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The Changing Focus in Computer Assisted Language Learning (CALL) and Educational Technology and its implication for Pedagogy

التركيزالمتغيرفي تعلم اللغات بمساعدة الكمبيوتر و في التكنلوجيا التربوية وانعكاسه على البيداغوجيا

اللغـات بمسـاعدة الكمبيوتـر تعلـم نحـاول مـن خـلال هـذا المقـال تحديـد بعـض جوانـب التقـدم الملحـوظ الـذي يعرفـه ميـداني المحتمـل المتبـادل بـين كلا المجالـين. ويعـد هـذا التطـور في هذيـن المجالين والتكنلوجيا التربويـة، مع طـرح التأثير نتيجـة بحـث متعـدد التخصصـات، بحيـث أنـه يجمـع بـين مسـاهمين مختلفين مثـل مهندسي البرمجيـات، مصممـي التعليـم، تربويـين لغويـين، و معلمـين أيضـا وفي الواقـع، إن المجموعـة المتناميـة مـن الأدوات و التطبيقـات المنبثقـة عـن التطـور التكنلوجـي قـد وجـدت طريقهـا إلى عمليـة التدريـس و التعلـم مـن جهـة؛ ومـن جهـة أخـرى، فـإن ضرورة ضبـط و تعديـل هـذه الوسـائل التكنلوجيـة لتتلائـم مـع تعليـم وتعلـم اللغـات سـاهم في تطويـر بعـض خصائـص تلـك التكنولوجيـا مثـل أدوات التأليـف. وبهـذا يعـرف كلا الميدانـين هـذا التطـور الديناميـكي، إضافـة إلى أنهـما يسـاهمان في العمـل عـلى تحقيـق الهـدف المتوقـع، أي تسـهيل عمليـة التعلـم عـلى العمـوم و هـي مـن اختصـاص التكنلوجيـا التربويـة، كـما أنهـا مـن مهـام . تعلـم اللغـات بمسـاعدة الكمبيوتـر أيضا بكونه يشـمل دراسـة تطبيقـات الحاسـب الآلي في عمليـة التعليـم والتعلـم باختصـار، يهـدف هـذا المقـال إذا إلى طـرح بعـض جوانـب هـذا التطـور في كلا الميدانـين ودراسـة التحـول في التركيـز الـذي يميـز هـذا التطـور المعـزز بالتنامـي التكنولوجـي و الحركـة المتواتـرة للمجـال النظـري اللغـوي، و الـذي مـن شـأنه كشـف التأثـير المحتمـل، المتبـادل بـين كلا الميدانيـين (التكنلوجيـا التربويـة و تعلـم اللغـات بمسـاعدة الكمبيوتـر) بهـدف

. دراسة انعكاسه على البيداغوجيا

Abstract

In this article, we try to identify some aspects of the great development Computer Assisted Language Learning (CALL) and Educational Technology have known, putting forward their liable mutual influence. This development in both fields is a result of a multi-disciplinary research, involving different contributors such as, software engineers, instructional designers, language pedagogues, and even teachers. Indeed, the growing range of tools and applications brought about by the developing technology have ended up by finding their use in the teaching/learning process, on one hand. On the other hand, adjustments have been sometimes necessary before adopting such tools, which contributed to upgrading a number of authoring tools and applications. Thus, both fields have known this development or movement in effervescence. They also share the expected objective of facilitating learning in general, which is the vocation of Educational Technology and the role of CALL as well, being concerned with the study of computer applications in language teaching and learning.

In short, the aim of this article is to consider the changing focus of this development that is enhanced by the ever-growing technology, and the pendulum swing of the language learning theoretical domain, which reveals a liable mutual influence. The latter is tackled in this article, with a view of examining its implication for pedagogy which has been adapted to this shift in concern, and modelled by this mutual influence.

Key Words: Computer Assisted Language Learning (CALL) – Educational Technology- Information &Communication Technology (ICT) - Electronic Learning (E-learning) - Virtual Learning Environment (VLE) - Pedagogy.

Introduction

The aim of this article is to trace back the development of both Computer Assisted Language Learning (CALL) and Educational Technology, examine its changing focus while in progress, and then discuss the implication of this changing focus for Pedagogy.

