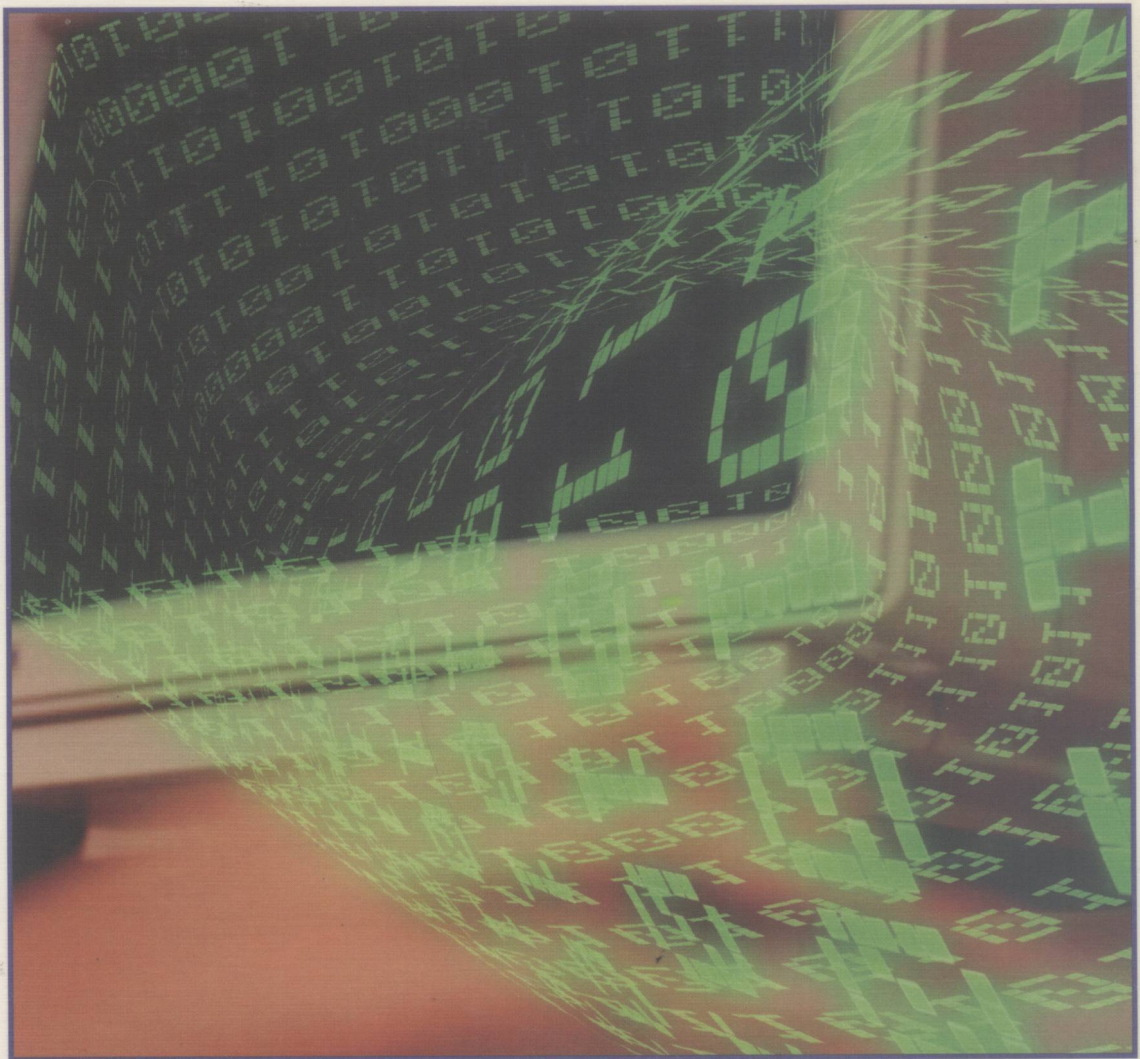


HANDBOOK OF RESEARCH ON
COMPUTER-ENHANCED
LANGUAGE
ACQUISITION
AND LEARNING



Felicia Zhang & Beth Barber

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Handbook of Research on Computer-Enhanced Language Acquisition and Learning

