



Third Generation Telephony: New Technological Support for Computer Assisted Language Learning

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AUSTRACT

The expansion of the Internet has led to the development of distance teaching models based on the net (e-learning). One of the crucial factors in this phenomenon is the continuous training required by workers to maintain or improve their professional skills. Foreign languages are, without doubt, one of the most in demand subjects. This is because they are needed for communication in an increasingly globalized world.

The development of new wireless communication technologies, UMTS or 3G nets, and their corresponding access terminals (Palm-size PCs, PPCs, with wireless telephone connection, also called smart-phones), will enable solutions to be found for some of the problems faced by current e-learning users. These problems include access speed and the physical constraints of the terminal. The new wireless communication technologies will bring other benefits like portability, always on-line, etc.

This article presents one of the world's first prototypes of language learning software for smart-phones, produced by the Laboratorio de Ingeniería Didáctica e Ingeniería Lingüística of UNED (Didactic Engineering and Linguistic Engineering Laboratory) (LIDIL, <http://www.vip.uned.es>). *Tele-EnREDando.com* is an Internet based multimedia application designed for 3G mobile phones with audio, video and interactive exercises for learning Spanish for business.

KEYWORDS: CALL, UMTS, mobile phone, Internet, access device

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I. INTRODUCTION

Society today is in the midst of a dramatic phase of technological development. Progress is taking place in every scientific field. This transformation is due, to a great extent, to the progress in computer science and telecommunications, which have transformed knowledge into a key factor for the economies of the developed countries. This is why we speak of the 'information society', or lately, and in our opinion more appropriately, of the 'knowledge society'. Monereo (2000) states:

New information and communication technologies are gradually bringing about a revolution which is already beginning to be considered as far-reaching and significant as its predecessors. This, however, is a revolution based on information and knowledge, that are likely to become a resource that changes the way we work and the way we live.

Among all of the factors that have contributed to social transformation, almost everybody agrees that there is one that stands out above all others: the Internet. The net is changing many of our every day activities: from the way we buy and sell, and the way in which we conduct business, to interpersonal relationships.

The demand for distance training is another consequence of modern society; society today requires people to undertake constant training throughout their professional life, so that they can maintain or improve their capacity in a changing and competitive workplace. Teaching without the teacher being present thus becomes a necessity, because it is precisely the model of training which is compatible with the professional obligations of the student.

II. INTERNET AND EDUCATION

Of course, the Internet revolution has also decisively affected the educational world. All agents of the training process have been affected, from teachers to students, educational material, forms of communication, and so on.

The Internet has proved to be a very powerful educational tool. There are two main reasons for this:

1. The capacity to distribute information rich in content' in a simple and quick way.
7. The ease of establishing cross-communication: between students, between teachers, and, of course, between teachers and students.

This particular adaptation of the Internet for education made possible the development of a model for distance learning, based solely on the use of the net. This is usually called virtual education or e-learning.

Virtual education is no more, however, than an additional means to carry out distance training, since all that changes is the way in which material is distributed to students (from printed material to material in digital form) and the development of the tutorial function (email or IKC substitute the telephone). With regard to this Heppel (2000) affirms, very much to the point in our opinion, the following:

E-Learning underpins learning with technology, but that in itself is not new. The information that people learn with, and the conduits through which they communicate that learning, have always been both liberated and, paradoxically, constrained by technology. From the earliest primitive forms of writing through to the coolest pocketable digital media this holds true.

