

Chapter III

CALL as Action

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ABSTRACT

The objective of this chapter is to offer a new approach for research in Computer-Assisted Language Learning (CALL). It starts with the assumption that CALL has traditionally emphasized unresolved dichotomies such as tutor vs. tool or individualized instruction vs. collaborative learning. It is argued that a unifying theory, capable of incorporating these conflicting views, is needed. For this purpose, Activity Theory, based on Vygotsky's ideas and developed by Leontiev, is proposed. It is suggested that research in CALL should focus neither on the individual nor on the community, but on the mediating tool that links them in situated context. CALL is seen as a cultural artifact that needs to be naturalized by the language teaching community.

INTRODUCTION

Mainstream theories in foreign language teaching tend to emphasize either the individual (focusing on such aspects as individualized instruction, learning styles, self-directed strategies) or the community (including methodologies such as community language learning, collaborative learning, study teams). The introduction of computers into foreign language instruction seemed to have contributed further to this dichotomy,

raising awareness of the differences between a student working alone in front of the computer or interacting with others in a community of learners. The basic motivation for writing this chapter is the assumption that an emphasis on either the individual or on the community results in a reductionist approach to the problem, incapable of addressing the complexity of CALL. What is proposed, then, is to emphasize the point where they intersect. For the individual to interact with the community, he or she has to do something (ac-

tion), through some kind of mediation (tool). This is described here as the “action” approach. CALL as mediated action introduces a new paradigm in language teaching and research, putting the focus neither on the student nor on the teacher, but on the relation between them in the learning community.

The chapter is structured in two main parts: (1) CALL as divided theory and (2) CALL as mediated action. The first part reviews classifications that have been proposed to explain CALL and its development, starting with the tutor/tool dichotomy and evolving to the concept of CALL as an invisible technology. Whereas in the tutor perspective, the computer is still seen as a traditional teacher, conducting drill practice with individual students, in the tool view the computer is seen as an instrument used by people to communicate with each other. The movement from tutor to tool also signals a movement from a focus on the individual to a focus on the community, with an emphasis on collaborative learning.

The second part tries to build the concept of CALL as mediated action, using the Activity Theory perspective: human beings are different from other species because they create tools and are modified by the tools they create, thus evolving and producing history. CALL is described as a cultural artifact, with resources of its own, including higher interactivity and connectivity. It integrates with other components in the learning community, transforming the way teachers and students work and think. From this collective perspective, teaching and learning become a unified activity, distributed not only among the community members but also on the artifacts available in the environment.

The main objective of the chapter is thus to describe CALL as a mediating tool, standing between subject (usually the student) and object (usually the content to be learned). In this chapter, we argue that change, and consequently learning, will be more easily implemented if the emphasis is neither on the teacher, as has traditionally been

done, nor on the student, as proposed by student-centered approaches, but on the instruments that link student to content, and the whole learning community, including teacher, other students, rules, and division of labor. We believe that an emphasis on the instrument, for its capability in binding all the elements in the community, offers a more comprehensive view of CALL in situated practice, with more possibilities both for teaching and research purposes.

CALL AS A HOUSE DIVIDED

The idea of CALL as either an individual or a social activity can be related to CALL classification attempts, three of which are detailed here, not only for their historical impact on the area, but mainly for their relevance to the line of reasoning developed in this chapter. They are the magister/pedagogue distinction, as proposed by Higgins (1988), the CALL phases described by Warschauer (1996), and the approaches suggested by Bax (2003).

The acknowledged need for a theory to explain CALL (Levy, 1997) has led some investigators to propose different theoretical frameworks, which resulted in different classifications. One of the earliest was postulated by Higgins (1988), who viewed the computer as playing two opposite roles in CALL, either as “magister” or “pedagogue.” Thus, the magister:

wears an academic gown to show that he is qualified in subject knowledge. Visible in his top pocket is his salary check, symbolizing the security of tenured appointment. In one hand he holds a handkerchief, symbol of the care and concern which (we hope) he feels for individual learners. In the other he carries a cane, symbolizing the authority to evaluate, praise and censure. In front of him is the book, the symbol of the order of events, the structure which is imposed on him by the syllabus makers and which he will impose

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on the learners by means of the lesson plan. (Higgins, 1988, p. 13)

