners awareness of the importance of kinesics (Kellerman, 1992). This can be implemented in the software by displaying the pitch and amplitude curves of authentic audiovisual texts (Lian & Lian, 1997). A CELL multimedia environment also offers learners some unique opportunities to select and focus on specific intercultural differences in kinesic and prosodic features and simultaneously gain practice in their use (Fidelman, 1994; Hoven, 1997b).

Essential Features of the Listening Process

Considerable L2 evidence has accumulated over the last two decades which shows that effective listening requires active mental processing by listeners on several levels, particularly in interactive listening situations (Anderson & Lynch, 1988; Lynch, 1988; Riley, 1981). Researchers have found that semantic and syntactic systems as well as top-down and bottom-up processing operate simultaneously (Anderson & Lynch, 1988; Bacon, 1992a; Bond & Garnes, 1980; Conrad, 1985; Lund, 1991; Marslen-Wilson & Tyler, 1980; O'Malley, Chamot, & Küpper, 1989; Van Patten, 1989; Voss, 1984; Wolff, 1987). However, there is some disagreement about which kind of processing predominates at different levels of learner L2 proficiency (Rubin, 1994, pp. 210-211). Nevertheless, the components of the listening process, including the listening text, the complete context of this text (both external and internal to the listener), the task demands, and the responses required of the listener are all interrelated.

Listening Comprehension and CELL: Constraints and advantages

Constraints. The implementation of listening and viewing comprehension tasks in a CELL context implies certain advantages and certain constraints. The constraints lie in the difficulties of allowing students to input random text of the kind necessary for summarising tasks. Technology has not yet developed the capacity to process random text input through the keyboard in ways that can simulate the way a teacher would annotate and give feedback on a student's work. However, this does not mean that such tasks cannot be implemented in a CELL environment in a modified form.

Another constraint for CELL, arising from the same difficulties as the one above, is the lack of realistic person-to-person interaction. In the context of CMC via e-mail or the World Wide Web, real learner-to-learner communication is possible for geographically separated students. Although there are still bandwidth and financial constraints on the personal use of visual computer-based communication, this may not be the case for much longer, given the present rapid rate of technological development. Nevertheless, even now it is easy to partially compensate for the lack of interpersonal interaction by making available on-line grammar notes, dictionaries, contextualised feedback, and repeated individualised playback. All of these features can be provided whenever and as often as the learner needs them.

Advantages. The importance of providing learners with timely, task-specific feedback in LC practice is widely acknowledged. Because of perception and recall constraints in LC, the availability of immediate feedback can be a distinct advantage. Another advantage of a CELL environment relates to the necessity for learners to be exposed to the same text from different perspectives and with emphasis on different aspects in order to fully comprehend a listening text. It is a simple matter to provide learners with "multiple exposures to the same or similar texts" (Rost, 1990, p. 169). Moreover, choices about how often to review a text, how many tasks to design for the same text, the level of cognitive difficulty, and the type of text, can all be determined by the learners themselves with appropriate structuring and guidance provided in the software.

Essential Principles of CELL

The following five findings flow from various research studies in learning, language learning, and computer- or technology-mediated learning as being critical to effective CELL:

1) Interaction and negotiation are important features of communication, and therefore of L2 learning (Doughty, 1987);

2) Computers with appropriately designed software can play a mediating role between L2 learners and their sociocultural context (Chapelle, 1994; Jonassen, 1992);

3) Software can be designed to facilitate L2 learners' interaction with the computer, and negotiation of meaning from texts (Bickel & Truscello, 1996; Meskill, 1992);

4) The essential characteristic of software is to enable learners to take control of both the content of the learning material, and their approach to making meaning from it (Robinson, 1991; Stevens, 1992); and

5) Not all L2 learners, especially in the initial stages of L2 acquisition, want to, or are able, to take control of their learning (Candy, 1987; Robinson, 1991).

What are the essential features of an instructional design model that incorporates these research findings? The following three features emerge at this stage:

1) We can improve the kinds of tasks we provide for learners by increasing the level of choice available to them;

2) In providing increased choice, we, as instructional designers, need to recognise, understand, and make provisions for individual differences in learning styles and learning strategies; and

3) With increased choice, learners must be provided with the information to make those choices.

In a CELL environment, we can therefore give learners informed control over the choice of task, topic or text content, and the speed of progress through the tasks or within a task.

Collectively, the above five hypotheses encompass the critical features of the proposed model for the nature of language learning, the contemporary role of computers in language learning, an instructional design framework to suit this role, and the nature of the relationship between learners and computer-based materials. In the discussion below some of the implications of these principles for the proposed instructional design model will be explored.

Learning Strategies and CELL

In order to incorporate awareness-raising about learning strategies into the CELL environment, taxonomies such as those of Oxford (1990), O'Malley and Chamot (1990), or Hoven (1997a) can be introduced to learners. They can serve to guide learners in their choice of strategies when working on tasks in a way similar to using a map or a street directory. For example, learners can be shown diagrammatically which learning strategies are embodied in the successful completion of each of the task types available in the software package. In this way, learners can set their own learning goals for the activity using information provided and structured by the software package. This exemplifies the second and third hypotheses above, in that the software mediates between learners and their context. Having been shown by the program the range of choices available, learners then use the program to guide them through their chosen paths.

The term *interactivity* in the context of the model being proposed here refers to the potential for the learner to make decisions about the content, mode, order, pace, level, and degree of self-direction of a software package. In addition, it can be extended to mean the capacity the model provides for the learner to interact with, interpret, negotiate, and make meaning from the texts available, whether these are printed, audio, audio-visual, or visual.