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Foreword

I am delighted to write the foreword for the *Handbook of Research on Computer-Enhanced Language Acquisition and Learning*, as its scope and content provide educational institutions and commercial computer software enterprises with practical information from the field of language learning for the successful implementation of computer technology. People have been experimenting with the uses of computer-assisted language learning (CALL) since the beginnings of computing. Wonderful and important mainframe-based systems, such as PLATO, were created and used to teach languages to significant numbers of students. Yet, these systems were reserved essentially for those elites that had access to these large and expensive systems. CALL, like other forms of technology-supported learning, has only truly captured the imagination of the language teaching profession since the advent of the microprocessor which began to democratize access to computing. Thus, CALLas, a major field of endeavor for “the masses,” has been in existence for only a very short time: less than three decades. It is such a new field!

From the very beginning of the microprocessor revolution, computing for all appeared to become a reality and the critical mass of people involved in the field multiplied exponentially, thus hugely increasing the intellectual commitment to the field. Such increasing intellectual commitment is demonstrated by the authors of the 30 chapters who contributed to this handbook.

Many of the authors invested in personal computers and hurried to produce the ultimate piece of language-learning software. Some wrote their own code (usually BASIC but sometimes Pascal or even machine language), others had to wait for the freedom afforded by the invention of Hypercard and systems like it. These were days of great hope and great ambition. There were also days of great frustration for two apparently contradictory reasons.

On one hand, the potential of the technology had outstripped the thinking processes involved with its application to language-teaching and learning. This often resulted in software which entrenched outdated teaching and learning paradigms. People argued that this was better than nothing. On the other hand, paradoxically, the technology was not sufficiently advanced to satisfy the hopes and aspirations of imaginative theoreticians of language learning who had been dreaming of the days when affordable computing would become available. Having theorized these systems, they were now keen to turn theory into practice, but were unable to do so because of the limitations of the technology.

The field of CALL/CELL/TELL is now maturing and heading toward a better balance between technology and thinking. While the technology is still developing faster than our thinking processes and we are still driving forward while, we are, inevitably, looking in the rear-vision mirror. We learned to recognize and deal more effectively with the dissonance between the speed of technological development and the speed of our thinking. This handbook provides some documentary evidence that, while dealing with the dissonance between the speed of technological development and the speed of our thinking, there is something genuinely to be gained in using technology in language learning. Technology and

our thinking process not only co-exist side by side, they also intersect in many interesting ways so as to inspire new thinking process and new ways of using technology alike.

This handbook contains a number of reports which provide us with information on how some of the tools that we had been waiting for reduced the frustrations of the past and, how they provided us with wonderful opportunities for thinking differently and imaginatively about the teaching and learning of languages.

The handbook of research on computer-enhance language acquisition and learning abounds with descriptions of how CALL practitioners from all over the world have taken advantage of these opportunities in remarkably different, yet eminently practical, ways to the clear benefit of the language-learning enterprise as a whole. It offers practical knowledge derived from implementation of technology based on theories of second language acquisition, multimedia learning, and theories from cognitive psychology. Its multi-disciplinary approach is most welcome. It represents an original and important contribution to the state of the art. It will help to build the future of CALL while, at the same time, provide a valuable historical record of the state of play in the early 21st century.

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Andrew Lian specializes in the methodology of teaching foreign/second languages and has had a special interest in the uses of modern technology to enhance learning since the late 1970s. He is one of the pioneers of technology-enhanced language-learning in Australia. Currently, he is professor and chair of the department of foreign languages and literatures at Western Illinois University in the United States. He has held professorial appointments and been head of department in four universities in Australia and the United States. His current research interests include the development and use of multimedia databases in language teaching and learning.

Preface

BACKGROUND

Over the last 30 years, dramatic changes have taken place in the ways that languages are taught. Language learning has moved from the learning of discrete grammatical structures to the fostering of communicative ability. The role of the learner has changed from being a recipient of grammatical structures to that of a creator and user of language. In the field of second language acquisition (SLA), it has also been realized that to be a proficient speaker of an L2 learners have to comprehend input from other speakers; they must produce comprehensible output through speaking and writing and be able to communicate appropriately according to the rules of the L2 culture. Culture is such an all-encompassing concept that though its importance has been recognized, there continues to be much (heated) debate about how it should be or could be taught (Kramsch, 1993; Kraus, 2003). The development of information communication technology (ICT) has also created many learning paths that can assist the process of learning an L2. With the availability of CD-ROMs, multimedia computer labs, the World Wide Web and e-mail, learners are able to access foreign language documents, and communicating with native speakers, teachers and fellow classmates through email or text messages has become an everyday reality. In other words, in the twenty first century, while the use of ICT in language learning by teachers is still not widespread (Abdal-Haqq, 1995; Cotton, 1995), learners have enthusiastically taken up various forms of technology despite the reluctance of teachers.