To explain pedagogue, Higgins resorts to the figure of the Greek slave, who was used to assist children in their daily learning activities:

So think of a man in sandals and a cheap cotton robe, walking five paces behind the young master. He carries the young master's books for him, but no cane. The young master snaps his fingers and the pedagogue approaches. He answers the young master's questions, recites a poem, translates words, plays a game, or even, if that is what the young master demands, gives a test. The young master snaps his fingers again, and the pedagogue goes back to his place. He hopes he has given satisfaction, since otherwise he may starve. (Higgins, 1988, p. 14)

According to Higgins, a computer is a magister when it plays the role of a tutor, controlling and guiding the student through a series of drills. The interaction between machine and student is typically conducted through exchanges, as in the IRF (Initiate/Respond/Follow-up) model proposed by Sinclair and Coulthard (1975) for traditional classroom discourse. It can be easily seen that the basic classroom exchange, in its three sequential moves, is faithfully reproduced in the CALL environment: (1) computer sets the task (initiate move), (2) student tries to accomplish the task (respond move), and (3) computer evaluates (follow-up move). Considering that, in this case, the machine is not a mediational means between teacher and student, but an actor in the exchange, we can argue that there is an attempt to replace the teacher with the computer; the one-to-one classroom interaction is seamlessly extended to one-to-one computing, with an emphasis on individual learning.

On the other hand, computer as pedagogue inverts the master/slave relation between student and machine. Unlike the IRF model, control is

now handed over to the student, who initiates the exchange and tells the computer what to do; the computer responds by trying to accomplish the task. The student finally evaluates the results and may or may not be satisfied with the job done by the machine, now seen as an obedient slave, ready to make things easier for its master. When Higgins proposed the magister/pedagogue dichotomy, in fact based on a previous paper (Higgins, 1983), the Internet, as we know it, was not yet available. Today, with Orkut, discussion lists, and distance learning, the pedagogue metaphor would certainly serve the purposes of collaborative teaching with its emphasis on the collective aspects of learning.

Warschauer classifies CALL in three phases, which he refers to as behavioristic, communicative, and integrative. The behavioristic phase is characterized by the heavy use of drills, following the audio-lingual model, with the computer playing the role of tutor. According to Warschauer (1996, p. 4):

Programs of this phase entailed repetitive language drills and can be referred to as 'drill and practice' (or, more pejoratively, as 'drill and kill')...A computer can present such material on an individualized basis, allowing students to proceed at their own pace and freeing up class time for other activities.

The communicative phase emphasizes the use of authentic materials and interactive activities, with the computer playing different roles, not only as a tutor but mainly as a tool for students' discussions, writing, and other creative activities. Through the use of authentic materials, the emphasis is not on teaching the language per se, but on using the language, taking advantage of materials that were not produced for students. "In this role, the programs do not necessarily provide any language material at all, but rather empower the learner to use or understand language" (Warschauer, 1996, p. 6).

The integrative phase combines multimedia (integrating text with graphics, sound, animation, and video) with the impact of the Internet (allowing language learners to communicate with other learners 24 hours a day). The use of computer-mediated communication clearly favors collective learning over individualized instruction:

It also allows not only one-to-one communication, but also one-to-many, allowing a teacher or student to share a message with a small group, the whole class, a partner class, or an international discussion list of hundreds or thousands of people. (Warschauer, 1996, p. 9)

A third classification for CALL activities, of special interest here, was proposed by Bax (2003). He also uses a three-element categorization, but defines CALL as restricted, open, and integrated. The restricted variety is related to Warschauer's behavioristic CALL, but is not limited to the underlying theory, since it includes activities that cannot be described as behavioristic. The term *restricted* is preferred because of the limitations that are still observed, considering, for example, the software used, the feedback offered to the students, and the role played by the teacher. By contrast, the *open* variety is more flexible in all of these aspects, integrating them with simulations and games. It is on the *integrated* type, however, that Bax differs most from Warschauer, and offers an interesting perspective on CALL.

