ReCALL **17** (1): 4–17. © 2005 Cambridge University Press
DOI: 10.1017/S0958344005000212 Printed in the United Kingdom

CALL: past, present and future – a bibliometric approach

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Abstract

A bibliometric approach is used not only to sketch out the development of CALL during the last 25 years, but also to assess the contribution of educational technology to 21st century foreign-language teaching and learning. This study is based on the six instalments of the author's International (and multilingual) Bibliography of Computer Assisted Language Learning and the 5,301 entries contained therein. The once text-based bibliography has been transformed into a searchable database. Since index terms to describe both the contents and the nature of individual publications have been attached to the bibliographic data, it is now possible to query whether the 25,000 descriptors cluster around certain topics and to depict developments chronologically. The statistical evaluation of a large corpus also avoids the pitfalls of selective interpretation. Recent controversies about the chronologisation of CALL events as well as the internal consistency of such time chunks are addressed. The data suggest that the online/offline divide occurs around 1993 and that the latest additions to the foreign language teacher's tool box – from e-mails to voicechats – overcome the language acquisition/language learning barrier. New and student-oriented forms of dealing with foreign language learning come to the fore. This has induced some researchers to concentrate on events where conversation breaks down, because learners must then ask for modified input or negotiate the meanings of lexical items. Such a strategy promises success in instructed second-language acquisition. It is suggested, however, that the foreign language teacher's intervention is a necessary complement to second-language developmental processes. Educational technology may allow the teacher to let nature run its course nowadays. But when nature is unsympathetic to the cause of foreign language learning the teacher must rein in the student's language acquisition device to protect him or her from certain sanctions the target community holds in store for the unsuccessful learner.

1 Introduction

On the occasion of the 4th AILA *Man and the Media Conference* held in Vienna in 1991, the then-Convenor of AILA's *Educational Technology* commission and present author gave a talk on "Galluping through the International CALLscape, or you can't teach an old dog new tricks" (Jung, 1991). It was based on the 2400 entries of his *International Bibliography of Computer Assisted Language Learning* (Jung, 1988; Jung & Lieber, 1993). Four instalments of the bibliography later (Jung, 1994, 1999, 2002, 2005), the

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number of entries has risen to 5,301 and the once text-based bibliography has been transformed into a searchable database.

1.1 Elementary vs. complex bibliometrics

The entries for the database were culled from more than 200 national and international journals (as well as books), some 60 of which were scanned regularly to extract the relevant information. The database, which is international and multilingual, reports on a total of 27 languages, from Arabic to Vietnamese as foreign languages. However, a closer look reveals that eight of the 27 languages account for 95% of the total. Languages like Burmese, Khmer or Tagalog occur only once, while others like English dominate the statistical breakdown (see Figure 1).

English can claim imperial status (40%), followed by French (20%) and German (17%). The positions of Spanish (7%) and Russian (5%) are comparable, but a chronological breakdown reveals that Russian is on the way down, whereas Spanish enjoys a steady advance. The same is true of Japanese. Italian is down to 2%, almost as low as Mother Latin (1%).

While the bibliographer is an avid collector of items, his alter ego, the documentalist, goes one step further and tags his prey. The tags, or descriptors, serve to describe the *contents* and the *nature* of the documents in question. If you tag your documents properly, you can always retrieve from the multitude of entries the ones you really want and need. You can describe the *nature* of your documents (whether they are research or literature reports or maybe conference papers) and examine their distribution. Most people, however, will be more interested in the *contents* of the papers. Let us take a fictitious example, where the descriptors are in italics. There is a paper by one Mark Warschauer. It reports about how the *Internet* and/or the *World Wide Web* can be used in the teaching

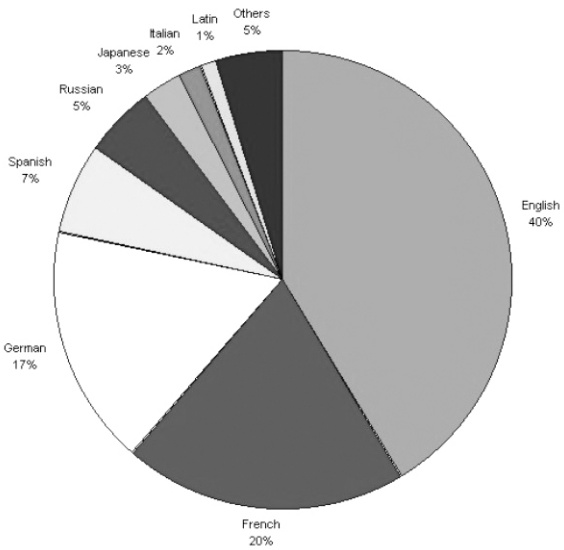


Fig. 1. Target languages.