From the teaching perspective, there has been considerable published research exploring the relationship between the use of ICT and language learning. However, the simple question: 'Does the use of ICT lead to better language learning?' still cannot be adequately answered. This might be because what is involved in language or language learning is still not well understood, let alone what constitutes "better" language learning. As observed by Zhang (2006), "Language and the human mind are not a well-charted terrain whose waterways are now rendered easily navigable. Linguists, psychologists, neurologists and even philosophers have made bold forays along some of the more easily recognized estuaries and returned with sketchy maps. Yet we do not know enough to know how (or even if) these maps fit together (p.35)."

As for the interaction of ICT and language learning, Warschauer and Kern (2000) observe that the computer, like any other technological tool used in teaching (e.g., pencils and paper, blackboards, overhead projectors, tape recorders), does not in and of itself bring about improvement in learning. We must, therefore, look to particular practices of use in particular contexts in order to begin to answer the question. Furthermore, these practices of use must be described as well as evaluated in terms of their specific social context. For instance, who were the learners? What exactly did they do? For what purpose? In what setting? With what kinds of language? In what patterns of social interaction? What were the particular outcomes in terms of quantity/quality of language use, attitudes, motivation?

PURPOSE AND SCOPE OF THE HANDBOOK

This book deals with the use of ICT in language learning. It is designed to be a comprehensive source of information providing researchers and teachers with a number of empirical studies that are based on sound pedagogy and are properly evaluated. The intention is to illustrate the development and growth in the use of ICT in language learning. Moreover, as is evident from the title, the book does not confine itself to research defined by any particular definition of computer assisted language learning (CALL). In other words, while acknowledging the contribution of CALL in the fields of study such as SLA or foreign language teaching (FLT), the intent is also to look beyond such disciplinary concerns and include examples of best practice in relevant areas of mainstream computer science such as speech technology.

The handbook presents cases of ICT use in language learning in which ICT is considered neither as an adjunct or tool for learning nor as a method of instruction in itself. One of the aims of the book is to present cases of successful interaction of ICT tools and pedagogy rather than just ICT tools or pedagogy alone.

The past few years have seen a number of comprehensive summaries of relevant research in CALL (Felix, 2001; Salaberry, 2001; Warschauer & Healey, 1998). Therefore, rather than reiterating what has been described before, in this preface, being the first chapter of this volume, the emphasis is on the role of learners and learning in the history of approaches to second language education and the particular history of CALL is briefly described.

SHIFTING PERSPECTIVES OF ROLE OF LEARNERS AND LEARNING

In recent history of language teaching changes that are evident in language teaching and learning can be characterized by the overlapping of three theoretical movements: structural, cognitive, and sociocognitive. These movements have also influenced how computer technology has been used in language teaching and learning. Therefore, we begin by briefly summarizing the development of these perspectives. Warschauer and Kern (2000) provide details of the respective instructional foci of the three perspectives in Table 1.

Structural Perspective

In the structural perspective, language was viewed as an autonomous structural system consisting of vocabulary, grammatical structures and prescriptive rules. Therefore, language learning is defined as the mastery of the various components of the structural system and this is accomplished, according to behaviorism (Skinner, 1938), by imitating the language stimulus and then receiving either positive or negative reinforcement. Teaching is carried out through the transmission of knowledge from competent users such as teachers and native speakers. The role of learners involves imitating the structures and developing habits through constant repetition and correction from a teacher or a competent user of the target language. The primary unit of teaching is usually isolated sentences. The success of learning is judged by examining the quality of the final products of learners.

