
Review of computer-assisted language learning: History, merits & barriers

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Abstract: With the rapid development of technology, more and more language teachers and learners are eager to use technologies such as computer and the Internet for language learning and teaching. Undoubtedly, the use of technology in education has a positive effect on the achievements of language learners, but it is a necessity to consider all aspects of this application – barriers. This paper provides an overview of the broad information regarding Computer-Assisted Language Learning (CALL). The focus of the review is on history, typology, phases, merits and barriers of this innovation in language teaching and learning.

Keywords: Computer-Assisted Language Learning (CALL), History, Merits, Barriers, Language Learning and Teaching

1. Introduction

Shifting from pedagogical paradigm is not always necessarily successful. Language teaching and learning has the same position. With the wide spread and development of Information and Communication Technology (ICT) in our daily lives, technology provides lots of opportunities for language teachers and learners to benefit or suffer from. Learning a foreign language, such as English, French, etc., has increased in popularity, and also became a necessity in our communicative world, therefore, the need to combine both technology and language became a vital part of language scholars and researchers' jobs. Literate, communicative, and technology-based world has to accept the challenges of applying new movement in education either negative or positive. Several e-learning technologies are available for use in educational context. Although its forms are different in different context based on the economical situations of that context, almost all of the settings are trying to apply technologies in their education to meet the demands of learners and teachers. The purpose of this paper to review the history, typology and three phases of Computer-Assisted Language Learning (CALL) in language courses, mainly English. Moreover, the merits and barriers of applying technology in language classes are mentioned based on the different published research papers.

2. CALL Definition

Levy (1997) defined Computer-Assisted Language Learning (CALL) as “the search for and study of applications of the computer in language teaching and learning” (Levy, 1997, p.1). Although the name includes “computer”, the term CALL embraces any applications of Information and Communication Technology (ICT) to teaching and learning foreign languages. Two different terms such as CALI (Computer-Assisted Language Instruction) and CAI (Computer-Assisted Instruction) was used instead of CALL before the early 1980s (Davies & Higgins, 1982). Around the early 1990s, alternative terms such as TELL (Technology-Enhanced Language Learning) also emerged.

3. History, Typology & Phases of CALL

Applications of technology in education not a recent story, but applying technology in language learning is very new for language learners, teachers and scholars. Computer-assisted instruction was first used in 1950s for other purposes than language teaching. Learning from a colleague in physics, Collett (1980) used the university's mainframe for computer-assisted instruction in French program. Computer-based diagnostic French test was

reported by Boyle, Smith and Eckert in 1976. Individual language teachers such as Rex Last and Graham Davies started to use technology for language learning purpose in UK (Chapelle, 2001). Richard Atkinson and Patrick Suppes initiated the best-known early CALL project at Stanford University, US. This project, in collaboration with IBM, was based on Atkinson's mathematical learning theory rather than language learning theories (Atkinson, 1972). The importance of this project came from the point that Atkinson and Suppes formed the Computer Curriculum Corporation in 1967, which continued to provide instruction in English as a Second Language (Saettler, 1990; cited in Chapelle, 2001).

The Computer-Assisted Learning Exercises for French (CLEF) project began by the cooperation of three universities in Canada to teach basic French grammar (Paramskas, 1983). The Programmed Logic for Automatic Teaching Operations (PLATO) and the Time-Shared, Interactive, Computer-Controlled Information Television (TICCIT) projects were developed to teach different languages. The former system was used for English, French, German, Spanish and Italian in 1980 (Hendricks, Bennion & Larson, 1983); and the later for those languages in addition to many others such as Arabic, Chinese, Hindi, Hebrew and Swedish. The courseware developed on PLATO system was supported audio, graphics and flexible response analysis; and Hart found it very successful (Hart, 1981).