Whereas Warschauer sees *integrative* in terms of technology, that is, the ability to integrate text with audio and video, for example, Bax describes *integrated* in terms of socio-cultural aspects, emphasizing not the ability to integrate, but rather the ability to be integrated. The technology, which is visible in Warschauer, becomes invisible in Bax (2003, p. 24):

This concept [integrated CALL] is relevant to any kind of technological innovation and refers to the stage when the technology becomes invisible,

embedded in everyday practice and hence 'normalized'. To take some commonplace examples, a wristwatch, a pen, shoes, writing—these are all technologies which have become normalized to the extent that we hardly even recognized them as technologies.

In theory CALL has gone a long way, developing from Higgins's (1988) metaphor of the magister, placed in center stage, to Bax's (2003) idea of CALL as an invisible technology. In fact, it starts developing from the center (computer as conspicuous tutor), moves to the margin (computer as an obedient slave, walking five paces behind its master), and finally reaches invisibility (computer as a naturalized tool). Along this journey from visible tutor to invisible tool, there is also a movement from individual action to social activity. Computer as tutor usually emphasizes individualized instruction, with the student working alone in front of the screen. Computer as tool, on the other hand, tends to emphasize collective learning, with students forming a community of learners, working cooperatively, exchanging ideas, and learning together through continual negotiations. The development from tutor to tool goes hand in hand with the development from individual learning, with an emphasis on cognition, to social transformation, with an emphasis on historicity and collective learning.

In classroom practice, however, the historical development of CALL does not reflect the ideas defended in mainstream theory. Considering what happens in the classroom, the tendency is towards stability: (1) keep things as they are, not as they should be; (2) if change is inevitable, improve from what is available, not by replacing things; and (3) merge dichotomies instead of strictly adhering to one side or the other. In mainstream theory (Kuhn, 1962), the tendency is in the opposite direction: (1) new things must be proposed and tried out, because there is no evolution without change; (2) scientific revolutions depend on paradigm replacement, not on their improvement; (3) dichotomies represent incompatible, mutually exclusive positions.

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The concept of development as substitution can be detected in the idea that we have moved from computer as tutor to computer as tool, replacing one by the other. This is more a theoretical construction than a practical fact. The development of CALL, as the development of most cultural artifacts in the history of civilization, is better characterized by the idea of evolution, where old artifacts are not replaced by new ones, but incorporated into them.

It seems that separation is a theoretical necessity. If we want to investigate CALL, we must find a way to divide and classify it, describe each one of these parts, and then hopefully relate these parts to one another, creating a system or a model. We may devise categories such as types of CALL (behavioristic, communicative, and integrative in Warschauer's terminology or restricted, open, and integrated, in Bax's). We may also create dichotomies such as tutor vs. tool or individual vs. society. All this breaking up and possible reassembling is part of the theoretical procedure. We may assume that the theorist's job is to make all these things visible, so that they can be described and analyzed.

In classroom practice, however, it is the opposite. As will be explained later, separation does not work. Using CALL with students is like taking them on a journey into invisibility. Software and computers have to become transparent so that students can see through them; they cannot be in the way between students and the content they need to learn. Tutor/tool or individual/society dichotomies are not adhered to, but ignored or blended together (e.g., Hubbard & Hiskin, 2003).

The point made here is that both adherence to the fragmentation paradigm, where parts of the whole are separated and analyzed, as done in theory, and adoption of the blending model, where things are put together, as done in practice, are misleading. It can be argued, for example, that the different classifications proposed by different authors are different because the criteria they use to classify them are arbitrary. Although we may

defend the idea that science is after all a subjective truth, dependent on the argumentative skills of the author, the possibility of having innumerable classifications is problematic and may be characteristic of the early stages of a new science, still in a consolidation process, as is probably the case with CALL. Different classifications may lead not only to an excessive concern with the parts, in detriment of the whole, but also preference for some parts in detriment of others, which may result in a blind man's view of reality, taking the tree for the forest. In a dichotomy, when we chose one side, this side becomes the whole and the other is erased.

On the other hand, adopting a blending model, in which both the whole and the parts are considered, is a practical necessity. In the classroom, for example, the teacher cannot always address the whole group; sometimes individual questions from individual students must be answered. Integrative exercises, such as summary writing, may go hand in hand with discrete item activities, such as gap-filling and multiple-choice tests. In CALL terms, computer as tutor is intensively used in some courses, along with collaborative tasks in which students work together with other students.