As a matter of fact, the evolution of Computer Assisted Language Learning (CALL) is not only due to advancement in the technological field, but to development in the language theoretical domain as well. Indeed, constantly developing technologies brought about a range of products, which has led to finding out about their use in the teaching/learning process. This requires some forms of adjustment and adaptation to teaching/learning situations in order to better exploit such technology. This state of affairs may partly explain, on one hand, the contribution of the movement of the language learning approaches' pendulum swing to E-Learning or CALL, terms that are used interchangeably here. This made CALL change its focus, and get enriched with the various applications of information and communication technology. This enhanced multidisciplinary researchers to look for more tools to be applied to teaching/learning situations which, on the other hand, indirectly gave an impetus to Educational Technology. The latter, being concerned with facilitating learning in general by creating and managing technological resources, has known indeed the elaboration of various applications as well as tools, which continued in the first decade of the 21st century and is still going on. Those movements in progress then, both in language teaching/learning theory and Educational

Technology allowed CALL to be integrated into language learning activities both in and out of class. Thus, various skills have come to be integrated owing to the association of different information and communication technology tools (ICT). This situation reveals the impact of Educational Technology on the recent language learning/ teaching practices, and makes one realize the liable mutual influence between CALL and Educational Technology. This probable mutual influence, which embodies the ongoing shift in focus of both fields, in addition to its implication for Pedagogy constitute then the concern of this article.

To convey all these ideas, we started by putting forward in the first section (1) the historical background which led to this breakthrough in both CALL and Educational Technology. We thus gave some related definitions, and then set up the basis on which this development is to be described.

This basis or framework corresponds to the three phases (behaviouristic, communicative, and integrative) related to the way the computer has been used in language learning and teaching. This is tackled in sub-section (1.1) where features of the language teaching/ learning process are described in relation to the use of the computer, and later of other new applications and tools. We thus depict the development from the structuralist/behaviouristic drill and practice teaching/learning in traditional labs, passing by somewhat more communicative activities, during the communicative phase, inspired by the communicative approach. Then, with the expansion of personal computers and the development of applications like word processing, some activities were facilitated, such as assignments, which reinforced writing skills. Moreover, more needs-specific software was designed for language learning purposes, in accordance with the English for specific purposes approach, and the development of notional/functional syllabi.

Later, the development of the Internet, followed by the World Wide Web gave an impetus to the elaboration of new applications

and authoring tools. This allowed the emergence of various pedagogical activities that integrated the four skills, and boosted interaction.

The advent then in Educational Technology of new information and technology tools (ICT), like the web, enhanced CALL and opened the way to putting into practice some learning/teaching theories like Vygotsky's social constructivism. This is discussed in the next section (2) and elaborated on, in the following sub-section (2.1).

In the latter part (2.1), we show indeed how the emergence of the new technologies, notably the Internet, the Web and the 'Web 2.0' inaugurated new ways of teaching/learning. Hence, CALL came to integrate new trends like Distance Learning, Open Learning, or even Hybrid, or E-Learning which is used here as a catch-all term. This led to the proliferation of ways and sources of learning opportunities.

This booming development then both in Educational Technology and CALL reveals an influence that is likely to be mutual, as explained in section three (3). In the light of this state of affairs, Pedagogy is to be considered.

The implication of that influence for Pedagogy is examined in the succeeding sub-section (3.1) in relation to the new CALL activities, like webquest. The latter is an instance of the new terminology which has also come to be encompassed in pedagogy.

Accordingly, the new roles of the teacher and the learner have to be thought about. This is discussed in the following part (3.2). We thus examine the role of the former who has become a course designer and manager in virtual communities, while the latter has turned out to be an active, knowledge constructor.

We finally conclude by recapitulating the aim of this article, which is considering the changing focus in the development of CALL and Educational Technology, their probable mutual influence and its implication for Pedagogy. This is followed by a summary of the main points embodied in the different sections of the article.

1- Setting the scene:

Before knowing more about this shift in both Educational Technology and CALL, depicting the related historical background is necessary in order to understand such movements and become familiarized with the terminology and concepts in those respective fields. This reminds one, as a matter of fact, how multidisciplinary we are likely to become nowadays, and the necessity to broaden one's scope of knowledge in order to cope with the requirements of quality assurance standards. Quality assurance constitutes a global trend in higher education, encompassing certain objectives among which this 'growing concern with the comparability of educational standards' UNESCO.Org. (2013: p.8). Such standards then will ensure constant control over quality.

To carry on then with this shift in CALL and Educational Technology, one of the definitions of the latter by Richey (2008: p.24-25) states that:

> "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources."

Educational technology deals therefore with all the technological support that may facilitate and enhance learning.

CALL however, may be defined as "the search for and study of applications of the computer in language teaching and learning" Levy (1997). Thus, CALL is mainly concerned with language learning and teaching using computers. Accordingly, reviewing the historical background of CALL implies considering the technological development of a range of computer tools as well as applications, and finding out about their use in the teaching/learning process. Therefore, while reviewing the historical background of CALL, computer tools and applications, the mutual influence between educational

technology development and the evolution of language learning/teaching is put forward.

