ERJournal Education Reform Journal Volume 4 Number 2, 2019

e-ISSN: 2602-3997 http://dx.doi.org/10.22596/erj2019.04.02.35.53

A General View on Utilization of Computational Technologies in Computer Assisted Language Learning (CALL)

Nihat Yigitcan Badem[1] & Fatma Demiray Akbulut[2]

Submitted: June 1, 2019; Accepted: November 10, 2019; Published Online: December 31, 2019

Abstract

Since the 1960s-1970s, the implementation of Computer-Assisted Language Learning concept has contributed to the progress made on Foreign Language Learning (FLL) in numerous ways. It has enabled the teachers and language learners to enrich the language learning process with improved interactivity with certain learning materials and gave rise to several opportunities for the development of applications in further implementation of the concept. At the present time, it is possible to witness a wide range of software and hardware developed for CALL that are able to present innovative and creative means for CALL which are, to some extent, proven successful in engaging foreign language learners with greater effectiveness. This research has been prepared in efforts of gaining a proper insight on utilization of the technological means and opportunities in CALL, and with aims to comprise an idea regarding the effects of the mentioned technologies which are and were used on CALL. In other words, this research presents an overview regarding history and typology of CALL and also types of programs in CALL.

Keywords: Computer-Assisted Language Learning, Foreign language learning, language teaching, English as a foreign language

Introduction

The concept of Computer-Assisted Language Learning (CALL), can be simply defined as "the search for and study of applications of the computer in language teaching and learning" (Levy, 1997, p. 1). The first instances of publications that coin the term 'Computer-Assisted Language Learning' are dated back around 1980's, with paper of Davies G. & Steel D. (1981) as the first possible publication that coined the term. A typical instance of computer-assisted whole-class teaching would usually involve a teacher bringing one microcomputer (e.g. Personal Computer) which would be connected to a large TV screen for visual output; then a student or the teacher itself would operate the computer using its keyboard, thus the process of language training would start when the teacher would ask for responses from students regarding the words or shapes that would appear on the screen. (Davies G. et al., 2012), This approach seemed to work very well with a range of text manipulation programs, simulations and other programs such as *Quelle Tête*, in which the aim was to build up the face of a person on-screen by

[1] Abant Izzet Baysal University, [ORCID 0000-0001-6943-9941], yigitcanbadem@gmail.com
[2] Abant Izzet Baysal University, [ORCID 0000-0003-0689-8483], demiray_f@ibu.edu.tr

typing the descriptions regarding that person's facial features such as the nose, eyes, hair, etc. (Davies G. et al., 2012). However, in the present, technological advancements have made it possible for a computer to contain more computing power while, at the same time, have a greater freedom of design in hardware, thus paving the way for devices with extended peripheral functions and increased interactivity, such as the Interactive Whiteboards (IWBs). In contrast to the older computers possessing the potential that is only limited with text manipulation and basic sound & graphics syntheses, IWBs have brought along the power of a modern Personal Computer capable of running many types of multimedia ranging from CD-ROMs to Internet applications, and from interactive slideshows to full-fledged, specialized IWB software, with the addition of touch screens for physical interaction between the user and learning material (Davies G. et al., 2012).

From the abovementioned comparison which reflects the technological changes in CALL on whole-class teaching, it can be stated that advancements in computer technology and implementation of modern educational approaches in CALL has greatly enriched the means a student or a teacher may employ to improve the efficiency and creativity of the process of foreign language learning. Thus, it can be expressed that having a proper insight on the technological advancements in CALL software and hardware represents a great importance for the reason that possessing an amount of knowledge regarding the effects of the appearance of these utilities may pave the way for a better understanding of possibilities to further refine the educational capabilities of CALL implementations.

This study has been prepared as a literature review in a systematic way. Firstly, the main feature of CALL studies has been examined and then its historical development has been considered. While examining the historical development, typologies have been determined according to the chronology of history. Following the typology classification, CALL programs and their features have been summarized and systematically presented. Basically, the historical development of CALL, the current position of CALL, its uses, programs developed on the basis of CALL, and a number of weaknesses have been identified as keywords. Following a chronological classification, a systematic path has been addressed and a detailed literature review on CALL has been performed.

Overview on History and Typology of CALL

From the simple drill and practice type programs that originated in the beginning times of CALL to today's specialized and more advanced groups of software with materials of varying kinds, it can be stated that CALL has improved in both technological and educational aspects as the time went on. It can be stated that in order to be able to properly categorize the types of programs and technologies among CALL, it is of essential importance to have a general overview on the definitions and assessments made for the history of CALL.

Behaviorist (Structural) CALL (1960s-1970s)

The first, "Behavioristic" phase of CALL, conceived in the 1950s and implemented in the 1960s and 1970s and was initially based on the behaviorist theories of learning (Warschauer, 1996), and was usually formed around the grammar-translation & audio-lingual English teaching paradigms. According to Warschauer (1996), the programs developed within this CALL phase involved repetitive language drills, which can be referred to as "drill and practice", or to put it rather more pejoratively, as "drill and kill", based on the fact that a typical computer is ideal for presenting the same materials and providing instant feedback regardless of the number of repetitions in such processes.

Moving on from descriptions regarding what is the first phase of CALL according to the Warschauer (1996), it can be stated that Behavioristic CALL would fulfill its lifetime to be replaced by a newer perspective in CALL based on the recent theoretical and pedagogical perspective changes of that time. As it can be seen from the work of Warschauer & Healey (1998), technological advancements were

being observed in parallel with the changes among the adoption of paradigms. Criticisms made over "drill and practice" type of Behavioristic CALL gave arise to voices within the language teaching community which were demanding a more intuitive, social and cognitive approach to the use of CALL opportunities within the class. Moreover, behavioristic approaches to language teaching were being rejected from both pedagogical and theoretical aspects. (Warschauer & Healey, 1998) This voice of change eventually led to the appearance of *Communicative CALL*, "the next stage" termed by Warschauer (1996) which possessed the aim of implementing a way of approach that was more focused on moving away from the solid borders of exercises with limited and pre-fabricated capabilities, to cognitive and open-ended applications which induced the courage of students for generating original utterances and responses (Warschauer & Healey, 1998).