The 1983 annual TESOL convention in Canada was the milestone in CALL from two aspects: 1. The CALL was the expression agreed upon. 2. A suggestion was made to establish a professional organization titled "CALICO" (Computer-Assisted Language Instruction Consortium). By that time, CALL flourished in education and market settings: a course on CALL at Lancaster University, EuroCALL professional organization, production of introductory materials, and publication of a large number of books on CALL. Chapelle (2001) mentioned:

"The following books are among those based on work of the early 1980s that were produced for teacher education: Ahmad, Corbett, Rogers, & Sussex, 1985; Brumfit, Phillips, & Skehan, 1986; Cameron, Dodd, & Rahtz, 1986; Davies, 1985; Hainline, 1987; Higgins & Johns, 1984; Hope, Taylor, & Pusack, 1984; Jones & Fortescue, 1987; Kenning & Kenning, 1983; Last, 1984; Leech & Candlin, 1986; Underwood, 1984; Wyatt, 1984". (Chapelle, 2001, p. 8)

Computer-assisted language learning and teaching provides students and teachers with lots of opportunities. The gradual development of the role of the technology in language courses has known a few different phases. Each phase relates to a certain level of technology and pedagogical level. These phases are called: behaviouristic CALL, communicative CALL, integrative CALL (cf. Barson & Debski, 1996; Warschauer, 1996; Warschauer & Healey, 1998). Each phase has its own advantages and disadvantages.

3.1. Behaviouristic CALL

This phase was conceived in the 1950s and implemented in the 1960s and 1970s. In that time, three main factors affected the use of CALL: (a) the use of programmed instruction based on behaviorism, (b) the enhanced sophistication of data processing, and (c) the use of time sharing system for CALL purposes (Atkinson & Wilson, 1969). As the psychological basis of this phase declared, behaviorism theory, activities should be entailed "drill and practice". In that time the role of the computer was a vehicle to deliver instructional materials to learners. Taylor (1980) stated that the role of the computer was the same as tutor, and the delivered materials were repetitive language drills, vocabulary, grammar and translation tests. The most famous tutorial system was PLATO which was based on a behavioristic learning pattern. Dina and Cironei (2013) offered series of advantages for repetitive language drills and practice:

1. providing whenever necessary access to the same learning material is essential to acquiring a language;
2. allowing students to access the same material over and over again and offering immediate and non judgmental feed-back every time is ideal for mastering a language;
3. presenting such language materials on an individualized basis, without time keeping and deadlines, offering students the choice to study in their own rhythm is beneficial for owing a language. (Dina & Cironei, 2013, p. 249)

3.2. Communicative CALL

The second phase of the CALL was based on communication. The communicative approach of teaching, as a reaction to behavioral approach, was the prominent approach in the years 1970s and 1980s. The advocators of this approach argued that "all CALL courseware and activities should build on intrinsic motivation and should foster interactivity—both learner-computer and learner-learner" (Han, 2009, p. 41). They also put the focus on using forms rather than on the forms themselves. Among different types of programs developed in during these years, computer games were the dominant and significant programs. Taylor and Perez (1989) defined the role of the computer as stimulus. This CALL approach was used for activities that involved communication such as conversations, written tasks, critical thinking, etc. Some activities such as spelling, grammar checks and text reconstruction programs were another model of computers in communicative phase which refer to the computer as a tool. They helped learners to learn and use the language easier. But how is it possible to evaluate an activity as communicative? Higgins and Johns (1984) declared that the courseware, which were based on text reconstruction and consisted of variations on cloze exercises, were communicative. Chapelle (2001) added that:

“... variations included: “words deleted on a fixed-ratio basis, words deleted on the basis of some criteria, or all words deleted, texts that the teacher entered into the program, texts that came with the program, or texts other learners constructed; with help options and scoring, or with simple yes/no judgments concerning the correctness of the learners’ entries; with the end result being the completed text, or the end result responses to comprehension questions about the text”. (Chapelle, 2001, p. 10)

Another significant invention in the early 1980s was borrowed from corpus linguistics – computer-assisted concordance activity. Concordancer software is used to identify words or expressions requested by the user and display them with reference to the lines in which they occurred in a text. This courseware strengthened the learner to find questions of vocabulary use and grammatical collocation on their own (Chapelle, 2001).