From programmed whole-class teaching to distance learning, encompassing a range of constantly developing technologies, CALL went through three phases which reflect the development in EFL (English as a Foreign Language) teaching. Those phases (behaviouristic, communicative, and integrative) correspond to the ways in which the computer has been used in language learning and teaching.

1.1 The movement start in technology and pedagogy

Since the PLATO system of the 1960's, mainframe-based computer programs were developed by teachers on Apple II, IBM PC, and BBC computers. They consisted in drill, self-paced auto-correcting exercises and practice materials of discrete areas of language learning, following the movement of the language learning approaches' pendulum swing, dedicated then to the structuralist-behaviourist trend. These approaches gave way to audio lingual methods, practised in traditional labs.

Then, with the shift of language learning/teaching pendulum swing towards the communicative language learning, supporting meaningful task-based interactions with the language, a new era has been inaugurated to let way to an increasingly interactive and communicative support for listening, speaking, reading and writing, including extensive use of multimedia CD-ROMs. The term CALL came to be favoured in the 1980's since the older term was CALI (Computer Assisted Language Instruction) associated with programmed learning, i.e. a teacher-centred rather than a learner-centred approach. The computer pattern drills revealed, as a matter of fact, to be less compatible with human language, than with other areas of knowledge which are exact like mathematics for instance. This does not mean however abandoning totally such exercises which may still

be useful mainly when matched with more open-ended, communicative tools and integrated into a multimedia-rich, language learning environment Godwin-Jones (2007: p.p.10-17). It is to be noted however that communicative ways in teaching have not come into use only with the advent of computers. In fact, the Council of Europe for Language References (CEFR) for instance had already adopted the communicative dimension before the arrival of microcomputers in educational institutions, as stated by Davies (2005) :

"The term **behaviouristic** certainly describes early CALL (late 1970s, early 1980s) but the **communicative** approach, spurred on by the Council of Europe's work on the Common European Framework of Reference (CEFR) for Languages and its emphasis on functions, notions and communicative competence in the 1970s, predates the advent of the microcomputer in schools and universities".

Here, it may be useful to remind one that the CEFR developed six levels of Languages proficiency that constitute a coherent framework of reference for the description of language learning and teaching at all levels. This has become a basis for the international comparison of objectives and qualifications, to facilitate personal and vocational mobility in Europe Warschauer (1996).

In the 1990's, the computer became widely spread and some of its tools like word processors very much in demand. Thus, with the important development of laser discs, dedicated computer labs for language learning came to substitute those traditional labs during the 1980's and the 1990's. Some applications were developed for the PC and were exploited for teaching writing skills, in addition to activities like assignments. These seem, according to Bell and Hubbard (2009) to enhance learners' motivation and increase their involvement in such interactive learning.

The mid-1990's however knew two major changes: one consists in an increase in commercial learning programs or what is called 'courseware' on CD-ROMs which have come to be integrated in

home computers. 'Courseware' which may refer to complete software packages intended for independent study, or to be integrated in a language learning course, is used here to refer to any software designed for language learning.

The other shift is related to the development of the internet, and the World Wide Web which is part of the former, allowing various skills to be integrated. This has become possible with the association of different information and communication technology tools (ICT). This phase (integrative) is considered however by some researchers, as describing developments rather in technology "The integrative phase appears to be describing the technology more than the pedagogy and methodology" Warschauer (1996). This does not mean either the end of the movement. In fact, new applications and tools have soon come to be appropriated by CALL with the development of the Web, as described hereafter.

2- The recent course of the movement in CALL and Educational Technology

The web and the use of CMC (Computer-Mediated Communication) brought about applications that put into fashion, and allowed the adoption of the 'social constructivist methodology', Vygotsky's sociocultural theory (1978). This approach considers knowledge as fundamentally social, and mostly results from the interpretation of personal experiences Resnick, Levine & Teasley (Ed. 1991), Salomon (Ed. 1993). The concept of 'cognitive apprenticeship', Collins Lave & Wenger, Brown & Newman (1989), was put forward to refer to learning as a process of participation in communities of practice, and occurs in interaction through cognitive apprenticeship in real contexts, in authentic learning tasks.

