Language and technology have long been related. The development of railroad transportation, steam navigation and the telephone marked the beginning of an era of national linguistic unification not only in Europe and North America, but in most other regions of the world (Porcher & Groux, 1998). Air transportation, radio and television heightened the phenomenon, and McLuhan (1964) felt it possible to speak of the world as a global village. The rapid development of ICT, in particular of the Internet, initially seemed to be paving the way for English as a *lingua franca* in the world. Contrary to the preceding media, ICT offers the possibility of responding individually, which was the case of the telephone too, in a much more limited way, when it was invented. Consequently, two trends of unequal strength can now be felt. On the one hand, English has undoubtedly become the language everyone feels they should learn. On the other hand, migrations have increased the need to learn the languages of the host countries, and studies abroad have increased the need to be able to cope with academic demands. In Europe, institutions such as the Council of Europe or the European Union have played an important role in developing language studies across the continent to facilitate intra-community exchanges. Finally, the notion of sharing life in a multicultural and multilingual world has become more and more appealing to many people and is creating a new demand for language courses.

The demand for language studies has been on the rise since the early seventies in school systems as well as in further education. Continuing education quickly saw the advantages of self-directed learning and resource centers in facilitating language learning for adults juggling a professional life and a family life. Universities followed suit. The advent of the computer and the development of the Internet made it possible to believe that one could learn at a distance. Some countries had already developed distance education, mainly for geographical reasons (Australia, Canada, etc.), but others discovered that it could provide valid solutions, in particular for adults who wanted to further their education or make a fresh start. The Open University in Britain is the most famous example, but other countries followed in the same direction (Bates, 2005). As computer-based communication technologies developed, distance language learning became an attractive and apparently reasonable alternative, especially as the potentialities of computer-enhanced learning offered more and more convincing interactions.

However, one of the most striking features of computer integration within the language learning situation is the enhanced complexity of the concept of pedagogic mediation as well as of the relationships between language, learners and teachers. This complexity may be accounted for by several factors:

- the multiplicity of pedagogic objectives justifying the resort to Information and Communication Technologies (ICT): such as looking for information, webquests and multimedia tasks, specific interactive exercises and the availability of virtual curricula for learners;
the multiplicity of existing software and online tools for language learning: e.g., commercial CD-ROMs for multimedia training, customized materials developed with authoring systems, language specific or general purpose websites;

• the multiplicity of ICT potential uses: if one commonly speaks of “the computer”, current practice reveals a wide array of uses ranging from:
  o materials aiming at complementing traditional face-to-face courses to environments especially designed for distance learning;
  o from very specific software (e.g. exercisers, tutorials) to integrated learning environments (i.e. that offer a coherent range of materials, learning tools and follow-up devices, among others);
  o from pedagogic diversion of generic software (such as text processors and the Internet) to very elaborate and (mainly) experimental applications, via the whole range of commercial products as well as Computer Mediated Communication (CMC) technologies such as chats, instant messaging, videoconferencing.

Furthermore, integrating ICT within a language learning situation presupposes organizing reflection both for individual actors and pedagogic teams along various perspectives.

First, the whole course of action needs to be reconsidered by distinguishing between several types of learning situations: face-to-face learning (man-man) on the one hand and computer-mediated learning (man-computer-man) on the other. Computer-mediated learning can take place on a face-to-face basis, as in the case of multimedia laboratories with the teacher, on a distance basis, which excludes face-to-face situations, or on the more and more frequent blended basis combining distance and face-to-face situations.

Secondly, materials designers have to choose between reproducing traditional paper-based materials in a digital media and completely reworking activities according to the specific features of the computer and the modes of learning (face-to-face, distance…).

Finally, integrating ICT implies considering the conditions of transferring traditional roles to the new environment as well as the emergence of new roles, such as tutors, and designers.

Such complexity makes it difficult for the various actors of the teaching/learning situation to form a clear idea of the various ways of answering a basic question: how to meet the specific needs of a given public in a given institutional context? Little, however, has been said so far about how this complexified pedagogic relationship requires a new vision of underlying theories. It has now become necessary to reassess the roles and interactions of the traditional actors as well as to describe the new roles emerging from a situation significantly affected both by ICT and distance. Revisiting theory in the context of distance learning, irrespective of the various possible uses of technology, will shed new light on mediation at a distance and help suggest a conceptual framework that can guide teachers, researchers as well as developers and administrators in the field.