A SOCIOCULTURAL MODEL FOR CELL

Background to the Paradigm Adopted for This Model

This section provides a preliminary explanation of the perceived need for and uses of CELL today. For the purpose of simplicity, the term *second language learning* is used here to refer to the learning of another language after oneÕs first language (L1), whether within the target culture, or removed from it.

The paradigm proposed here is based on a *humanistic cognitivist* perspective on the teaching of language using computer technology. This perspective incorporates some elements of humanistic methodology (Stevick, 1990), cognitive learning theories (McLaughlin, 1987; O'Malley & Chamot, 1990), and sociocultural theories of language learning (Halliday, 1993; Lantolf & Appel, 1994; Wells, 1994). The humanistic aspect is based on a belief in the necessary involvement of the whole person in the language learning process. The cognitivist aspect derives from the conviction that one of the ways L2 learners acquire language is through progressive modification of their interlanguage brought about by a process of hypothesis testing, confirmation/disconfirmation, and subsequent modification. The sociocultural paradigm provides an interpretative framework within which to anchor the complex interplay of the features both internal and external to the physical body of the learner. It is this paradigm which promotes cohesion and complementarity among these disparate perspectives.

Within this paradigm, learners take an active, goal-oriented role, negotiating and interpreting new experiences in terms of previous ones and in terms of models they have built up to reformulate their internal schemata. A corollary to this view is that if learners are provided with opportunities to use language and learning strategies in L2, and if they are given some training in their application, they can develop these strategies through exposure to and experience in the L2 (McMeniman, 1994; Perrett, 1995). Such development can take place through a series of steps called *scaffolding,* in which teachers play a progressively diminishing role as the involvement and investment of the learner progressively increases (Donato, 1994). In this way, learners become more autonomous and self-directing in their attitudes and approaches to their own learning (Adair-Hauck & Donato, 1994; Rowsell & Libben, 1994), enabling teachers to devote their time and effort to aspects of language learning not easily mediated by computers.

In an attempt to remedy the perceived inability of Chomsky's transformational generative grammar (1965, 1981) to account fully for the influence of social and cultural contexts on the semantic aspects of language, Halliday (1978, 1985) developed a systemic functional grammar, which emphasises the way in which the different systems interact in the whole context of language, including the social and cultural features. This theory represented the introduction of a focus on the sociocultural aspects of language, with emphasis on the way in which social and cultural interaction shapes the realisation of meaning.

A particularly strong influence over the last few years on our understanding of the nature of language learning and the interrelationship between language and learning has come from the recognition of the similarities between the theories of Halliday and Vygotsky. While Halliday, as a linguist, has produced a detailed grammar that incorporates an acknowledgement of the integral part that social interaction plays in language, Vygotsky's contributions have been greater in the area of the role of language processing in the development of higher mental processes. However, both scholars are interested in the development of language as human beings grow and develop as social beings. In addition, they both subscribe to the notion that "language is a human invention" (Wells, 1994), and both believe that there is a symbiotic relationship between language and culture, and that language is intimately involved in the development of the intellect.

A critical facet of Vygotsky's conception of the development of higher mental processes is realised as the *Zone of Proximal Development,* or ZPD (Vygotsky, 1978, p. 86). This zone represents the sphere of potential intellectual growth within which an individual can develop with the stimulus and intervention of other more skilled individuals. The ZPD has been likened in concept to Krashen's concept of $i + 1$ (Richard-Amato, 1988). However, the ZPD places more emphasis on the *process* of learning development than on the stages. It is the interaction with others, such as teachers, guides, mentors, or even computers, that triggers the arousal of internal developmental processes. Lantolf and Appel (1994) describe it as follows:

> The process of voluntary acting is distributed between two people, one of whom (the adult or expert) already knows how to perform a particular act and one who (the child or novice) does not.

> Equally important is the fact that speech serves to direct, or mediate, the interactive process that transpires between the two. . . .The difference between what the child, or novice, is capable of when acting alone and what he or she is capable of when acting under the guidance of a more experienced other is referred to as the *zone of proximal development.* (p. 10)

Donato (1994) uses the concept of the ZPD to expand the potential of interaction from the *conduit metaphor* of a message in communication to include and emphasise collaborative meaning making. For Donato, this metaphor for a communicative event as merely "the successful sending and receiving of linguistic tokens. . .masks fundamentally important mechanisms of L2 [second language] development" such that "in the end, the social context is impoverished and undervalued as an arena for truly collaborative L2 acquisition" (p. 34). Donato proposes the metaphor of scaffolding as an alternative to that of the conduit, to exemplify the role of the ZPD in language development. The metaphor of scaffolding is used to support the principle that, "in social interaction a knowledgeable participant can create, by means of speech, supportive conditions in which the novice can participate in, and extend, current skills and knowledge to higher levels of competence" (Donato, 1994, p. 40).

The concept of the ZPD thus represents a useful metaphor for describing the kinds of interactions and posited outcomes that a successful CELL software package should engender.

The Concept of Learner-Centredness

Central to the development of a CELL model that allocates more control to the learners is an understanding of what is meant by learner-centredness. Over the last quarter-century, the predominant factors effecting changes in approach and methodology have been the following:

1) a stronger focus on the learner as an individual (Ellis, 1985; Skehan, 1989; Stevick, 1976, 1981);

2) a corresponding shift from a focus on teaching to a focus on learners and learning (Cotterall, 1995; Gremmo & Riley, 1995; Kumaravadivelu, 1993; Little, 1995);

3) consideration of differences in learning styles (Felder & Henriques, 1995; Griffiths & Sheen, 1992; Oxford & Ehrman, 1993; Wenden & Rubin, 1987; Willing, 1989) and learning strategies (O'Malley & Chamot, 1990; Oxford, 1990, 1993; Wenden, 1995; Wenden & Rubin, 1987); and

4) various manifestations of humanism (Asher, 1981; Crawford & Trojer, 1983; Curran, 1976; Gattegno, 1976; Lozanov, 1979; Stevick, 1990; Underhill, 1989).