What is needed is a theory, robust enough to incorporate both sides of the dichotomy, no matter how they oppose each other, no matter how apparently incompatible they are. Such a theory is based on the idea of mediation. The concern is neither the individual nor the community, neither the student nor the content to be learned, but the relation between them. Learning does not occur directly but through a mediational artifact, which stands between student and learning as a bond, cementing them. This idea of mediational artifact as cement is important because, although we cannot change either a person's nature or the nature of an object, we can change the mediational artifact that links them together. Considering, for example, a student learning a foreign language, it is obvious that we cannot change either the foreign language or the student. We might wish to erase

some verb irregularities in the language we teach to make our job easier, but that is not possible. We might wish to have different students, but that is not possible either. We have to take language and students as they are. The only place where changes are possible is in the artifacts we use: books, learning activities, computer software. If we want to change the way students learn, we have to change the artifacts they use.

CALL AS A UNIFYING TOOL

This section addresses the main point of this chapter, which is to present a unified theory for CALL, merging long-standing dichotomies such as tool vs. tutor and individualized instruction vs. collective learning. Unifying different points of view is not an easy task in any area of human activity and seems to be even more difficult in the area of educational research. A view of available literature shows that researchers in education tend to group themselves in different scientific paradigms (Piagetian, Vygotskian, Chomskian, etc.), surrounding themselves with a shield that automatically blocks out all the others. Any suggestion to mix different paradigms into one eclectic approach may be discarded as “intellectual obscenity,” according to a saying attributed to Krashen (Barasch & James, 1994). The attempt to describe CALL as mediated action questions this feudalized view of science and offers a multifaceted perspective, viewing research as bricolage (Kincheloe & Berry, 2004). It is proposed that what is traditionally defined as static, lifeless, and a-historical, frozen in space and time, becomes a dynamic, living, and historical entity. The parts are no longer isolated from each other, but integrated into a living organism that reacts to the surrounding environment: what functions as tool in one context may function as tutor in another and vice versa. Describing CALL as a unifying tool in a living organism is obviously more complex than describing it as a

static entity. Previous views on related cultural artifacts such as books, classroom lectures, and language teaching activities have to be revised and reconceptualized for a post-digital perspective. What follows is an attempt to describe CALL in this direction.

Due to human tendency to anthropomorphize objects, the tutor/tool dichotomy can be applied to many cultural artifacts, including books, television, radio, tape recorders—and CALL. Books are of special interest here, both for what they have in common with computers and for the differences that set them apart when they are anthropomorphized. Teachers are familiar with books and can easily integrate them in their classroom activities; they know exactly when to treat them as physical objects or psychological realities, and know exactly when they are talking in a figurative or in a literal way. As regards computers, however, they are unsure, mainly because the boundary between the figurative and the literal worlds becomes unclear. When they say, for example, that “a book is a teacher,” they know they are talking metaphorically, but if they hear that “a computer is a teacher,” they may not know how to interpret the sentence. Is it a metaphor or can the computer really act as a teacher? The differences between book, computer, and teacher are dealt with here, considering the notion of anthropomorphization, resistance to new technologies, and the need to appropriate the new technology. The basic idea is that a computer should not be seen as a substitute for either book or teacher, but as a technology that integrates them into a greater unit. Considering that the tutor/tool dichotomy is confusing, it is replaced by the words teacher, artifact, and tool. No difference is made between the words tool and instrument, both seen as mediation. As mediation, a tool can be either an object (book, computer) or a subject (teacher, student).

Both books and computers are cultural artifacts that can be anthropomorphized, but there are some differences in this anthropomorphization process that must be taken into account. First,

as regards books, there is an association between object and subject that is not found in computers. Books, unlike computers, are individual entities written by people, which makes it easy to associate any book with its author. We may say that we love Shakespeare, Chaucer, or Charles Dickens, referring to the books they have written, thus erasing the difference between the author and his work. There is no need for the author to be present when he is read; he can be represented by the work he produced. Literally speaking, author and book belong to opposite worlds; one is a subject, the other is an object. Metaphorically speaking, however, they share the same subjective nature. It is also important to notice that no reader is diminished and no author is depreciated when a book is referred to as a person.