However, the virtual classroom (Heppel 2000) is particularly efficient, because it makes the traditional model of distance learning based on printed material and telephone tutoring even more flexible:

Mediante el *e-learning*, la gente accede a lo que necesita en el momento que lo precisa, tal es la inmediatez del sistema. De este modo se superan realmente las barreras geográficas de tiempo.²

Virtual training is starting to impose itself, albeit slowly and with problems, and it is starting to become a method which is not only accepted, but demanded by students. The initial scepticism about the validity of e-learning has been overcome, and it seems that there are no more doubts about the virtual model. For example, Fernández (1999) says "En la clase virtual podemos llegar a la mismas cotas de éxito que se dan en cualquier otro tipo de situación de aprendizaje."³ And Borreguero (2000) points out that "con todo ello no nos precipitamos al decir lo siguiente: En las aulas virtuales puede que se encuentre la clave del futuro de la formación educativa"⁴:

According to IDC's *Distance Learning in Higher Education: Market Forecast and Analysis, 1999-2004*, the number of colleges and universities offering e-learning will more than double, from 1,500 in 1999 to more than 3,300 in 2004. Student enrolment in these courses will increase by 33% annually during this time.⁵

III. THE INTERNET AND LANGUAGE TEACHING

Business administration subjects, and all those related with information technology and telecommunications, are among the subjects most in demand in virtual teaching. In particular, we can highlight the connections between them all, because there are more and more courses on e-commerce, as traditional firms look for alternative business models using the Internet to diversify and expand.

However, there is no doubt that the command of foreign languages has become a necessity to achieve professional success. This has been generated by the growing demand for the exchange of information between people of different nationalities who work thousands of

kilometres apart. As a consequence, the teaching of languages in the modern world is one of the most in demand subjects because it makes access to knowledge easier and its exchange possible.

Thus, society demands training in foreign languages, mainly in the English language, which is compatible with professional obligations. This implies distance learning and, once again, the Internet is prominent.

With time, the initial doubts about the effectiveness of the net in the teaching or learning of languages have disappeared. Ruy Pérez (1997:24) points out, speaking mainly about the teaching of Spanish as a foreign language (E/LE), the following:

Las posibilidades de intercambio de todo tipo de información multimedia por parte de la Web ya han empezado a cambiar las formas de aprendizaje del E/LE, a pesar de encontrarnos en la fase inicial de desarrollo. El fenómeno interactivo, al igual que el recurso multimedia, son dos recursos que seguirán potenciando enormemente el uso del coordinador en el aprendizaje del E/LE, pues parecen haber sido creados a la medida para ese fin.

Aid Moehle-Vicregge (1997:v) concludes:

Foreign language learners and instructors have discovered the Web's value as an educational resource and instructional tool with endless possibilities.

This current of generalised opinion does not rule out different nuances and currents of thought as regards how to accommodate the Internet to the learning of foreign languages. However, this problem has not been generated by the appearance of the net, because fundamentally it involves the already existing discussions about second language acquisition, which also affect, for example, traditional face-to-face teaching.

The main obstacle is still the design of didactic material, which is probably very poor and limited at present on the Internet. Now, it is fair to expect that, just as printed material has evolved according to the existing pedagogic theories of the time, the same will happen with the contents of the net, since it is a very new medium.

Warschauer & Healy (1998) have a very different point of view, which may be used as the final overall reflection of this very brief review, since the debate about this subject is still very much ongoing:

As the developed world moves from the industrial age to the information age, economic activity and growth is based less on the input of more labor and capital and more on the exchange and interpretation of information and the development of knowledge (Castells, 1993; Castells, 1996). In such a society, it is safe to assume that the ability to read, write, and communicate effectively over computer networks will be essential for success in almost every sphere of life. Given these circumstances, the question might become less «what is the role of informational technology in the language classroom?» and more «what is the role of the language classroom in the information technology society?»⁶

IV. NEW ACCESS TERMINALS TO THE INTEHNET

Nowadays, most users gain access to the Internet via a personal computer. This type of access has, among others, two disadvantages:

1. Access speed is generally slow since most users connect using conventional telephone lines, which have frequent communication breakdowns and which guarantee in the unlikely case of optimal performance, a connection of 56.6Kbps⁷. This transmission capacity, also called bandwidth, is not appropriate for example, for the transmission/reception of audio or video with acceptable quality⁸.
3. Physical dependence, that is, the user has to be physically in front of the computer. This inconvenience, which may seem trivial in principle, is not so if we take into account the growing mobility of people, and the inconvenience of not being able to use the Internet in slack time anywhere. We can comfortably read a book on a train or in a waiting room, etc., but we cannot use a computer, not to mention having access to the net.