The focus on learners' needs has become central to the philosophy of learner-centredness, as has the principle of developing learners' understanding of their own language learning styles and processes (Brindley, 1984; Nunan, 1988; Wenden, 1991; Willing, 1985). As part of these processes, learners need to be able to select which texts may be appropriate for their specific needs. In the contexts of distance education and flexible delivery, this can be facilitated through a multimedia database which uses classifications such as register, participants, and language function (Hoven, 1997b; Lian & Lian, 1997).

In a CELL environment, learners can be introduced to taking control over their own learning by being provided with exposure to awareness-raising activities across all parts of their language learning program, including the CELL software. In the initial stages, highly structured (teacher-centred) materials need to be available to cater to the needs of those learners with a strong dependence on teacher direction. However, to cater to differentially rapid development in the direction of autonomy, it is also necessary to provide the means whereby learners can take more control if they feel capable of doing so. This can be achieved by writing into the design of a CELL software package several levels of entry or several modes of interaction based on varying levels of learner control.

Roles and Characteristics of CELL in Relation to Listening Comprehension

In the context of multimedia, it is also necessary to consider the nature of emerging roles of the computer as interlocutor, expert teacher, and mediator of learning. According to Jonassen (1992, p.2), less emphasis should be placed on the design of the technologies and more on the processes involved in task completion. In order for these roles to be realised, the use of computers needs to be located within a learning environment that promotes and supports the activation of learners' mental processes across all activities and resources. The following is an outline of the elements of such a technology-mediated learning environment:

> I. Total learning environment characterised by a task-based and/or process-based syllabus and a focus on
>> A. Learning strategies (learning how to learn)
>> B. Language functions and purposes
>> C. Language structures
>> D. Paralinguistic features
>> E. Sociocultural features
>> F. Autonomy and self-direction
> II. Focus all activities on the development of control and responsibility for own learning
> III. Cultivate learner self-direction and autonomy
> IV. Provide access to facilities for multi-channelled perception/production
> V. Cultivate self- and peer-feedback and evaluation techniques among learners (to improve self-confidence and group cohesion)
> VI. Design CELL activities that incorporate self-exploration and self-discovery of problems and errors
> VII. Provide a range of print and non-print based resources, including student- and teacher-produced materials and well as those commercially available and on the Web.

In the context of CELL, there is also room to raise the question of whether characteristics of the computer software, help, and feedback mechanisms may be classified as *interlocutor characteristics* when there is a level of interactivity between learners and these functions. While such questions lie outside the scope of this article, studies in the field of human-computer interface (Reeves & Nass, 1996), have begun to deal with some aspects of this question.

There have so far been no studies in the CALL area dealing specifically with the characteristics of interlocutors in human-computer interactions, though researchers such as Dickson (1985) and Meskill (1992) have begun to investigate which aspects of software and what kinds of computer-learner groupings lead to more communicative interaction. In addition, Chapelle (1994), working within the understanding of genre developed by Halliday and Hasan (1989) and Swales (1990), suggests that the effective use and study of CALL hinges on the analysis of CALL activities in terms of three levels of difference: text, genre, and context. According to Chapelle, the computer is both one of the participants in the co-creation of a text, and a mediator in the learning experience (p. 38).

For Chapelle, the computer clearly has a role to play as an interactor in a language learning context. However, as stressed by Jonassen (1992), computer technology does not of itself take this role. Pedersen (1987, p. 100) also finds that "recent CALL research. . .suggests that the *design* of computer software to cause adjustments in cognitive processing, not the *medium* used to deliver instruction, stands the best chance of affecting learning outcomes." Technology is only the vehicle for the pedagogy embodied in the software, and thus the rationale behind the design of the software is what allows the computer to perform in this interactive role. More specifically, the features of the computer that allow it to be used as a mediator of learning are the instructional design of the learning activities, the content of the learning material, the design of the interface, and the various help and feedback facilities. This mediator role includes that of mentor in the learnerÕs learning progression through the Zone of Proximal Development.

PUTTING IT ALL TOGETHER: WHAT DOES THE MODEL LOOK LIKE?

Having considered the various features to be included in a learner-centred sociocultural model for incorporating CELL software, we now turn to the question of how these features can be put together. It seems clear from the preceding discussion that in order for the software to be effective as a learning tool, it needs to be located within a learning environment that employs the same approach consistently across the different learning activities, resources, and tools which comprise this environment.