Computers, on the other hand, are not individual entities; they are artifacts manufactured by a few big companies and registered as trademarks. They have general characteristics (more or less memory capacity, higher or lower speed), but they cannot be easily associated with an author, as happens with books. We may know that Steve Jobs is the maker of Apple Computers, but if we say that we love Steve Jobs, we are probably referring directly to the person, not to the machine that he made. The author is not visible in the computer. Although a given computer usually leaves the factory with a specified serial number, that number is restricted to the documentation; it is not used in our daily interaction with the machine. Computers are not born with individuality; they are produced on an assembly line, all alike, within the specifications of a given model. Individuality is added later, when we buy them, adding accessories, and mainly with use, when we customize them to our needs. Computers do not come ready-made for use, unlike books that come ready-made to be read. There are no metaphors involved here; they literally grow with use, reacting and changing to our personal wishes and needs. Computers are not prêt-à-porter artifacts.

Anthropomorphization is easier with books than with computers. We accept without any sign of discomfiture the notion of a book as a dear friend, always ready to help us, more than we do with computers. The metaphor of a book as a patient friend has probably been used since the days people started reading books. The segment “book is a friend,” for example, produced more than 26.2 million hits in a Google search in early 2007. Some examples:

- “*A book is a friend.*” (American proverb)
- “*A book is a friend; a good book is a good friend. It will talk to you when you want it to talk and it will keep still when you want it to keep still; and there are not many friends who know enough to do that.*” (B.A. Billingsly)
- “*A book is a friend you can trust, a friend you can turn to for advice and inspiration whenever you like.*” (Anonymous)
- “*Each book is a friend that converses with and teaches me.*” (Warren Wiersbe)

Being friendly and trusty are subjective characteristics that are attributed to an object, through anthropomorphization, as we have traditionally done with animals (Easter Bunny, Mickey Mouse) and toys (Pinocchio, the Hardy Tin Soldier), including, lately, household objects (SpongeBob). This process of anthropomorphization is seen as something natural. In the case of books, it is also seen as desirable, based on the assumption, in most cultures, that books are essentially good and should be loved and respected—not for their physical reality, just leaves of paper bound together, but for their psychological content.

On the other hand, as regards computers, they may easily spark feelings of disapproval, whether anthropomorphized or not. Some examples:

- “*Most schools would probably be better off if they threw their computers into the dumpster.*” (Michael Fellows, computer scientist,

University of Victoria, British Columbia, 1997)

- *“When I put a child in front of a computer, what am I subtexting to the child? Please go hide...I have something more important to do. I have something more important than you!”* (Clifford Stoll, astronomer, writer, leading authority on computer security, in a lecture at the Buffalo Arts Center, 1996)

A Google search, using the same string above, but replacing *book* with *computer*, produced only 26 hits for “computer is a friend,” as compared to the 26.2 million for “book is a friend.” Out of these 26 occurrences, only one put the computer in a clear positive light:

*For me, computer is a friend who helps me do my work easily, gets me connected with my friends around the world, helps me plan the daily memo, guides in my son’s school projects and what not!*¹

Considering that we are used to attributing human qualities to animals and objects, including books and computers, the question that begs answering here is why we act one way when we refer to books and a different way when we refer to computers. When we say that a book is a friend ready to teach us, we are treating the book not as an artifact but as a teacher—and that is totally acceptable. On the other hand, if we treat a computer as a teacher, not as an artifact, that is usually seen as undesirable. We see it as commendable if books are metaphorically treated as human beings, replacing the teacher, and we encourage students to read books, which is as solitary as playing with a computer. As far as anti-social behavior is concerned, there is more solitude in front of a book than in front of a computer screen.

There are certainly many explanations for treating books and computers so differently, although they are both cultural artifacts. One important difference is that a book is a static,

physically inanimate object. We can attribute human qualities to it, but they are not really there; they are only in our minds. The black marks on the page mean nothing by themselves, unless we give them meaning. When we say that a book is a teacher, we are speaking metaphorically. Computers, on the other hand, are dynamic, physically animate objects. They react to input, analyze the data we enter, and can provide different answers to similar questions, generated by a random seed working within certain parameters. When we say that a computer is a teacher, we may be speaking not only metaphorically but also literally. When we interact with a book, the interaction is not really with the book but with a representation of the book that we have built inside ourselves; the book remains untouched as a physical reality. It does not interact back. When we interact with a computer, the computer changes physically, as a result of our interaction; it may add new information to a data bank inside the unit, for example, and then capitalize on this information for the next user, literally becoming a different computer. Unlike a book, the computer interacts back.