The comfort, which often becomes necessary, of access anywhere and anytime to information, together with the technological advances of the last few years, are the stimuli behind the development of advanced mobile telephones that allow access to the Internet. These terminals are called third generation mobile phones, or 3G, and will probably be, in the near future, the most heavily-used consumer devices to search the Internet.⁹

The use of a 3G phone resolves the two disadvantages previously pointed out, since it uses advanced communication protocols that allow much greater real speeds of data transmission which are very acceptable, for example, for the adequate reception of audio and video, and they are completely portable, like a pocket book.

These new terminals are really evolved versions of palm computers (PCC, Palm-size Personal Computer)¹⁰, which were already available on the market, to which a wireless system of data transmission is connected, that is, a mobile phone. The PCC are personal computers of reduced size which have been transformed since the traditional electronic diaries, which had a calendar, contact list and a "to do" work. They are now much more powerful, and they also have more general software, like visual web page display, word processing, calculation pages, and so on, all totally compatible with the versions of the equivalent conventional PC. Among the most widespread PCC models we can highlight Palm Pilot, CasioPcia and iPaq, marketed by Palm, Casio and Compaq respectively.



Figure 1: Different PPC models: Palm m505, iPaq H3660 and Cassiopeia BE-300

(Source: <http://www.palm.com>, <http://www.compaq.com> y <http://www.casio.com>, respectively)

Many of these ICC have expansion slots which allow the connection of additional peripherals, like, for example, a modem. In this way, they allow access to the Internet in a way equivalent to a conventional PC, though, of course, with the same disadvantages already outlined. The breakthrough has been in integrating a mobile phone into these palm computers. Therefore, they can be used to obtain access to the Internet anywhere and anytime, and also to establish voice communications, in the same way as with conventional cellular phones.

The great revolution has been that, in parallel with these events, the protocols used by mobile telephones have evolved, to the point of achieving some that guarantee a much higher speed in data transmission. The most widespread mobile telephony protocol nowadays¹¹ is GSM¹², which allows data transmission speeds of 9.6 Kbps., while its successors, called GPRS¹³ and UMTS¹⁴, allow over 171 Kbps. and 2000 Kbps respectively. The increase in the bandwidth is considerable, if we compare it with the 56.6 Kbps. that a PC modem offers.

GPRS is an evolution of the GSM which will facilitate the transition to the ultimate objective, which is none other than UMTS. This is a completely new technology, which will completely change the terminals and the transmission nets of telecommunication operators.

While we wait for the definitive takeoff of the UMTS, estimated by some analysts for 2004 or 2005, the first third generation mobile phones for GPRS are already available on the market, among which we can undoubtedly highlight, the Siemens SX-45, a combination of Cassiopeia ICC. from Casio, with a Siemens GSM/GPRS mobile phone.



Figure 2: Siemens SX-15 (Source: <http://www.siemens.com>)

It has a high definition colour screen and it is equipped with full multimedia capacities¹⁵, being based on the Pocket PC operational system, which means it can reproduce audio, video. It also has the Internet browser 'Pocket Internet Explorer', e-mail programmes, and so on.

Like all 3G telephones, the SX-45 has some disadvantages, among which we can highlight:

1. Reduced size screen, which limits the quantity of information that can be seen at any one time.
2. Data entry, which is done by means of a virtual keyboard that appears on the touch screen, which the user uses to introduce the characters one by one using a pointer.



Figure 3: Virtual keyboard of Palm m505 (Source: <http://www.palm.com>)

With regard to the first problem, there is no worse inconvenience than to design Web pages intended for this screen size. There also are some solutions for the second problem, like folding keyboards that can be connected to the device, or voice recognition programmes which function as dictating machines.

