

# 1 Applying information and communication technologies to language teaching and research: an overview

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## Abstract

Currently, there is an international change in education that includes the development of new learning programmes and policies, such as (a) bilingual education programmes, (b) the Bologna process, with an emphasis on a more autonomous way of learning, or (c) the systematic evaluation and assessment of students and educational results. These changes in the educational situation require changing the way we learn, think and behave. Thus have emerged several new scenarios and environments for teaching and learning, such as blended learning, e-learning, ubiquitous learning or incidental learning. All these new approaches put the focus on learners and are intended to adapt to their needs and limitations. It seems that the easiest way to implement these new approaches is to apply Information and Communication Technologies (ICTs) to teaching and/or learning. This is the main assumption underlying the research in important language teaching and learning areas, such as Computer-Assisted Language Learning (CALL) and Mobile-Assisted Language Learning (MALL). This chapter (as well as this whole volume) tries to show how this goal is currently being achieved.

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**Keywords:** language learning, language teaching, distance learning, autonomous learning, blended learning, ubiquitous learning, MALL, CLIL, LMOOCs.

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**How to cite this chapter:** Pareja-Lora, A., Rodríguez-Arancón, P., & Calle-Martínez, C. (2016). Applying information and communication technologies to language teaching and research: an overview. In A. Pareja-Lora, C. Calle-Martínez, & P. Rodríguez-Arancón (Eds), *New perspectives on teaching and working with languages in the digital era* (pp. 1-22). Dublin: Research-publishing.net. <http://dx.doi.org/10.14705/rpnet.2016.tislid2014.418>

## 1. Introduction and motivation

As shown by most theories and studies about evolution and adaptation, changes in habitat (or environment) entail mutations and other types of adaptations in nature and all its beings. This is also true for science, education, the human mind and behaviour: changes in our environment require modifying the way we learn, think and behave (Barkow, Cosmides, & Tooby, 1992).

Currently, there is an international change in education that includes the development of new learning programmes and policies, such as (a) bilingual education programmes (Thomas & Collier, 2012), including courses taught in a second language (usually English); (b) University programmes resulting from the implementation of the Bologna process and the European Higher Education Area, with an emphasis on a more autonomous way of learning (EHEA, 2010); (c) the systematic evaluation and assessment of students and educational results, such as PISA (Programme for International Student Assessment, OECD, 2014); and (d) the application of guidelines and recommendations in order to correct the problems in education identified by means of these evaluations and assessments.

This international shift in education has recently motivated the emergence of several new scenarios and environments for teaching and learning. Thus, we are witnesses to the transition from the traditional, pure (and opposed) face-to-face and distance approaches to teaching and learning to a whole new range of (mixed) ways of learning, such as blended learning, e-learning, ubiquitous learning, social learning, incidental learning, contextual learning, autonomous learning or lifelong learning. All these new approaches (discussed in the next chapters) put the focus on learners and are intended to adapt to their needs and limitations. In our days, for example, people do not have much time for learning, and it is often difficult for us to allocate a fixed moment in our schedules to attend courses (be they virtual or not).

This is the new scenario for education, and the way we teach and learn is adapting in accordance. Indeed, this new global education context requires some adaptations not only in the way we learn, but also in the way we teach and in

the way we do educational research. An easy way to move ahead and adapt to this new education scenario is applying ICTs to teaching and/or learning. This is one of the main assumptions underlying many recent research advances in language teaching and learning, in particular in the areas of CALL, MALL, Content and Language Integrated Learning (CLIL), or Language Massive Open Online Courses (LMOOCs).

However, what are the real benefits of applying new technologies to teaching and/or learning? Are they actually also applicable to language teaching and learning? Are CALL, MALL, CLIL, LMOOCs, etc., as effective as traditional models of language teaching and/or learning? Do they really help language learners? Will language teachers and researchers (or learners) who fail to adapt and apply ICTs to language teaching and/or research (or use ICTs for language learning) be neglected and left aside?

The present volume tries to shed a light on these issues. For this reason, it has been divided into three different but fairly interrelated sections. The first aims at describing how information and language technologies are generally applied to language teaching and learning. Its different sections provide detailed information, for instance, about how ICTs are being used in the different levels of face-to-face language learning or in distance language learning and/or e-learning. The second section introduces some new trends in the application of ICTs to language learning, such as MALL or CLIL. Finally, the third section presents how language technologies, i.e. computational linguistics and language resources, are being applied to language teaching and learning.