Cognitive Perspective

In the early 1960s, Noam Chomsky (1959) rejected B.F. Skinner's behaviorist notion of language learning, arguing for the vital part played by the mental activities of the language learner himself and strongly

questioning the relevance of external factors such as imitation, frequency of stimulus and reinforcement. Chomsky further argued that because a speaker of a language can produce (and understand) an infinite number of well-formed utterances, language competence could not possibly be explained by a model based on imitation and habit information. Instead, Chomsky proposed a transformational-generative grammar which assumed that the ability to learn languages is innate. The development of an individual's grammatical system is guided by innate cognitive structure such as the "language acquisition device" (LAD) and not by behavioral reinforcement.

Chomsky's theory contributed to the paradigm shift from that of instilling language habits in learners to enquiring how learners construct the second language syntactic system mentally. Thus, errors produced by learners came to be seen as signs of second language development. This new perspective has led to a renewed interest in grammar which culminated in Krashen's Input Hypothesis (Krashen, 1985), a theory which emphasizes the importance of providing comprehensible input (grammatically) to enable the internal working out of the L2 language's grammatical system rather than an explicit teaching on grammar rules. For Krashen, language input is not to foster authentic social interaction but rather to give individuals an opportunity to mentally construct the grammar of the language from extensive natural data. From this perspective, learners have become active agents capable of generating and transforming knowledge.

Sociocognitive Perspective

As the cognitively-oriented perspective on language acquisition was gaining popularity, Dell Hymes (1971) coined the term "communicative competence" in response to Chomsky's mentalist characterization of linguistic competence, thus emphasizing the importance of the social appropriateness of language use. At the same time, Michael Halliday (1978) emphasized the need to consider language from a functional perspective. Halliday (1978) posited three functions of language use: ideational, interpersonal and textual. While the ideational function of language use has customarily been dealt with in language teaching, the interpersonal function (i.e., use of language to maintain social relations) and the textual function (i.e., to create situationally relevant discourse) has largely been neglected. Both Hymes and Halliday consider language as a socially constructed phenomenon rather than something that occurs in a language user's head. Hymes (1978) argued that, "There are rules of use without which the rules of grammar would be useless."

During the 1980s, language instruction embraced communicative competence wholeheartedly and culminated in a series of more learner-centered and less structurally driven instructional methodologies. In these methodologies language instruction was viewed not just in terms of providing comprehensible input, but also in terms of helping students enter into the kinds of authentic social discourse situations and discourse communities that they would later encounter outside the classroom. With these methodologies, learners, for the first time, are no longer passive vessels to be filled. They play an active role, internalizing the linguistic stimuli but also using a variety of communication strategies to manage both the content and the process of communication.

In summary, in the development of language teaching pedagogy a learner's role has developed from being a repetition machine to a person who somehow internalizes the language, to a person who not only repeats and internalizes the language input but also participates actively in the management of social and communicative exchange.

CHANGING NATURE OF COMPUTER USE IN LANGUAGE TEACHING

Shifts in perspectives on language learning and teaching have paralleled developments in technology. Many of the early computer programs for language learning are heavily influenced by the theoretical movements in the history of language teaching and learning. Early examples of vocabulary tutorials and drill and practice programs are programs influenced by the structural perspective in language learning. In recent times the use of computer mediated communication (CMC) is influenced by the sociocognitive perspective on language learning (Warschauer, 2004, 2005).

Linguistics or theories of second language acquisition, however, have also been barriers to the development of ICT for language learning. For instance, in pronunciation training of a L2 language, years of research have been devoted to the teaching of segments (consonants and vowels, minimal pairs) to the neglect of suprasegmental aspects (intonation, prosody, and stress) of L2 languages. Though the importance of the suprasegmental aspects of language use has been recognized, most research into the use of ICT for enhancing the teaching of pronunciation involves products developed from research into language learning and related fields such as speech recognition (Derwing, Munro & Wiebe, 1998; Neri, 2001; Neri, Cucchiari & Strik, 2003). Notably, while research in second language research is directed towards segments, research into the production of speech recognition tools for e-commerce is highly relevant and has significantly increased our understanding of the prosodic aspects of many languages. Research findings from e-commerce, as well as the more traditional areas, can beneficially feed back into language learning.