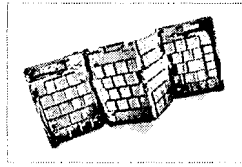


Figure 4: Folding keyboard adaptable for a PPC

Despite the inconveniences, it has many advantages which, as we mentioned earlier, will probably end with the gradual replacement of the PC, as we know it, by these 3G phones. This prediction is based on data such as the level of penetration of mobile telephony in society¹⁶ and unquestionable advantages such as mobility and personalisation, the possibility of offering geographically specific services¹⁷, etc.

This hypothesis is also endorsed by the success of i-mode in Japan, a project comparable, to a great extent, to the introduction of UMTS in Europe. This pioneering initiative, carried out by the Japanese telecommunications operator NTT DoCoMo, allows users to surf the Internet¹⁸, send e-mails, and so on. Its success has been so remarkable that NTT DoCoMo has already announced that it will soon start to offer the same service in Europe.

V. THE TEACHING OF LANGUAGES ON 3G MOBILES

To illustrate the real possibilities of the latest generation mobile phone, a prototype of multimedia application for language learning specially designed for the Siemens SX-45¹⁹ has been

developed in the Didactic Engineering and Linguistic Engineering Laboratory (LIDIL)²⁰ of UNED.

The chosen content was an area of business Spanish for foreigners, adapted from a unit of EnREDando²¹, an Internet multimedia course in Spanish language and culture, also produced by the LIDIL. The interested users are students with upper intermediate levels of Spanish. Each unit is based on a video, which is accompanied by exercises for students. The student also has access to a glossary containing words whose meaning may cause difficulty.

From an initial Web page the student can access the home page of each unit, and also the glossary:

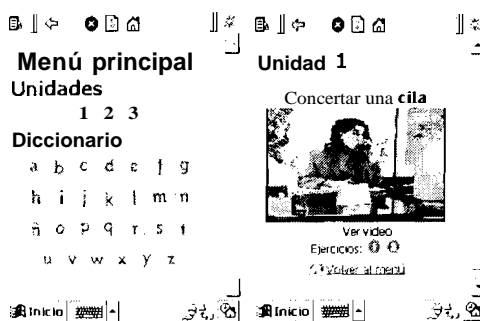


Figure 5: Main menu and home page of Unit 1. © LIDIL, 2001.

From the first screen of each unit the student can start the video, and, subsequently, carry out the suggested exercises:

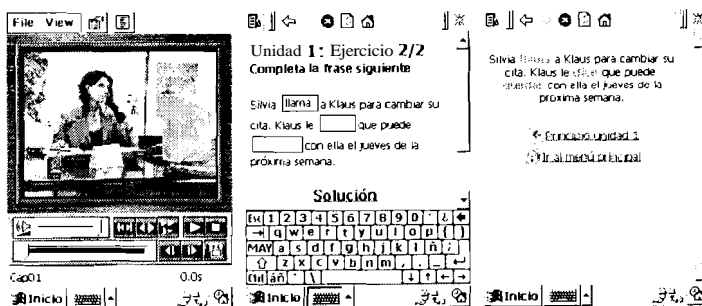


Figure 6: Video playback. Fill in the blanks exercise and solutions © LIDIL, 2001.

As has already been mentioned, the user also has a glossary at his/her disposal, which allows him/her to look up terms he/she may find difficult to understand. There is a definition for each entry, the example, which appeared on the video and also the corresponding audio extract:

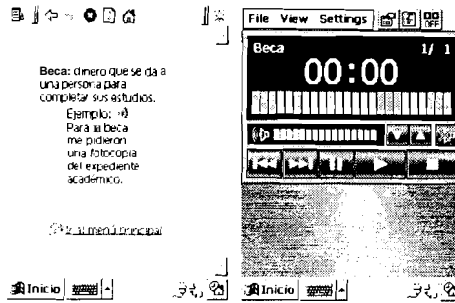


Figure 7: Entry of the audio glossary and play back of the associated audio © LIDIL, 2001.

The tests carried out on students had very satisfactory overall results. In the surveys, the students proved to be very motivated and positively impressed by the qualities of the media. In particular, it is worth mentioning the positive comments about the video, a very motivating element, and, in general, about the multimedia functions of the device, capable of reproducing audio-visual files of great quality. The students proved the potential of the tool, they did not feel disoriented and they found it easy to use. The results were equivalent to the ones obtained with the EnREDando version for conventional PCs.