## **2. General applications of ICTs to language teaching and learning**

This section contains three different subsections, namely (a) E-learning and languages in primary/secondary/tertiary education, (b) Language distance, lifelong teaching and learning, and Massive Open Online Courses (MOOCs), and (c) Interaction design, usability and accessibility.

The first subsection shows how ICTs are being used to enhance both face-to-face and distance language learning within the different levels of formal education. The second one explores how ICTS are being used in other contexts of language learning, mainly entailing autonomous and collaborative teaching or learning. In particular, this subsection shows how social networks and online collaboration are being used in order to learn languages. The third subsection discusses the importance of correctly designing and implementing the human-machine interfaces of language learning applications, so that they are user-friendly and/or accessible enough and, thus, do not diminish the motivation of language learners if they decide to use them.

### **2.1. E-learning and languages in primary/secondary/tertiary education**

This subsection focuses on the new approaches to teaching that overcome barriers of distance, time and age. These new approaches provide broad opportunities for learning beyond the classroom, and also for more varied and deeper learning. These opportunities (a) include online interaction between the learner and their teacher or peers, and (b) show that e-learning is no longer associated just with distance learning, but is also about using relevant technologies. Thus, e-learning is an important part of a suite of approaches that aim at providing the best and most appropriate ways of supporting learners' engagement and achievement.

E-learning demands a deep change both in the teacher's role and the student's. The role of the teachers moves from transmitter of knowledge to guide or tutor of the learning process. Likewise, they acquire an elementary importance as designers of learning strategies and materials, creating conducive conditions for this purpose. On the other hand, students move to channel their own process of learning, relying on the teacher and classmates to achieve their objectives.

One of the most important disadvantages of e-learning is a major abandonment of the students. Carrying out a successful learning process requires fulfilling a

series of conditions. The motivation of the students, their level of responsibility and autonomy are key factors. Moreover, the importance of quality digital materials and the design of contexts and appropriate methodologies to accomplish learning, as well as a proper and efficient tutoring of students, are essential elements. There are a wide variety of e-learning activities, which range, for instance, from using short digital videos in the classroom to programming an online course via the Internet.

In this regard, **M<sup>a</sup> Camino Bueno Alastuey** and **Jesús García Laborda** in their article “*Technology use in nursery and primary education in two different settings*”, explore the use of ICTs in several schools of two provinces in Spain: Madrid and Navarre. The authors describe the applications and programs used in nursery and primary education and compare the frequency of use in both provinces. In line with other similar works in the area, the results show a lower than expected use of ICTs in education.

**Susana Gómez**, in “*How working collaboratively with technology can foster a creative learning environment*”, details the results of an experience funded by the European Union within the project PopuLLar. In this experience, music and ICTs are combined; schoolchildren worked autonomously and collaboratively in order to create lyrics for songs of their choice in their L2. They sang their songs, recorded them and uploaded their creations to a wiki. Children from other countries later translated those songs from the L2 to their L1. The conclusions of the piloting (both local and large-scale) were very positive and went beyond the expectations of the researchers involved. Excellent feedback was received from all participants in the project, due to its humanistic approach to teamwork and creativity.

In the next article, “*The e-generation: the use of technology for foreign language learning*”, **Pilar Gonzalez-Vera** explores how e-learning platforms and new technologies have contributed to the process of learning languages in first year students of primary education. The research has been carried out through some questionnaires, at the beginning and at the end of the course, to assess the role of ICTs and the improvement of the students’ skills and competences. The results

demonstrate the positive effects of the use of new technologies in education as well as a positive reaction among students towards technology.

Then, **Cristina Vilaplana Prieto**, in her article “*Evaluation of reading achievement of the program school 2.0 in Spain using PISA 2012*”, analyses which part of the variation in reading scores is due to the Program School 2.0 implemented in some Spanish regions, which has the aim of introducing digital methodologies at schools. To this end, the author used data from PISA (2009 and 2012) for 15-year old students attending public schools. The results show that the increase in the provision of computers has different effects over reading scores based on the teaching methodology applied.