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of *English as a Foreign Language*. The examples adduced are from a *Beginners' Class in Tertiary Education*. The *Students* and the *Teachers* involved in the *Experiment* answer *Questionnaires*, so that the researcher can deduce their *Attitude* towards CALL and/or the experimental setup chosen. The researcher also uses a *Book Keeping Facility*, student logs, to document the strokes at the keyboard. Students *Read, Write* and finally *Chat* with *Native Speakers*. A *Statistical Analysis* of the raw data is performed.

In constructing the database, I had a total of 2061 different descriptors at my disposal, from *Accuracy* to *Zone of Proximal Development*. Some of them crop up only very rarely: *Zone of Proximal Development* only three times. Others, *English as a Foreign Language*, for instance, a record 922 times.

Of course, the documentalist is an endangered species, as there are now a number of methodological booby traps in a world which is constantly changing. Who, in 1980, would have foreseen that in the year 2004 *Blended Learning* or *WebQuests* would be commonly-used terms? However, if a new term becomes popular, the documentalist must introduce new descriptor terms. More important, he must find a way to cut the new key in such a way that it not only fits the lock, but puts the information seeker on the road to those facts and circumstances which godfathered the new developments. A database thus always needs a bit of postediting, which is not always a straightforward task. For example, the predecessor of *Blended Learning* is called *Integration*, a change which it is feasible to include in the database. It would, however, be futile to do this in the case of *WebQuests*. A *WebQuest* is the website of someone who has roamed the Internet for some time, in order to tap the riches of the World Wide Web. The pagehunter displays his spoils in one place so that someone who is interested in the fate of John T. Scopes[1]

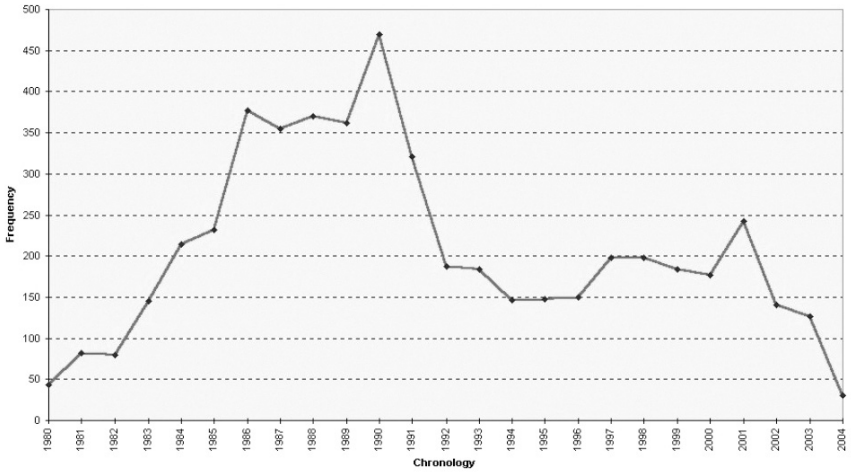


Fig. 2. 25 years of journal and book publications on CALL.

1 John T. Scopes was a teacher colleague from Tennessee who in 1925 was fined $100 by a Tennessee court for having taught Darwin's theory of the evolution of the species to his high school students. A modern-time American colleague has assembled the relevant information on his website (coe.west.asu.edu/students/vanburen/scope.sp.htm).

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and the "Scopes Monkey Trial" need not repeat the exercise: all or most of the relevant links are there, categorized and ready for use. Such *WebQuests* have no predecessors. All the documentalist can do is to refer the information seeker to a related term, say *Project Work* - and add *WebQuest* as a new descriptor to his thesaurus.