This ability to interact is not well understood yet and may generate fear, which in turn may lead to resistance. Some people believe that artificial intelligence will turn computers into amazing thinking machines that will eventually replace human beings (Shneidermann, 2002). Computers are interactive machines that can be programmed to simulate some human actions, using algorithms that compare the data entered by the user with the data stored in their random access memories, thus providing automatic feedback based on these comparisons. It may be striking to some people that computers can simulate rather long conversations with human beings, playing different roles. One of the earliest programs, exploiting this side of artificial intelligence, for example, was ELIZA (Weizenbaum, 1966), in the role of a psychiatrist. The excerpt² below reproduces a possible dialogue with the machine:

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ELIZA: How do you do? Please state your problem.

Person: I spend too much time with computers.

ELIZA: Why do you mention computers?

Person: You are one.

ELIZA: Does it please you to believe I am one?

Person: Yes.

ELIZA: You seem to be quite positive.

Person: I suppose I am.

Although the idea of artificial intelligence as a replacement for human action has generally been seen with skepticism (Shneidermann, 2002), the fear still remains in some quarters. It may be difficult, for example, to separate the metaphoric from the literal in the ELIZA excerpt above, when we interact with the program on a computer screen and receive immediate answers to the questions we pose. Consequently, what should be seen as a simple preprogrammed algorithm in the machine may be seen as intelligence.

When fear is associated with the difficulty that people meet in trying to use the new tools, the result is usually resistance to their use. People who feel that they are excluded from the community of successful users will tend to play down the role of a given tool in that community. Sometimes, however, resistance may be found in the initiated themselves. Plato's criticism against the use of writing for its undesirable effects on memory is a famous historical example:

...your invention [writing] will produce forgetfulness in the souls of those who have learned it, through lack of practice at using their memory, as through reliance on writing they are reminded from outside by alien marks, not from inside themselves by themselves: you have discovered an elixir not of memory but of reminding. To your students you give an appearance of wisdom, not the reality of it; having heard much, in the absence of teaching, they will appear to know much when for the most part they know nothing, and they will be difficult to get along with, because they have acquired the

appearance of wisdom instead of wisdom itself. (Plato, trans. Rowe, 1986, pp. 275a-b)

What Plato said of writing in 400 BC is very similar to what Postman, a well-known cultural critic, said of computers in 1992: "It is important to remember what can be done without computers, and it is also important to remind ourselves of what may be lost when we do use them" (Postman, 1992, p. 120).

One possible explanation for why we are ready to accept the metaphor of books as teachers is because we are not afraid of books and know how to use them; books have already been naturalized, "normalized" in Bax's terms. We talk about books as we talk about the objects we use everyday. Centuries of contact with books in our civilization, the years we spend in school learning how to read them, the way we see them displayed in bookstore windows, buy and borrow them, exchange and discuss them, all this has contributed to naturalize books as part of our daily lives. We are so used to books that it causes us no discomfort at all to refer to them as our friends or teachers.

On the other hand, when we see how computers are used, either in fiction or in real life, we realize immediately that they are different from books—they interact directly with the user, answering questions, providing feedback, and so forth, with no apparent human intervention. Some authors have defined this human-machine exchange as interactivity, as opposed to interaction, which is human to human (Wagner, 1994). The computer moves from a simple bearer of messages (e-mails, academic texts, encyclopedias, etc.), to a data processing machine (word processors, presentation programs, design applications, music making software), and reaches subjectivization, simulating human actions. "A computer is a medium in which a variety of methods, approaches, and pedagogical philosophies may be implemented" (Garrett, 1991, p. 75).