**Boris Vázquez Calvo** and **Daniel Cassany**, in their article “*Language learning actions in two 1x1 secondary schools in Catalonia: the case of online language resources*”, provide details on the prevailing project Educat1x1, focusing on practices carried out by six language teachers of Catalan, Spanish and English and twelve students from two schools. They seek to provide information about (a) the attitudes of teachers and students towards classroom digitisation, (b) language learning practices led by teachers and students when in a digitised classroom, and (c) the online language resources used and their purpose. Three preliminary conclusions can be extracted from this research: first, School 2.0 and OLPC (one-laptop-per-child) programs are not a guarantee for success; second, individual teachers make change happen, and not technology in itself; and finally, Online Language Resources (OLRs) remain unknown and poorly taught.

**Rebeca González Otero**, in her article “*Innovative resources based on ICTs and authentic materials to improve EFL students’ communicative needs*”, reflects on English as a Foreign Language (EFL) students’ communicative needs and the development of their oral skills through the use of authentic materials and ICTs in the classroom. She carried out her study on three secondary schools in Madrid, focusing specifically on students who attend a subject whose aim is to improve their oral skills. To this end, the author developed a set of innovative resources designed to check whether these materials promote students’ oral skills. Her

research has shown that innovative materials based on ICTs provide great results in Teaching English to Speakers of Other Languages (TESOL).

**Regina Gutiérrez Pérez**, in her article “*Teaching the use of WebQuests to master students in Pablo de Olavide University*”, shows the aims and results of the implementation of the use of WebQuest in the module of foreign languages into the “*Máster de enseñanza de profesorado de educación secundaria obligatoria y bachillerato, formación profesional y enseñanza de idiomas*” (Teacher Training and Language Teaching Degree). In so doing, she proposes blended and cooperative learning through the use of this educational resource in order to support autonomous learning. The result of the study is positive, as this tool can help teachers include the Internet into their programs in addition to creating motivating activities.

The first part ends with the study “*ICTs, ESPs and ZPD through microlessons in teacher education*”, from **Soraya García Esteban**, **Jesús García Laborda** and **Manuel Rábano Llamas**, which seeks to enhance English for Specific Purposes (ESP) learning as well as a Zone of Proximal Development (ZPD) interaction with technology through microteaching in teacher education. In this light, the authors explore how ICTs can be used in these frameworks in three different educational ways: (a) as a support (video) for analysis through teacher-instructor interaction, (b) as means of social interaction and use of language for education between teacher and students, and (c) for the creation of their own designed materials for language training. The results obtained show that the use of technology through microlessons is positive not only as a training technique, but also to introduce new content.

## **2.2. Language distance, lifelong teaching and learning, and MOOCs**

Distance learning offers flexibility, as the student determines when and how much time to dedicate to a course. It fosters learner autonomy and can cater for multiple intelligences. Thus, it is a very useful setting in lifelong learning and teaching, as the students can have other work or family commitments to

fulfill during the day, and spend their free time learning or improving other skills without the need for total dedication.

One of the most recent formats of distance and/or lifelong learning and teaching are MOOCs. MOOCs are a new model of online education that appeared and immediately spread in 2011 (Conole, 2013; Yuan & Powell, 2013). They are a natural evolution of social network based learning and, thus, also constitute a new type of Open Educational Resources (OERs, cf. Read & Rodrigo, 2014).

Hence, MOOCs are closely related to distance learning education, technology and innovation. They are centered on a topic, and its language-related variant (i.e. LMOOCs) are an ideal setting for language learning. Learners benefit from practicing the L2 and having immediate feedback from the many students enrolled. The open nature of an LMOOC means that the contents can be very varied and adapted to the specific needs of any particular program. They are also suitable for Lifelong Learning, as they provide open access to content in many fields of study. LMOOCs are a very ‘democratic’ way to learn languages, as anyone can create a topic of discussion.

However, any of these types of education suffers from similar disadvantages: a high dropout rate, the feeling of isolation on the part of the students, the difficulties they encounter to keep their motivation levels up, etc. Social networks are starting to be present in these courses and seem to provide a more ‘human touch’ to the use of technologies to learn. This topic is present in several articles of this section of the volume, and is specifically researched in the first one within a MOOC course.

There are also three other papers describing research in distance education. The second addresses the need to foster collaborative behaviour in a group of in-service teachers and, although the outcome of the experience was not totally positive, it highlighted the features that make good collaborative practice. If the students feel isolated from the group, they stop taking part, as social interaction was the driving force behind the tasks. The third paper again points out the enriching motivational qualities of the social dimension of a course.