According to Vygotsky's social constructivism, higher mental processes in the individual have their origin in social processes. He illustrated this by the example (1978, p. 56) of pointing a finger which is considered in the beginning as a meaningless behaviour, then it becomes a movement that has meaning when people react to it. Thus, social interaction is important for the development of cognition, and

the social environment models the behaviour. Vygotsky's concept of "zone of proximal development" (ZPD) represents the level of development achieved when a child takes part in social behavior. Thus, ZPD stands for the gap between what he/she (a learner) could do alone and what could be done with the help of a more experienced person (a teacher). What is developed while learning in collaboration with peers and a tutor's guidance far exceeds what can be achieved individually; therefore ZPD full development is determined by full social interaction. The learner's cognitive processes (like attention, retention) and personal factors (like motivation) interact with environmental events to yield learning which should be tested to measure his/her understanding. Recent research in constructivism points out learning in communities of practice Wenger (1998) like groups of science students sharing knowledge and problem-solving. Learners are therefore encouraged to take part in the construction of knowledge. For this, they are guided through activities to build on prior knowledge, assist peers on forums, and collaborate with them by preparing projects, or writing assignments using the Wiki tool. This is a space where learners can type, modify, and add writings to their mates' without loosing previous versions. They are also asked to search the web for more information to enrich a definition or to contribute to a glossary building. Such an activity is known as a webquest, and it is an inquiry-oriented activity.

Thus, new activities have come to be integrated in CALL as a result of the development in Educational Technology of new resources adjusted and adopted. Moreover, new trends in CALL have emerged, taking advantage of the booming tools and applications in Educational Technology, as it may be observed in the upcoming section.

2.1 New practices in CALL, and new resources in Educational Technology

To start with, we may distinguish between computer mediated learning, done exclusively via the computer (students working

without the teacher's presence), and hybrid or blended learning which is a blend of distance learning online (individual work) combined with face-to face tutorials (students work with the teacher's presence). Many activities indeed can be extremely time-consuming to accomplish in class and which may be completed individually by students, like revising vocabulary, practising listening, and/or working grammar structures.

Before going further, it is necessary to distinguish between 'Distance learning', 'Open learning', and 'E-learning'. There is a thorough definition, Hewer (2008), which makes a clear distinction between distance-learning and open-learning. It states that:

> "The term **distance learning** is taken to mean, principally, individual learners working by themselves, at a place and time of their choosing and, to some extent, at a pace and in an order also chosen by themselves. This term encompasses aspects of **open learning** in that it includes degrees of openness in terms of place, time, pace and content of learning. It also takes in aspects of **resource-based learning** in that, as the student's knowledge of the target language develops, he/she is often required to work with a range of resources presented in different media, particularly for practice in reading and listening skills. The essential characteristic of this kind of learning is that it involves a substantial element of self-study, despite the provision of tutors who can be contacted by phone, email and letter. The term **distance learning** tends to imply that the students are linked to a centre, from which they are at a distance."

According to this definition, distance language learners study online language learning materials provided and organized by institutions for home study, like 'l'Université de la Formation Continue' (UFC), 'l'Office National d'Enseignement et de Formation à Distance' (ONEFD, formerly called 'CNED') which is specialized in distance

learning, or the BBC website (UK). Here, it is useful to remind one that distance language learning existed much earlier than the advent of the Internet and was dispensed via letters, television and CDs. Online courses adopt a multiple-media approach in that materials are produced in any medium that suits their purpose, like learning packs encompassing text books, audiocassettes, videocassettes, or even TV and radio programmes as support materials. We may cite the BBC programmes which provide students with a learning environment involving both distance and face-to-face contact modes, which may be qualified as' blended learning' or 'hybrid' learning.

Concerning Algeria, in the 2006 report planning priorities for 2007 up to 2009, the Ministry of Higher Education and Scientific Research (MESRS) put forward two objectives concerning Information and Communication Technology (ICT): i- implement an ICT system; and ii- set up distance learning as an adjunct (a complement of the official course) to face-to-face learning. For this purpose, different institutions have already been equipped since 2003.

To carry on with our distinctions between 'Distance learning', 'Open learning', and 'E-learning', the latter (electronic learning) may be considered as learning materials on the internet. E-learning is also defined Seda YUCEL (2006) as '...a web-based educational system on platform with Internet, Intranet or computer access'. It may include then the use of web-based teaching materials and hypermedia in general, multimedia CD-ROMs or web sites, discussion boards, e-mail, blogs, text chat, computer aided assessment, simulations, games, learning management software, as well as a combination of different methods which are likely to enhance the learning process.

Here again I shall interchangeably use the terms 'E-Learning', 'CALL', 'Distance' and 'Open Learning' to refer to teaching/ learning using the computer, the web-based teaching materials, and hypermedia in general, since they share common features.

In line with this, it may be useful to consider what is exactly meant by 'multimedia', and 'hypermedia'. What was first referred to

as multimedia consisted in books, audiocassettes, and videocassettes seen then as revolutionary. With the development of computer tools more labels have been subsumed under this term (multimedia). The following definition is very informative Warschauer (1996, p.p. 3-20)**:**

> "The term **multimedia** was originally used to describe packages of learning materials that consisted of a book, a couple of audiocassettes and a videocassette. Such packages are still available, but the preferred terms to describe them seem to be **multiple media** or **mixed media** …Nowadays multimedia refers to computer-based materials designed to be used on a computer that can display and print text and high-quality graphics, play pre-recorded audio and video material, and create new audio and video recordings. Because of its capability of integrating the four basic skills of **listening**, **speaking**, **reading** and **writing**, multimedia is of considerable interest to the language teacher".