As stated by Warschauer (1996), Communicative phase in CALL was based on the communicative approach in language teaching, which was prominent in 1970s and 1980s. The supporting communities proposed that the previous, form focused decade of behaviorism limited class members from engaging in adequate amount of authentic communication within the learning process (Warschauer, 1996). …This may changeJohn Underwood, one of the main proponents of Communicative CALL, proposed a series of "Premises for 'Communicative' CALL" (Underwood, 1984, p.52) which stated that communicative CALL "focuses more on using forms rather than on the forms themselves"; "teaches grammar implicitly rather than explicitly"; "does not judge and evaluate everything the students nor reward them with congratulatory messages, lights or bells"; and (most interestingly) "will never try to do anything that a book can do just as well" (Underwood, 1984, p.52).

Communicative CALL (1970s-1980s)

As years have passed, the changes in educational theories would arise in the world of foreign language which would replace the rather obsolete behavioristic theories that were used in the CALL of 1960s and early 1970s, and with the progresses made towards more powerful computing capabilities for computing devices would allow more diverse options to be chosen for the implementations of CALL. These changes would arrive before people as applications and systems in CALL that would utilize new computational capabilities which would be more interactive and efficient with the combination of modern theories and paradigms in foreign language training.

Warschauer (1996) further analyzes the Communicative CALL into several types of CALL programs where each type defines a computer's role differently. The first type among these, according to Warschauer (1996) was an extension of the "computer as tutor" model observed in Behavioristic CALL. In addition to this purpose model, another proposed CALL model for communicative activities involved the computer as "computer as stimulus" (Taylor M.B. & Perez L.M., 1989, p.63; cited in Warschauer, 1996). The purpose of CALL activity in this model was focused mainly on stimulating discussion, writing or critical thinking capabilities of the students. The third model proposed in this framework was the role of the computer "as a tool" (Brierley & Kemble, 1991) or as defined by Taylor & Perez (1989), "as workhorse". This role did not involve the computer as a means of providing language learning material, but rather as a toolkit that enabled the learner to use or understand the language (Warschauer, 1996). In addition, Warschauer (1996) further states that the distinction between these models is not absolute, meaning that for example, a skill practice program can be used as a conversational stimulus, as can a paragraph written by a student on a word processor, or likewise several drill and practice programs could be used in a more communicative fashion if the students in the case were assigned to work in pairs.

Table 1: Overview of computer roles as analyzed by Warschauer (1996)

Computer as a Tutor	Observed as an extension of Behavioristic CALL. Programs were designed to provide skill practice, without drill-like qualities of the previous phase Range of programs encompassed paced reading, text reconstruction, etc. (Healey & Johnson, 1995).
Computer as a Stimulus	Purpose was mainly focused on stimulating discussion, writing, critical thinking Programs used were not specifically designed for language learners (for example, Sim City, Sleuth, etc.) (Healey & Johnson, 1995a).
Computer as a Tool/ as a Workhorse	Did not involve the computer as a provider for language material, but rather as a tool for the learner to use/understand the language. Example programs consist of word processors, spelling and grammar checkers, etc.

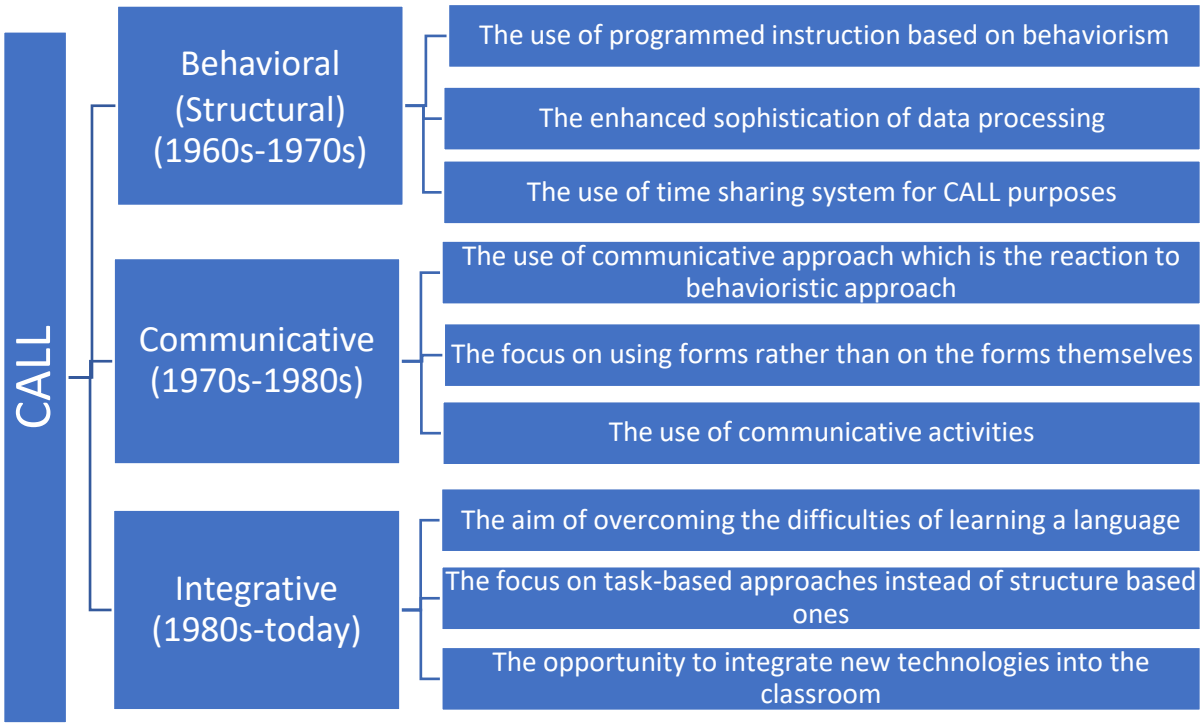
With the beginning of CALL's flourishing in 1980s, the range of CALL programs has dramatically expanded in terms of focuses on language training paradigms and presentation of educational material, which then the types of these programs were identified and classified by Davies and Higgins (1985), Jones and Fortescue (1987), Hardisty and Windeatt (1989) and many more. To provide an example on these technological improvements, a comparison among two different timelines of whole-class teaching would constitute an adequate reflection of improvements on the CALL technologies.

