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SECOND LANGUAGE ACQUISITION 13
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Raising Error Awareness

Marina Dodigovic

MULTILINGUAL MATTERS LTD
Clevedon • Buffalo • Toronto

Library of Congress Cataloging in Publication Data
Dodigovic, Marina
Artificial Intelligence in Second Language Learning: Raising Error Awareness
Marina Dodigovic.
Second Language Acquisition: 13
Includes bibliographical references and index.
1. Language and languages–Computer-assisted instruction. 2. Second language acquisition. 3. Language and languages–Study and teaching–Error analysis.
4. English language–Computer-assisted instruction for foreign speakers.
I. Title. II. Second Language Acquisition (Clevedon, England): 13.
P53.28.D638 2005
408'.00285–dc22 2005014805

British Library Cataloguing in Publication Data
A catalogue entry for this book is available from the British Library.

ISBN 1-85359-830-5 /EAN 978-1-85359-830-2 (hbk)
ISBN 1-85359-829-1 /EAN 978-1-85359-829-6 (pbk)

Multilingual Matters Ltd
UK: Frankfurt Lodge, Clevedon Hall, Victoria Road, Clevedon BS21 7HH.
USA: UTP, 2250 Military Road, Tonawanda, NY 14150, USA.
Canada: UTP, 5201 Dufferin Street, North York, Ontario M3H 5T8, Canada.

Typeset by Archetype-IT Ltd (http://www.archetype-it.com).
Printed and bound in Great Britain by the Cromwell Press Ltd.

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Acknowledgements

Much as writing may be a cognitive process developing in the mind of an individual, research is, and always will be, a social process, one in which an individual is inspired by the ideas of others and receives help at every step of the way. Consequently, the publication of this book would not have been possible without the help of a number of individuals, groups and organisations, all of whom I would like to acknowledge as far as possible in this way.

First and foremost, I would like to thank Macquarie University for the research and development grants, which covered important parts of the research leading to this and other publications. Similarly, I am grateful to Zayed University for a research grant, a part of which supported the investigation described in Chapter 6. I am also much indebted to Piphawin Suphawat, who conducted one of the studies described here as my postgraduate student. I also thank my former colleagues for instances of theoretical input. Aliy Fowler of the University of Kent, on the other hand, very capably translated my program into SICSTUS PROLOG, and added a lot of her own thought to it as well as to the user interface in PERL, which altogether relies on her superb programming skills. Without her, the Intelligent Tutor described in this book would have never appeared on the Web.

Apart from the above, I have received help in many other ways. Thus, my friend Min Yong single handedly organised the shipment of my private library, much needed for the literature review, while the librarians at Zayed University, Remia Philip, Ramza Al Soury and Rajen Munoo, went out of their way to enable easy access to hard-to-get books. Friends and colleagues, David Palfreyman, Frank Borchardt, Abdellatif Sellami and Lynnette Crane, read chapters of this book and provided useful and thought-provoking comments. I should not forget the students who participated in numerous studies described here, who inspired and supported the author. Thanks also to my mother and all who encouraged me to persevere with this endeavour.

One organisation, however, made a huge difference; it enabled the quantum leap from local research to global communication. This organisation is my publisher, Multilingual Matters, whom I must thank for having faith in me and deciding to support this effort. In particular I am grateful to

my contact person, Marjukka Grover, who has been a delight to work with. My thanks are of course due to the series editor David Singleton and the confidential referees, whose comments have been most helpful. I am also indebted to CALICO, CALL and Language Awareness Journals for showing interest in and publishing articles on aspects of this research at various stages of completion. Finally, I would also like to acknowledge the value of the Language Awareness organisation, which provided an exciting forum for the exchange of ideas and their dissemination to a broader public. Thanks indeed to everyone who assisted in any way while this book was in the making and perhaps kindly overlooked some of the author's less praiseworthy idiosyncrasies.

Introduction

Second language learners all over the world seem doomed to making errors, which clearly label them as non-native speakers of English, Chinese, Arabic, French, German, Indonesian or indeed any other language they are trying to acquire in addition to their mother tongue. The idiosyncrasies of their expression are sometimes met with patience and understanding by the native speakers of that language, while at other times, the patience and understanding seem to wane. An anecdotal example is my attempt to master some Polish while I was visiting a good friend in that country. At one time, my hostess wanted me to pronounce a particularly difficult word and I gave it my very best try. After having delivered what I thought was a reasonable instance of pronunciation at that stage, her whole family burst into laughter over my word stress. Moreover, this became a subject of teasing all through my visit, which even though well meant did cause me some frustration. Needless to say, my Polish is still at the beginner level.