We live in a world where the border between subject and object seems to have become movable, making it difficult to decide whether we are receding towards ourselves, relinquishing the human in us to the objects that surround us, or expanding our humanity and incorporating these same objects. When we wear contact lenses, for example, it is difficult to decide whether our eyes end before the lenses or continue beyond them, creating what Kuuti (1996) referred to as functional unit. The point is that it probably does not matter: we do not interact with our lenses; we interact through them. They are artifacts like telephones, books, and computers. Likewise we do not interact with these artifacts, but through them, no matter how sophisticated they may be. We may talk to computers as we talk to other objects: metaphorically. But we may also talk to computers as we talk to people, that is, literally. A computer is both a book and a teacher; sometimes it acts as a book (just bearing text, for example), but sometimes it also acts as a teacher (providing individualized feedback, evaluating tasks, etc.). Either as book or as teacher, a computer can always be seen as a mediating tool. A good student does not study for the teacher but uses the teacher as a means for reaching a given objective, the same way a home builder uses an architect to design a house or a sick person uses a doctor to get well. A computer, either as a teacher or as an artifact, can always be seen as a mediating tool.

A tool does not exist by itself; it was created for some purpose, empowering people in a community to attain a given objective more efficiently. It is apparently obvious that people, including both the individual and the community, should be on the foreground. But this may not always be so. When we do research on how people learn, for example, it may be more productive to put people in the background, so that the tools they use can be brought to the foreground. If we want to teach a child to ride a bicycle, having a bicycle is essential for the child to acquire the skills of riding. We have to sit the child on the bicycle and

do some amount of practice. The child's behavior will be shaped by the use of the bicycle, to the point that it becomes an extension of her legs and arms and she will be able to ride by herself, without any help. Learning to read or speak a foreign language may require the acquisition of different skills, but they can only be done with the mediation of some kind of tool.

Tools are important because it is only through them that we can change the individual, the community, and the world. "Neither hand or mind alone suffice; the tools and devices they employ finally shape them" (Francis Bacon, as quoted by Brunner, 1987). We do not need surgery to change anybody's hand; we can change the hand by changing the gesture made by the hand. In the same vein, we do not need surgery to change people's brain; we can change it by changing their mind. And this is done with the mediation of tools.

Mediated action has received a lot of attention lately, as part of the Activity Theory paradigm in education. Vygotsky and Leontiev are the main historical references here, complemented by contemporary authors such as Kuuti (1996), Engeström (1999), Wertsch (1998), and Cole (2003). For them, learning is mediated by tools (both psychological such as language, strategy use, etc., or technical ones such as books and computers). The subject who uses these tools is not an isolated individual but a member of a given community (EFL classroom, language lab, etc.). The members in the community (teachers, administrators, etc.) all share the same objective (learning a foreign language). For the community to subsist, a set of rules must be created, dividing responsibilities between its members. When a new tool is introduced (podcasts, RPG, iPods, etc.), it must be mastered by all members in the community, according to the role played by each member (a teacher's knowledge of an authoring system, for example, may need to be different from the student's). Any action, any task in the community only makes sense if viewed from a holistic perspective and cannot be separated

from its final objective (shared by everybody in the community).

There seems to be a considerable difference between what is actually done in CALL and what could be done. The reasons for this difference are many, including restrictions from the technology itself and human resistance to its use. In terms of technology, we are still working with an emergent system, lacking in fundamental aspects such as interoperability, standard compliance, and hardware interconnectivity. In terms of human resistance, we tend to compare the computer to the teacher and then rejoice on what it cannot do. Adopting a new technology implies a new way of working and thinking. Producing a learning object to be used on the computer is not necessarily more difficult than preparing an activity to be used with paper and pencil, but it is certainly more complex. A computer program is not a replacement for either the book or the teacher. It has resources of its own, including higher interactivity and connectivity, which have to be adequately exploited.

In a socio-cultural perspective, CALL should be seen as a cultural artifact that integrates with the other components in the learning community, including other artifacts and other members (teachers, students, etc.). From this collective perspective, teaching and learning become a unified activity, distributed not only among the community members but also on the artifacts available in the environment. Introducing a new tool is always a challenge, subject to more or less resistance from the members in the community. It usually means acquiring new skills, from the operational (more automatic) stages to higher intentional levels, with the result that by doing different things, we end up thinking differently. When any new artifact (pencil, television, computer, or CALL) is introduced in a community, not only the whole body is involved, but the environment as well and everybody in it.