Later on, by the end of 1980s, many language educators felt that CALL was still failing to live up to its potential (Kenning & Kenning, 1990; Pusack & Otto, 1990; Ruschoff, 1993; cited in Warschauer, 1996). Critics claimed that the potential found within computers was being used in an *ad hoc* and disconnected sense, thus "finds itself making a greater contribution to marginal rather than to central elements" of the language teaching process (Kenning & Kenning, 1990: 90; cited in Warschauer, 1996). These criticisms would blend in one as a search for more integrative, social and socio-cognitive manners (Warschauer & Healey, 1998). Recent advancements in computer technology of that time fortunately made it possible to establish new models that would fulfill this search.

Integrative CALL (1990s-today)

The appearance of two main advancements in technology brought along the third and current phase of CALL in the timeline provided by Warschauer (1996) named *Integrative CALL*. This phase was mainly represented with the two abovementioned advancements, thus it can be seen that Warschauer (1996) divides this phase into two fields that would reflect the steps taken within the framework of these innovations. Multimedia technology (i.e. CD-ROMs) allows a variety of media such as text, graphics, sound etc. to be contained and accessed on a single computer. Internet, on the other hand, provides learners the strength of Computer Mediated Communication (CMC), which was defined as "probably the single computer application to date with the greatest impact on language teaching" (Warschauer, 1996) for its potential to fulfill the mentioned need for "use of language in authentic social contexts" (Warschauer & Healey, 1998).

Tablo 2. An Overview on CALL History



Bax's Perspective on History and Typology of CALL

Warschauer's and Healey's (Warschauer, 1996; Warschauer & Healey, 1998) assessment of CALL history and definition of its phases were followed by Stephen Bax's (2003) demand for a critical examination and reassessment of the history of CALL. In his paper, Bax (2003) provides three new categories, *Restricted, Open,* and *Integrated CALL* differently than Warschauer's framework. Moreover, before providing his own analysis of CALL history, Bax proceeds with pointing out several weaknesses and inconsistencies that he found within Warschauer's CALL timeline model (Bax, 2003). First, Bax (p. 15) mentions the chronological inconsistencies regarding the time periods assigned for the phases put out by Warschauer. For instance, Bax indicates that Behavioristic CALL, according to Warschauer, is dated around 1970s-1980s with the name "Structural CALL" (Warschauer, 2000), however in a previous paper, Bax states that this phase was described as "conceived in 1950s and implemented in 1960s and 1970s" under the name of "Behavioristic CALL" (Warschauer & Healey, 1998). Bax (2003, p.15) expresses that "a more through historical analysis should surely attempt greater consistency in terms of chronology".

In addition, Bax (2003) also criticizes the *Unclear Criteria* provided by Warschauer, especially for Communicative CALL and computer models within the phase. For instance, according to Bax (2003), Warschauer's preference for the name of the second CALL phase, *Communicative CALL* would feel confusing for language teachers because language teaching is still generally operated in a communicative approach among numerous teaching contexts, although it can be thought based on Warschauer that Communicative CALL has fulfilled its time and is no longer being used. However, possibly the most important part within Bax's criticism is about *Integrative CALL* (Bax, 2013, p. 18). In his critical analysis, Bax states that Warschauer & Healey's (1998) definition of the phase is far from distinguishable from Communicative CALL, as most of the time "use of language in authentic social contexts" (Warschauer & Healey, 1998) was stressed out from the beginning of Communicative Language Teaching (CLT) and was taken as a central part of it for years. With additional arguments put forth by Bax (2003), he finishes his

critical analyses regarding Warschauer's and Healey's phase definitions with his following conclusive words about Integrative CALL: "the integrative phase is also suspect. If it is defined as an approach, it cannot be divided from CLT; as a new hope or ambition for CALL, there may be some validity in the category. (Bax, 2003, p.19)"

Following these statements, Bax (2003) then tries to provide an alternative analysis and assessment for CALL by firstly naming his definitions as something general as "approaches" instead of "phases" which in his words, "implies a greater historical validity than is warranted" (Bax, 2003, p. 20). The researcher then proceeds with describing the approaches in terms of multiple aspects regarding feedback, roles of teachers, position of computer, etc. (see Bax, 2003, p. 21 for the outline table). First approach found within Bax's assessment, *Restricted CALL*, differs little from Warschauer & Healey's "Behaviorist CALL" (1998) in terms of historical period and key characteristics, however according to Bax (2003) it is more of a satisfactory term since it can also be used to refer to the software and activities of that time in addition to an underlying theory of learning. The term is used in a self-explanatory sense; at the time, most aspects and dimensions within CALL were 'restricted' within their own means (Bax, 2003).

The second approach represented by Bax (2003) is *Open CALL*, since he finds it relatively open in all dimensions (i.e. feedback given to the students, software types, role of teacher, and so on.). Despite its some aspects which are not truly 'open', main characteristic of the approach is its relative openness in comparison with *Restricted CALL* (Bax, 2003, p. 22). The third and final approach envisioned by Bax (2003) is the *Integrated CALL* (not to be confused with Warschauer and Healey's (1998) *Integrative CALL*), which was characterized with the concept of 'normalization' as the final stage of CALL, a term that refers to the point where the technology in question "becomes invisible, embedded in everyday practice, (…) to the extent that we hardly even recognize them as technologies" (Bax, 2003, p. 23). The same author states that CALL is far from achieving complete normalization at the moment, and it will reach this stage when computers (which may differ in terms of their physical manifestation in the future) are used every day by language learners and teachers as part of each lesson in an integral sense just as a pen or a book (Bax, 2003). Therefore, according to the same researcher, it can be expressed that CALL falls currently within the second approach, *Open CALL*.