Van Lier (1996) agrees that sometimes intolerance of non-native-like speech prevails and native speakers put the onus back on the non-native speaker to bring their expression in line with the standard. This can lead to frustration on both sides, especially if the non-native speaker cannot bring forth the expected correct language. How that can affect the non-native speaker's motivation is quite clear from my encounter with the Polish language. Yet, many language learners worldwide expose themselves willingly to such risks. They do so by temporarily or permanently moving to another country, often with the purpose of completing their tertiary education there. While in some technical degree programs the mastery of language perhaps plays second fiddle, and the effects of being a non-native speaker are minimised, in the humanities and social sciences language is the crucial factor influencing academic success, often to the disadvantage of the non-native speaker.

Just how devastating the criticism of one's second language could be is exemplified by the stories of many students I have encountered over the years in my English teaching career. Two such examples stand out. The first one is of a Japanese girl who kept sobbing for hours because the feedback to her essay said that some of her sentences could not be understood by the lecturer. Another example is of a student from a different Asian country

who having passed a certain English proficiency test decided that his English was good enough and took any attempt on the part of the teachers to improve it very personally. I am not sure what had happened to the first student – I just remember my very strong sense of concern for her. The second student, however, dropped out of at least four universities, his anger and frustration spiralling. I was concerned about him, too.

I was also deeply concerned about my apparent inability to do more for either of those students. I assume that most language teachers would have had similar moments of self-doubt, moments in which they wished that by magic they could have removed the often stigmatising idiosyncrasies of their students' language. My way of dealing with the issue was to resort to the magic of our time – artificial intelligence. I thought that having a computer, which unlike some of their lecturers understood their erroneous language and offered remedy in a socially non-threatening way, would help. Thus I devoted a lot of my energy to developing what is considered to be a specimen of Intelligent Computer Assisted Language Learning (ICALL).

The concept of 'artificial intelligence' or AI is what sets certain software apart from computer programs in general. Thus, the majority of programs we use nowadays for data processing, i.e. spreadsheets, calculators, database applications, are not considered to be artificially intelligent. The reason for this is that these programs are most of the time equipped with a finite number of alternative paths or procedures. Thus, given the data, we can easily predict which route the program will follow. Artificial intelligence, on the other hand, can deal with new problems, once it has learnt the general principle. For example, in order to process a student's erroneous sentence, a non-intelligent program would have to have the exact same erroneous form hard-wired into its system. For the same kind of error, committed in a different sentence, using different vocabulary, this program would again have to have the exact wording pre-stored in its memory. However, an intelligent program would only have to have a rule the student uses for such erroneous production. The program could theoretically recognise the same type of error in any context and with any vocabulary. For this very reason artificial intelligence could possibly become the student's and the teacher's best ally in dealing with second language errors.

This book examines the conditions under which ICALL could be truly useful to second language learners. Its purpose is also to demonstrate the learnability of a second language by focusing on some interlanguage problems and their proposed remediation. The interlanguages researched and described here are Chinese and Indonesian with English as the target language. Some reference is also made to Arabic, but only in comparison with Chinese and Indonesian. The remediation device proposed is an artificially intelligent computer program designed to raise the learners' general

language awareness, in particular the error awareness. This is therefore a cross-disciplinary volume bringing together instances of research in second language acquisition (SLA), language awareness, computer assisted language learning and natural language processing. It is written for language teachers, students in applied linguistics and language engineering as well as for applied linguists in general. While trying to bring the SLA terminology and approaches closer to a wide range of audiences (Chapter 1), it also makes an attempt to clarify the issues in ICALL to an equally wide array of language specialists (Chapter 4). By doing so, the book aims to become a mediator between what are sometimes regarded as two different groups of audiences – language teachers and applied linguists on the one hand and ICALL specialists on the other.

Thus the aim of this book is to cater to a wide range of audiences associated with the field of CALL. Because of the cross-disciplinary nature of our field of study, it is, as experts admit, very difficult to assess the prior knowledge of the potential readership. For this very reason, this book assumes very little and can therefore be seen as at times overly theoretical. This is not to say that the assumption is made that every individual reader would bring along very little knowledge. To the contrary, it is assumed that the reader will often be an expert in one or more of the feeder disciplines of CALL. Such readers often bring along a deep theoretical curiosity concerning the disciplines that are not a part of their portfolio. It is also expected that the title might attract a novice or even an expert in foreign or second language teaching, but not necessarily in the area of CALL. Such a reader may be encouraged by the book's easy and informative approach to the use of AI in language teaching. On the other hand, it is likely that a computational linguist without much background in language pedagogy might become interested in the application of AI in language teaching and learning. In this case, the book will provide the necessary information regarding the language learning theories and their impact on CALL. Naturally, this is a strategy based on much compromise and may be asking for some patience of each individual reader. However, I am convinced that everyone interested in this topic will find at least something in this book that provides answers or stimulates the mind. It is the bringing together of all the nuts and bolts of CALL, viewed from varying perspectives, in a language understood by every reader, that this book has set out to accomplish. A brief overview follows.