The last paper presents an investigation into the features that make an electronic textbook more useful for learners. It is clear that if a textbook is designed bearing in mind its future audience it can provide activities that can make the student feel in control of the learning process, such as by adding the possibility of including learner generated examples.

Thus, **Patricia Ventura** and **Elena Martín-Monje** author “*Learning specialised vocabulary through Facebook in a massive open online course*”. Their paper explores the inclusion of social networks in MOOCs in order to improve the learning experience of Professional English-related vocabulary. The results of the experience are rather positive, as participants believe that they learnt more by benefitting from the added presence of Facebook in their course. Moreover, although this is part of ongoing research, it seems clear that this inclusion partially solves the problems associated with this type of course, with a lower than average dropout rate among Facebook participants.

**Margarita Vinagre Laranjeira** offers in “*Identifying collaborative behaviours online: training teachers in wikis*” the results of a training program of in-service teachers in collaborative tasks. The conclusions of the experience were not very positive; however, the author pinpoints the features that were relevant to those teachers who were successful collaborators: (a) they gave priority to social interaction over finishing the tasks; and (b) collaborative groups regularly discussed topics, made relevant contributions and were prompt in their communication.

**Greta Zanoni** points out, in her paper called “*The community as a source of pragmatic input for learners of Italian: the multimedia repository LIRA*”, the usefulness of a repository of multimedia materials to help Italian speakers living abroad develop or recover their linguistic and pragmatic competences. The paper highlights the motivation that can be fostered by the social dimension of e-learning in deepening socio-cultural knowledge.

**M<sup>a</sup> Ángeles Escobar-Álvarez** highlights in “*Grammar processing through English L2 e-books: distance vs. face-to-face learning*” the choice between the

use of printed and e-textbooks, depending on the type of educational setting (whether distance or face-to-face). As most students seem to prefer the printed version of textbooks, the author concludes the paper with some interesting points to take into account when designing materials for electronic dissemination.

### **2.3. Interaction design, usability and accessibility**

As shown all throughout this volume, lately, many language learning activities are taking place on different types of computers (PCs, laptops, etc.) and more recently on mobile devices (tablet PCs, smartphones, etc.). Thus, devices that had not been originally designed for educational purposes are being used in an educational setting. In addition, the new MALL apps that are being launched for smartphones present some problems for certain target groups, such as people with complex communication needs or even some disabled users. As a result, the level of usability and/or accessibility (i.e. usability from a disabled person's perspective) of these devices is often lower than desired. This is a clear setback if they are to be used at a greater scale for inclusive learning (Jordano de la Torre, Pareja-Lora, Read, & Rodrigo San Juan, 2013).

As also pointed out by these authors, one of the problems of usability and accessibility is that they are frequently defined in overly brief and ambiguous terms (see, for example, ISO/IEC, 2011). Accordingly, more comprehensive and precise definitions of usability, accessibility and their basic attributes and indicators are needed. This is particularly true when dealing more specifically with mobile device usability in education, where it is not possible to characterise the whole range of user experiences that comprises many different technologies, contexts of use, study modes and learning objectives (Jordano de la Torre et al., 2013).

**Silvia Buset, Emma Bosch, and Joan-Tomàs Pujolà** partly fulfil this need in their article "*A study of multimodal discourse in the design of interactive digital material for language learning*". They provide some interesting criteria that can be used to analyse and assess the usability and the 'clarity of contents' of language learning applications. These criteria focus on the screen

design of learning applications, such as (a) the shape, colour, size, resolution, or significance of their graphic elements; and (b) their screen typography or composition. They also discuss the way in which these features of multimodal discourse can influence the language learning processes.

Then, **Emmanouela Patiniotaki** explains in “*Audiovisual translation and assistive technology: towards a universal design approach for online education*” how the fields of audiovisual translation and assistive technology are rarely studied together, although they share many common features. The paper concludes that the future of online education is bright and, therefore, there is a need for universally accessible materials and whole educational contexts on the web.