In line with two different perspectives provided for the history of CALL, it can be stated that listing and categorizing the technologies and programs conceptualized and implemented during the abovementioned phases (or approaches) may become easier as we proceed further through the subjects. With the periods and definitions provided by two different perspectives, effects regarding the utilization of certain CALL technologies may be examined better in terms of their historical impact (i.e. the degree achieved in Bax's 'normalization', or achievements in use of authentic social contexts as stated by Warschauer), and in terms of approval they have received from language learners and teachers.

Types of Programs Among CALL

From the abovementioned information, it can be stated that CALL has quite a history that may be deemed to have a progress timeline parallel to the advancements in modern computers. It is probably for this reason that CALL was implemented with a diverse range of applications which were designed to address different aspects of foreign language learning. As the technology on computers improved, program designers became able to introduce newer software that was richer in terms of teaching materials; also, with the changes within the theories regarding foreign language teaching, CALL programs were made to bear approaches that were more modern and up to date. From the perspective of these changes and improvements, numerous researchers have proposed identifications for different types of CALL programs.[3]

[3] In this section, these classifications will be mentioned with the purpose of establishing grounds for categorizing the technologies currently presented in CALL and corresponding them to a relevant field of CALL software. However, it is regretfully

Davies & Higgins (1985) proposed a series of types for CALL programs with certain software examples. In the paper, it can be seen that Davies & Higgins (1985) have identified CALL programs as *Gap-filling Exercises* ("GapKit" by Camsoft, and "Gapmaster" by Wida), *Multiple-choice Exercises* ("Choicemaster" by Wida), *Free-format Exercises* ("CLEF" by Camsoft, and "Testmaster" by Wida), *Tutorial Programs* ("CLEF" by Camsoft), *Re-ordering Programs* ("Word Sequencing" by ESM and Camsoft, and "Textsalad" by Wida), *Simulations* ("Granville" by Cambridge University Press, the "Montevidisco" interactive videodisc (Schneider & Bennion, 1984), *Text Mazes* ("Mazes" by NCCALL, adapted from Berer & Rinvolucri, 1981), *Adventures* ("French on the Run" by Gabriel Jacobs, Silversoft), Games ("Vocab" by Vida), *Cloze* ("Clozewrite" by Camsoft, and "Clozemaster by Wida), *Text Manipulation* ("Fun With Texts" by Camsoft, and "Storyboard" by Wida), *Exploratory Programs* ("S-Ending", v. Higgins & Johns, 1984:71 ff; cited in Davies & Higgins, 1985), and *Writing – Word Processing programs*.

Apart from Davies & Higgins (1985), Jones & Fortescue (1987) proposed another series of types with a different categorization method. In the list provided by Jones & Fortescue (1987), CALL programs are identified within the categories of *Grammar* ("Matchmaster", "Choicemaster", "Testmaster" by Wida), *Vocabulary* ("Vocab" by Wida), *Reading Skills* ("Storyboard" by Wida), *Authoring Programs* ("The Authoring Suite" by Wida), *Writing – Word-processing*, *Oral Skills* ("London Adventure" by Cambridge University Press), *Listening Skills* ("Getting the Message" interactive videodisc by Glyn Jones, Eurocentres), *Information Source* ("Wordstore" by Wida), and *Discovery & Exploration* ("Loan", v. Higgins & Johns, 1984:73f). From this list, it can be stated that Jones & Fortescue (1987) used an approach which is quite different than Davies & Higgins (1985), by categorizing the programs according to corresponding aspects of language learning rather than focusing on the qualities (e.g. genres) of CALL programs.

On the other hand, Hardisty & Windeatt (1989) provides a classification for CALL programs which is more simplistic in comparison with the types provided by the abovementioned researchers. In their classification, Hardisty & Windeatt (1989) proposed four basic types for identifying CALL programs: *School programs*, which are excercises that include gap-filling, multiple-choice, sequencing, matching, and total text reconstrucion; *Office programs*, which are consisting of word-processing programs, databases, DTP, communications, and spreadsheets; *Library programs* that are made up of concordancers; and *Home programs* that provide adventures and simulations.

From the classifications and lists mentioned in this section, it can be said that there are a sufficient range of typologies regarding the kinds of CALL programs and their intended purposes. Researchers of the time have carried out the process of identifying CALL programs with varying approaches. For example, it is seen that Davies & Higgins (1985) took an approach that mainly focuses on the functional qualities of practices related to CALL, however, Jones & Fortescue's (1987) perspective reflects a distinguishable route for the reason that their typology represents a focus on the aspects of foreign language learning itself. This situation can be considered beneficial for seeking an evaluation regarding the effects of the promising technologies of CALL which will be determined in the following section of this research. Thanks to the abovementioned classifications, it will be possible to seek the effects, attitudes and outcomes regarding the technologies of CALL programs within their intended framework.

Promising Technologies Currently Present in CALL Practices

Thanks to the efforts of research areas in the path of classification, we are now able to take a deeper look into the current technologies within CALL in order to classify their nature and functions

an obligation to state that an openly accessible copy of research which the classifications originate from were unable to be found despite the efforts, therefore the work of Davies G. et al. (2012) will be benefited from for the purpose of providing references for most of the following classifications.

under solidified outlines defined from 1980's to 2000's. Although more contemporary cases beg to be carried out for providing up-to-date classifications that reflect today's technological elements, currently available identification types within this research will be sufficient in order to clarify the functionalities of CALL programs, and to lay ground for discussing their effects on both the foreign language learners and teachers. However, in a world with rapidly changing technology trends and preferences in choosing the right CALL material, it is required to benefit from more recent research materials that encompass the technologies of today.