Within this environment, the content of the software must incorporate what we know about effective listening and viewing comprehension from a theoretical perspective, and relate this to sociocultural principles. In addition, individual differences in learners, including learning styles and preferred learning modes, must be factored in, to cater to the heterogeneity of learners. Finally, the instructional design of the software, including the functional and navigational aspects, must be mapped onto these components to produce a coherent model as illustrated in Figure 1.
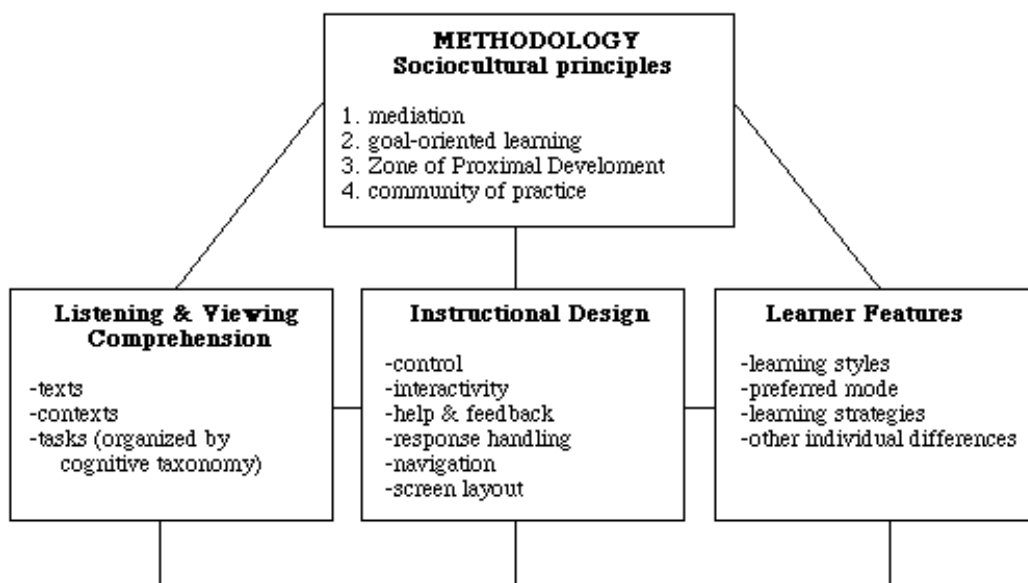
METHODOLOGY
Sociocultural principles

1. mediation
2. goal-oriented learning
3. Zone of Proximal Development
4. community of practice

Listening & Viewing Comprehension

-texts
-contexts
-tasks (organized by
   cognitive taxonomy)

Instructional Design

-control
-interactivity
-help & feedback
-response handling
-navigation
-screen layout

Learner Features

-learning styles
-preferred mode
-learning strategies
-other individual differences

Figure 1. Proposed learner-centred model for designing multimedia CELL software for listening comprehension

CONCLUSION

From the preceding discussion, it can be seen that it is difficult and probably undesirable to attempt to determine the difficulty of a listening and viewing task in any absolute terms. By considering the three aspects that affect the level of difficulty, namely *text, task,* and *context features,* it is possible to identify those characteristics of tasks that can be manipulated. Having identified the variable characteristics of tasks in developing the model, it is necessary to look to the dynamic interaction among, tasks, texts, and the computer-based environment.

Task design and text selection in this model also incorporate the identification and consideration of context. Teachers can make provision for their influence on learner perception of difficulty by providing texts and tasks that range across these levels, and by ensuring that learners with lower language proficiency can ease themselves gradually into the more contextually difficult tasks. This can be achieved by reducing the level of difficulty of other parameters such as text or task difficulty, or by minimising other aspects of contextual difficulty. Thus, for example, learners of lower proficiency who are exposed

for the first time to a task based on a broadcast announcement would be provided with appropriate visual support in the form of graphics or video to reduce textual difficulty. The task type would also be kept to a low level of cognitive demand (Hoven, 1991, 1997a, 1997b).

In a CELL environment, this identification of parameters of difficulty enables task designers to develop and modify tasks on the basis of clear language pedagogy that is both learner-centred and cognitively sound. Learners are provided with the necessary information on text, task, and context to make informed choices, and are given opportunities to implement their decisions. Teachers are therefore creating a CELL environment that facilitates and encourages exploration of, and experimentation with, the choices available. Within this model, learners are then able to adjust their own learning paths through the texts and tasks, and can do this at their own pace and at their individual points of readiness. In sociocultural terms, the model provides learners with a guiding framework or community of practice within which to develop through their individual Zones of Proximal Development. The model provides them with the tools to mediate meaning in the form of software incorporating information, feedback, and appropriate help systems.

By taking account of learners' needs and making provision for learner choice in this way, one of the major advantages of using computers in language learning--their capacity to allow learners to work at their own pace and in their own time--can be more fully exploited. It then becomes our task as researchers to evaluate, with learners' assistance, the effectiveness of environments such as these in improving the their listening and viewing comprehension as well as their approaches to learning in these environments.

ABOUT THE AUTHOR

Debra Hoven teaches Indonesian language and culture at undergraduate level and supervises postgraduate research students in CALL-related areas in the Department of Asian Languages and Studies at the University of Queensland, Australia. She has taught ESL/EFL, Indonesian, Japanese and German at all levels from kindergarten to tertiary in Australia and Asia. Her research interests include learner-centred CALL, learning styles and strategies, particularly in multimedia language learning applications, innovative teaching practices, collaborative and cooperative learning, and sociocultural implications of the uses of electronic communications in the east Asian region.

E-mail: d.hoven@mailbox.uq.edu.au

REFERENCES

Adair-Hauck, B., & Donato, R. (1994). Foreign language explanations within the zone of proximal development. *The Canadian Modern Language Review 50*(3), 532-557.

Anderson, A., & Lynch, T. (1988). *Listening*. Oxford: Oxford University Press.

Armstrong, D. F., Stokoe, W. C., & Wilcox, S. E. (1995). *Gesture and the nature of language.* Cambridge: University of Cambridge.

Arndt, H., & Janney, R. W. (1987). *InterGrammar: Toward an integrative model of verbal, prosodic and kinesic choices in speech.* Berlin: Mouton de Gruyter.

Asher, J. J. (1981). Comprehension training: The evidence from laboratory and classroom studies. In H. Winitz (Ed.), *The Comprehension Approach to Foreign Language Instruction* (pp. 187-222). Rowley, MA: Newbury House.

Bacon, S. M. (1992a). Authentic listening in Spanish: How learners adjust their strategies to the difficulty of input. *Hispania 75,* 29-43.

Bacon, S. M. (1992b). The relationship between gender, comprehension, processing strategies, cognitive and affective response in foreign language listening. *Modern Language Journal 76*(2), 160-178.