On the negative side, the users highlighted the difficulty of data entry, which is done by means of a virtual keyboard and a pointer, and which they found slow and somewhat complicated.

VI. CONCLUSIONS AND PROSPECTS

As we have seen, third generation mobile phones are very versatile devices, which have functions equivalent to a conventional PC. Despite the present limitations, complex applications can be developed, which give good results with students.

Some Spanish newspapers, like El País or El Mundo, already offer the possibility of downloading their electronic versions for PPC. We envisage a growth in the number of services available for these devices, and it can be expected that the great reception of GSM mobile telephony will be repeated with following generations, though it probably will not be so dramatic.

It is also foreseeable that the audio and video services in demand, probably via the pay as you go business model, will be in greater demand, as they will allow the viewing of films, video lessons, and so on.

It also seems likely that personalised business will become more important. The use of terminals designed principally for individual use will permit the definition of user profiles and as a result of this provide contents to satisfy individual needs, authorise access to restricted contents, or carry out on-line exams, for example. The geographically specific services based on the physical position of the user, will be the other key ingredient for personal-

ization. For example, it will be attractive for users to be able to automatically obtain information about a country in which they have just arrived.

As a final thought, maybe we should think about offering the user contents which depend on the access device, because this will in many cases be indicative of his/her needs at any one time. It is reasonable to think that there will be a diversification of the methods of information access: the Home PC for intensive work, and a 3G phone in more relaxed situations, in public places, etc. The learner will require heavier content from the PC because he/she is in a suitable environment for study, whereas from the third generation mobile phone he/she will require information that does not require much concentration, and will thus tend to have a more entertaining pedagogical approach

NOTES

Multimedia information: text, images, audio and video

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² Vilá, J. (2001): "Formación en red a medida del cliente". In *El País*, Sunday, 11 November 2001.

³ Fernández Pinto, J. (1999): "Tutorías virtuales". *Especulo*, 11. [<http://www.ucm.es/info/especulo/numero11/tutorias.html>, 30/4/99].

⁴ Borreguero, M. (2000): "El aula virtual: el futuro de la formación". *Click-On-It*, December 2000.

IDC.com (2000): "According to IDC's Higher Education Study, eLearning Spending and Enrollment Are on Course to Grow Steadily". [<http://idg.com/www/pr.nsf/webPRForm?OpenForm&xregion=WW-&unid=B38BEFDF0F8A1B06882569B900617BD6;15/10/01>].

⁶ Warschauer, M. & Healy, D. (1998): "Computers and language learning: an overview." *Language teaching* 31, 57-71. [<http://www.gse.uci.edu/markw/overview.html>; 16/3/2001].

⁷ Kbps: abbreviation of kilobits per second. The speed of a transmission is usually measured in bits per second (bps). Kbps is a multiple equivalent to 1024 bps.

⁸ More advanced communication technologies, like RDSI, ADSL or optic fibre wiring, are very adequate solutions to the slowness of the internet. Unfortunately, its introduction in Spain is nowadays a minority.

⁹ And very probable for other tasks, since investigations tend to obtain a kind of "convergence at universal distance" to allow surf the internet, open the garage door of our house, or start the heating system at home from our workplace.

¹⁰ Or also PDA (=Personal Digital Assistant)

¹¹ Mainly in Europe.

¹² Global System for Mobile Communications.

¹³ General Packet Radio Service.

¹⁴ Universal Mobile Telecommunication System.

¹⁵ The colour screen and the high quality capacity for audio and video reproduction are two of the most remarkable features of the SX-45, and they currently make it stand out technologically above the majority of other models available in the market.

¹⁶ Only 25% of EU citizens have a PC, whilst 50% has a mobile phone. (Instituto de Estadística de la Comunidad de Madrid (2001): "Estadística «Sociedad de la información»". [<http://www.comadrid.es/iestadis/historico/u3170701.htm>; 7611/01]). This amazing figure has been achieved moreover in an extremely short period of time.