This definition describes therefore the changes in meaning this term has known, following the subsequent developments in technology, and the way they have been used.

With the advent of the Internet and the Web, the term 'hypermedia' came as a new label considered by some as a sub-set of multimedia since all these tools are now integrated Warschauer (ibid.) "... multimedia resources are all linked together and [...] learners can navigate their own path simply by pointing and clicking a mouse." The term 'multimedia' will be used here as a catch-all term. Thus, the development of the Web (and particularly of JavaScript) and digital multimedia has provided new options and capabilities for the creation of language exercises. More than that, the Web has become the favourite platform for delivery of intelligent tutoring systems like LMS (Language Management Systems), and CMS (Course Ma-

nagement Systems) such as the platform 'MOODLE', which provides a rich context for self-paced instruction, an opportunity for language teachers to become active participants in this process. Moreover, educational technology standards**,** like SCORM (Shareable Content Object Reference Model) allow the creation and distribution of on-line language learning resources. Such standards indeed, enable online learning materials to be re-used, shared, and 'operable', i.e., they can be run on any other learning environment systems, Witthaus (2009, p.p. 183-190).

In Algeria, and from 2009 some institutions like preparatory schools have been endowed with classes, virtual laboratories and multimedia. As for the distance or e-learning system which has been developed, it is based on a platform (e-Charlemagne platform has now been surpassed by Moodle) allowing the asynchronous (not in a real-time) access and creation of web-based resources. Accordingly, teachers can develop online courses and exercises as support materials for their learners who can self-study them. The platform also provides collaborative tools (chat, forum, documents uploading).

The emergence of the 'Web 2.0' technologies has increased functionalities, visual appearances, and ease of use. We may cite some Web 2.0 integrated technologies like synchronous JavaScript and XML (Ajax) as well as video streaming, which contribute to varying online courses' activities and boosting leaning opportunities.

Thus, much information can be visualized on the web multiplying therefore sources for e-learning. Potential blogs, media-sharing services and other social software, not designed specifically for e-learning, are being explored by educators to eventually exploit them for the creation of new learning opportunities, Suwannawut (2008). This is explained in the following section which highlights the mutual influence between CALL and Educational Technology, indicating its outcomes in pedagogy.

3- The implication of the liable mutual influence between CALL and Educational Technology for Pedagogy:

The developments in Educational Technology brought about, undeniably, the growth of various applications as well as tools, allowing CALL to be integrated into language learning activities and shaping pedagogy. This may be perceived from the review of the three stages of CALL which describe at the same time the movement in Educational Technology. They illustrate the development of ways in which the computer has been used in language learning and teaching, as in Warschauer (1996):

i. Behaviouristic: In this phase the computer plays the role of tutor, serving mainly as a vehicle for delivering instructional materials to the learner.

ii. Communicative: In this phase the computer is used for skill practice, but in a non-drill format and with a greater degree of student choice, control and interaction. This phase also includes:

- Using the computer to stimulate discussion, writing or critical thinking, e.g. using simulation programs.
- Using the computer as a tool, e.g. using word-processors, spellcheckers and grammar checkers
- Using concordancers.

iii. Integrative: This phase is marked by the introduction of two important innovations: (a) multimedia, (b) the Internet. Multimedia packages enable reading, writing, speaking and listening to be combined in a single activity, with the learner exercising a high degree of control over the path that he/she

follows through the learning materials. The Internet builds on multimedia technology and in addition, enables both asynchronous and synchronous communication between learners and teachers. A range of new tasks is made possible, e.g. collaborative writing, Web searches, and Web concordancing (i.e. using concordance tools which facilitate the handling of corpora, in order to find out how the language is used).

The introduction and development of all those ICT tools in language learning and teaching then imply a flexible pedagogy or methodology of teaching. The latter has indeed undergone changes with CALL development. This is to be described and completed with dates, putting forward as well the mutual influence we have been dealing with so far. All this is presented in the following table we thought useful to insert below. It recapitulates CALL main phases, from programmed learning to e-learning, depicting the changing focus in Educational Technology, and giving insights on pedagogy in Nicholson (2007)**:**

Era	*Focus*	*Educational characteristics*
1975-1985	Programming;	Behaviourist approaches to learning and instruction;
	Drill and practice;	programming to build tools and
	Computer-Assisted Learning – CAL.	solve problems;
		local user-computer interaction.
1983-1990	Computer-Based Training;	Use of older CAL models with
	Multimedia.	Interactive multimedia courseware;
		Passive learner models dominant;
		Constructivist influences begin to appear in educational software design and use.
1990-1995	Web-based Training	Internet-based content delivery; Active learner models developed; Constructivist perspectives common; Limited end-user interactions.
1995-2005	E-Learning	Internet-based flexible courseware delivery;
		increased interactivity;
		online multimedia courseware;
		Distributed constructivist and
		Cognitivist models common; Remote user-user interactions.