Batley, E. M., & Freudenstein, R. (Eds.). (1991). *CALL for the Nineties: Computer Technology in Language Learning.* Marburg, Germany: FIPLV/EUROCENTRES.

Beebe, L. M., & Takahashi, T. (1989). Do you have a bag?: Social status and patterned variation in second language acquisition. In S. Gass, C. Madden, D. Preston, & L. Selinker (Eds.), *Variation in second language acquisition: Discourse and pragmatics,* pp. 103-125. Clevedon, England: Multilingual Matters.

Bickel, B., & Truscello, D. (1996). New opportunities for learning: styles and strategies for computers. *TESOL Journal 6*(1), 15-19.

Boekaerts, M. (1981). Is there a direct link between the comprehension process and the production process? In M. Heid (Ed.), *Protokoll eines Werkstattgesprachs des Goethe House, New York,* pp. 26-60. München: Druckerei Kemmler und Hoch.

Bond, Z. S., & Garnes, S. (1980). Misperceptions of fluent speech. In R. A. Cole (Ed.), *Perception and production of fluent speech,* pp. 115-132. Hillsdale, NJ: Erlbaum Associates.

Boyle, J. P. (1984). Factors affecting listening comprehension. *ELT Journal 38,* 35-38.

Brett, P. (1995). Multimedia for listening comprehension: The design of a multimedia-based resource for developing listening skills. *System 23*(1), 77-85.

Bright, D. E., Verano, M., & Cubero, R. A. (1991). From theory to practice: A model for an interactive videodisc lesson. In M. D. Bush, A. Slaton, M. Verano, & M. E. Slayden (Eds.), *Interactive videodisc: The "Why" and the "How."* (CALICO Monograph Series, Vol. 2, Spring, pp. 1-15.) Provo, UT: Brigham Young Press.

Brindley, G. (1984). *Needs analysis and objective setting in the Adult Migrant Education Program.* Sydney: NSW Adult Migrant Education Service.

Brown, G. (1986). Investigating listening comprehension in context. *Applied Linguistics 7*(3), 284-302.

Brown, G. (1989). Making sense: The interaction of linguistic expression and contextual information. *Applied Linguistics 1,* 97-108.

Brown, G., & Yule, G. (1983). *Teaching the spoken language.* Cambridge: Cambridge University Press.

Buck, G. (1992). Listening comprehension: Construct validity and trait characteristics. *Language Learning 42,* 313-349.

Byrnes, H. (1984). The role of listening comprehension: A theoretical base. *Foreign Language Annals 17*(4), 317-329.

Canale, M. (1984). Considerations in the testing of reading and listening proficiency. *Foreign Language Annals 17*(4), 349-357.

Candy, P. (1987). Evolution, revolution or devolution: Increasing learner-control in the instructional setting. In D. Boud & V. Griffin (Eds.), *Appreciating adults learning: From the learners' perspective,* pp. 159-178. London: Kogan Page Ltd.

Chang, K-Y. R., & Smith, W. F. (1991). CALL/IVD workstations: Towards a rationale for their use in cooperative learning environments. In M. D. Bush, A. Slaton, M. Verano, & M. E. Slayden (Eds.), *Interactive videodisc: The "Why" and the "How."* (CALICO Monograph Series, Vol. 2, Spring, pp. 101-109.) Provo, UT: Brigham Young Press.

Chapelle, C. A. (1994). CALL activities: Are they all the same? *System 22*(1), 33-45.

Chomsky, N. (1965). *Aspects of the theory of syntax*. The Hague: Mouton.

Chomsky, N. (1981). *Lectures on Government and Binding.* Dordrecht: Foris Publications.

Conrad, L. (1985). Semantic versus syntactic cues in listening comprehension. *Studies in Second Language Acquisition 7*(1), 59-72.

Cook, V. J. (1985). Bridging the gap between computers and language teaching. *Computers in English language teaching. ELT Documents,* No. 122, 13-24.

Cotterall, S. (1995). Readiness for autonomy: Investigating learner beliefs. *System 23,* 195-205.

Craven, M.-L., Sinyor, R., & Paramskas, D. (Eds.). (1990). *CALL: Papers and reports*. La Jolla, CA.: Athelstan Publications.

Crawford, J., & Trojer, L. (1983). An introduction to the structuro global audio visual approach to language learning. *Australian Review of Applied Linguistics 6,* 20-29.

Curran, C. A. (1976). *Counseling-learning in second languages*. Apple River, IL: Apple River Press.

Dalgish, G. M. (1987). Some uses of computers in teaching English as a Second Language: The issue of control. In J. S. Blanchard & G. E. Mason (Eds.), *The Computer in reading and language arts,* pp. 81-93. New York: The Haworth Press.

Davies, G., & Higgins, J. (1985). *Using computers in language learning: A teacher's guide. Information Guide 22*. London: Centre for Information on Language Teaching and Research.

Dickson, W. P. (1985, May). Thought-provoking software: juxtaposing symbol systems. *Educational Researcher,* 30-38.

Donato, R. (1994). Collective scaffolding in second language learning. In J. P. Lantolf & G. Appel (Eds.), *Vygotskian approaches to second language learning,* pp. 33-56. Norwood, NJ: Ablex Publishing Corporation.

Doughty, C. (1987). Relating second-language acquisition theory to CALL research and application. In W. F. Smith (Ed.), *Modern media in foreign language education: Theory and implementation,* pp. 133-167. Lincolnwood, IL: National Textbook Company.

Doughty, C. (1991). Theoretical motivations for IVD software research and development. In M. D. Bush, A. Slaton, M. Verano, & M. E. Slayden (Eds.), *Interactive videodisc: The "Why" and the "How."* (CALICO Monograph Series, Vol. 2, Spring, pp. 17-23.) Provo, UT: Brigham Young Press.