FUTURE TRENDS

Looking ahead is a general pastime in the area of computer-mediated communication and learning, as can be seen in popular books such as Gates' (1995) *The Road Ahead*, Negroponte's (1995) *Being Digital*, and Shneiderman's (2002) *Leonardo's Laptop*. In CALL, even components of some current models are sometimes projected into the future, as is the case with Bax (2003), for example, who described his Integrative CALL as something that "does not yet exist to any significant degree, but represents instead an aim towards which we should be working" (p. 22).

The future is a challenge because the more unpredictable it is, the more the need to predict it. In terms of CALL, and in the line of reasoning defended here, the trend is towards the idea that computers will be instrumental in the formation of different kinds of communities. Learning to speak a foreign language is acquiring admittance into the community of the speakers of that language, which can be done with computers, through local, regional, and global networks.

In the early days of CALL, the emphasis was on the individual and consequently on individualized learning. Later, with the introduction of the Internet and the socio-cultural perspective on education, the emphasis moved to the community and collaborative learning. Considering that computers are instrumental in connecting individuals and communities, the trend, in terms of research and teaching, is to move beyond the individual and the community and focus on what has the potential of introducing the individual into society and society into the individual, along Morin's (1990) hologrammatical principle. This principle states that not only the whole contains the part, but that the part also contains the whole. Thus, for a language student to be part of a foreign language community, this student must appropriate the language and the values that constitute this community. The community, on

the other hand, to be ecologically competent to allow for interaction between individuals, needs to develop some cultural artifacts that function as messaging tools for individuals and communities to talk to each other, incorporating the parts into the whole. There is a big difference between CALL as is and CALL as it can be. CALL as is still confines itself to the individual-vs.-society dichotomy, favoring the part in detriment of the whole. CALL as it can be focuses on what links individual to society, accounting for both the part, which contains the whole, and the whole, which contains the part. The trend is clearly towards CALL as it can be.

CONCLUSION

Summarizing, the idea put forward in this chapter is that CALL is not aimed at replacing either the teacher or the book. The idea that computers should act like human beings, the humanoids in science fiction, or the agents in some versions of artificial intelligence research may be interesting as entertainment or research projects, but not very useful in practice and is being discarded (Shneiderman, 2002). The basic idea is that we need tools to help us, not humanoids to replicate our actions.

CALL has often been described in terms of dichotomies: tutor vs. tool or individual vs. community. These dichotomies can be referred to as the “or” approach, where either the individual or the community is excluded, which is a logical impossibility, since one cannot exist without the other. Another possibility is to go the other way around and emphasize both the individual and the community, reasoning that we may refer to it as the “and” approach. Again, this is problematic because nothing is left out and would probably result in redundancy and duplication of effort. What we propose here is that neither the individual nor the community should be emphasized, but the point where they intersect. For the individual to

interact with the community, he or she must do something (action) through some kind of mediation (tool). This can be referred to as the “action” approach, in which the emphasis is neither on the individual nor on the community, but on the relation between them.

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KEY TERMS

Activity: Minimal unit of investigation in socio-cultural theories, involving a subject, an object, mediational tools, and the community with its rules and division of labor.

Activity Theory: Socio-cultural theory initiated by Vygotsky and his colleagues, based on the idea that human activity is situated in social context and mediated by psychological and physical instruments such as language, dancing, books, or computers.

Cultural Artifact: Mediational object used by a member of a community to interact with other members. Examples of cultural artifacts are pencils, books, iPods, computer operating systems, and so forth.

Distributed Cognition: Cognitive theory emphasizing the idea that cognition expands from the individual to the community and its artifacts.

Distributed Learning: Decentralized instructional model in which teachers, students, and the resources are located in different places. Sometimes a synonym for distance learning.

Learning Community: Group of people who share common educational goals and typically work in a collaborative, non-hierarchical fashion to achieve these goals.

Learning Object: Reusable learning unit, usually digital, that can be combined into a bigger unit.

Mediated Action: Use of cultural artifacts (pencil and paper, data projector, computer programs, etc.) for the purpose of attaining a given objective such as demonstrating a theorem or learning a foreign language.

Orkut: An Internet social network created by Google, in which users display their profiles, receive and send messages, post testimonials, and create communities.

ENDNOTES

- ¹ <http://www.indusladies.com/forums/technology-for-you-and-me/2914-computers-mere-machine-mans-best.html>
- ² <http://jerz.setonhill.edu/if/canon/eliza.htm>