The pivotal issues in this book are language, second language learning and the learner. Linguistic theories differ greatly in their views of language (Graddol, 1994), which in turn affect language learning theories. In Graddol's (1994) terminology there are three historical models of language description: the structuralist, the sociolinguistic and the post-modern. In my view, the structuralist model revolves around an idealised code called language that belongs to no person in particular, but is available to all.

While the sociolinguistic model shifts the focus from the code to the code user and his or her social identity, the post-modern view abandons the construct of a consistent self and puts forward the contextualised discourse as the locus of language. Accordingly, three types of language learning theories are distinguished by their understanding of the locus and ownership of language. So the nativist theories converge with the structural linguistic views through their focus on the common and impersonal linguistic code, in a way relieving the individual of the responsibility for language learning. The cognitivist learning theories, akin to sociolinguistic theories, put the onus for language learning and its ownership on the individual, while the interactionist theories, which correspond to post-modern linguistic theories, make the social group responsible for an individual's language learning.

In addition to having completely different views on the nature and the locus of language, language learning theories also seem to be designed for different types of learners (Oxford, 1995). While the cognitive language learning theories may have an analytical (Willing, 1989) learner in mind, the interactionist language learning theories seem to be geared toward a communicative learner (Willing, 1989). Nativist theories do not seem to have a learner in mind at all, as according to Chomsky (1965) or Krashen (1987) language is something that takes care of itself. These and similar issues will be discussed in more detail throughout the book, in particular though in Chapter 1.

Technology, as will be shown in Chapters 3 and 4 of this volume, can conform to any linguistic or language learning theory. Thus it is regarded as theory neutral (Levy, 1998; Warschauer, 1999; Murray, 2000). Any approach facilitated by a particular computer program is merely a reflection of its author's view of language learning and his or her particular slant on linguistic theory. This gives rise to thinking that CALL should be more generously used for theory testing (Chapelle *et al.*, 1996), as we shall see in Chapter 2. However, while the theory may or may not include the learner specifics, the practice most certainly should pay attention to the characteristics of the potential learners (Hubbard, 1996; Levy, 1997b). Therefore, Chapter 5 examines the intended learner of the Intelligent Tutor of Academic English on the Web, the development and the evaluation of which is systematically followed in the same and the following chapters respectively.

As pointed out in the title of this book, artificial intelligence merely provides a perspective, a technological opportunity to try out less commonly practised CALL approaches, such as natural communication, i.e. interaction between man and machine that resembles that between humans. It also has the potential to parse the learner-free style output and assess its accuracy. If such a device were to be available to the learner for limitless practice and feedback, this could mean an effective attack on

learner errors, regarding which there is much resignation in SLA circles. Some nativists even believe that certain errors may be beyond any student's learnability grasp (Yip, 1995). This belief is based on the notion that learners learn from positive evidence or what can be found in the language they encounter (input). If negative evidence, or any kind of feedback following the error, is taken as a solid basis for learning, then software that uses artificial intelligence to provide learners with feedback regarding their errors can be seen as extremely useful. Describing the development of such a program as well as discussing a number of relevant issues pertaining to it is the subject of this book. In the following each chapter will be briefly outlined.

Chapter 1 of the volume addresses the question: 'Can another language be learnt?' This chapter discusses SLA theories, especially the current interlanguage theories (Yip, 1995; Selinker, 1997) and their implications for the learnability of a second or a foreign language. The concept of interlanguage (i.e. 'between languages') is derived from the notion that when acquiring a new language the learners create systems in which the information gaps concerning the target language are bridged by either relying on the rules of the native language or by overgeneralising/over-simplifying from the target language rules the learner already knows. Thus interlanguage as a rule incorporates linguistic errors in a systematic way. These errors tend to become fossilised at a certain level from which the learners do not seem to make any progress. More recent language learning research (N. Ellis, 2002) has shown that raising language awareness can significantly contribute to language learning. Thus error awareness and timely correction seems to matter, firstly in preventing the errors from being fossilised, and secondly in helping with the de-fossilisation of the already fossilised errors. It is therefore deemed that an artificially intelligent error correction aid would be absolutely conducive to error eradication or de-fossilisation and therefore to language learning. While this chapter may be of more interest to the readers without much background in second language acquisition theories, even SLA experts may wish to skim through it to find out what the theoretical underpinnings of the Intelligent Tutor are.