Another problem inherent in the bibliometric approach is the flow of publications. The researcher can easily fall victim to a numbers fallacy. Figure 2 illustrates this point. Figure 2 traces the publication history of CALL. The numbers of published papers are listed in one-year steps. A rapid increase of published materials can be observed between 1980 and 1990, with an alltime high of more than 450 publications in a single year occurring in 1990. After that, CALL publications fall rapidly, and, with only one exception, the line never again passes the 200 mark. The nose dive between 2003 and 2004 is misleading, as it may well be due to the fact that in the spring of 2004, when the author stopped collecting material, several 2003 journal numbers had yet to appear. There is this little upswing between 2000 and 2001, and a plateau between 1994 and 1996 which deserves further attention. This period seems to be an important time in the history of CALL.

2 CALL: Past, present, and future

We have recently seen a number of attempts to describe the development of CALL. Stephen Bax's article, published in 2003, is perhaps the most recent attempt at historiography. Bax starts off by enumerating seven of his predecessors, but he discards them one after the other and in the end, according to him, only Warschauer and Healey's 1998 State-of-the-Art article in *Language Teaching* is worth considering, which he then proceeds to do. With unrelenting, intellectual stringency Bax examines the terminological inconsistencies displayed in two versions of the Americans' paper and subjects their work to a scything critique, which is summarised in section 2.1.

The American CALLists split up the last thirty years into three periods and call them Structural CALL (1970s–1980), *Communicative CALL* (1980s–1990), and *Integrative CALL* (late 20th or 21st century). *Structural or Behaviouristic CALL*, according to Bax (2003: 16), "is perhaps the most plausible". So let us agree with Bax's and the reviewees' description that the first ten years of CALL are a "drill & kill" period, although it must be said that there were not a few attempts in those days to engage the help of artificial intelligence operations (Last, 1989) as well as a number of keyword-based programs like ELIZA and/or LIESL (Kossuth, 1984).

2.1 The Decade from 1980 to 1990

In *Communicative CALL* as described by Warschauer and Healey, Bax does not find much that is or was "communicative at all in any significant way". He contends that Warschauer and Healey's conception of Communicative CALL lacks the "central features of human communication and interaction". In Bax's view there are "two notions criterial to CLT, namely that learners learn language in order to communicate and that they probably learn to communicate best through the process of communication itself". And he points out that "we need to explore actual practice at the time" (Bax, 2003:

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17–18). The existence of the database makes such an exploration possible.

First, let us have a look at the four skills, two of which, *Listening* and *Speaking*, are constitutive of communication, although *Reading* and *Writing* cannot be excluded from what we are used to calling Communicative Competence (see Figure 3).

Between 1980 and 2004 a fundamental prerequisite of communication, *Listening*, ranks only third, and *Speaking*, the quintessence of verbal communication attracts no more than eight per cent of the total. It ranks fourth, whereas *Reading* (34%) and *Writing* (44%) clearly dominate. Of course, the availability of courseware is relevant here. Let us, therefore, have a look at the most popular programs of the eighties and early nineties: Adventures, Simulations, Text Reconstruction, Word Processing (Davies, 1988), and Concordancers (Tribble & Jones, 1990) plus Grammar Teaching (Decoo, 1988) and Vocabulary Learning (McKee, 1993). The data are presented here in four-year intervals to make developmental lines more curvy, see Figure 4.

With two exceptions – Vocabulary Learning and Concordancers – the chronological development for these programs resembles a normal distribution curve before it peters out after 1996. The peak is somewhere between 1985 and 1989. Vocabulary programs continue in (relative) strength for a while and so do concordancers before they, too, go down slowly. A student could execute all these programs without uttering a word. And yet, the eighties were the period of communicative competence, when teachers wanted their students to "focus[es] more on using forms rather than on the forms themselves" (Bax, 2003: 16). So what they did in "actual practice" was inventing conversational events and scenarios, remembering Jones's (1986) dictum that it is not so much the program, more what you do with it that counts. Students were encouraged to talk to one another *off-computer* while running the programs. Let us thus examine the statistico-chronological behaviour of four descriptors which encapsulate the teachers'