### **3. New trends in the application of ICTs to language learning**

This section includes three subsections, namely (a) MALL, (b) ICTs for CLIL, and (c) Computerised language testing and assessment. All these subsections present some examples of application of ICTs to some new purposes or within a recently created scenario or teaching/learning modality. The first one describes how language learning can be enhanced by the use of mobile devices and/or specific language learning mobile apps, within both distance learning and blended learning. The second one deals with a setting of language learning that is becoming more and more frequent, CLIL, in particular in Spain, with the advent of bilingual learning programmes. The articles of the third one explore how ICTs can be applied to automatically evaluate the results of language learning and/or teaching.

#### **3.1. MALL**

MALL is a new learning modality that uses mobile devices as a medium to teach and/or to learn languages. As described in [Calle-Martínez, Pomposo Yanes, and Pareja-Lora \(2016, this volume\)](#), mobile devices allow for an

almost ubiquitous web access and, hence, make MALL most suitable for today's language learners, who usually combine their learning tasks with other multiple activities, such as work or child care. These new learners usually learn 'anytime, anywhere'. This is yet another learning modality, referred to as ubiquitous learning (Kukulska-Hulme, 2012; Peng, Su, Chou, & Tsai, 2009), and usually implied by MALL.

Mobile apps for language learning probably are the main outcome of MALL. MALL apps are, together with LMOOCs, the main elements that enable not only ubiquitous, but also blended learning (Bueno-Alastuey & López Pérez, 2013) nowadays.

However, as also shown by Calle-Martínez et al. (2016, this volume), whereas (L)MOOCs are more adequate to present theoretical content, apps are more suitable not only for this, but also to practice what has been or is being learnt, since they are usually more interactive and less restricted than LMOOCs.

Accordingly, we present in this section a selection of MALL apps, which provide altogether a nice survey on the state of the art in MALL app development and its related technologies. This MALL section begins with an article by **Nelson Gomes, Sérgio Lopes, and Silvia Araújo**, who write in "*Mobile learning: a powerful tool for ubiquitous language learning*" about ongoing research on the use of mobile devices as tools for language learning. The authors, together with other IT experts, have created an app for Portuguese language teachers and learners. This app can be used for the creation of content to teach and test all the different skills by using the templates provided. Although the project is still in process, the authors hope to foster standardisation in online teaching and to encourage teachers to work together and share materials.

Next, **Giselda Dos Santos Costa and Antonio Carlos Xavier** show in "*Critical visual literacy: the new phase of applied linguistics in the era of mobile technology*" that, although our society lives surrounded by visual information, there is still a significant lack of visual literacy. They describe a classroom activity to foster this skill and conclude that their critical approach helped the

students to decode visual meanings. The authors consider critical visual literacy as a fifth linguistic skill in L2 learning.

The following four articles describe four pieces of research (and/or MALL apps) that belong in the SO-CALL-ME project, whose final aim is to design and create EFL mobile apps by applying a solid pedagogy to teaching technical and language skills.

First, **Jorge Arús Hita**, in his article “*Virtual learning environments on the go: CALL meets MALL*”, presents *Eating out*, a tool that he and other authors have developed for EFL teaching. *Eating out* is a Moodle-based digital learning resource that can be run both on computers and mobile devices. This is one of its main advantages. However, its main contribution to the area may possibly be that it has been developed using “a carefully planned methodology and a well-grounded theoretical basis for the explanation of lexicogrammatical issues” (this volume, p. 213). As the author shows in his paper, *Eating out* has already been tested by University students with quite outstanding results.

Second, the use of a sound theoretical framework and/or basis in the development of MALL apps is further discussed in the article “*Exploring the application of a conceptual framework in a social MALL app*”, written by **Timothy Read**, **Elena Bárcena**, and **Agnes Kukulska-Hulme**. This article presents Audio News Trainer (ANT), a first prototype of a social MALL app, based on **Kukulska-Hulme’s (2012)** conceptual framework. This framework postulates that time, place and activity type are the three axes around which the development of MALL apps should revolve. Thus, the article (a) describes how this framework has been used to create ANT, which aims at developing oral and written competences in a mixed individual-social modality; and (b) presents the formal features and functionality of this app.

Third, “*Design and implementation of BusinessApp, a MALL application to make successful business presentations*” also provides insight into the methodological aspects of app development; however, in this case, **Cristina Calle-Martínez**, **Lourdes Pomposo Yanes**, and **Antonio Pareja-Lora** focus

not only on the pedagogical and/or linguistic aspect, but also on a Software Engineering perspective. They present *BusinessApp*, a MALL app that they have developed following this hybrid methodological approach, (a) to help its users create and perform successful business presentations in English; and, in general, (b) to improve their oral and communication skills in this language. Another main contribution of *BusinessApp* is that it enables autonomous learning by means of self-evaluation (automatically-corrected) exercises.