Table 1 The changing focus of educational technology

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Accordingly, we may say that Pedagogy now relates to the choice, use, and management of the tools, the course content, like learning resources as well as activities. In addition to this, Pedagogy also involves the various strategies followed to optimize learning, reflect on learning and transfer the skills having been trained in, to construct additional expertise. Some of these activities are presented in the coming section.

3.1- The new activities in CALL

To begin with, we thought it useful to give a definition which seems to take into consideration the new activities brought about by the adoption by CALL of new applications and tools from Educational Technology. This definition Bonk (2005) states that pedagogy "… is the tools, activities, strategies, and decisions for a more interactive, engaging, collaborative and motivational learning environment"

This definition seems therefore appropriate in that, it subsumes concepts related to online teaching such as collaboration. Thus, pedagogy now seems to have been enriched with new practices and concepts since CALL implies coping with new activities enabled thanks to the new applications and tools borrowed from Educational Technology. In line with this, it may be useful to know more about learning activities which may be defined like in ACU National Australian Catholic University (Accessed: November 2008, p.6) as: "… the tasks and exercises which assist students in making meaning from the content of a course. They are the vehicle through which learning occurs."

Learning arises then from note making, like in traditional classes (though in CALL from online materials too), debates, group discussions, but also from surveys, or in accessing and completing exer-

cises on the Web, from a CD-ROM, gathering information from community sources, participating in applied practical sessions, and teleconferencing as well as videoconferencing (ibid.).

CALL has indeed come to be used for various purposes and at different levels, covering a wide range of roles. Other examples of CALL activities may be added to the ones given above. We may thus cite CALL typology, Davies (2008) as:

- Gap-filling exercises
- Multiple-choice exercises
- Free-format exercises
- Tutorial programs
- Re-ordering
- Simulations
- Text mazes (also known as action mazes)
- Adventures
- GamesCloze
- Text manipulation
- Exploratory programs
- Writing - word-processing

We may say that such activities therefore enhance collaboration and communication via computers, in addition to supporting the idea of learning by doing. This favours interacting, learning by carrying out authentic learning tasks (simulation), or collaborating with peers

on projects. Such learning environment seems to encourage the learner to be more involved in learning; but what about the teacher? This brings us to the issue of the learner's and teacher's new roles, to be considered in what follows.

3.2- The new roles of teachers and learners

Teachers are no longer knowledge transmitters, but course creators, managers of online courses, facilitators of learning by structuring content, using signposts (hyperlinks, pop-up windows) and giving adequate feedback.

Along this line of thought, we may mention a distinction made between 'institutional' and 'functional' roles. The former refer to classroom teachers, both pre- and in-service, language lab managers, language skill area specialists, and professionals of CALL, while the latter indicate practitioners, developers, researchers, and trainers Hubbard & Levy (2006). Therefore, some deal with technical matters like language lab managers, while others like language skill area specialists deal with pedagogical knowledge and skills. Teachers may thus be developers at the same time. According to Colpaert (2006) the collaboration of multidisciplinary teams is likely to yield dedicated CALL. This author also emphasizes, in the same article, the important role of teachers as contributors in this field, stating in *CALICO* (2006: pp. 477-497) that:

> Teachers should become designers: designers of what they need…The main consequence for pre-service and in-service training is that teachers should not be trained in applying guidelines, checklists, and principles but in analyzing learning situations, setting their goals, defining their language method, reflecting on the requirements, and designing solutions.

Thus, the teacher's feedback is important for adjusting ICT tools and applications so as to be fit for language learning and teaching. This emphasis on the role of the teacher may be explained by her dedication to pedagogy and practice.

However, the teacher no longer imposes a method of learning; she is rather a facilitator of learning. She is aware that she has to cope with the new information and technology tools, and get used to applying the acquired information and technology literacy skills. She is therefore more likely to adopt a flexible way of teaching, by managing her own course content and digital sources. She becomes an animator, suggesting topics to be discussed and enriched in order to boost interaction and learners' motivation through meaningful tasks (having here the same meaning as activities).