For various reasons, distance learning and e-learning in particular have been seen as vital stakes in the field of education and at times a belief in their magic powers was all too evident in some circles (Annoot, 1996).

A new paradigm (Perriault, 1996) has influenced all educational institutions: since networks were connected and media became digital, the diversification of online courses has gone with the necessity of accepting competition and of coping with a radical change in scale. The industrialization of knowledge is not compatible with amateurism, and the protected academic world has had to open up to competition
with courses offered by less traditional institutions. Furthermore, the variety of online courses has blurred traditional beliefs on roles of teachers and learners that can no longer be seen as static. The increasing number of sites changes the situation in a way which cannot yet be anticipated.

It is therefore imperative to construct models that include all the specific parameters of distance education. Doing this implies going into different fields of study with different approaches to research and no unified paradigm (Kuhn, 1970). No one field of the human sciences will cover all the parameters and because of its technological complexity; ICT goes beyond the traditional realm of the human sciences in many of its aspects.

Going over different fields of research will be a test of our epistemological responsibility and the way in which we construct our knowledge (Kelly, 2005). M. McLuhan (1962) insisted that in bringing all social and political functions together in a sudden implosion, electric speed has heightened human awareness of responsibility to an intense degree. All life is problem solving, Popper used to say (1999). He suggested determining first of all the problem, then formulating tentative theories, and then trying to invalidate these theories (1999, p. 14).

Determining an object of research means overcoming a number of obstacles which Bachelard (1938) called epistemological obstacles. These obstacles make it difficult or impossible for individuals to construct the object they are researching in a scientific way. Experience and “general” knowledge are two of these obstacles. Experience and “general knowledge” often rely on social constructs, described as a phenomenon “invented” or “constructed” by participants in a particular culture or society because they agree to behave as if it exists in order to follow certain conventional rules. Distance second language learning is likely to reflect a number of such social constructs which we will have to analyze and redefine according to the theories available.

In fields such as testing (Chapelle, 2003), a concept called construct plays an important role, and construct validity is of paramount importance, it is connected to theory, in the sense that a construct will be valid if its theoretical construction is sound. Its theoretical construction will depend on the theories the researchers refer to (Chapelle, 2003). In this sense, theoretical construct validation is considered to function as a unified framework for validity (Kane, 2001).

In this book, the authors problematize the construct of distance second language learning, in order to see what it covers, if its parameters are well-defined, what theories can guide the actions of the participants, and whether a model of action can be suggested with a method to validate the model. This book is research-based, and not method-based (Ellis, 1997), it results from the collaborative work of researchers belonging to two different laboratories and having different scientific backgrounds, which will be reflected in the content of the twelve chapters.

The construction of our model resulted from a number of research projects (Bertin & Annoot, 2000; Bertin et al, 2005; Bertin & Gravé, 2006; Bertin et al., 2007; Narcy-Combes, 2005) and from doctoral dissertations which clarified the situation, their authors will be duly mentioned. Action research (see Burns, 1995, Ellis 1997, and Narcy-Combes, 2005) was carried out when courses were implemented, but other research methodologies were applied when specific data had to be collected (Juan, 1999). The most interesting result is related to the role of the context which is by far the most important element in language learning environments as exemplified in Benoit (2004) (French high schools), Khreim (2008) (Syrian further education), and Fanou (2009) (Universities in Benin). Taking the context into account imposes the recourse to more of the human sciences than was the case before and research and theorizing becomes even more complex. Thus, it was necessary to combine the didactician’s approach with a more
explicit psycho-sociological perspective (Gravé, 2002). The degree of interdisciplinarity introduced in this book enhances the originality of its contribution.

Following Seliger and Shohamy (1989), Narcy-Combes (2005) and Bertin & Narcy-Combes (2008), we will state our epistemological position in clear terms.

