Computer-Assisted (Greek) Language Learning: state-of-the-art, potentials and perspectives

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1 Introduction

In the last three decades the integration of technology in second language (L2) education has led to the emergence of a new scientific field named CALL (Computer-Assisted Language Learning). CALL is an interdisciplinary field in which Linguistics, Language Pedagogy, Second Language Acquisition (SLA) and Computer Science are in a symbiotic relationship. According to Levy (1997: 1) CALL is "the search for and study of applications of the computer in language teaching and learning", while Beatty (2003: 7) defines it as "any process in which a learner uses a computer and, as a result, improves his or her language".

The rapid evolution of the field and its penetration in L2 teaching and learning is interwoven with tremendous advances in Information and Communication Technologies (ICT), which have resulted in various tools and technologies that are exploited in educational contexts and support L2 learning. These involve easy access to and retrieval of unlimited authentic material and resources in the target language, Computer-Mediated Communication (CMC), an array of language tools (speech recognition, text-to-speech technologies, parsing, contextual checkers etc.) and multimedia technologies (which cater for different learning styles and preferences).

Apart from the above, a significant factor, which justifies the evolution of CALL, is its impact in supporting, promoting and disseminating lesser used and taught languages (such as Modern Greek). In the context of what has become known as the "computer culture", empowering a "small" language in the 21st century is closely interwoven with advances in the language engineering field in general and high-standard e-learning applications within the CALL framework in particular, as these applications may increase its visibility and render it easily accessible worldwide.

In this paper we shall outline the state-of-the-art of CALL in general and CALL "made in Greece" in particular with specific reference to the "filoglossia+" courseware, an educational application designed for the novice adult learners of Modern Greek. Strengths and limitations and new directions in the field will also be discussed.

2 A brief CALL history

Warschauer (1996) has suggested a CALL typology with three phases fully aligned to approaches and findings in SLA research, their pedagogical implications and advances in ICT, namely:

(a) **Behaviorist CALL**: This CALL phase was implemented in the 60's and 70's drawing heavily on the then dominant behaviorist movement. It involved developing simple drill-and-practice language activities, which would reward the users upon successful completion. During this phase the computer was deployed as a tutor that would deliver instructional materials to the language learner. CALL programs of this phase presented a stimulus to which the learner should provide a response. When behavioristic approaches to L2 learning were rejected, the stage was set for the second phase of CALL: communicative CALL

(b) **Communicative CALL**: The second phase of CALL became prominent in the 70's and the 80'. Following the new communicative approach in language learning, the drill-and-practice programs were now substituted with more learner-centered activities, which focus on the actual use of the language for communication purposes rather than learning the language system *per se* out of its communicative context. During this period the microcomputers (or PCs) first appeared, enabling a whole new range of possibilities and potentials in language education and resulting in a boom in the development of L2 courseware. According to Underwood (1984: 52), communicative CALL should:

- focus more on using forms rather than on the forms themselves;
- teach grammar implicitly rather than explicitly;
- allow and encourage students to generate original utterances rather than just manipulate prefabricated language;
- not judge and evaluate the students in everything nor reward them with congratulatory messages, lights, or bells;
- avoid telling students they are wrong and be flexible to a variety of student responses;
- use the target language exclusively and create an environment in which using the target language feels natural, both on and off the screen;
- never try to do anything that a book can do just as well.

Within the "communicative CALL" framework, the computer functions as "stimulus" (Taylor and Perez 1989: 63) and CALL activities are designed to

stimulate critical thinking rather than focusing on finding the correct answer.

(c) **Integrative CALL**: the term "integrative" was employed to denote the potential of integrating the multifaceted aspects of the L2 learning process. This phase is marked by the evolution of two technologies of paramount significance: multimedia and the Internet. The former enables the combined use of media (texts, sounds, graphics, animation, video) and language skills (e.g. listening could now be combined with reading). Students gradually gained more control over their L2 learning and learner autonomy was fostered: the use of multimedia material enabled them to work at their own pace, navigate freely in the CALL application, decide which path to take, what to follow and what to skip. The advent of the Internet, on the other hand, had a tremendous impact on L2 learning and altered the landscape in language education and communication forever. It enables access to unlimited authentic input in the target language (newspapers, magazines, blogs, wikis) and resources (e-dictionaries, corpora) as well as various modes of communication among its users. More recently, the confluence of Web 2.0 technologies has led to a new communication paradigm and the term Computer-Mediated communication (CMC) was employed to denote the synchronous or asynchronous mode of communication among the Net generation (via e-mails, chats, blogs, wikis, MOOs, virtual worlds etc.). Nowadays, web-based language learning provides one of the chief resources for L2 in the 21st century and will no doubt continue to flourish to its full potential and support collaborative learning, distance learning and lifelong learning.