These are described by Ellis (2003) as being exercised through:

- involving learners in pragmatic activities, rather than in exhibitions of knowledge;
- setting up activities that are perceived as real;
- requiring a definite, concrete, meaningful production;
- putting into play more than one ability;
- stimulating learners' cognitive processes by means of operations such as selection, classification, evaluation, problem solving

In addition to this, the teacher keeps encouraging learners through appropriate feedback, either to review lecture notes,

or make other attempts on quizzes. She provides references for articles, books, and websites to enhance further reading, reinforce learning, and broaden the learner's knowledge.

At the same time, this instructor has to guide the learner so as not to be distracted and move away form the course objectives, by making clear and concise instructions, and explaining objectives as well as expected achievements. For this, it is useful to be aware of some learning models which constitute methods of classifying educational objectives, educational experiences, learning processes, and carrying out evaluation. We may cite Bloom's taxonomy (1956) for course design revised by Anderson & Krathwohl (2001) which represents behaviorism, Gagne's "Nine Events of Instruction" (1965) that illustrates cognitivism, and the model of learning stages proposed by Chan, Lin, Lin and Kuo (1993) called the OCTR Model which rather exemplifies constructivism. Knowing about such models will certainly bring one to reflect over one's own course, as how to determine and formulate objectives, organize the content, in addition to stating comprehensible instructions. This is important indeed to make learners aware of what is conveyed in the course, how they should tackle the various activities, and what is expected to develop as knowledge, learning skills and strategies.

To recapitulate, the teacher's role has shifted to that of a course creator, designer, manager, facilitator, animator, and not only knowledge transmitter. She has not only to deal with traditional modes of knowledge delivery (chalk, talk, and paper), but also with digital resources, and multimedia environments.

Aware of this active learning in rich multimedia environments, learners have come to know how to navigate, use appropriate information and technology tools, manage knowledge by searching for relevant data, learning skills and

applying them. In addition, the different activities they have to carry out while learning enhance them to contribute to the construction of knowledge by collaborating with mates in specialised study groups, like enriching glossaries with definitions, and making suggestions. They take initiatives by requesting further information from experts, and provide explanations to help in clarifying definitions, or even describing their learning experiences on forums. Learners are indeed actively engaged in the course in meaningful tasks. These are concrete and designed to look as real as possible. That is authentic learning which is likely therefore to prepare the learners for target challenges, and may be illustrated in the following, by Lombardi (2007):

> With the help of the Internet and a variety of communication, visualization, and simulation technologies, large numbers of undergraduates can begin to reconstruct the past, observe phenomena using remote instruments, and make valuable connections with mentors around the world. Isolated facts and formulae do not take on meaning and relevance until learners discover what these tools can *do* for them. As George Siemens suggests, learning to be a physicist, a chemist, or an historian is all about forging concrete connections—interpersonal connections between apprentices and mentors, intellectual connections between the familiar and the novel, personal connections between the learner's own goals and the broader concerns of the discipline.

Thus, the use of different tools and applications, like searching the web for further information (webquest) and contributing with this new obtained information, in addition

to taking part in forum discussions makes the learner an active partner.

This favours interaction that can be defined as: "Structured opportunities for the learner to engage with the content by responding to a question or taking an action to solve a problem", Clark & Mayer (2003).

Interactivity in computer-mediated instruction is also defined in Roblyer and Ekhaml, based on Gilbert and Moore (2000) as a mutual exchange between the technology and the learner. Interaction and interactivity are used here interchangeably.

According to such learning then, learners work on real-world problems, through problem-based activities, or task-based activities, simulations, case studies, role-playing and participation in virtual communities of practice. Such authentic activities reinforce the learner's self-confidence and abilities, which enables her/him to meet the requirements of modern life, and face its challenges, as put forward in the following Lombardi (2007):

> Authentic learning may be more important than ever in a rapidly changing world, where the half-life of information is short and individuals can expect to progress through multiple careers. According to Frank Levy and Richard Murnane, expert thinking and complex communication will differentiate those with career-transcending skills from those who have little opportunity for advancement. Expert thinking involves the ability to identify and solve problems for which there is no routine solution. This requires pattern recognition and metacognition. Another differentiator is complex communication, such as persuading,

> explaining, negotiating, gaining trust, and building understanding. Although foundational skills (reading, writing, mathematics, history, language) remain essential, a more complex set of competencies are required today. … According to employers, the most important skills in new hires include teamwork, critical thinking/reasoning, assembling/organizing information, and innovative thinking/creativity.

Multiplying training courses, job experiences, careers and trying to acquire multi-disciplinary skills offer indeed more opportunities for advancement nowadays. Young researchers need therefore to be trained in such a way as to develop their thinking skills, and be able to tackle problems which require novel as well as specific solutions. In addition to the traditional skills therefore (reading, writing, listening and speaking), critical thinking and creativity need to be enhanced.