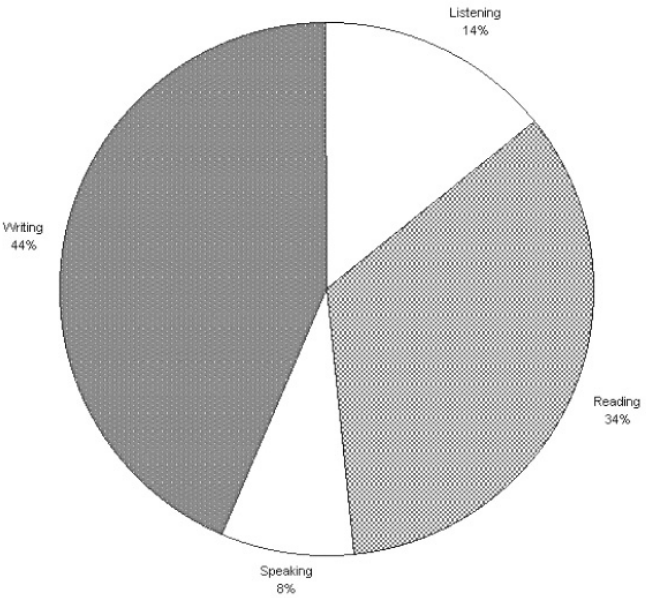


Fig. 3. The four skills.

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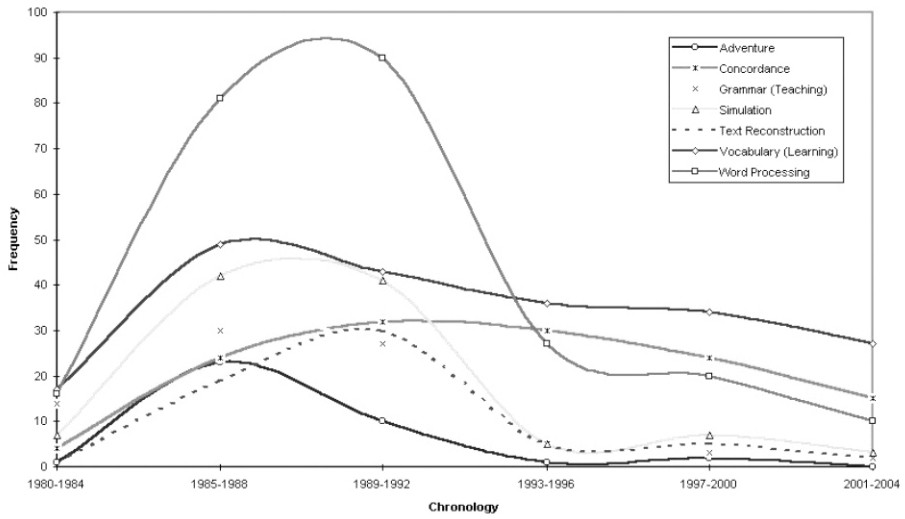


Fig. 4. CALL programs.

intentions and the students' tasks in those scenarios: *Communicative Competence, Conversation*, *Dialogue*, and *Speaking* again, see Figure 5. There are obvious similarities here. With the exception of Speaking and its steady climb, the normal distribution curve returns with its peak, again, between 1985 and 1989.

In summary, having followed Bax's advice to explore "actual practice" at the time, one can now observe something which might be termed escapist or off-computer communicative CALL. But the evidence from our database also suggests that Bax is right when he says of the *software* "that communicative CALL in the 1980s was never communicative at all in any significant way" (2003: 18). Perhaps this period should simply be called *post-behaviouristic*, as it is an experimental phase with teachers trying to distil an essence of speaking out of software that was essentially deaf and dumb.

The steady climb of *Speaking* cannot be adduced as counter evidence. It is due to the rise of the Internet. Starting around 1995, both *Speaking* and *Conversation* rise in popularity once again, but it is no longer the *off-computer conversation* of the eighties that we see here. This is so because there are, unfortunately, no clear-cut phases or watertight periods in CALL or in the documentation thereof. It is therefore perhaps unfair of Bax (2003: 16) to complain that Warschauer and Healey offer "disclaimers as to the historical validity" of their phases. "How is it", Bax (2003: 16) asks, "that all three [phases] coexist together today?" The answer is, of course, that this depends on what you examine and on what you base your argument.