Chapter 2 is entitled 'Where does research end and CALL development begin?' and discusses the role of research in CALL development projects. It is difficult to imagine a good CALL (Computer Assisted Language Learning) development project which would be completely detached from research. From close observation, it follows that two software development phases stand out in terms of research opportunities: needs analysis and evaluation (McDonough & McDonough, 1997). Accordingly, this chapter makes a distinction between pre-developmental and post-developmental research, attempting to demonstrate that the literature on CALL related research often neglects the former. However, the chapter also argues that it

is difficult to draw a clear line between research and non-research in CALL, as its development is cyclic and prone to re-examination. This chapter may be of interest to all readers, regardless of their professional backgrounds, in particular though to CALL practitioners.

The question asked in Chapter 3 is: 'Why the Web?'. This is an attempt to justify the choice of the first technology selected for the dissemination of the Intelligent Tutor, the software whose development is described later in this volume. This chapter views the intelligent language tutor as an innovation. Thus it looks into the theoretical underpinnings for the diffusion and acceptance of innovation in general (Rogers, 1983). It then argues that due to its similarity with a large library of materials, a concept that the user already knows, and therefore compatibility with the accepted social values (Geoghegan, 1998) the Intelligent Tutor is more likely to be accepted if offered on the Web than in any other mode. In addition, it seems to conform to the two dominant learning theories, cognitivism and social learning theory (Levy, 1998). Again, this chapter may interest readers of widely diverse backgrounds.

The fourth chapter juxtaposes the pros and cons to the question: 'Can computers correct language errors?'. It examines the current state of the art in the area of artificial intelligence and natural language processing. It is argued that most parsers or programs designed to analyse utterances made in a natural language would ignore an error one way or another (Dodigovic, 2002). The so-called rule-based parser (Smith, 1991) would not have a rule by which to recognise an erroneous utterance, whereas a probabilistic parser based on language statistics (Jurafsky & Martin, 2000) may not be able to recognise the error for what it is or offer pedagogically sound feedback. It is proposed that a pedagogical parser used for error correction should be trained on learner interlanguage (James, 1998). This would provide it with the ability to capture student produced errors and provide comment in an appropriate way. The above conclusion is hence the basis for the development work described next. This chapter may be particularly informative to the readers with a background in CALL without previous training in AI. It can also be useful to AI specialists not previously trained in language teaching, but no particular readership should feel excluded.

In Chapter 5 we learn how to develop an artificially intelligent language tutor. The premise for this is the notion that individual learner differences can be very well accommodated by an intelligent writing tutor program. Such a program takes into account the personality related learning style and typical errors made by the learner in a foreign or second language learning environment. As a result, each learner can utilise the strategies most helpful to her in the process of language acquisition. Accordingly, this chapter describes three studies conducted in the lead-up to the program development: the first one in learner styles, the second one in the target language of instruction, and the third one in the student interlanguage

(Dodigovic, 2002). As the target language in this context happens to be academic English, a semiotic based theoretical framework leading to the linguistic description of this register is also presented. The chapter concludes with the implementation of the research data in the programming language called SICSTUS PROLOG and some examples of use. While the trained language teacher is the primary intended audience for this chapter, anyone else with an interest in CALL should be able to gain something from it, not the least an impression of what it takes to design CALL programs for language learners. To some this chapter may appear overly theoretical. However, the theory is there to demonstrate clearly what an intelligent program must 'know' and indeed 'knows' in order to address learner specific needs. This being a declarative, knowledge based and not merely a procedural program, the outworking of its knowledge base, as well as the underlying knowledge itself, should be a matter important enough to communicate to the reader.

The final chapter poses the question: 'How does it work?'. It describes the functioning of the artificially intelligent language tutor and evaluates it in several different ways, using both learners and fellow teachers for that purpose. It points out which aspects are most useful to particular learner types. Finally it presents a simple effectiveness study with suggestions for future development. All readers should be able to find something of interest in this chapter.

Despite the obstacles faced in the phases of needs analysis, development and evaluation, this book is cautiously optimistic about the future of artificial intelligence in language learning, in particular when it comes to combating learner errors, whether fossilised or not. It also welcomes the opportunity that ICALL provides for students like the two described at the beginning of the chapter, the opportunity to receive correction in the privacy of their own study, without having to risk public loss of face. The question asked here is: can such a program be effective? Chapter 6 will hopefully demonstrate so. However, what seems like simple efficiency in terms of learning outcomes may prove to be much, much more. It may prove to be an instrument of empowerment, putting language learners once and for all in control of their own learning as well as the resulting educational success.