The World Wide Web has long been touted as the new medium for organizing, linking and accessing information. Using the World Wide Web, students can search through millions of files around the world, thus gaining instant access to authentic materials that correspond to their personal interests. They can also use the Web to publish their own texts or multimedia creations in the public domain. As Kern, Ware, and Warschauer (2004) point out, "These features [of the World Wide Web] can facilitate an approach to technology use in which authentic and creative communication is integrated into all aspects of the course" (Kern, Ware & Warschauer, 2004, p.). New technologies, such as the World Wide Web, and new information and communications technology such as wireless communication, broadband connections and mobile computing technology also have changed the learning contexts and extended them beyond the classroom. Learners now can engage in self-access learning by means of the Internet; they can participate in online forums through a variety of means such as e-mail, listserv, internet relay chat programs, internet telephony systems such as Skype as well as interact in MOOs.

The promise of the World Wide Web and online learning, however, has not been realized for learners. Although online learning encourages collaboration, the efficacy of integrating such technology into a language curriculum is still open to debate and requires further research. Whether technology can provide social contexts that are needed to promote second language learning is still hotly debated. Consequently, many researchers are investigating the use of pedagogical agent within online learning to enhance social interactions online (Dowling, 2002). Such research findings can certainly enhance online language learning as well.

To summarize, quite evidently the computer can play multiple roles in language learning. An examination of education related literature in computer science suggests that we have much to learn about technological development. To take full advantage of technology for language learning, it is necessary for students, teachers, linguists, applied linguists, and educationalists to step out of their respective fields and talk to the computer scientists who are instrumental in realizing the technology needed to better

learning. Understanding language is always a multi-disciplinary endeavor. In this case of successfully and beneficially integrating ICT into language learning, the dialogue between computer scientists and language educationalists is essential, to make sure that the technology created does in fact enhance learning.

From the learning perspective, the central factor influencing the learners' choice of engagement is still motivation. In other words, the job facing every teacher or curriculum designer is still, and probably will continue to be, how to motivate learners to seek out possible ways of using ICT to interact with native speakers of a target language themselves and so enhance their own learning. Motivation in language learning has had a long history in second language research.

Dornyei (2003) put forward a model of a motivational learning practice which is multifaceted. In his model, no single computer program, no matter how well thought out or designed, can possibly create the kind of motivational learning environment envisaged. Therefore, it is vitally important when incorporating ICT in the language learning process that the relationship between ICT activities and the learning pedagogy be thoroughly considered. For instance, for a particular context such as learners learning beginning Spanish, the incorporation of a Web search activity in the learning process might not be beneficial to learners at all as they might be overloaded with too much information. Such an activity would probably lead to learners feeling less confident and they would probably find little enjoyment or stimulation in undertaking it. However, for the same group of Spanish learners, if the activity is a Web quest on a Spanish cinema site, and learners only have to collect information such as the names of actors in a specific film, then the task can be accomplished and is unlikely to overload learners.

Past research has shown that many teachers remain skeptical of the value of computer use in language learning. One of the reasons might be the piece-meal nature and poor quality of the research that has been conducted. Based on a review of some 78 articles published in four CALL-oriented journals from 2000-2003, Hubbard (2005) noticed the following inadequacies in most of the research:

- There are a small number of subjects, partly because the research often takes place with a single intact class.
- Surveys or questionnaires of both attitudes and patterns of use are employed in place of more objective evaluative measures.
- The research subjects often engage in the task/activity or use the application for only a short time, in many cases in just a single session with a new tutorial program or application (e.g., online chat).
- Participants are studied during their initial experience with the task, activity, or application.
- Participants are novices to CALL: this may be the first time (or one of the first times) they have tried to use computers to support their language learning.
- Participants are novices to the general type of task, activity or application under study; for instance, they are attempting something they have never done in more "traditional" forms, such as on paper, through audio or video tape, or in a face to face classroom setting.
- Participants are untrained before the study: they receive neither technical nor pedagogical tutoring that could assist them in using the application or performing the task effectively to meet learning objectives.
- Participants are undirected during the study: although there may be monitoring of their activity, once the study begins there is no intervention by either teachers or researchers.

