

A Portrait of Computer-Assisted Language Learning research: History, Typology, and Normalization

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Abstract: *The present review is an attempt to draw a portrait of CALL research from three points of research effort. First a definition and history of CALL is discussed. Then through a chronological order, the phases of CALL, or in other words, CALL programs typology and approaches to CALL research are introduced. Then via a number of prominent research studies, the general orientations as well as modern movements of instructional technology, known as normalization is addressed.*

Keywords: *Technology integration, CALL, Normalization*

1. Introduction

The influence of instructional technology has been long matter of deliberations. Mustafa (2001) and Burston (2006) could not see enough evidence to prove the efficacy of technology use in learning. Quite the reverse, many other researchers such as Pusack and Otto (1997); Alessi and Trollip (2001) and Dexter (2002) discussed against such statements and maintained the use of technology in developing learning processes. Nonetheless obviously the accelerating stride of technology integration supports its outstanding role in educational context.

The definitions of CALL cover a wide range of multi-dimensional activities which concern language teaching and learning through the channel of computer technology. CALL captures diversity of ICT (Information and Communication Technology) applications and teaching/learning approaches, such as those which are used in virtual learning environment and Web-based distance learning. It embraces the use of corpora and concordancers, interactive whiteboards, Computer-mediated communication (CMC), language learning in virtual worlds and Mobile-assisted language learning (MALL) as well. Accordingly, studies that concentrate on computer technology and its application in language education fall within the domain of CALL research field. CALL comprises a multidisciplinary research framework (Zapata, 2004) and is entering rapidly into the language learning routines, assisting teachers and learners to foster the

processes of representation of content, material design and educational techniques. Moreover CALL has the capability to click on the pedagogical theories and open them with a flourish.

2. History of CALL

To promote the knowledge bases of CALL, the historical background of CALL which ages about half a century should be necessarily revealed. There are several classifications of CALL, each having distinct views toward CALL typology, phases of CALL and approaches to CALL (Davies & Higgins, 1985; Jones & Fortescue, 1987; Hardisty & Windeatt, 1989; Warschauer, 1996; Levy, 1997; Warschauer & Healey 1998; Beatty 1998; Delcloque, 2000; Warschauer 2000; Jung 2005; and Bax 2003). Published histories of CALL follow particular manners. Delcloque (2000, p.96) emphasizes that histories of CALL fit in to one of these two categories:

"1. The properly researched, objective historical accounts which attempt to summarize the progression and might include precise dates and a comprehensive list of sources.

2. The interpretative type which tends to draw more subjective conclusions about advances and trends in the field, thus analyzing its progression in a less objective manner."

Bax (2003) severely criticized Delcloque's (2000) propensity to type 1 research, and termed his view a *limited* one. Concerning the precedence of analytical research, He contended that histories must move far beyond mere software and hardware developments.

3. CALL programs typology

Davies and Higgins (1985), Jones and Fortescue (1987) and Hardisty and Windeatt (1989) sketched CALL programs typology considering software applications.

Davies and Higgins (1985) listed the following programs:

- Gap-filling exercises: GapKit, Gapmaster
- Multiple-choice exercises: Choicemaster
- Free-format exercises: CLEF, Testmaster
- Tutorial programs: CLEF
- Re-ordering: Word Sequencing, Textsalad
- Simulations: Granville, the Montevideo interactive videodisc
- Text mazes (also known as action mazes): Mazes
- Adventures: French on the Run
- Games: Vocab

- Cloze: Clozewrite , Clozemaster
- Text manipulation: Fun with Texts, Storyboard
- Exploratory programs: S-Ending
- Writing-word-processing

Likewise Jones and Fortescue (1987) outlined CALL software programs in this way:

- Grammar: Matchmaster, Choicemaster, Testmaster
- Vocabulary: Vocab
- Reading skills: Storyboard
- Authoring programs: The Authoring Suite
- Writing - word-processing
- Oral skills - using simulations and adventures as a stimulus: London Adventure and Yellow River Kingdom
- Listening skills: Getting the Message interactive videodisc
- Information source: Wordstore
- Discovery and exploration: Loan

Hardisty and Windeatt (1989) categorized types of CALL programs in a simpler way as follows:

- School programs: exercises involving gap-filling, multiple-choice, sequencing, matching, total text reconstruction
- Office programs: word-processing, database, communications, spreadsheets
- Library programs: concordancers
- Home programs: adventures and simulations

4. Phases of CALL

4.1. Warschauer (1996) and Warschauer and Healey (1998)

Warschauer (1996) and Warschauer and Healey (1998) identified three historical phases of CALL, namely *Behavioristic CALL*, *Communicative CALL*, and *Integrative CALL*. Specific methodology and pedagogical approaches are the distinctive features of each phase. (Since these papers follow the same approach toward the history of CALL, both are introduced under the same heading.)