3.3. Integrative CALL

Moving from cognitive view of communicative language learning and teaching to socio-cognitive, educators integrated different language skills – listening, speaking, reading and writing – into language learning. This goal made possible by incorporating technology into language teaching and learning, too. The aim of the last phase of the CALL was to overcome the obstacles of language learning and teaching, and therefore to optimize the opportunities for integrating new technologies in the language classrooms. Different educators and scholars tried to find more integrate manner of teaching instead of structure-based one, therefore, task-based approaches tried to integrate learners in more authentic environments. Fortunately, developments and advances in technology provided the mentioned opportunities. In the mid-1990s, multimedia computers and the World Wide Web (WWW) were the base of the integrative CALL. Nowadays, it is very easy for all of the learners to click a mouse to access lots of multimedia resources on the Internet. Network-based technology made the greatest contribution by which people can share whatever and communicate with each other whenever and wherever. Mark Warschauer in 2000 changed the name of the first phase from behavioristic CALL to structural CALL. Moreover, he revised the dates as followings:

- Structural CALL: 1970s to 1980s
- Communicative CALL: 1980s to 1990s
- Integrative CALL: 2000 onwards (Warschauer, 2000)

In 2003, Bax proposed other three similar phases:

- R estricted CALL - mainly behaviouristic: 1960s to 1980s.
- pen CALL: 1980s to 2003 (i.e. the date of Bax’s article).
- Integrated CALL - still to be achieved (Bax, 2003).

For further readings on Bax’s proposed phases, refer to Bax, 2003; Bax and Chambers, 2006; and Bax, 2011.

4. Merits and Barriers of CALL

Nowadays, CALL is gaining more popularity in language learning and teaching. Different scholars considered several merits and barriers for applying CALL, but most of them have the same items. Warschauer and Healey (1998) mentioned different beneficial aspects of CALL: 1) multimodal practice with feedback, 2) individualization in a large class, 3) pair or small group work on projects, 4) the fun factor, 5) variety in the resources available and learning styles used, 6) exploratory learning with large amounts of language data, and 7) real-life skill building in computer use.

On the one hand, Cabrini Simões (2007) mentioned some advantages of applying the technology, mostly the Internet, in language education. According to this paper, teachers have the opportunity to call students’ attention by using sounds, images, colors, different types of letters etc. Thus, it helps the students to visualize the contents in a better and more efficient way. Also, technology allows learners to participate in the culture of the target language, which in turn can enable them to further learn how cultural background influences one’s view of the world (Singhal, 1997). Moreover, students not only have access to other people’s work, but they may also generate their own work to be published (Singhal, 1997). Furthermore, students may use the Internet to search for additional language activities (Singhal, 1997). It also mentioned that the use of the Internet has also been shown to promote higher order thinking skills. The Internet may increase student’s motivation (Lee, 2000); and the Internet provides greater interaction (Lee, 2000). There are some activities in the Internet that give students positive and negative feedback by automatically correcting their on-line exercises (Lee, 2000). From the larger perspective, the Internet provides global understanding (Lee, 2000). Also he noted that, exchanging e-mail provides students with an excellent opportunity for real, natural communication (Warschauer, 1995). Finally, the Internet allows students around the world to interact with one another cheaply, quickly and reliably (Cabrini Simões, 2007, pp.31-33). On the other hand, sometimes it may take time to access information (Singhal, 1997). Also, the lack of training on the part of the teachers to implement the Internet in the language classroom is another negative factor (Singhal, 1997). Moreover, the Internet offers access to all types of issues and topics, some of which are unsuitable for children, and this lack of limits in itself may result in various problems (Singhal, 1997). The lack of infrastructure/facilities is a barrier for implementing technology in language classes (Corrêa, 2001). Finally, surfing the net can be fun and/or time consuming (Corrêa, 2001) (Cabrini Simões, 2007, p.33).