The inadequacies summarized by Hubbard (2005) demonstrate the fact that interaction between pedagogy and ICT is not adequately researched and that research in the area is not adequately evalu-

ated. This handbook is an attempt to fill this gap. A call went out for submissions based on best practices which have the following characteristics:

- If possible, studies should have a large number of subjects either in a single intact class or in a cross-sectional setting.
- While acknowledging the usefulness of surveys or questionnaires as instruments for data collection, this volume calls for studies with more rigorous evaluation.
- Studies that involve both novices to CALL and non-novice subjects.
- Studies which are longitudinal in nature or involving subjects in a longer period of time than a few hours per week.
- Studies that involve participants who have received adequate training before the experiments.
- Studies that attempt to eliminate the novelty effects. In other words, studies which consider the use of ICT as part of the overall design of the methodology used for the learning process.
- Therefore, the activities or tasks the students attempted to do through the use of ICT should form part of the normal “traditional” tasks and be part of the usual learning methodology. ICT is chosen not because it is there and therefore we must use it, but because it has a firm place in the language learning methodology.
- Studies that redefine the role of teachers and students in the learning process.
- Studies that report students learning English as a second or foreign language or any other European languages such as French or language of another script such as Japanese, Chinese, Arabic, or Thai.
- Studies that are concerned with new contexts: that is, moving away from classroom bound contexts to informal, self study, non-institutionalized contexts.
- Studies that emphasize the need to equip students with skills that facilitate the transition from institutionalized contexts to non-institutionalized contexts.

The primary objective of the handbook is to improve our understanding of what language learning entails in such a way that language learning designs utilizing ICT can translate successfully into practice. Hence, empirically grounded evaluations of learning are especially important.

THE IMPORTANCE OF THE CHAPTER SUBMISSIONS

The chapter submissions in this volume include many cases of successful international collaborations. In order to provide the best balanced coverage of research related to the selected topics of this handbook, researchers from around the world were asked to submit proposals. All proposals were carefully reviewed by the editors in light of their suitability, researcher’s records of similar work in the area of the proposed topics and the best proposal for topics with multiple proposals. Upon the receipt of full entry submissions, each submission was forwarded to at least three expert external reviewers on a double-blind, peer review basis. In many cases, submissions were sent back for several revisions prior to final acceptance. As a result, this handbook includes 30 chapters highlighting current research conducted in the field of computer-enhanced language learning. The 30 submissions came from knowledgeable researchers around the world: while many submissions from the United States were accepted (seven chapters), five chapters from Australia, three from the United Kingdom, two from Japan, New Zealand and Thailand, one from Germany, Spain, Korea, Sweden, Hong Kong, Turkey and Dubai. Contributions

involved a variety of contexts including tertiary education and secondary schools. While the majority of the chapters involved empirical studies in the implementation of ICT for language learning, chapters that describes innovative use of technology such as text-to-speech technology and audio-video chats have also been included.

Heeding the inadequacies summarized by Hubbard (2005) and outlined previously, many of the chapters selected for publication are longitudinal in nature and employ both quantitative and qualitative evaluation instruments. In these chapters, whether ICT has been integrated within the overall design of the methodology used in the language learning process is a key factor. The international nature of this volume is demonstrated by the inclusion of many chapters which report on the learning of Mandarin, Thai, German, French, and English in foreign language learning contexts.

The diverse and comprehensive coverage of the interaction between language learning and ICT in this authoritative handbook will contribute to our understanding of how ICT can be successfully implemented in a variety of language learning contexts. The coverage of this handbook provides strength to this reference resource for language professionals who seek inspiration and new ideas to implement in their classrooms; equally, it is useful for researchers in applied linguistics who might want to replicate some of the studies reported in this handbook. For computer scientists, this handbook can also provide information on how to translate products from computer sciences to real life language learning contexts. It is our sincere hope that this publication and its great amount of information and research will assist our research colleagues, or faculty, their students and our organizational decision makers in enhancing their understanding of the language teaching and computer-enhanced language learning and acquisition fields.

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*Editors,
Felicia Zhang PhD
Beth Barber MA
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Section I

Online Resources for Language Learning

This section contains seven chapters covering various uses of online resources for language learning. The section contains an evaluation of an approach to second language learning involving Italian Web sites; a study comparing the benefits of written electronic conferences over face-to-face conferences as pre-writing activities in an ESL classroom; a study that utilizes blogging in a beginning level academic writing course; a chapter summarizing up to date research on the use of hypertext/hypermedia in second language reading; two accounts of using WebCT questionnaire tools for the teaching of grammar in EFL and in learning French as a second language and a longitudinal evaluation of the integration of IC T in the secondary school language curriculum in Quebec, Canada.

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