4.1.1. Behavioristic CALL

Warschauer and Healey (1998) noted that in 1950 the groundwork of the notion of behavioristic CALL was laid and in two successive decades, 1960s and 1970s, it was fully implemented. This model of CALL which grew as a sub-branch of the broader notion of CAI (Computer-Assisted

Instruction) was actuated by the then-dominant behaviorist learning theory. The inclusion of repetitive language drills, referred to as drill-and-practice, was the major product launched by behavioristic CALL which aimed directly at forms of the language. This phase of CALL viewed computers as indefatigable mechanical tutors that provide large volumes of practice mostly known as drill-and-practice material, for students. The most salient tutoring system in the era of behavioristic CALL was the Programmed Logic/Learning for Automated Teaching Operations (PLATO) system which developed on large mainframe computers the University of Illinois. The rejection of behavioristic approaches to language learning in the late 1970s and early 1980s, in both theoretical and pedagogical level and the creation of the microcomputer made criticisms to behavioristic CALL soar, giving space for communicative CALL to appear in 1970s.

4.1.2. Communicative CALL

Warschauer and Healey (1998) added that the advent of new personal computers which paralleled the communicative move in 1970s and 1980s, created the space for the emergence of communicative CALL in the late 1970s and early 1980s. Using forms of the language instead of the analysis of the language, communicative CALL programs incorporated sophisticated cognitive principles which stressed learning as a process of discovery.

Three models of computer programs in communicative CALL were identified by Warschauer (1996). The first model was the extension of behavioristic concept of computer as tutor with a sharp distinction in learner's choice, control, and interaction. The second model of communicative CALL, computer as stimulus, tended to stimulate students' discussion, writing, or critical thinking. The third model was computer as tool or computer as workhorse which enabled learners to use or understand language.

4.1.3. Integrative CALL

Critics of communicative CALL (Kenning & Kenning, 1990; Pusack & Otto, 1990; Rüschoff, 1993) in the late 1980s and early 1990s claimed that the computer was being used on an ad hoc basis and isolated from the central purposes of language teaching process. Dissatisfaction with compartmentalized skills or structures and the need to integrate language skills and use in authentic environments made educators select more integrative task-based, content-based and project-based approaches (Warschauer, 1996).

The innovation of multimedia networked computers and the Internet gave birth to integrative CALL. Multimedia technology, empowered by hypermedia, the impact of CMC (Computer Mediated Communication) and the Internet, facilitated the integrative approach to using technology.

Warschauer and Healey claimed that the underlying social and economic changes produced CALL paradigms:

"Many of the changes in CALL paradigms flow from economic and social changes. The shift to global information-based economies has meant a dramatic increase in the need to deal with large amounts of information and to communicate across languages and cultures." (p. 59)

In sum, Warschauer (1996) and Warschauer and Healy (1998) argued that the advent of specific types of computer technology (mainframes, microcomputers/PC's, and multimedia computers and the Internet) and the dynamic evolution of learning theories were the motive power for each phase.

4.2. Levy (1997)

Levy (1997) in his well-known contribution to CALL, *CALL: context and conceptualization*, conducted a comprehensive survey among CALL authors to figure out their underlying concepts. The upshot revealed that Communicative approach to language teaching, task-based learning, formal grammar instruction and eclectic approach received great attention. Regarding the role of computers in language learning process, non-directness was attributed as the most dominant role. But his center of attention was the newly introduced Data-driven approach to language learning. DDL (Data Driven Learning) which thrived to push corpus linguistics ahead, helped generate exercises that include typical authentic forms and uses of language.

4.3. Warschauer (2000)

Warschauer (2000) revised his earlier classifications (Warschauer, 1996; Warschauer & Healey, 1998). Accordingly Behavioristic CALL was replaced by *Structural CALL* and moved forward from 1960s to 1970s to 1970s to 1980s. Communicative CALL dated forward to 1980s to 1990s and Integrative CALL moved to the beginning of new millennium onward.