To sum up, we can say that conscious of the fact that the teacher is not the only possessor of knowledge, learners have become aware of the necessity to take charge of their own learning, and search for ways to deepen it. They know therefore that for this, they have to look for other sources of knowledge, like specialised web sites as well as experts, and exchange information with peers sharing the same discipline.

Accordingly, the learner seems to be more engaged in the learning process which has become more interactive than ever.

Conclusion

We wanted through this article to put forward the

development of CALL and Educational Technology, examine the different aspects generated from the shift in focus of this development in both fields, and then discuss the implication of the probable mutual influence between them for pedagogy.

We thus, described how the computer was used in CALL as a tutor for programmed, drill and practice teaching/learning, following the structuralist-behaviourist approach. Along with this, we pointed out the resulting limited interaction and lack of creativity, indicating the relevance of such teaching/learning rather for exact sciences like mathematics.

We next explained the shift towards using the computer as a tool for skills study, being integrated to enhance communication. We stated that the communicative approach was already adopted in language teaching/learning before the advent of the microcomputer in academic institutions. As an example, we cited the CEFR's framework of reference for the description of language learning/teaching and international comparison of qualifications. We thus indicated that the emphasis on communicative competence was already on the way in language learning/teaching in the 1970s. So, there was a predisposition to not only adopt the new multimedia tools in Educational Technology, but to elaborate on a multitude of moderately interactive courseware on CD-ROMs as well. This state of affairs, in addition to popularizing home microcomputers, enhanced CALL.

We then described how the advent of the Internet and the World Wide Web boosted online multimedia courseware, resulting in CALL branching out into trends such as hybrid or blended learning, open learning or e-learning. We gave examples of the new activities integrated in CALL, like the Webquest, and collaborative writing. We explained that this helped in putting into practice the social constructive concept already developed in language learning theory but then not yet

adopted in language teaching. We stated that such activities have been favoured with the development of platforms for the delivery of intelligent tutoring systems like LMS and CMS, which constitute a diversified multimedia context for self-paced instruction, and an increased interaction. We also mentioned the development in Educational Technology of standards such as SCORM, enabling the creation and distribution of on-line language learning resources. We later showed how those developments in both CALL and Educational Technology have obviously stamped pedagogy.

We thus put forward the impact of the mutual influence of both fields on pedagogy which shifted from a teacher-centred teaching/learning situation using the computer as a machine for programmed learning, to a more open communicative tool for the study of notions and functions. We then pointed out that pedagogy has become even more flexible, based on the student's learning needs with the widespread of home microcomputers, and the booming of CD-ROMs based materials. We underlined however the fact that interaction was still limited, and the learner still relying on the active intervention of the teacher.

We finally described pedagogy with the advent of the Internet, then the World Wide Web, and the flourishing of online digital resources. We explained how interaction has enormously increased particularly with the 'Web 2.0' technologies. We mentioned the role of the teacher who has become an animator in virtual communities of practice, managing traditional as well as digital resources, and authentic activities. We also emphasized the role of the learner who, thanks to all this CALL authentic teaching/learning, the improvement in Educational Technology of multimedia-rich environments, and the flexible pedagogy, has become reinforced with self-confidence as well as abilities. We gave examples

of this learner's engagement in full interaction, sharing group interests in discussion boards, and collaborating with peers on projects through the Wiki tool, following the constructivist social principles. We also argued that such teaching/learning will enable the learner to face the requirements of modern life and its challenges, like diversifying trainings and careers.

In the light of this analysis, we can say that there has been indeed an influence that is likely to be mutual between CALL and Educational Technology. This influence has brought a positive impact on pedagogy which has become more flexible, and more open to encompass various activities as well as resources. Pedagogy has now found a compromise to bring the teacher and the learner closer to technology, and make them active participants in the teaching/learning process, in order to make it successful.

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Acronyms

CAI: Computer-Aided Instruction

CALL: Computer Assisted Language Learning

CEFR: Common European Framework

CMC: Computer-Mediated Communication

CMS: Course Management Systems

EFL: English as a Foreign Language

E-Learning: Electronic Learning

ICT: Information & Communication Technology

LMS: Learning Management System

MOODLE: Modular Object-Oriented Dynamic Learning Environment

MESRS : Ministère de l'Enseignement Supérieur et de la Recherche Scientifique

ONEFD: Office National d'Enseignement et de Formation à Distance

PLATO: Programmed Logic for Automated Teaching Operations

QA: Quality Assurance

SCORM: Sharable Content Object Reference Model

UFC: Université de la Formation Continue

VLE : Virtual Learning Environment

VTC: Video Teleconferencing

WWW: World Wide Web

XML: eXtensible Markup Language

ZPD: Zone of Proximal Development