Dunkel, P. (1986). Developing Listening Fluency in L2: Theoretical Principles and Pedagogical Considerations. *The Modern Language Journal 70*(2), 99-106.

Dunkel, P. (Ed.) (1991a). *Computer-assisted language learning and testing*. New York: Newbury House.

Dunkel, P. (1991b). Listening in the native and second/foreign language: Toward an integration of research and practice. *TESOL Quarterly 25*(3), 431-457.

Ellis, R. (1985). *Understanding second language acquisition*. Oxford: Oxford University Press.

Faerch, C., & Kasper, G. (1986). The role of comprehension in second language learning. *Applied Linguistics 7*(3), 257-274.

Felder, R. M., & Henriques, E. R. (1995). Learning and teaching styles in foreign language education. *Foreign Language Annals 28,* 21-31.

Felix, U. (1995). *Theater Interaktiv*: multimedia integration of language and literature. *On-CALL 9,* 12-16.

Fidelman, C. (1994). *In the French Body/In the German Body: Project results*. Demonstrated at the CALICO '94 Annual Symposium "Human Factors." Northern Arizona University, Flagstaff, AZ.

Fidelman, C. G. (1997). Extending the language curriculum with enabling technologies: Nonverbal communication and interactive video. In K. A. Murphy-Judy (Ed.), *NEXUS: The convergence of language teaching and reseearch using technology,* pp. 28-41. Durham, NC: CALICO.

Fish, H. (1981). Graded activities and authentic materials for listening comprehension. In *The teaching of listening comprehension. ELT Documents Special: Papers presented at the Goethe Institut Colloquium Paris 1979,* pp. 107-115. London: British Council.

Garrigues, M. (1991). Teaching and learning languages with interactive videodisc. In M. D. Bush, A. Slaton, M. Verano, & M. E. Slayden (Eds.), *Interactive videodisc: The "Why" and the "How."* (CALICO Monograph Series, Vol. 2, Spring, pp. 37-43.) Provo, UT: Brigham Young Press.

Gassin, J. (1992). Interkinesics and Interprosodics in Second Language Acquisition. *Australian Review of Applied Linguistics 15*(1), 95-106.

Gattegno, C. (1976). *The common sense of teaching foreign languages.* New York: Educational Solutions.

Graham, J. L. (1990). An exploratory study of the process of marketing negotiations using a cross-cultural perspective. In R. Scarcella, E. S. Andersen, & S. D. Krashen (Eds.), *Developing communicative competence in a second language,* pp. 239-279. Boston, MA: Heinle & Heinle Publishers.

Grellet, F. (1981). *Developing reading skills.* Cambridge: Cambridge University Press.

Gremmo, M. J., & Riley, P. (1995). Autonomy, self-direction and self access in language teaching and learning: The history of an idea. *System 23,* 151-164.

Griffiths, R., & Sheen, R. (1992). Disembedded figures in the landscape: A reappraisal of L2 research on field dependence/independence. *Applied Linguistics 13,* 133-148.

Halliday, M. A. K. (1978). *Language as social semiotic: The social interpretation of language and meaning.* London: Arnold.

Halliday, M. A. K. (1985). *An introduction to functional grammar.* London: Edward Arnold.

Halliday, M. A. K. (1993). Towards a language-based theory of learning. *Linguistics and Education 5*(2), 93-116.

Halliday, M. A. K., & Hasan, R. (1989). *Language, context, and text: aspects of language in a social-semiotic perspective.* Oxford: Oxford University Press.

Hanley, J. E. B., Herron, C. A., & Cole, S. P. (1995). Using video as an advance organizer to a written passage in the FLES classroom. *The Modern Language Journal 79,* 57-66.

Herron, C. (1994). An investigation of the effectiveness of using an advance organizer to introduce video in the foreign language classroom. *The Modern Language Journal 78*(2), 190-198.

Herron, C., Morris, M., Secules, T., & Curtis, L. (1995). A comparison study of the effects of video versus text-centered instruction in the foreign language curriculum. *French Review 68,* 775-795.

Herron, C., & Seay, I. (1991). The effect of authentic aural texts on student listening comprehension in the foreign language classroom. *Foreign Language Annals 24,* 487-495.

Higgins, J. (1995). *Computers and English Language Learning.* Oxford: Intellect.

Hoven, D. (1991). Towards a cognitive taxonomy of listening comprehension tasks. *SGAV Review 9*(2), 1-14. Retrieved from the World Wide Web July 25, 1999: http://jcs120.jcs.uq.edu.au/~dlh/pubs/SGAV91.htm.

Hoven, D. (1997a). Instructional design for multimedia: Towards a learner-centred CELL (Computer-Enhanced Language Learning) model. In K. A. Murphy-Judy (Ed.), *NEXUS: The convergence of language teaching and research using technology,* pp. 98-111. Durham, NC: CALICO.

Hoven, D. (1997b). *Improving the management of flow of control in computer-assisted listening comprehension tasks for second and foreign language learners.* Unpublished doctoral dissertation, University of Queensland, Brisbane, Australia. Retrieved July 25, 1999 from the World Wide Web: http://jcs120.jcs.uq.edu.au/~dlh/thesis/.

Hoven, D., & Farquhar, M. (1996). On messages and media, clocks and cannibal chiefs. In M. Farquhar & P. McKay (Eds.), *China connections: Australian business needs and university language education,* pp. 258-292. Canberra: National Languages and Literacy Institute of Australia.

Hurley, D. S. (1992). Issues in teaching pragmatics, prosody, and non-verbal communication. *Applied Linguistics 13*(3), 259-281.

Jonassen, D. (1992). What are cognitive tools? In P. A. M. Kommers, D. H. Jonassen, & J. T. Mayes (Eds.), *Cognitive Tools for Learning,* pp. 1-6. Berlin: Springer-Verlag.