4.4. Davies et al (2011)

Davies et al (2011) offered the most up-to-date classification of CALL phases. Like other classifications, theirs is also a three-element categorization: Dumb CALL from 1970s to 1980s, Multimedia CALL from 1990s and Web CALL from 1993 to present day.

4.4.1. Dumb CALL (1970s to 1980s)

Pointing to behavioristic, drill-and-practice nature of programs, they used the term *dumb* for this

era to refer to the lack of sounds and videos in computer technology. Computers in this era were not able to play or record sounds unless other peripheral equipment were connected to them, though such equipment were so expensive. Even they couldn't show primitive pictures.

4.4.2. Multimedia CALL (1990s to present day)

Multimedia computers carried soundcards that meant the era of dumb technology is over. They could play and record sounds without any other peripheral equipment. The ability of showing images and playing videos increased day by day.

4.4.3. Web CALL (1993 to present day)

The invention and public launch of Web in 1993 gave rise to new CALL applications. The first websites operated in a similar way to dumb computers of 1970s, but gradually with the innovation of Web 2.0, the quality of programs which were repeating behaviorist modes in web, changed to be an inevitable part of people's social life nowadays.

5. Approaches to CALL

5.1. Bax (2003)

In his genuine article, *CALL — past, present and future*, Bax (2003) severely criticized the impressing Warschauer and Healey's (1998) phases of CALL. He argued that although Warschauer's attempts seem to be the only methodical and substantial enterprise in CALL historiography, there must be a more thoroughgoing analysis at work.

Referring to Warschauer's (2000) summary of three phases of CALL (table 2.2), he identified conceptual confusion, chronological inconsistencies and obscurities in Warschauer's classifications, (Warschauer & Healey, 1998; Warschauer, 2000) as follows:

- **Conceptual confusion: What are these phases?**

Terming *approach* rather than *phase* lies in the heart of Bax's argument. He provided reasons why *phase* would not fit within the frameworks of CALL histories. He also criticized Warschauer's disclaimers as to the historical validity of the phases. Bax went on to introduce the terming paradigms or perspectives as add-ons to the conceptual confusion:

"This seems ambiguous—are they historical phases or are they not? If they are historical phases, how is it that all three coexist together today? And if they are not in fact closely related to historical periods, then it is surely unwise to speak of them as phases at all and to attach dates to them. In some places,

furthermore, Warschauer speaks of these three categories as 'paradigms' or 'perspectives' (e.g. Warschauer) — which only adds to the conceptual confusion." (p. 16)

- ***Chronological inconsistencies***

As mentioned earlier in this chapter, Bax (2003) took issue with Warschauer's phases of CALL in different publications (Warschauer, 1996; Warschauer & Healey, 1998; Warschauer, 2000). Chronological inconsistencies are as follows:

Behavioristic CALL was replaced by Structural CALL and moved forward from 1960s to 1970s to 1970s to 1980s. Communicative CALL dated forward to 1980s to 1990s and Integrative CALL moved to the beginning of new millennium onward. Moreover Bax continued:

"Though these inconsistencies are not particularly important in themselves, they are peculiar, and avoidable. A more thorough historical analysis should surely attempt greater consistency in terms of chronology." (p. 15)

- ***Obscurities: unclear criteria***

The third point he pointed out, is the unclear criteria of the three categories. Although he claimed that Behavioristic CALL is the only plausible category, he gave reasons why two other phases are doubtful. Bax sorely criticized Communicative CALL and Integrative CALL because there seems to be unclear criteria for such phases. Afterward he outlined clarifications and amendment to Warschauer and Healey's (1998) credible analysis.

After the analysis of Warschauer and Healey (1998), he put a step forward and proposed a more general term, approach instead of phase. Restricted CALL, dominated from 1960s until about 1980s (however some manifestations of it exist today), is the first approach that seems to be in line with Warschauer and Healey's (1998) Behaviorist CALL. The term Restricted has a broader, more satisfactory and flexible scope as an indicator; and covers the technological and pedagogical restrictions of that time. Furthermore it inhibits terminological fallacy, for instance Delcloque mistakenly called the first phase Behavioural (Delcloque, 2000). The next approach, Open CALL, lasted from 1980s onward, shows more openness in every type of activity or technology in Restricted CALL, especially in terms of feedback, software and the role of the teacher. The third approach is Integrated CALL that is totally different from that of Warschauer and Healey (Bax, 2003). In this regard he stated:

"The key point about Integrated CALL— which sharply

distinguishes it from Warschauer and Healey's—is that it does not yet exist to any significant degree, but represents instead an aim towards which we should be working. I shall argue later that at this moment in the historical development of CALL we are still operating within the second approach, Open CALL, our aim being to move towards Integrated CALL in future." (p. 22)

Through different analyses with diversity of approaches, the accelerating pace of trends in both theories of learning and pedagogical technology is observable. Such diversity among CALL historiographies within the framework of two decades signifies the ever-changing nature of CALL; yet it implies the relative accuracy of CALList interpretations. However it seems that there must be more deliberate attempts at rendition of such upward developments. The researcher suggests setting standards that comprises the underlying methods for CALL historiography.

Although it may be challenging to signify the current stage of CALL in our country, Iranian teachers not only welcome CALL activities; but they even have the tendency to integrate technology into pedagogy at higher levels also. Yet what is observed as obstacles to CALL activities consists of socio-economic conditions and teacher knowledge of technological knowledge. The marked situation is that the infrastructures of pedagogical technology in state schools have maintained minimum; therefore state schools swim in sluggish streams of the real practice of technology integration. Since technology innovations contribute to form as inseparable parts of educational theories, the ministry of education needs to revise the decisions made for pedagogical mutations.

6. CALL Research Approaches

Generally CALL research is conducted within a dichotomous system; Impact and effectiveness. Effectiveness emphasizes on the effect of ICT on improving the approaches and methods of foreign language education in comparison to traditional methods; while impact deals with CALL infrastructures, essential applications and theoretic bases of use, acceptance, access, etc. (Felix, 2005; EACEA, 2009)

CALL impact deals with the wide-ranging philosophies of CALL in qualitative or quantitative manners. The implications of ICT use and the modifications it adds to pedagogy are also covered in this research approach. As a respectable case of CALL impact, Warschauer and Matuchniak (2010) appraised studies of the equity in access, use and outcomes of new technologies. They found substantial gaps, inequalities and challenges in internet access and claimed that measures of statistical analysis should change.

CALL effectiveness has been extensively researched worldwide. Since research design and implementation with this focus are not so tedious, many researchers (see Felix 2005) tend to evaluate the role of computer applications and programs in changing the static conditions of language skills in traditional settings. Consequently one of the major effects of CALL is to develop language skills.

7. The Modern Movement: Normalization of CALL

The essence of Bax's (2003) discussion was the idea of normalization. Integrated CALL brought with itself so many challenges. Bax who first introduced Normalization of CALL to language research domain claimed that CALL is moving toward such state; yet it's just practiced in some special environments. Moreover he implies that normalization occurs when computers are developed in shape and size (maybe he meant small portable notebooks, laptops, cell phones, tablets...) (Bax, 2003, 2011). Invisibility of technology and decentralization of computers are two main characteristics of the state of normalization which can be figured out in Bax's (2003, 2011) argument.

Some advantages are considered for the practice of normalization. The most distinguished advantage is the act of clarifying practitioners' goals of CALL integration and obstacles to normalization (Chambers & Bax, 2006). Other advantages are concerned with researchers. These include the expansion of educational literature and providing space for educational development under the influence of modern innovations.

8. Concluding Remarks

It's worth noting that investigating the effects of technology integration courses provides an appropriate ground for teachers, or in general CALL users, to identify the potentials of both the professional development issues and the practice of teaching. On the whole, what is evident in technology integration research to be recommended for CALL users could be listed as:

- Mounting their knowledge bases for optimal operation of instructional technologies;
- Increasing the number of new technology integration techniques;
- Increasing the swiftness of learning process;
- Assessing the suitability of new technologies to help students learn;
- Developing activities involving the use of instructional technologies to easily reach course objectives; and
- Teaching with diverse instructional approaches and computer applications.

The realization or failure of technology integration projects extremely depends on the congruity of all involved elements (Rahmany, Sadeghi, & Serdivand Chegini, 2014). Generally what

Chambers and Bax (2006) identified about the role of normalization in very specific situations, is to some extent in line with what is now not being practiced in Iran. Although meeting the conditions of normalization seems to be far reaching (at least now), the ideal situation of CALL classrooms which is depicted in Bax (2003) appears to have the least deficiencies. However considering the local perspectives and parameters helps the success of technology integration projects.

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