Our approach is comprehensive (Weber, 1920): in this book, we are going to present how research has enabled us to understand phenomena and what we assume can be done accordingly. Theories are only approximations of reality (Chalmers, 1987; Jordan, 2004), but they can help us change the course of things, if constant attempts at invalidation are carried out. While constructing a model to guide our actions, we remain conscious that it should be flexible and adaptive, as we have an idiographic approach to the study of human phenomena. Humans may be neurobiologically similar, but their psychological and social construction makes them all different (cf. LeDoux, 2003). The main stance taken in this book is close to emergentism as reported in (Dörnyei, 2009) and (Randall, 2007), and special reference will be made to systemics as well as to the study of complexity (Le Moigne, 1977; Morin, 1980). It should be borne in mind that the French concept of systemics on which our approach is grounded is close to the American dynamic systems theory as referred to in (Herdina & Jessner, 2002, Jessner, 2006 and Randall, 2007) to which the reader might be more familiar with.

The book is structured in three parts. The three authors contribute to the fields in which they specialize, though the book was designed as a coherent and complementary whole, which explains its organization. The preface, introductions to parts and general conclusion were written collaboratively, and cross-references will highlight the coherence.

Section 1 is to be read as an introduction to didactic ergonomics as originally developed by Bertin (2000, 2001). The psycho-sociological perspective brought by Gravé (2002) explains the originality of the approach: instead of describing distance second language learning experiments, this book provides principles for understanding, designing, and running learning environments. The objective of Section 1 is to explain how the didactic ergonomic perspective can help grasp the complexity of the reality of distance language learning. It will justify the recourse to theories and models for all the actors concerned (researchers, practitioners, designers, administrators, etc.).

Chapter 1 reads like a gradual construction of the didactic ergonomics model which serves as a reference for the approach developed in the book. It begins with a reminder of the various theories accounting for the notion of complexity. Then, the various models traditionally used to describe pedagogic and, more specifically, language learning situations are reviewed. The notion of ergonomics is introduced in order to show why it is necessary to distinguish didactic ergonomics from the industrial context in which the concept was originally developed. After reviewing the main ergonomic models, the three authors show how they build a specific model for language learning.

Chapter 2 explains how the model can account for the introduction of distance. After reviewing what is commonly understood as distance learning, the authors resort to a concept derived from psychosociology, the concept of analyzer. Rather than being just another component of the system, distance is shown to reveal aspects of language learning which traditionally remain ‘hidden’, i.e. implicit. Applying this concept to our field of study first highlights a distinction between three different levels of mediation, then it reveals the nature of the virtual – or ‘enriched’ – reality displayed on the computer screen, and finally it shows how distance as an ‘analyzer’ makes it possible to better understand space and time as well as social interactions. Technological mediation is also seen in a new light.

In Chapter 3, Narcy-Combes introduces “Language” as a construct in a systemic approach and shows its indissociable connection with culture and content. Language is a complex construct and distinguishing
between the faculty, the different forms it can take and their descriptions is shown to be of importance. The link between language and ordinary cognition is investigated, especially as a way of facilitating second language acquisition. Piaget’s assimilation and accommodation and the concept of nativization can help more than has been stressed so far. Plurilingualism, diglossia and polyglossia, context and code switching are revisited in that new light. Some space will be devoted to writing and reading to stress the fact that they are very different from listening and speaking and should not be confused. Learner language and levels and the myth of native speaker usage are now seen in a way that changes traditional expectations of the outcomes of L2 acquisition. The implications for language learning in terms of curriculum design, tasks, integrating content, culture and language etc., are developed and lead into the following section.

Section 2 offers a wide-scope description of the various components of a distance language learning environment. It is necessary to understand the nature of each component and the way the set of interactions reverberates on the components. Section 2 provides a comprehensive vision of the environment, the theoretical options, and the authors’ standpoint. While traditional, analytical descriptions tend to discuss the various elements of such environments separately, didactic ergonomics relates them one with the other and addresses the notion of complexity by refusing to avoid areas of uncertainty.

Each chapter discusses the nature of the five elements that constitute the system as well as the process around which it revolves.

Chapter 4 studies learning theories and the need for distanciation. Distanciation is shown to be the essential requirement for developing a capacity for learning. This implies taking into account the relative complexity of the learning task and a new understanding of the pedagogic relationship to gain access to distributed knowledge. The metaphorical validity of a kaleidoscopic view of theories of second language learning is put forward with the implication that the concepts are the crystals, and the theories what happens to the combination when you rotate the kaleidoscope. The various theories are described under three headings: sophisticated all-encompassing theories, theories that do not cover every aspect of second language learning) and finally, classroom approaches and theory. The crystals that have been retained are listed and the chapter ends with how all the crystals can be accommodated in a model that also includes culture and content.