Finally, the article “*Using audio description to improve EFL students’ oral competence in MALL: methodological preliminaries*”, whose authors are **Ana Ibáñez Moreno**, **Anna Vermeulen** and **Maria Jordano**, presents the methodological steps taken to develop a MALL app prototype (VISP v1), which aims to help B1 English language learners to use their oral skills, especially speaking. This app uses audio description (which is normally used to describe orally visual information in the gaps between dialogues for accessibility reasons) as a tool to promote oral production skills by means of mobile devices (Android smart phones).

### **3.2. ICTs for CLIL**

CLIL is a learning environment that aims at teaching subjects of the curriculum by using an L2 as the vehicular language. It promotes intercultural communicative competence, computer literacy and lifelong learning skills, as well as multidisciplinary learning and positive attitudes and acceptance towards other languages and other ways of life.

This holistic approach to teaching is not without its problems, as its fast development requires materials designed for this purpose and not simply translated from the L1 to the L2. Unfortunately, this is not always the case, and teachers find themselves with the extra task of adapting and creating activities for their classes.

The papers presented in this section of the volume address some of the needs in the field: students entering tertiary CLIL education without the necessary previous

foundations in the L2, and the difficulties related to specific area vocabulary acquisition. Students can greatly improve their level of L2 at university level through a combination of ICT methods used in and out of the classroom. Vocabulary acquisition can be made easier through the use of software specially designed for this task, which (a) can replace the old hand-written notebooks, and (b) free some of the time that area teachers used to devote to teaching words and expressions and dedicate it to putting them into practice.

**Nuria Hernandez-Nanclares** and **Antonio Jimenez-Munoz** address in “*ICT in EMI programmes at tertiary level in Spain: a holistic model*” the problems that are experienced when universities offer degrees taught through English to students whose secondary education has not prepared them for such events. They present a holistic model for ICT-supported learning, which combines CLIL blended learning (i.e. a combination of distance and face-to-face learning), social networks and micro-blogging, among other tools, in order to help students to improve their performance. Their conclusions are that the use of one single element of the previous ICT forms does not result in better learning outcomes, and that only an integrated holistic method combining several in-class practices improves students’ performance.

**Plácido Bazo**, **Romén Rodríguez** and **Dácil Fumero** highlight in “*Vocabulary Notebook: a digital solution to general and specific vocabulary learning problems in a CLIL context*” the advantages of the use of this digital tool and its features. They conclude that Vocabulary Notebook helps the teacher to devote more time to practicing the vocabulary as it frees the time taken by teaching it. This tool (a) stores the information compiled by the student in the cloud, (b) can organise words and expressions according to different criteria, and (c) has specific functionalities for teachers.

### **3.3. Computerised language testing and assessment**

The success of most of the approaches to language learning mentioned above (e.g. distance learning, lifelong learning, autonomous learning, blended learning and ubiquitous learning) requires defining convenient and effective

ways to test and assess language learners' knowledge improvement and skill development advances. On the one hand, this entails including self-evaluation (and automatically-corrected) activities in distance learning modules and MALL apps, as pointed out by [Calle-Martínez et al. \(2016, this volume\)](#). These self-evaluation activities should help (a) keep learners motivated, and (b) provide the learning system with information to further guide and/or tutor the learning process by proposing some additional scaffolding activities. On the other hand, as pointed out by [García Laborda and Magal Royo \(2016, this volume\)](#), the use of computerised language testing is becoming urgent in massive education scenarios, where “[o]nline testing is becoming a popular way to deliver language tests, partly because of its reduced cost, partly because of the high quality of test data collection” (p. 283).

Accordingly, in this subsection, we have included three articles dealing with computerised approaches to language testing and assessment. These articles (together with [Pareja-Lora \(2016, this volume\)](#), who presents an extreme computational linguistic approach to this issue) also provide an overview of the different problems that these approaches have to face and how to (partially) solve them.