Part of the history of CALL is the fact that CALL is not a grassroots movement, but rather a top-down movement which trickles down from tertiary education institutes into secondary schools. This is the exact opposite of what we saw in the sixties when language laboratories "trickled up", so to speak, into the realm of university teaching. It is important to keep in mind the provenance of the data when you start describing the history of CALL.

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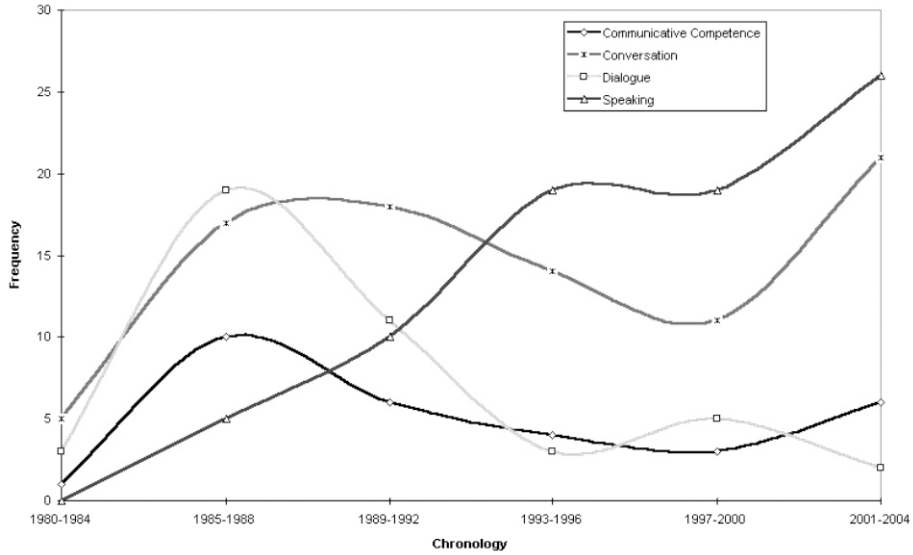


Fig. 5. Communication.

2.2 The online/offline divide

Warschauer and Healey have termed their third phase *Integrative CALL*. Of course, this is not a completely new phenomenon. Teachers have always wanted to integrate new media, as they appear, into existing educational systems (Barr, 2004). The post-behaviouristic, off-computer conversation period is an example. For Warschauer and Healey the third phase starts in either the 20th or the 21st century, depending on which of their papers is consulted. Bax has rightly registered a complaint here. Warschauer and Healey define their third phase as follows: "In integrative approaches, students learn to use a variety of technological tools as an ongoing process of language learning and use, rather than visiting the computer lab on a once a week basis for isolated exercises (whether the exercises be behaviouristic or communicative" (1998: 59). The question arises as to what makes up this variety of technological tools. In 1993, the EU assembled the spearhead of the European ed tech community in London to take stock and to "achieve better exploitation of the new technologies in foreign language learning" (Commission of the European Communities 1993: 10). On page 205 of the conference proceedings we find a "DELTA[2] reference list of technologies relevant to foreign language learning". The list of tools contains the following items: Hypertext, CD-ROM, Interactive Video, Authoring Systems, E-Mail, Computer Conferencing, and Databases. Also mentioned are Artificial Intelligence and Machine Translation. Despite the fact that the Keynote Speaker (Wolff, 1993) mentioned a hyphenated "Multi-Media", the overarching term Multimedia is not part of the DELTA list, nor is the *Internet* (Warschauer *et al.*, 2000) or its cousin, the *World Wide Web* (Felix, 2002). Also missing is the forerunner of the latter terms: *Telecommunication*.