For the purpose of identifying the technologies regarding foreign language learning, Golonka, Bowles, Frank, Richardson & Freynik (2014) provide an extensive list of CALL technologies accompanied with their effectiveness. As today's technological means of communication are mostly represented by the recent invention of powerful 'mobile internet-accessible devices' (E. M. Golonka et al., 2014) such as smartphone and the advancements made within the concept of World Wide Web (i.e. Web 2.0), it can be stated that following the similar focus adopted throughout their research shall be more effective for the sake of maintaining relevance within our efforts.

In their research, E. M. Golonka et al. (2014) list the technologies reviewed by them under the main categories that are listed as "Schoolhouse- or classroom-based technologies", "Individual study tools", "Network-based social computing", and "Mobile and portable devices". First type within this list, *Schoolhouse- or classroom-based technologies* are comprised of *Course management systems (CMS)*, *Interactive white boards*, *ePortfolios*, technologies which help the classroom in terms of material presentation and student tracking. It can be stated that this type of CALL technology and its elements are an essential part of the foreign language learning environment in today's classes, for they are able to contain almost all of the programs that are designed for enhancing language skills mentioned among the classifications of Davies & Higgins (1985) and Hardisty & Windeatt (1989) Programs such as *gap-filling exercises, simulations, multiple-choice exerises*, etc. are included, and even designed for the said type of technologies in today's classroom-based and distant foreign language learning models, for the reason that the listed technologies (i.e. Interactive white boards) possess a great amount of flexibility, modularity, computational performance and knowledge capacity in a relatively intuitive and non-complex design.

Individual study tools, another category found within the reviews of E. M. Golonka et al. (2014) can be explained as tools which the language learner or teacher can utilize for supplementary purposes during an individual's process of language learning, rather than utilizing them for a whole-class teaching scenario (in which these tools would fail to prove their efficiency). In their work, *Corpus* tools, *Electronic dictionaries*, *Electronic gloss or annotation* tools, *Intelligent tutoring systems*, *Grammar checkers*, *Automatic speech recognition (ASR) and pronunciation programs* are reviewed under this category. These tools would indeed provide significant assistance for a language learner, yet rather than containing partial or complete language curriculums or lessons, or CALL materials which would generally be accompanied as supplementary elements for a learning class, said tools help the students in terms of aspects of language such as reading, listening, writing, etc. For example, electronic dictionaries, which can be assumed to take place in Jones & Fortescue's (1987) classification as a *Vocabulary* program, may help a student who is carrying out writing exercises. Another instance may be that a student who is practicing his/her speaking in foreign language may want to ensure that he/she pronounces a phrase correctly by speaking into a microphone for an ASR (Automatic Speech Recognition) program to identify his words. Thus, ASR programs can be thought to serve the *Oral Skills* aspect of Jones & Fortescue's (1987) classification system. Because of their assistive nature and supplementary roles within learning sessions rather than acting as complete learning materials or material presentation technologies, effects of the technologies available in this second category should be assessed under the classification system of Jones & Fortescue (1987).

E. M. Golonka et al. (2014) further continues to list the technologies that went under their assessment efforts under the category of *Network-based social computing* which contains the technologies such as *virtual worlds or serious games, chatting environments, social networks* and *blogs*, environments without a specific purpose for language teaching, yet providing a great amount of benefits in terms of practicing language skills within real-life contexts and with other people, who may also bear the same

objective in their mind when exercising their foreign language knowledge. For this reason, these software of social universes might be reviewed under Lancien's (1998, cited in Kartal, 2005) learning method of *language exchange between students with the online tandem*, however, it can be thought that these programs should be assessed and reviewed under their own contexts and fields rather than classifications made for CALL technologies, for the reason that most of the programs under the name of *network-based social computing* are not designed specifically for computer assisted foreign language learning, except for a few examples.

Mobile and portable devices are also reviewed in the research of E. M. Golonka et al. (2014) as technologies among computer assisted language learning. These devices (i.e. Tablet PCs, smartphones, etc.) serve the language learners and teachers beyond the conventional aspects of foreign language learning and CALL. At the present time, with their ever-developing computational power, mobile devices contain almost limitless possibilities in terms of delivering language material, establishing social networking environments, authoring, and so on. Despite their lack of direct links between CALL, these devices significantly assist the process, moreover, it can be stated that devices which fall under this category give the language learner autonomy on the choices of CALL material and curriculums.

Despite a considerable time gap between the technologies of today and classification systems proposed in relatively earlier times, it can be stated that conventional approaches in classification of CALL programs are still applicable in most of the newer technologies and programs currently available in the universe of CALL. The classification is only challenging when the focus is given on technologies that have relatively less direct relations with CALL and foreign language learning (i.e. social networks, cellphones). However, it would not be wrong to state that during the assessment and review of CALL technologies, identifying the functionalities and natures of these programs before carrying out any form of assessment would provide a facilitating foundation for adopting an approach which would ensure that the said programs are found successful in fulfilling their intended objectives (i.e. Whether the use of electronic dictionaries with user-content helps the students to conduct more efficient research on unknown words compared to a printed dictionary or not.). In the following section, findings within the reviews of E. M. Golonka et al. (2014) will be further dealt with along numerous other research and assessments regarding the effects of these CALL technologies on the attitudes of foreign language learners and teachers, and their efficiency will be discussed under the intended natures of their classifications, and where inapplicable, under the light of their own distinctive functions which affect the world of CALL.

Effects of New Technologies in CALL on Attitudes of Language Students and Teachers

Until this point throughout this research, the main point of focus has been providing definitions and classifications and constituting a general list of technologies and tools that are currently used in CALL. Now, it can be easily expressed that the amount of background information required to gain a clear insight on the present state of CALL and its future projections will be complete with utilizing this information on evaluating the conducted reviews regarding the abovementioned technologies. The tools which we were introduced thanks to the research of E. M. Golonka et al. (2014) have been examined with several approaches in mind ranging from writing proficiency to student anxiety against real-world contexts in the past 10-15 years. Despite not having enough empirical power to be referenced for generalization of the effects of CALL technologies, these cases can be used for their qualitative findings that may reveal the attitudes of language students and instructors towards CALL technologies. Still, quite a few quantitative results within some research may prove useful for obtaining some tangible information regarding the progresses of students, thus they will also be mentioned as provided. Moreover, in order to be able to analyze these assessments more effectively, the methods and experiment groups will be also provided whenever possible.