The first article is entitled “*Using tablet PC's for the final test of Baccaulaureate*”, and has been authored by **Jesús García Laborda** and **Teresa Magal Royo**. This piece of writing introduces OPENPAU, a tablet PC app developed by the authors for assessing both productive and receptive skills in foreign languages for its prospective use in the final test of the Baccaulaureate. The main contribution of this article is that it offers reliable, simple and effective solutions at a low cost for the needs of a nationally delivered online test, which can serve to assess all the traditional language skills.

The second one, namely “*The implications of business English mock exams on language progress at higher education*” by **Rocío González Romero**, provides an application of computerised language testing within a particular language teaching and learning area, namely Business English. The goal of the research presented in this article was to evaluate and describe the impact of taking



mock exams on learners' foreign language progress. Thus, an experiment was conducted with adult participants taking online Business English as a compulsory subject of their degree in Economics. The results of this experiment (a) verify the benefits of mock exams as scaffolding activities to foster language learning, and (b) indicate that "these types of activities promote outstanding final grades as well as prove to be an effective way of engaging students in learning tasks" (this volume, p. 301).

Finally, **Vicente Beltrán-Palanques**, in the third article of this section, "*Assessing pragmatics: DCTs and retrospective verbal reports*", discusses the use of a communication tool, namely *Skype*, in conjunction with two different research methodologies (DCTs, i.e. discourse completion tests/tasks, and verbal reports) in order to investigate the cognitive processes undertaken by a group of English language learners as regards their pragmatic performance. This study shows that retrospective verbal reports are instrumental in providing further information concerning participants' speech act production.

#### **4. Applying computational linguistics and language resources to language teaching and learning**

Computational linguistics can be roughly defined as the particular area of linguistics in which languages and/or language resources are created, generated, enriched, analysed, processed and/or managed digitally and/or automatically. A language resource, in turn, can be defined as a component that models, processes and/or manages some language(s) or some language or linguistic metadata and/or phenomena. Typical and well-known examples of language resources are corpora, digital dictionaries and computational lexicons, as well as the tools to manage and process languages in general or these other language resources (e.g. applications for linguistic annotation or computer aided translation tools). Computational linguistics is already a consolidated research and development area, with well known applications, like machine translation, speech recognition and generation, or information retrieval and extraction.

This section includes seven different articles that provide seven quite particular examples of the applications of computational linguistics to language learning and teaching. Whereas some of them aim at developing a particular language resource (for instance, an application to store and display English verb graphical representations or an affective dictionary for Spanish), some others apply language resources and/or computational linguistics techniques (such as machine learning or Part-Of-Speech (POS) taggers) to (a) solve a particular problem in language teaching and/or learning applications, or (b) to create new useful resources for this area.

In the first article, “*An updated account of the WISELAV project: a visual construction of the English verb system*”, **Andrés Palacios Pablos** provides a summary of the work carried out in the WISELAV ongoing project. WISELAV offers a visual interpretation of English verbs through colours and shapes. This software is becoming more user-friendly and illustrates operational aspects of verbs in order to produce grammatical forms and meanings. The computer program has been designed as a support with the aim of helping students to improve their grammar by detecting and showing the mistakes made.

The second one, “*Generating a Spanish affective dictionary with supervised learning techniques*”, written by **Daniel Bermudez-Gonzalez**, **Sabino Miranda-Jiménez**, **Raúl-Ulises García-Moreno**, and **Dora Calderón-Nepamuceno**, shows some research on combining several machine learning techniques (decision trees, naive Bayes, and a support vector machine) to develop a particular language resource for Spanish, namely an affective dictionary for this language. This affective dictionary will be used later on to analyse and determine the affective orientation of texts, that is, for opinion mining and sentiment analysis. The resulting lexicon has 30,773 words, classified as positive or negative words, and has an acceptable quality (precision=67.0%), especially when compared with the quality of other similar lexicons.

The third one, “*Transcription and annotation of a Japanese accented spoken corpus of L2 Spanish for the development of CAPT applications*”, by **Mario**

**Carranza**, describes some research aiming at compiling a training corpus for the development of Computer Assisted Pronunciation Training (CAPT) applications. Towards this end, a longitudinal non-native spoken corpus of L2 Spanish by Japanese speakers was (a) collected, (b) fully transcribed at both phonological and phonetic levels, and (c) annotated at error level. This error annotation was statistically analysed in order to evaluate the influence of oral proficiency, speaking style and L2 exposition in pronunciation accuracy. The results of this analysis show that (a) only the starting oral proficiency level of the student has an attested positive impact on Spanish pronunciation acquisition, and (b) in general, exposure to the target language is not enough to expect pronunciation accuracy improvement in foreign language learners.