In another research paper, Han (2008) stated that: a) CALL programs could offer second language learners more independence from classrooms. b) Language learners have the option to study at any time and anywhere. c) CALL programs can be wonderful stimuli for second language learning. d) Computer can promote learning interaction

between learners and teachers. e) Computers can help classroom teaching with a variety of materials and approaches (Han, 2008, p. 41-42). The mentioned author also declared negative points: a) Financial barriers are the main outstanding problems. b) Computers cannot handle unexpected situations due to technological barriers. c) Both teachers and students need training to learn to use computers (Han, 2008, p. 42-43).

AbuSeileek and Abu Sa'aleek in 2012 mentioned that a) computers can facilitate a variety of learning tasks, and have enormous potency as teaching tools. They can help both the students and the teachers because of their special properties (Wang, 2006). b) Software vendors (and language teachers) no longer feel bound to grammar practice as the main goal of computer use in the language classroom (Gündüz, 2005). c) Computers are good to motivate students. d) Students' learning becomes more individualized and autonomous. e) The computer provides a platform for communication between teachers and students. f) The teaching resources can be stored for a longer time and shared by other teachers and students. g) Language learners have the option to study anytime and anywhere. h) CALL programs can be wonderful stimuli for second language learning. i) The computer can promote learning interaction between learners and teachers. j) The random access to Web pages would break the linear flow of instructions (Warschauer & Kern, 2000). And k) CALL programs, besides teaching a foreign language, will provide the learner with some sort of computer literacy (Gündüz, 2005) (AbuSeileek & Abu Sa'aleek, 2012, pp.25-29). On the contrary, a) CALL requires computers and software as well as other equipment all of which are expensive (Gündüz, 2005). b) Computers can only do what they are programmed to do. c) Both teachers and students need training to learn to use computers. d) Some students can never really adjust to using computers. And e) Computers cannot handle unexpected situations due to technological barriers (AbuSeileek & Abu Sa'aleek, 2012, pp.30-32).

Wang (2012) mentioned three advantages for network English teaching. In this study, creating a better English communicative environment for students, improving the efficiency of class teaching, and improving the teaching mode are the main beneficiary points for network English teaching (Wang, 2012, p.155-156). The researcher also mentioned disadvantages of this mode of teaching like financial barriers, students' difficulty in adapting to this new teaching mode, and some English teachers' vexation (Wang, 2012, 156-157).

Based on Shyamlee & Phil's (2012) study, language teachers should use technology to: 1) cultivate students' interest in study; 2) promote students' communication capacity; 3) widen students' knowledge to gain an insightful understanding to Western culture; 4) improve teaching effect; 5) improve interaction between teacher and student; 6) create a context for language teaching; and 7) provide flexibility to course content (Shyamlee & Phil, 2012, p. 151-153). Whereas, language teachers should not use technology as: 1) major

means replaced by the assisting one; 2) loss of speaking communication; 3) the restriction of students' thinking potential; and finally 4) abstract thinking replaced by imaginable thinking (Shyamlee & Phil, 2012, p. 153-154).