In this section of this research, more emphasis will be given on recent technologies such as Tablet PCs, Social Networks and Mobile Devices as they are currently receiving more popularity from both the

students and teachers. It can be thought that this focus will also prove helpful in building a contemporary foundation for the further discussion about CALL technologies, which will be the healthier choice in gaining insight on the future of CALL. Therefore, some of the technologies that have origins of earlier times are discarded within this section for the sake of establishing a framework that is focused on today's arising technologies. Based on their current widespread usage, it can be stated that the said technologies which we will not mention (i.e. Electronic Dictionaries, Corpora) have proven themselves effective in the daily efforts of language learners, if not in the findings of conducted academic studies.

Automatic Speech Recognition

Automatic Speech Recognition (ASR) tools can be defined as the technology that processes sound input provided by a computer user by means of speaking into a microphone, in order to process them into words which can be used in a CALL software for several purposes such as writing, comparison, etc. This technology is currently used in CALL for assessing the reading skills of foreign language learners by the aspects of pausing, stress, intonation and so on- the general qualities analyzed for the assessment of a learner's skill.

A research conducted by Tanner and Landon (2009) regarding the effect of computer-assisted pronunciation readings revealed that the usage of Cued Pronunciation Readings significantly helped learners in terms of adopting a well-controlled speech pattern. In the conducted study, seventy-five ESL (English as a Second Language) students were grouped into treatment and control groups, where their treatment group was exposed to a 11-week-long self-directed computer assisted practices that utilized Cued Pronunciation Readings. Quantitative results revealed that the treatment had enabled the treatment group to greatly reduce the amount of instances where the participants failed to perceive pauses and stresses in speech (Tanner & Landon, 2009, p. 58) and improved the group's ability to utilize word stressing appropriately (Tanner & Landon, 2009, p.59). As a result of the follow-up survey carried out as a part of the research, quantitative findings indicate that 82% of the students within the treatment group felt that they could understand English conversations more easily, as a result of their improved command of English pronunciation, thanks to this treatment. Moreover 79% of the participants in the treatment group have stated that "they could communicate more effectively in situations previously difficult for them, they had more confidence when speaking English in public, and they could speak more fluently and correctly in English" (Tanner & Landon, 2009, p. 60).

In a recent research conducted by Penning de Vries, Cucchiarini, Strik and Hout (2019), it was found that speaking practices via CALL programs with automatic feedback could generally improve the speaking proficiencies of students (Penning de Vries et al., 2019, p.16), however, it was also revealed that the practices had outcome that differentiated among the education backgrounds of the students. In the study, it was revealed that students with higher levels of education benefitted more from the practices within comparison with the students with a relatively lower lever of education background. With or without the employment of *Corrective Feedback* throughout their study, students with lower education background did not improve their speaking proficiencies (Penning de Vries et al., 2019, p.16).

On the contrary, in the research of Tanner & Landon (2009), it can also be seen that students have also experienced certain difficulties during their interaction with Cued Pronunciation Readings. Students provided some negative comments that were mainly focused on the difficulty of the perception tasks, and on the relatively difficult objective of having to imitate native English speakers. One student's comment was recorded as "Most difficult was to understand where the stresses in the sentences were" and another student stated, "It's difficult sometimes when the native speaker speak very fast and I couldn't understand the pronunciation of each word". In general, the students had felt significant improvement thanks to the treatment that employed automatic speech recognition technology.

Blog

Blogs can be thought as a means of communication with the possibility of including wide range of mediums such as pictures, audio and video files and texts, etc. Blog writers are able to write just about anything within the liberty of their creativity. While writers can express their thoughts, blog readers can get to know different and original stories within subjects that they may know for the first time. Thus, it can be stated that blogs prove useful as a tool to express thoughts with enriched writing material, and to read about stories that may improve the knowledge of a reader.

Under these beneficial aspects, numerous cases have been carried out for the purpose of obtaining insight of students' and teachers' perceptions and attitudes towards blogs. In a research conducted by Sun (2009), voice blogs were used as a platform for a study of language learners' speaking skills. 46 college students were introduced with a voice-blogging platform with the objective of enabling them to practice their speaking skills over the course of 18 weeks. The results of the survey taken by the participants revealed that the majority of the participants had agreed that the technology of voice-blogging is useful for the enhancement of oral-communication skills. Besides, it was observed that students perceived blogging also as a means of self-presentation, information exchange, and social networking. This finding suggested that blogs provide a dynamic platform that encourages extensive practice and motivation to learn (Sun, 2009). In another qualitative study carried out over 16 students by Armstrong and Retterer (2008), it was seen that all of the students agreed that they felt more comfortable while writing in Spanish. Moreover, 69% of the participants stated that "they wrote more because they were writing online" (Armstrong & Retterer, 2008). In addition to these efforts, another research carried out by Ducate and Lomicka (2008) which involved two groups, consisting of a reader group (n=29) and a writer group (n=21) respectively reading native speaker blogs, and maintaining their own blogs. In the research evaluations, it was found that over half of the participants in the reader group stated that they enjoyed reading the blog, and a majority of these students expressed that they felt blog reading improved their reading skills and vocabulary and their knowledge of target popular culture (Ducate & Lomicka, 2008). Moreover, the reader group of the study stated that they had a positive experience of writing blogs, which they see as of high academic value that they would like to use in future FL classes (Ducate & Lomicka, 2008).

Chat

The essential purpose of chatting programs is connecting computer users together in a synchronous communication platform in which the users may send texts and other visual/aural material for others to receive and respond to. In some of the more advanced chatting programs, users may interact via live video feeds of their cameras and may even take control of their working environments remotely to provide assistance in a certain problem that another user might have encountered.