The fourth one, “*Using ontologies to interlink linguistic annotations and improve their accuracy*”, whose author is **Antonio Pareja-Lora**, proposes to reuse natural language annotation and/or analysis tools in order to include mistake and exercise automatic correction in language learning applications. The main problems that prevent these tools from being reused for these purposes are that (a) they usually provide annotations with a much too high error rate, and (b) they are hardly interoperable. Thus, this work also proposes to use a structured software architecture to combine the annotation of several tools, both ontology and standards-based, in order to solve these problems. The article concludes with showing the impressive results obtained in an experiment that implemented this architecture to reduce the POS tagging error rate for Spanish by combining the annotations of three different POS taggers for this language. These results should allow the inclusion of these technologies before long in learning applications for the purposes aforementioned.

The fifth, sixth and seventh articles show the close relation between (a) computational linguistics and/or language resources, (b) translation, and (c) language teaching and/or learning. On the one hand, the fifth and sixth papers feature two applications of language resources (namely corpora and corpora management tools) to Translation Studies; on the other hand, the seventh article shows how Computer-Assisted Translation (CAT) tools can be reused and retargeted for language learning purposes.

Thus, in the fifth article, “*The importance of corpora in translation studies: a practical case*”, **Montserrat Bermúdez Bausela** presents how another type of language resource, so-called ‘ad hoc corpora’ or ‘translator’s corpora’ can be used in Translation Studies as a working tool both in the classroom and for the professional translator. Indeed, corpora can be “an inestimable source [...] for terminology and phraseology extraction” (this volume, p. 363). The main challenge and contribution of this work is showing how this other type of corpora can be applied to help students acquire and develop their own competence in translation.

The sixth article in this section is “*Using corpus management tools in public service translator training: an example of its application in the translation of judgments*”, by **María Del Mar Sánchez Ramos** and **Francisco J. Vigier Moreno**. This article presents how monolingual virtual corpora and corpus management tools (e.g. concordance software) are being used for teaching within a particular domain of Translation Studies, commonly referred to as Public Service Interpreting and Translation (PSIT). PSIT deals mainly with the legal translation of the documents most commonly used in criminal proceedings and, accordingly, is intended to help trainees to develop their legal translation competence and, fundamentally, on the rendering of a text which is both valid in legal terms and comprehensible to the final reader. As shown in the article, these language technologies really help translation students acquire both subject field knowledge and linguistic knowledge, such as terminology, collocations, phraseology, style and register.

The last article, written by **María Fernández-Parra**, “*Integrating computer-assisted translation tools into language learning*”, describes how to use CAT tools not only within the translation curriculum, but also within the foreign language learning curriculum, as additional language learning tools, especially in universities or schools where CAT tools are already part of the curriculum. The article shows that, in effect, CAT tools can co-exist with other methods already used in language learning, and contribute to enhance the language learning experience.

## 5. Conclusions

To sum up, this volume tries to show how new and emerging approaches to teaching and learning (such as blended learning, e-learning, ubiquitous learning or incidental learning) can be successfully implemented within language teaching and/or learning by means of the application of ICTs. In fact, this is the main assumption underlying the research in important language teaching and learning areas, such as CALL, MALL, CLIL or LMOOCs.

We also (a) show how information and language technologies are generally applied to language teaching and learning, (b) introduce some new trends in the application of ICTs to language learning (MALL, CLIL, etc.), and (c) present how language technologies (i.e. computational linguistics and language resources) are being applied to language teaching and learning.

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Published by Research-publishing.net, not-for-profit association  
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New perspectives on teaching and working with languages in the digital era  
Edited by Antonio Pareja-Lora, Cristina Calle-Martínez, Pilar Rodríguez-Arancón

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Cover design and frog picture by © Raphaël Savina ([raphael@savina.net](mailto:raphael@savina.net))

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British Library Cataloguing-in-Publication Data.  
A cataloguing record for this book is available from the British Library.

**Legal deposit, France:** Bibliothèque Nationale de France - Dépôt légal: mai 2016.