3 CALL for "small" languages: the case of Modern Greek

It has been argued that the distinction between widely and lesser-used languages could be conceived as analogous to the difference between "technology-rich" as opposed to "technology-poor" languages. The latter are those, which lack language tools and resources and, therefore, run the risk of being excluded from the Information Society and possibly condemned to gradual attrition. In such a context, we consider CALL as a conduit and a powerful mechanism for delivering L2 material to learners who are self-directed either by conscious choice or simply due to circumstances (e.g. someone wishes to learn Modern Greek, but no courses are available in the area where s/he lives).

Developing high-standard CALL materials for Less Widely Used and Lesser Taught (LWULT) languages is imperative and may significantly contribute (apparently combined with appropriate language policies and measures on a national and international level) to their "revitalization" and dissemination (Charalabopoulou 2010). CALL applications for "small" languages may ensure equal opportunities of

all languages and cultures, contribute to preserving language and cultural diversity and address the needs of those people who may be interested in such languages (and cultures), but cannot attend courses due to various issues (related to mobility, age, sex, financial status, lack of institutionalized courses etc). Within this framework, we consider CALL as a channel, which may provide easy and affordable access to LWULT language education and thus lay an optimal foundation for successful lifelong L2 learning -one of the hallmarks of a civilized society.

Although MG is not among those languages deemed "useful" to know, it is an extremely powerful cultural language spoken in the same geographical location for 4.000 years, a source of loan words for the creation of thousands of scientific terms in many languages, the national language in Greece and Cyprus (spoken by about 14 million people), one of the official and working languages of the European Union, the L2 in Greece and Cyprus (used by more than 1.000.000 people) and a minority language spoken by millions of people worldwide.

In the last twenty years there has been a constantly increasing demand and interest in learning Modern Greek (MG) as an L2, which may be attributed to a number of factors, such as the influx of migrants and refugees, a frontier-free Europe, which encourages human mobility, the Greek expatriates around the globe, who wish to keep the language of their ancestors alive and thus preserve their Greek identity etc. This growing interest in MG has led to a need for modern language learning material and e-learning applications, thus CALL has reached Greece (albeit with some delay) and an array of Greek language learning applications (both on-line and off-line) have emerged in the local market. One of these applications titled "filoglossia+" will be presented here.

3.1 CALL "made in Greece": the "filoglossia+" courseware

The Institute for Language and Speech Processing (ILSP)/"Athena" R.C. (www.ilsp.gr) designed and developed the "filoglossia+" series in order to address the needs of learners who wish to learn Modern Greek (MG). This is a multimedia courseware for learning Greek, which spans four CD-ROMs, with each CD-ROM containing 5 chapters (i.e. 20 chapters in total). The courseware is currently available in six versions employing English, Chinese, Albanian, Bulgarian, Serbian and Romanian as support languages respectively. The support language is used to provide translations, explanations of language phenomena and sociocultural issues of the Modern Greek society. Here we shall present the version of the courseware, which targets English-speaking learners of MG.

filoglossia+ is addressed to adult Anglophone learners of MG who have no previous knowledge of the language and wish to obtain the necessary linguistic equipment required for general language purposes. The language material of the application follows the general specifications provided by the Common European Framework of Reference/CEFR (2001) and corresponds to A1 and A2 levels, as defined by CEFR. The learning material in each chapter is organized in four sections:

dialogue, vocabulary, grammar and useful phrases. In particular:

(a) **Dialogue**: The dialogue texts are supported by videos, the majority of which are filmed in authentic settings (e.g. super market, airport, subway, restaurant, shops), while English translation is always available. The users may access the whole dialogue text at any time, click on any of the dialogue sentences and listen to them as many times as they wish, thus working at their own pace. The texts feature native speakers who make use of colloquial and sociolinguistic appropriate language in the context of everyday life situations.

(b) **Vocabulary**: In this section, the users may activate all content words of the dialogue text, listen to them pronounced by a native Greek speaker, and realize how they are used in context by reading the sentence and watching the relevant video segment in which the actual word occurs. Recording facilities are also available, enabling the users to record their voice pronouncing each word and then comparing it to the native speaker's model. Each word is also grammatically annotated. Apart from the vocabulary introduced in the dialogue texts, additional words and phrases that are likely to be used within the framework of the communicative situation of each dialogue are also provided to help the learners further expand their mental lexicon.