This vital opportunity of remote and instant social interaction among learners and instructors within a CALL environment has surely attracted the attention of researchers that have aimed to study their effects within FL classes. In a study carried out over 30 subjects by Lee (2008) on the subject of expert-to-novice interaction in a computer mediated communication (CMC) environment, a working environment was set up in such a way that one advanced L2 learner could be able to help another L2 learner who has relatively less knowledge and command of the foreign language. The results showed that experts assisted their partners linguistically and cognitively throughout their mutual feedbacks; moreover, in many instances, the corrections made by the L2 experts were displayed visually within the chat screen (Lee, 2008), meaning that novice students were able to "see" the correction in a facilitated way of providing the correct phrase instantly.

In another research conducted on 90 students by Satar and Ozdener (2008) which aimed to compare overall speaking proficiency and anxiety among text and voice chats, the results revealed that speaking proficiencies of text and voice chat groups were significantly higher than the control group,

which had no access of any CMC environment (Satar & Ozdener, 2008). Furthermore, results of the pretest and posttest scores regarding the foreign language anxiety of experiment groups indicated that the anxiety levels of the students decreased after their use of chatting environments, while the control group showed no significant difference in terms of their foreign language anxiety levels (Satar & Ozdener, 2008). On the other hand, results of a research done with 34 ESL students by Christopher Blake (2009) concerning the potential of Internet chats for improving L2 oral fluency reveals that Internet chats, when compared with a conventional Face-to-Face chatting environment and an environment where no interaction is made (e.g. Control group), bore significantly higher oral L2 fluency gains among the participants.

An example for an up-to-date assessment of the technology can be given as the study of Khoshsima, Saed and Arbabi (2018) assessed the attitudes of online teachers towards technology usage in foreign language education. In the study carried out with 280 learners and 15 tutors, it was found that use of chatting/instant messaging platforms (Communication software *Telegram* was used in the study) received a positive reaction from the tutors as they thought it enabled online collaboration among teachers that are from different countries, and with thanks to various tools embedded to the programs, they could conduct tutoring with visual and aural teaching material, with voice sharing stated as the most efficient by one participant (Khoshsima, Saed, Arbabi, 2018, pp. 144-146).

Forum & Messaging Board

Forums, discussion and messaging boards possess a similar purpose with chatting platforms in terms of communication, with small differences. As distinct from chats, forums are asynchronous platforms of communication, where the users have the liberty of constructing their messages in that the responses are not expected to be sent within such a short time as it is expected in a standard chatting environment. This distinguishing quality of forums may be considered useful for the reason that more effort can be shown among students/instructors when providing a well-constructed & detailed information and assistance for their peers.

Ware and O'Dowd (2008) approached the analysis of perceptions and usage of this technology in their research under the framework of *Telecollaboration*, where a two-phase study was carried out over a total of 98 students. In the research, self-report results indicated that the students held positive opinions regarding the use of online information exchange about providing or receiving assistance and knowledge on the subject of language form (Ware & O'Dowd, 2008).[1]

Another research carried out by Alzahrani (2017) can be considered as a contemporary research that also supports the use of this technology within foreign language teaching. Under the light of the findings of tests between experiment and control groups, it was revealed that use of *Online Discussion Forums (ODFs)* as a supplement to a traditional language teaching environment may lead to higher overall student achievement (Alzahrani, 2017, p. 170).

iPod

The use of mobile and portable devices within the subject of foreign language learning may be considered a recent development in pedagogy, therefore the use of such devices may require further research in terms of their effects on FL learning, in order to reach an idea on whether they prove themselves effective in language acquisition in comparison to a conventional foreign language class.

Abdous, Camarena and Facer (2009) investigated the use of academic podcasting by means of iPods and MP3 players in order to gain an opinion on whether such use would reflect any positive effects on the learning habits of students and on acquisition of language skills. The research findings indicated that students found academic podcasting through the use of iPods very facilitating in regard to learning course material, completing assignments, and obtaining feedback (Abdous, Camarena & Facer, 2009).

Moreover, the results also reveal that the students found podcasting via means of iPods and other mobile communication devices helpful in their efforts of improving oral and aural skills in their foreign language.

While not being related exclusively to the use of iPods, another research carried out by Tabatabaee and Rezvani (2019) also focused on the effects of podcast usage on EFL learners' vocabulary and idiom learning processes. According to the pre-test/post-test results of the study, the use of podcasts was found to be improving the overall achievement of the students in the experiment group. Moreover, the participants also indicated that they held a positive attitude towards such use of podcasts in EFL classes (Tabatabaee & Rezvani, 2019, pp. 18-22).

Interactive Whiteboard

The interactive white board can be considered perhaps one of the most significant improvements made for the conventional classroom. By bearing the capability of including almost infinite amount of visual and aural content whether in online or offline form, and combining the ability to present an enhanced, interactive experience with technical peripherals such as the touchscreen, the IWB introduces many possibilities that may further improve the FL pedagogy.

A research conducted by Orr (2008), indicates that the students who were involved in a class where the IWB was used generally returned positive feedback regarding the use of the technology. According to the research results, the positive opinions of students were mainly focused on the appreciation of a new technology (Orr, 2008, p.5), and faster paced lessons, which may collectively contribute to the feedbacks regarding an improved understanding (Orr, 2008, p.6).

Another, and a more recent effort in assessing the effects of Interactive Whiteboards was shown with the research of Sengul and Turel (2019), where a 14-week study with 19 Nigerian Turkish Language Learners was carried out. Within the results of survey and interview analyses, it was found that the use of IWBs had a strongly positive effect on the attitudes of students in terms of usefulness of the technology and contribution made on their learning by means of IWB usage (Sengul & Turel, 2019, pp. 108-110). [2]

PDA/Tablet PC

In a research conducted by Tsung-Yu Liu (2009), it is found that within an environment of *"Handheld English Language Learning Organization (HELLO)"* (Liu, 2009), where students were provided a PDA device, the students within the experiment group obtained higher average assessment scores, and it was also revealed within the interviews that use of such a learning environment that employs handheld devices reflected an encouraging effect on the students' creativity (Liu, 2009).