In another review study on the advantages of technology in language education, Riasati, Allahyar and Tan (2012) considered the followings based on other studies: a) Technology increases students' motivation (Galavis, 1998; Warschauer & Healey, 1998; Dunken, 1990; Lee, 2000; DEECD, 2010). 2) Technology improves language learners' academic ability (Galavis, 1998; Dunken, 1990; Lee, 2001). 3) Technology makes a shift from teacher-centered to learner-centered approaches in language learning and teaching (DEECD, 2010). 4) Technology enables learners to assess their own work in a more meaningful way, become better aware of the quality of their work and accept feedback more willingly (DEECD, 2010). 5) Technology provides the encouragement of collaboration and communication in learning activities (Gillespie, 2006; Murphy, 2006). 6) Technology has the potential to lower anxiety among learners (Levy, 1997; Chapelle, 2001; Braul, 2006; Ozerol, 2009) (Riasati, Allahyar & Tan, 2012, p. 25-26). Quite the opposite, 1) lack of access to technology resources that requires an Internet connection (Coghlan, 2004); 1) financial barriers (Warschauer & Meskill, 2000; Gips et al., 2004; Lai & Kritsonis, 2006); 3) lack of teacher training, lack of knowledge and practice (Baylor & Ritchie, 2002; Romano, 2003); 4) teachers' [negative] attitude (Hodas, 1993; Beggs, 2000; Dawes, 2001; Fang & Warschauer, 2004; McGrail, 2005); 5) students' [negative] attitude; and 6) lack of time and technical support (King, 2003; Jacobsen & Lock, 2005; Ismail & Almekhlafi, 2010) are the disadvantages of technology in language education (Riasati, Allahyar & Tan, 2012, p. 26-27).

In the recent paper, Dina and Cironei (2013) mentioned that: a) computer can promote language interaction between teacher and learners; b) it offers the possibility to simulate some processes and phenomena in motion through animation, and thus some experimental demos; c) methods and manners of organizing efficiently and modern the educational / learning process; d) getting used to computer technology from an early age influences students intellectual development; e) it offers the possibility of realizing a string of didactic operations which are very important for evaluation, and also for developing students creativity (Dina & Cironei, 2013, p. 251). However, a) deterioration of the teacher role in the learning process; b) division in small sections and well delimited of content leads shortening the matter, favouring those students with analytic thinking, but not those with synthetic thinking; c) controlling step by step students mental activity by the teacher stops them from developing creative abilities and entrepreneur spirit and initiative; and d) excessive individualization of learning can lead to denial of the teacher – student dialogue and leads to the isolation of the learning process from its psycho – social context, are mentioned as the barriers of CALL (Dina & Cironei, 2013, p. 251).

5. Conclusion

CALL may be a vital supplementary tool for English language teaching and learning, however, we have to consider all the aspects of using CALL in our classes. Considering technology's double face is the key factor in applying CALL (Saeedi, 2013:41). We have to pay attention to technocentrism and the lack of experimentation in applying CALL (Plana & Ballester, 2009; cited in Saeedi, 2013, p.46). Warschauer and Whittaker (1997) gave some suggestions for successful planning and implementing technology in language courses. They believed that teachers should carefully consider their goals, since little is gained by adding random on-line activities into the classroom. Clarifying course goals acts as an important first step toward the successful use of technology in classrooms. The next vital aspect of the technology-based instruction is integration, and the teacher should think about how to integrate technology-based activities into the syllabus. Also, the teacher should be aware of all the complexities of using technology in learning environment, such as cultural, infrastructural, structural, etc. difficulties. According to CALL advantages, it is not logical to judge CALL as a substitute for language teachers, but we have to consider technology as the vital supplementary tool in language classes. Technology offers learners opportunities for much more valuable communicative interaction in the target language than what was ever possible in the traditional language classes (Chirimbu & Tafazoli, 2013). We would urge language teachers to make use of technology in their language classrooms. Having such projects are good way of motivating students to use technology outside the classroom and to make learning a part of their daily lives. Although it is to some extent impossible to present all CALL advantages and disadvantages in a paper, this paper has reviewed a range of projects, papers and studies on CALL. The researchers believe that choosing, planning and applying the CALL courseware will be provided wide range of opportunities for language teachers and learners.

The findings of the present study can be looked upon as a general driving force to the educational policy makers to allocate more budgets on providing state-of-the-art CALL programs and devices in schools and universities. In addition, course designers can benefit from the outcome of the present study by allocating more computer activities in schools and universities curriculum. More familiarity with computers will result in more use of the computer in EFL classes by the teachers.

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