(c) **Grammar**: In this section, the most important morphosyntactic phenomena occurring in the dialogue texts are presented and discussed within a communicative context. All explanations are provided in English, while a number of language activities have been integrated to establish a sufficient level of comprehension for the specific grammatical phenomena.

(d) **Useful phrases**: The aim of this section is twofold: (i) to help the user accumulate a sufficient knowledge of the use of particular stereotyped phrases most likely to be used within the context of the communicative situation of each dialogue and (ii) to point out language variations determined y the social norms of the target culture (e.g. formal vs informal conversations). The phrases are presented in short video clips and are accompanied by interactive role-playing activities in which the user's voice overlays the video dialogue by using a voice recording tool.

A bilingual Greek-English e-glossary has also been implemented, which includes all words that appear in the application (approximately 3.200 lemmas) and may be accessed at any point. The versatility of the courseware allows the users to customize the input via enabling, for instance, access to the translation of the Greek input in English, the transcripts of the videos and/or subtitles, looking up unknown words in the bilingual e-glossary etc. Fluency is achieved by exposing the user to lots of videos filmed in authentic settings and dealing with communicative situations in

which socioculturally appropriate language is deployed, as determined by the social norms of the target culture. The structures to be taught in each chapter are projected by employing different ways and techniques and in most cases they have a communicative "lining". Taking into account the importance of background knowledge in L2 learning (Lee 1986; Nunan 1985) —especially in the case of adult L2 learners—the use of the knowledge of L1 may facilitate and accelerate L2 learning because it makes learners more confident and independent in their learning process. Therefore, when deemed necessary similarities and differences between L1 and L2 are pointed out.

filoglossia+ deploys and exploits the multimedia technologies and potentials. A plethora of audio and video clips portraying everyday life situations have been embedded in the application, which also include features of cultural value. All video segments are linked to and synchronized with their transcripts and the narrative of all videos is available as Greek text and in English translation. Two speech tools have also been embedded to help the novice learner become familiar with the Greek phonetic system: an Automatic Phonetic Transcription (APT) Tool and a Text-to-Speech (TTS) converter, both developed by ILSP. The APT tool converts arbitrary written input to its International Phonetic Alphabet (IPA) equivalent. The TTS tool, on the other hand, produces an audio output from its textual input using a digitized voice. The speech synthesizer also works with arbitrary Greek input, provides the pronunciation of any typed word, phrase, or sentence, and functions as a simplified Pronunciation/Reading Tutor. Recording facilities are also available in "filoglossia+": the users are encouraged to produce words or utterances that are subsequently recorded and played back so they can study their own output and try to improve it by comparing it to the native speaker's pre-recorded models. No automatic assessment of the learner's input (oral/written) is available in the current version of the courseware.

The application has been reviewed by CALICO experts (Computer-Assisted Language Instruction Consortium)[1] scoring high marks (4+ out of 5). It has also been evaluated by adult learners of MG (n=100), who live abroad and were asked to use the English version of the courseware in a self-learning mode and evaluate all its aspects (for details on the evaluation method, tools and results see Charalabopoulou 2006). A free of charge on-line version of the courseware (which, however, comprises a subset of the learning material and tools available in the CD-ROM version) is also available (http://www.xanthi.ilsp.gr/filog/).

4 New directions in CALL

CALL complies with the demands and requirements posed by the new culture of learning in the 21st century and has led to new approaches and didactics, thus reshaping the field of L2 learning and teaching. A bewildering array of multimedia-

[1] Review available at https://www.calico.org/p-341- Filoglossia%2B%20(92007).html.

based and Web-based CALL applications is now available. Existing language learning systems employ and exploit the multimedia technologies, provide a satisfactory interactivity level and comprise language activities, which, however, conform to the "closed-ended" pattern with preenvisaged learner inputs.