Kasper, G. (1989). Interactive procedures in interlanguage discourse. In W. Olesky (Ed.), *Contrastive pragmatics,* pp. 189-229. Amsterdam: Benjamins.

Kellerman, S. (1992). "I See What You Mean": The role of kinesic behaviour in listening and implications for foreign and second language learning. *Applied Linguistics 13*(3), 239-258.

Kellerman, E., Ammerlaan, T., Bongaerts, T., & Poulisse, N. (1990). System and hierarchy in L2 compensatory strategies. In R. Scarcella, E. S. Andersen, & S. D. Krashen (Eds.), *Developing communicative competence in a second language,* pp. 163-178. Boston, MA: Heinle & Heinle Publishers.

Kennedy, C., Tiziana, M., & Murray, S. V. (1995). *Italia oggi:* a multimedia window on contemporary Italy. *On-CALL 9,* 2-10.

Kenning, M. M., & Kenning, M. J. (1990). *Computers and language learning: Current theory and practice.* Chichester, England: Ellis Horwood Ltd.

Kumaravadivelu, B. (1993). The name of the task and the task of naming: Methodological aspects of task-based pedagogy. In G. Crookes & S. M. Gass (Eds.), *Tasks in a pedagogical context: Integrating theory and practice,* pp. 69-96. Clevedon, England: Multimedia Matters.

Lantolf, J. P., & Appel, G. (1994). Theoretical framework: An introduction to Vygotskian approaches to second language research. In J. P. Lantolf & G. Appel (Eds.), *Vygotskian approaches to second language research,* pp. 1-32. Norwood, NJ: Ablex Publishing Corporation.

Lian, A. P., & Lian, A. B. (1997). The secret of the Shao-Lin monk: Contribution to an intellectual framework for language learning. *On-CALL 11*(2), 2-18.

Linquist, K., Rowekamp, J., & Stenson, N. (1991). Learner-controlled listening materials using a commercial videodisc. *CÆLL Journal 2,* 3-7.

Liou, H-C. (1995). Evaluation of interactive videodisc courseware: Effects of strategy training and collaborative learning. In F. L. Borchardt & E. M. T. Johnson (Eds.), *Proceedings of the Computer Assisted Language Instruction Consortium 1995 annual symposium "Computers and collaborative learning,"* pp. 112-115. Durham, NC: Heinle & Heinle Publishers.

Little, D. (1995). Learning as dialogue: the dependence of learner autonomy on teacher autonomy. *System 23,* 175-181.

Long, D. R. (1989). Second language listening comprehension: A schema-theoretic perspective. *The Modern Language Journal 73*(i) 32-40.

Lörscher, W. (1986). Conversational structures in the foreign language classroom. In G. Kasper (Ed.), *Learning, teaching and communicating in the foreign language classroom,* pp. 11-22. Aarhus, Denmark: Aarhus University Press.

Lozanov, G. (1979). *Suggestology and outlines of Suggestopedy.* New York: Gordon and Breach, Science Publishers.

Lund, R. J. (1990). A taxonomy for teaching second language listening. *Foreign Language Annals 23*(2), 105-115.

Lund, R. J. (1991). A comparison of second language listening and reading comprehension. *Modern Language Journal 75,* 196-204.

Lynch, A. J. (1988). *Grading foreign language listening comprehension materials: The use of naturally modified interaction.* Unpublished doctoral dissertation, University of Edinburgh.

Marslen-Wilson, W., & Tyler, L. K. (1980). The temporal structure of spoken language understanding. *Cognition 8,* 1-71.

McLaughlin, B. (1987). *Theories of Second Language Learning.* London: Edward Arnold.

McMeniman, M. (1994, April). Putting thinking back into language. Public Research Lecture delivered at Griffith University, Brisbane, Australia.

Mendelsohn, D. J., & Rubin, J. (1995). *A guide for the teaching of second language listening.* San Diego, CA: Dominie Press.

Meskill, C. (1991). Multimedia and language learning: Assessing goals and system attributes. *CÆLL Journal 2,* 11-14.

Meskill, C. (1992). CALL: Individual versus negotiated task processing. Paper presented at the CALICO Symposium: Outreach '92, Monterey, CA.

Meyer, L. (1990). It was no trouble: Achieving communicative competence in a second language. In R. Scarcella, E. S. Andersen, & S. D. Krashen (Eds.), *Developing communicative competence in a second language,* pp. 195-215. Boston, MA: Heinle & Heinle Publishers.

Mueller, G. (1980). Visual contextual cues and listening comprehension: An experiment. *Modern Language Journal 64,* 335-340.

Neu, J. (1990). Assessing the role of non-verbal communication in the acquisition of communicative competence in L2. In R. Scarcella, E. S. Andersen, & S. D. Krashen (Eds.), *Developing communicative competence in a second language,* pp. 121-138. Boston, MA: Heinle & Heinle Publishers.

Nunan, D. (1988). *The learner-centred curriculum.* Cambridge: Cambridge University Press.

Nunan, D. (1989). *Designing tasks for the communicative classroom.* Cambridge: Cambridge University Press.

Nunan, D. (1990). Learning to listen in a second language. *Prospect 5*(2), 7-23.

Nunan, D. (1991). *Language teaching methodology.* Sydney: Prentice-Hall.

O'Malley, J. M., & Chamot, A. U. (1990). *Learning strategies in second language acquisition.* Cambridge: Cambridge University Press.

O'Malley, J. M., Chamot, A. U., & Küpper, L. (1989). Listening comprehension strategies in second language acquisition. *Applied Linguistics 10*(4), 419-437.