2 The acronym stands for Developing European Learning through Technological Advance.

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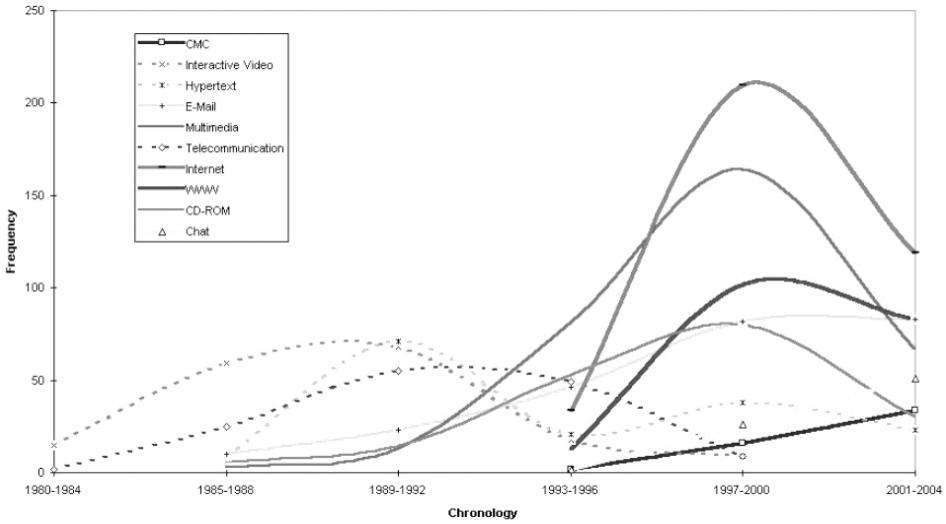


Fig. 6. The offline/online divide.

Figure 6 presents a spaghetti dish of curves which chart the way of the tools mentioned above – with the exception of *Artificial Intelligence* (Last, 1989), *Machine Translation* (Ahmad & Rogers, 1992) and *Authoring Systems* (Rüschoff, 1998), which have been excluded to enhance the legibility of the diagram. What do we learn from the flow of events? Some terms, such as *Interactive Video* (Schneider & Bennion, 1984) and *Telecommunication* (Raasch & Jung, 1988), existed before the London conference, but disappear by the year 2000 at the latest: Interactive Video because its analogue technology has been replaced by digital CD-ROMs or even DVDs (Bush, 2000) and Telecommunication, because this pre-Internet term is now outdated. Three new terms – Hypertext (Barrett, 1989), CD-ROM (Burston, 1998; Felix, 2000), and E-Mail (Wolff, 2001) – come upstage between 1985 and 1988.These terms have a relatively long and successful career, but the profession's interest in Hypertext begins to flag around 1993 as part of a normalisation process. Multimedia, of which Dieter Wolff (1993: 25) said on the occasion of the London conference that "we do not know much about", also has its origin in 1985. Two years after the London conference, Multimedia was named *Word of the Year 1995* in Germany. Its stupendous career is only topped by the Internet which makes a first appearance in our database in 1993 and then quickly replaces its predecessor Telecommunication. Together with the Internet and the World Wide Web, two other terms appear for the first time in 1993, Computer-Mediated Communication (Warschauer, 1997) and Chat (Fraser, 1999), both of which can boast a steady climb from zero in 1993 to around 50 entries in 2004.

The year of the London conference can be taken as the watershed between online and offline media. In 1993, we are witnessing for the first time this divide which will continue and expand. Is there further evidence that something like a paradigm shift has occurred? Let us see how the clients of CALL fared.

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2.3 A paradigm shift

What we see here are the fates of both students and teachers, the way students learn, and their attitudes to CALL, as well as the instruments – questionnaires – used to register their attitudes, see Figure 7. There is a strong positive correlation between what emerged from the last picture and the new diagram, and, again, the period from 1993 to 1996 is the turning point. Interest in the roles of students and teachers has always been moderate to high, but now, all of a sudden, researchers use questionnaires more extensively to find out about CALL, CALL users' attitudes towards the programs they work with and the new forms of learning. The student now moves fully centre-stage. *Collaborative* (Belz, 2002) and *Tandem Learning* (Kötter, 2002) are the two start-up strategies which were previously underrepresented. These strategies put students in touch with one another across national and cultural boundaries. Learners first email, then "speak", they chat and converse in pairs or in groups about problems that concern them. The difference between this Internet-based intercultural information exchange and the pair- or group-work exercises of yore is that communication is no longer exclusively classroom-centred with, technically speaking, Interlanguage system communicating with Interlanguage system, but rather acquisition-promoting. One could even say that the learning/acquisition barrier breaks down. Teachers around the world, once sceptical of computers and educational technology, now hasten to set up cross-cultural projects for their students. The latter roam the World Wide Web to solve problems that they would not have dreamed of considering without computers and the Internet. With the help of the New Information Technologies they dig up *authentic* materials. There are only 61 instances of the descriptor *Authenticity* in our database, but 98% of them are post-1992. Students also become more *autonomous*. There are 115 instances of *Autonomy* in the database, of which 32 belong in the pre-1993 period and 83, or 72%, in the post-1993 period. This is yet another upsurge that corroborates the picture of the active student,