Chapter 5 will be devoted to the learner pole in the model, revisiting individual differences in second-language learning in the light of recent theories. Language (learning) awareness at a distance will be the obvious follow-up stressing the connection with distanciation and denativization. Metacognitive experiences will differ from face-to-face environments. Autonomy at a distance will be described as a matter of balance between independence and interdependence and is obviously connected to achievement. Reflexive interaction in distance learning connected to such phenomena as affiliation and formative evaluation will be seen to be a key parameter. Learner training in distance learning education cannot be neglected in terms of language awareness, nor in terms of awareness of learning processes, in order to enable the learners to overcome difficulties. The chapter will conclude with a return to the learning cycle showing the part the learner plays in the cycle.

Chapter 6 deals with the teacher pole. Because of the constant need for innovation, teacher education is seen a life-long project that should be related to theory. Teachers have become mediators and they are expected to be able to tackle the complexity of mediation at a distance. They need to understand their new roles and acquire new skills. Monitoring learner activity is shown to require technological support, but, even with technical support, knowing and understanding the learners is no easy task at a distance. In
order to be able to fulfill this job more successfully the teacher will need to understand his or her posture as well. Self-knowledge can help teachers, but assessment by learners and colleagues helps maintain a happy balance in courses. The chapter concludes by going back to the learning cycle and by showing how the teacher operates in the cycle.

Chapter 7 is devoted to the specificity of the ‘technology’ pole: its extreme variability and rapid evolution makes it impossible to formulate a static definition or description. What is necessary is a dynamic description based on theoretical principles. The essential question is: how can technology enrich didactic reflection and, conversely, how can didactic thinking act as a stimulus for research in technology? After reviewing the evolution of the relationships between technology and education, the authors focus on the central ergonomic notion of instrumentation and on the distinction between technological and pedagogic innovations. Then they consider the place of technology within the field of language learning in the distinction between (global) language learning environments and (virtual) learning spaces. The chapter concludes on the actors’ perception of technology.

Chapter 8 highlights the originality of the approach in considering context as a pole in itself. The object of the chapter is to provide answers to three questions:

- How to define context?
- How to integrate the notions of social change and innovation?
- Which conditions can be identified to opt for and support change?

Finally, the chapter will suggest a number of pathways to reconcile theory and action by designing a training and action research program.

Chapter 9 offers a conclusion to the second part by considering the various sets of interactions at work within the ergonomic model on the one hand, and analyzing the way learning environments are structured on the other hand. Finally, the roles of the various actors in distance language learning contexts are defined.

Section 3 deals with putting the model into practice. The authors avoid explicitly referring to time-related elements that would become obsolete too rapidly. Nevertheless, they consider the practical applications of the principles outlined in the earlier parts since the book is meant for researchers, practitioners, and administrators, etc.

In Chapter 10, based on the suggestions for action defined at the end of chapter 8, the engineering methodology is developed by Gravé and Bertin. It includes a description of the four traditional engineering phases. In a second part, the chapter focuses on the implementation phase with an action-research and training component. This component will form the basis of the assessment and regulation phase. Finally, to define the new roles of the actors and especially of the teachers, the chapter will address the central question of teacher training.

Chapter 11 tackles how to actually run courses and Narcy-Combes describes a task-based approach to distance second language learning. The advantages of implementing TBL and a description of three complementary approaches (action-based approach, TBLT and our model) lead to a methodological framework. This organizing framework consists of a dual learning cycle composed of macro tasks and micro tasks in order to adapt TBLT to self-directed and distance learning. Types of tasks are described as well as their sequencing. Task-based approaches have common features that cannot be ignored while taking into account the specificity of distance learning. The chapter is practical and discusses guiding principles and descriptions of how to go from curriculum to course design, while showing that learners
benefit from being course designers. Various approaches for the selection of content (thematic, disciplinary, linguistic) are suggested, followed by a practical discussion of feedback and monitoring. A taxonomy of tasks and its application in the dual cycle includes concrete examples. Assessment concludes the chapter and opens the way to the future.

A final conclusion offers a synthetic overview of the whole book while stressing the authors’ present position as far as second language courses are concerned.

Jean-Claude Bertin  
*University of Le Havre, France*

Patrick Gravé  
*University of Le Havre, France*

Jean-Paul Narcy-Combes  
*University of Paris 3 La Sorbonne Nouvelle, France*

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