Oxford, R. L. (1990). *Language learning strategies: What every teacher should know.* Boston, MA: Heinle & Heinle Publishers.

Oxford, R. L. (1993). Research on second language learning strategies. *Annual Review of Applied Linguistics 13,* 175-187.

Oxford, R. L., & Ehrman, M. (1993). Second language research on individual differences. *Annual Review of Applied Linguistics 13,* 188-205.

Pederson, K. M. (1987). Research on CALL. In W. F. Smith (Ed.), *Modern media in foreign language education: theory and implementation,* pp. 99-131. Lincolnwood, IL: National Textbook Company.

Pennington, M. C. (Ed.). (1989). *Teaching languages with computers: The state of the art.* La Jolla, CA: Athelstan Publications.

Pennington, M. C. (Ed.). (1996). *The power of CALL.* Houston, TX.: Athelstan Publications.

Perrett, G. (1995, August 21-24). Communicative language teaching and second language acquisition theory. *MLTAQ Inc. Newsletter,* No. 101.

Pica, T., Young, R., & Doughty, C. (1987). The impact of interaction on comprehension. *TESOL Quarterly 21*(4), 737-758.

Reeves, B., & Nass, C. (1996). *The media equation: How people treat computers, televisions, and New Media like real people and places.* Center for the Study of Language & Information, Lecture Notes Series: CSLI Publications.

Richard-Amato, P. A. (1988). *Making it happen.* New York: Longman.

Richards, J. C. (1983). Listening comprehension: Approach, design, procedure. *TESOL Quarterly 17*(2), 219-240.

Richards, J. C. (1985). *The context of language teaching.* Cambridge: Cambridge University Press.

Riley, P. (1981). Viewing comprehension: lÕoeil ecoute. *The teaching of listening comprehension.* (ELT Documents Special: Papers presented at the Goethe Institut Colloquium Paris 1979, pp. 143-156.) London: British Council.

Robinson, G. L. (1991). Effective feedback strategies in CALL. In P. Dunkel (Ed.), *Computer-assisted language learning and testing,* pp. 155-167. New York: Newbury House.

Rost, M. (1990). *Listening in language learning.* London: Longman.

Rowsell, L. V., & Libben, G. (1994). The sound of one hand clapping: How to succeed in independent language learning. *The Canadian Modern Language Review 50*(4), 668-687.

Rubin, J. (1994). A review of second language listening comprehension research. *The Modern Language Journal 78*(2), 199-221.

Schmidt-Reinhart, B. C. (1994). The effects of topic familiarity on second language listening comprehension. *The Modern Language Journal 78*(2), 179-189.

Secules, T., Herron, C., & Tomasello, M. (1992). The effect of video context on foreign language learning. *Modern Language Journal 76,* 480-490.

Skehan, P. (1989). *Individual differences in second-language learning.* London: Edward Arnold.

Staddon, S. (1990). Interactive video and language learning ø the Expodisc Spanish experience. *On-CALL 5,* 2-4.

Stevens, V. (1992). Humanism and CALL: A coming of age. In M. C. Pennington & V. Stevens (Eds.), *Computers in applied linguistics: An international perspective,* pp. 11-38. Clevedon, England: Multilingual Matters.

Stevick, E. W. (1976). *Memory, meaning and method.* Cambridge, MA: Newbury House Publishers.

Stevick, E. W. (1981). *Teaching and learning languages.* Cambridge: Cambridge University Press.

Stevick, E. W. (1990). *Humanism in language teaching.* Oxford: Oxford University Press.

Swaffar, J., & Bacon, S. (1993). Reading and listening comprehension: Perspectives on research and implications for practice. A. Omaggio Hadley (Ed.), *Research in language learning: Principles, processes, and prospects,* pp. 124-155. Lincolnwood, IL: National Textbook Company in conjunction with the American Council on the Teaching of Foreign Languages.

Swales, J. (1990). *Genre analysis: English in academic and research settings.* Cambridge: Cambridge University Press.

Taylor, H. M. (1981). Learning to Listen to English. *TESOL Quarterly 15*(1), 41-50.

Underhill, A. (1989). Process in humanistic education. *ELT Journal*, *43*(4), 250-260.

Ur, P. (1984). *Teaching listening comprehension.* Cambridge: Cambridge University Press.

Van Patten, B. (1989). Can learners attend to form and content while processing input? *Hispania 72,* 409-417.

Vogely, A. (1995). Perceived strategy use during performance on three authentic listening comprehension tasks. *The Modern Language Journal 79,* 41-56.

Voss, B. (1984). Perception of first-language and second-language texts: a comparative study. *Bielefelder Beiträge zur Sprachlehrvorschung 13*(2), 131-153.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* M. Cole, V. John-Steiner, S. Scribner, & E. Souberman (Eds. and Trans.). Cambridge, MA: Harvard University Press.

Wells, G. (1994). The complementary contributions of Halliday and Vygotsky to a "language-based theory of learning." *Linguistics and Education 6*(1), 41-90.

Wenden, A. (1991). *Learner strategies for learner autonomy.* New York: Prentice Hall International.

Wenden, A. (1995). Learner training in context: A knowledge-based approach. *System 23,* 183-194.

Wenden, A., & Rubin, J. (1987). *Learner strategies in language learning.* Englewood Cliffs, NJ: Prentice-Hall.

Willing, K. (1985). *Helping adults develop their learning strategies.* Sydney: AMES.

Willing, K. (1989). *Teaching how to learn. Learning strategies in ESL: A teachers guide.* Sydney: National Centre for English Language Teaching and Research.

Wipf, J. A. (1984). Strategies for teaching second language listening comprehension. *Foreign Language Annals 17*(4), 345-348.

Wolff, D. (1987). Some assumptions about second language text comprehension. *Studies in Second Language Acquisition*