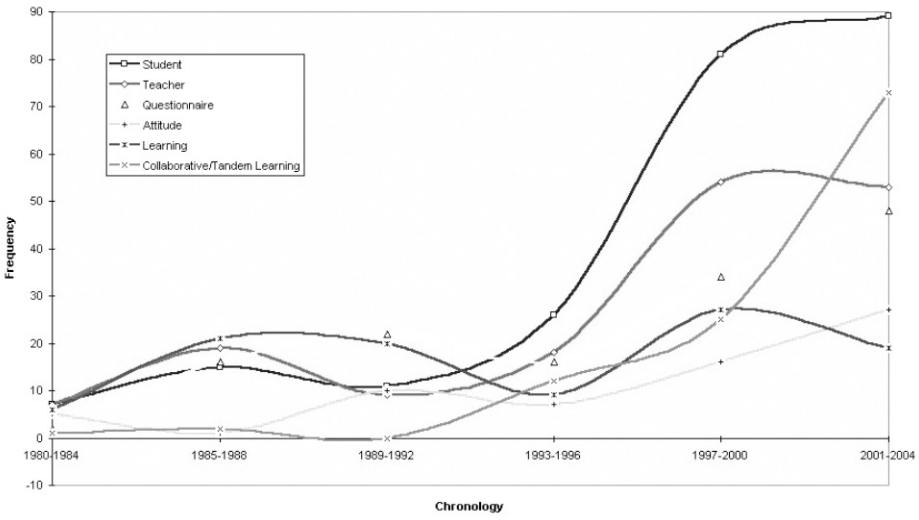


Fig. 7. Paradigm shift.

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whom his teacher now positions in such a way that he or she is nudged into a learning partnership with target language facts and interlocutors. *Autonomy* here also means becoming increasingly more responsible for one's learning. At this juncture, constructivism might seem a relevant topic, one which is hotly debated in the Federal Republic of Germany (Königs, 2003; Wendt, 1996, 2000; *Zeitschrift für Fremdsprachenforschung*, 2002) and elsewhere, but one which will not be discussed here: the quarrel between radical and moderate constructivists is for the constructivists to solve. The non-combattants should ask themselves: Where are we going from where we are in 2004? Bax (2003: 23) is of the opinion that "CALL practitioners should be aiming at their own extinction". No one, according to Bax, is nowadays talking about PALL (pen-assisted) or BALL (book-assisted) language learning. These are examples of technologies which are "invisible, hardly even recognized" by either teachers or students (Bax, 2003: 23).

It is arguable that some of the new information technologies have already achieved this state of canonisation. Students of English in Austria who chat, maybe even voicechat (Cziko & Park, 2003; Hampel & Hauck, 2004) with native speakers in an anglophone country find themselves in a second language acquisition situation. And, of course, they have no awareness of the technology that mediates the verbal exchanges. They chat with their partners, and the technology which overcomes the barrier between second language acquisition and foreign language teaching has quasi annihilated itself. Is this not that what we foreign-language teachers have always wanted? Is there not plenty of reason to be overjoyed?

3 Prolegomena to a CALL research strategy

In a way, this is our second escape from CALL. The first escape occurred when students engaged in off-computer talks with their peers. This time, we are using the computer and the Internet as an empty transport medium like the telephone (for a definition of this and other media in the context of foreign-language teaching see Jung, 2002). The medium does not interfere with or impose itself on communication, it just lets through what is produced at the two ends of the line. We still have to solve the problem of creating an intelligent technological partner for the language learner.