Despite its strengths and euphoric descriptions expressed sometimes by fervent CALL practitioners, the field certainly has its limitations: the "Achilles' heel" of existing CALL systems is mainly error detection/diagnosis and the type of feedback provided to the L2 learners when they produce an erroneous utterance. The latter is usually restricted to a "right/wrong" indication provided as soon as the learner enters his/her output. In other words, CALL is not still "clever" enough to be able to parse free human input produced by non-native speakers, locate errors and provide corrective feedback. Handling closed-ended exercises is "convenient" since it is not computationally demanding: assessing the correctness is simply based on a pattern matching algorithm; hence, the development of productive skills in what is labeled "conventional CALL" (as opposed to "parser-based CALL") is hindered due to technology limitations. Holland *et al*. (1993: 31) mention that "[...] in parser-based CALL the student has relatively free rein and can write a potentially huge variety of sentences. ICALL thus permits practice of production skills, which require recalling and constructing, not just recognising [as in conventional CALL], words and structures".

In order to rectify existing shortcomings, research should focus on the development of more "intelligent" CALL (i.e. ICALL) systems and the bridging of CALL with Human Language Technologies (or Natural Language Processing/NLP, an umbrella term used to describe the use of computers to process information produced in natural/human languages), Corpus Linguistics, Speech Technology and Artificial Intelligence (AI). Apparently, this is far from being a trivial undertaking. Attempts in AI-based CALL were witnessed in the 1980s and early 1990s. However, this approach soon fell into disfavor among CALL practitioners, mainly due to the fact that the expectations were too high and unrealistic (given the potentials and the state-of-the-art technologies at the time). Despite the vehement criticism of early attempts in ICALL, it seems that the field is again attracting increasing attention (Heift and Schulze 2003).

Ideally, an "intelligent" CALL (ICALL) application should be able to emulate the features and qualities of a human language tutor (Dodigovic 2005) to the extent, of course, that this is feasible and given the limitations that technology itself imposes, also combined with the undisputed fact that no technology will ever replace a gifted language teacher. Although sporadic instances of applications that integrate language technologies and tools do exist, the potential of technology to replace some aspects of an expert language teacher still has a long way to go and the dearth of ICALL fully functional applications is a fact. Regarding written speech diagnosis, parsers should be developed that are able to process the non-native speakers' input, spot the exact location of the error and provide feedback, which will lead to self-correction

(by providing, for instance, the relevant rule, which explains the norm in L2 and depicts its deviation in the learner's interlanguage). Parsing presupposes the use of part-of-speech taggers, tokenizers and lemmatizers with high levels of accuracy in order to enable processing of learner texts. As far as speech production is concerned, Automatic Speech Recognition technologies, which enable oral speech assessment must be deployed to analyze and evaluate language input produced by L2 learners. Text-to-Speech technology, which allows for the conversion of written texts to oral speech, may also support L2 acquisition functioning as a simplified pronunciation tutor.

In Greece, research in NLP and Speech Technology is ongoing and has led to the development of highly efficient and robust language tools and resources. A number of commercial applications are available in the local market, which yield reliable results (including parsers, efficient structural and grammatical text annotators, corpora, Automatic Speech Recognition, Text-to-Speech tools etc.). However, the vast majority of the available applications is geared towards native Greek speakers and is unable to cater for the educational needs of a foreigner who strives to master the Greek language system. To this direction, adjustments and customization are required in order to accommodate and be able to handle and process utterances produced by non-native speakers and, moreover, to ensure that the whole approach is pedagogy-informed (and not technology-driven).

Greek CALL needs to closely follow up on recent developments, trends and reshaping of the field by shifting its focus to designing and implementing ICALL systems. In other words, high-standard e-learning environments need to be implemented for the Greek language, which will integrate "open" language activities, automatic diagnosis and evaluation of learner responses (calling NLP modules and speech technology tools), on-the-spot provision of individualized corrective feedback, learner modeling and "customization" of the learning material in an overall attempt to address the challenge of intelligent language tutoring.

5 Summary

Nowadays the L2 learning paradigm is hardly restricted to the use of textbooks in the classroom. The new culture of learning has spread and introduced new approaches and didactics in the field of L2 via the technology channel. The "standard" and traditional means are now usually accompanied by multimedia material (available on-line or off-line in the form of CD-ROMs/DVD-ROMs), while communication with teachers and peers has also been reshaped and redefined via a number of technologies that fall under the rubric of CMC. CALL has clearly entered the mainstream and as Chapelle (2010: 67) states "… today almost anyone who is working on materials for classroom language learning is working in CALL".

In this paper we briefly outlined the state-of-the-art of CALL in general and CALL "made in Greece" in particular by describing a courseware, which was designed and developed in the local market for adult learners of Modern Greek. We

also identified some strengths and limitations of this *sui generis* learning paradigm and discussed future perspectives, which will pave the way from conventional CALL to ICALL.

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