¹⁷ Based on the physical position of the user. For example, personalised contents can be offered depending on which country the user is in.

¹⁸ More precisely for pages written in CHTML language, a subset of the HTML in which standard Web pages are written.

¹⁹ This prototype could not have been developed without the unconditional support of Siemens A.G. España. We are also grateful to the Dirección de Tecnologías Avanzadas del Vicerrectorado de Metodología, Medios y Tecnología de la UNED, to the Unidad de Virtualización Académica, the Centro de Servicios Informáticos and the Centro de Producción de Materiales Audiovisuales.

²⁰ El LIDIL (<http://www.vip.uned.es>), directed by German Ruízper, it also includes José Carlos García Cabrero, M^a Dolores Castrillo, Birgit Ott, Esperanza Roman, Antonio Ruízper, Ricardo Mairal and Norberto Cereza

²¹ EnREDando (<http://www.enredando.org>) is the result of a European project of the LIDIL of the UNED, in collaboration with the universities of Erlangen-Nürnberg (Germany), Braga (Portugal) and Parina (Italy). The EnREDando project has been directed by Geriian Ruiperez. It is based on a computing development coordinated by Jose Carlos Garcia Cabrero with contents by Blanca Aguirre and Monika Guttack, and in which development many other people have collaborated.

REFERENCES

BIT: <http://www.iies.es/teleco/publicac/publbit/bit125/sumario.htm>

Borreguero, M. (2000): "El aula virtual como futuro de la formación". Click-On-It, diciembre 2000.

Casio: <http://www.casio.com>

Compaq: <http://www.compaq.com>

Eurotechnology: <http://www.eurotechnology.com>

Fernández Pinto, J. (1909). Tutorías virtuales. *Espéculo*, 11.
[<http://www.ucm.es/info/especulo/numero11/tutorias.html>, 30/4/99]

García Areteo, L. (2001). La educación a distancia. Barcelona: Ariel.

Heppell, S. (2000). eLearning. How might eLearning really change educational policy and practice?.
[<http://www.ultralab.ac.uk/papers/elearning/>; 23/2/2001]

IDC.com (2000). According to IDC's Higher Education Study. eLearning Spending and Enrollment Are on Course to Grow Steadily. [<http://idg.com/www/pr.nsf/webPRForm?OpenForm&xregion=WW-&unid=B38BEFDF0F8A1B06882569B900617BD6;15/10/01>].

Instituto de Estadística de la Comunidad de Madrid (2001). Estadística («Sociedad de la información».
[<http://www.comadrid.es/iestadis/historico/u3120701.htm>; 26/11/01]

Moehle-Vieregge, L. et al (1997). Surf's Up! Website Workbook for Basic Spanish. P.V. Guilford, CO: Jeffrey Norton Publishers

Monereo, C. et al. (2000). Internet Search and Navigation Strategies Used by Experts and Beginners. *Interactive Educational Multimedia 2000*, Núm 1, pp. 24-34.
[<http://www.ub.es/multimedia/iem/Contiguts/monereo.htm>; 17/7/00].

Palm: <http://www.palm.com>

Ruipérez, G. (1997). La enseñanza de lenguas asistida por ordenador. In *Carabela*, no. 42. Madrid: SGEL.

Siemens: <http://www.siemens.com>

Skomars, N. (1900). *Educating with the Internet*. Rockland (MA): Charles River Media.

Telefónica S. A. (2001). *La sociedad de la Información en España. Perspectiva 2001-2005*. Madrid: Telefónica S. A.

UMTS Forum: <http://www.umts-forum.org>

Vilá, J. (2001). Formación en red a medida del cliente. In *El País*, Sunday, 11 November 2001.

Warschauer, M. & Healy, D. (1998). Computers and language learning: an overview. *Language teaching*, 31, 57-71. [<http://www.gse.uci.edu/markw/overview.html>; 16/3/2001].