3.1 The acquisition/learning controversy revisited

Carol Chapelle (1997: 27) suggests that researchers concentrate on analysing those moves of CALLing learners in which the normal structure of interaction is disrupted, so that students must request modification of the input. She continues: "activities should be designed to create opportunities for comprehension of linguistic input through modification of the normal structure of interaction". In other words, researchers should be interested in communicative acts where something goes wrong. "The normal structure of interaction" is of less or no interest. As soon as something goes wrong, if misunderstanding occurs, the learner must ask for clarification or negotiate the meaning of a lexical item. Once that has been achieved, he or she gets a chance to climb a new rung of the acquisition ladder, and the linguistic system gets a chance to grow. This is the exact opposite of what was preached in pre-communicative times. Behaviouristic teaching

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methods aimed at avoiding mistakes and/or errors: successful communication was what they aimed at.

The research paradigm sketched out by Chapelle promises success in an instructed second language acquisition situation where students who are being taught the target language jump into the language bath immediately after they have closed the classroom door. It even applies to situations where foreign-language learners benefit from the barrier-breaking capacities of the new technologies, because the students' language acquisition device is situation-blind, it cannot discern between a conversation that takes place abroad and another which is mediated by computer technology. While Chapelle's prolegomena to a CALL research strategy is not flawed, what is lacking is *vision*, a vision of what the learner should be able to cope with after leaving school.

3.2 Checks and balances

Let us, therefore, ask ourselves "Do we really want the results normally obtained in second language acquisition?" There are examples of children who successfully grow up bilingual or even trilingual, who do not need the foreign-language teacher's guiding hand. But what of the many who, despite a year spent abroad, still sound as if they had never set foot on foreign soil?

This is perhaps the time and the occasion to pay my dues to Henning Wode, the applied linguist who was also one of Germany's leading second language acquisition researchers. He was sceptical of educational technology and he said to me on one occasion: "You know, the foreign-language teacher's job begins only after we second-language acquisitionists have finished ours". What he meant was that the foreign-language teacher must speed up and optimize a process whose natural development the second language acquisitionist is intent on describing.

An echo of Henning Wode's dictum is to be heard towards the end of Carol Chapelle's paper where she says that there is something that "was not very well understood years ago", namely "the importance of learners' attention to form periodically while they are working toward a communicative task goal" (Chapelle, 1997: 27). And Rod Ellis in 2002 joins the debate, when he says: "There are strong theoretical reasons for claiming that the teacher's role in a communicative task should not be limited to that of communicative partner. The teacher also needs to pay attention to form" (Ellis, 2002: 430). On a practical level, two foreign-language teachers from Hong Kong confirm this: "The emphasis on Focused Practice reflects our growing realisation, as advisers, researchers, teachers and learners, that Grammar, Pronunciation and Vocabulary are fundamental to L2 proficiency and are often the causes of the language skill problems that Intermediate-level learners in Hong Kong report. This realisation came to us late in the day as it ran counter to much L2 research, our own training in Communicative Language Teaching, and our own teaching experience on courses with a strong task-based, communicative and output-focused emphasis" (Pemberton & Toogood, forthcoming). And the student? If you ask the student what the most suitable exercises might be, he or she will answer that it is the *drill & kill* type they need most (Davies, 1989; Nunan, 1987). Of course, the students might be wrong, poor judges of the effectiveness of certain exercise types. It is not impossible, however, that they are excellent judges of what is demanded of them when they sit their exams.

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4 Conclusion

Be that as it may, we are foreign-language teachers in the first place, CALL is only our middle name. It is our job to deploy all the media, old and new, to prepare the student for the onslaught of real-life communicative situations and the concomitant sanctions. Elsewhere, I have used the term Omnimedia (Hogan-Brun & Jung, 1999) to describe the judicious use of a multiplicity of technological tools in the teaching of foreign languages. If possible we should protect our students from ridicule by inculcating in them first of all the respect that is due to the target language and their speakers. But we should also impart to them the joy of being able to speak one or more foreign idioms to a satisfactory degree of perfection. Information technology may provide us with the means of overstepping the boundaries between classroom and real life, making experiential learning a possibility. It is true, we can allow nature to run its course nowadays. Nature, however, can be very unsympathetic on occasion to the cause of foreign-language learning. That is why we need teachers who can adapt or modify their students' language acquisition devices when necessary. A 'checks and balances' methodology is therefore what we need. But that is another story.

Acknowledgements

This paper is based on a keynote speech delivered at EUROCALL 2004.

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https://doi.org/10.1017/S0958344005000212 Published online by Cambridge University Press