In addition, a study conducted by Hazaea and Alzubi (2016), more supporting evidence was found regarding the use of online devices for various tasks within the reading practices of EFL learners. In the research, the results of the study which was conducted in order to find the effects of varying mobile applications such as *WhatsApp* (a communication and messaging application), online/offline dictionaries, online resources etc. showed that pre-test and post-test results of students indicated a sharp improvement of the reading proficiencies of the students who participated in the study (Hazaea & Alzubi, 2016, pp. 15-17).

Barriers of Using CALL Technologies in the Classroom

In addition to the positive aspects of CALL, it is necessary to mention the negative senses or weaknesses associated with its use. Basically, the weaknesses of CALL technology can be grouped under 4 main headings. First one is financial barriers, second one is time-consuming, the other one is unsuitable types and issues and the last one is teachers' roles.

Financial barriers are the primary exceptional issues (Gips et al., 2004; Han, 2009; Lai & Kritsonis, 2006; Warschauer & Meskill, 2000). CALL requires computers and software programs as well as other equipments such as ipod, white board etc… all of which are expensive (Gunduz, 2005). As a *time-consuming*, PCs cannot deal with startling circumstances because of mechanical obstructions. That's why learners can have difficulty in adapting new technology and programs. Educators and learners need to be trained on how to use PCs (Han, 2009, Wang, 2012) since the lack of teacher training, lack of knowledge and practice (Baylor & Ritchie, 2002; Romano, 2003), the students' difficulty in adjusting technology in the classroom (AbuSeileek & Abu Sa'aleek, 2012) can result in time-consuming. The need of internet connection for using some programs and also computers can be also seen as time-consuming if there is a problem in connection to Internet (Coghlan, 2004). Also, accessing information, surfing the net or using different parts of programs can be time-consuming in the classroom environment. Another negative factor of CALL is *unsuitable types of issues or topics* in terms of using technology in the classroom. Since Internet presents an opportunity to acces to all types of issues, some of them can be seen as unsuitable and result in different problems (Singhal, 1997). Considering *teacher's role* in the classroom, CALL and its properties can result in excessive individualization among learners. Thus, they can corrupt the teachers' role from the point of students and can lead to the isolation of the learning process from its psycho – social context (Dina & Cironei, 2013). Besides, controlling learners in each step can prevent them from developing creative activities and restrict their thinking potential (Shyamlee & Phil, 2012; Tafazoli & Golshan, 2014).

Results and Discussion

Throughout the first sections of this research, it was initially aimed to draw an outline for the history of CALL. The first efforts in conceptualization of CALL has been examined, then the timeline of CALL is investigated by benefitting from the phases provided by Warschauer (1996, 2000) and Healey (Warschauer & Healey, 1998), and by Bax (2003) as a critical reassessment of the former proposals regarding the timeline of achievements and progresses within CALL. Then, under the light of the characteristics, motives and objectives of these phases, it was attempted to obtain a classification system proposed for the types of programs which would correspond appropriately with the qualities of mentioned CALL phases. These program types were then used to identify CALL technologies and categorize them according to the issues that they address within EFL and CALL, where the list of programs provided by E. M. Golonka et al. (2014) was used as a guide. The promising, more recent technologies which arose in the last 10-15 years were selected out from this list for a more detailed assessment of their effects on the attitudes of EFL learners and teachers, as well as their quantitative findings. Programs within this role were designed to provide a skill practice, but without possessing any drill-like qualities, which the said programs would encompass courseware for paced reading, text reconstruction, etc. (Healey & Johnson, 1995a)

In addition to gaining insight about historical timeline of CALL, the efforts made in line with integrating technology and computerization into foreign language teaching were better understood with the examination of effects of current implementations of CALL technologies, as a result of this research. While CALL is deemed to be on its path for normalization, as defined by Bax (2003), where at some time in future the technologies which the FL classrooms currently benefit from will be embedded into the classes to the point where they shall become unrecognizable as distinct technologies, it is seen from the examined studies that the technologies which people use on a daily basis have gained positive reactions from both learners and teachers. These technologies, such as forums (e.g. messaging boards), iPods (e.g. devices capable of MP3 playback or online streaming), and PDAs (e.g. Tablet PCs), have gained immense popularity among the general population in the last 10-15 years. Thanks to the improvements in Internet accessibility and technological advancements in online material presentation, the technologies which we have examined can be considered to be capable of establishing a foundation for online, widespread interactive language teaching materials that are adaptable to contemporary real world contexts

besides presenting conventional visual and aural FL materials. Moreover, introduction of more sophisticated tools such as the Interactive Whiteboard brings the potential to change the nature of a traditional classroom. In addition, it can be seen that the employment of such opportunities and the idea of enhancing the experience of language learning via computerized and interactive teaching materials is generally considered as a useful and effective means of language learning and practicing, according to the findings of studies that we have examined within the last section of our literature review (Sengul & Turel, 2019).

Despite the current technical and pedagogical limitations found in the implementation of CALL programs, it can be stated that teachers and students are almost always eager to try new opportunities for the purpose of rendering the experience of foreign language learning more interactive, and nested with real-world contexts (Khoshsima, Saed, Arbabi, 2018, p.145; Sengul & Turel, 2019, p. 112). Yet, during this research it was found that one main limitation of research could be considered as the lack of power for reaching a generalized conclusion, caused by the small sample size in the studies on the effects of CALL programs. Although that the technology is rapidly advancing, and the attention towards CALL is gradually increasing, more research is required to be carried out, especially towards newer CALL technologies, in order to determine the ways and possibilities which can help to adapt these applications to an appropriate pedagogy model. In the current situation, it can be stated that attempts in using these technologies still haven't surpassed the point of being experiments for including technologies of the daily life into the classroom while still preserving their social features.

In summary, it can be stated that a great amount of knowledge about the promising developments among CALL was obtained as a result of this research. For the sake of determining the scope, the main focus was given on the more recent technologies, rather than the ones which originated from relatively earlier times and still used today to some extent. From this research, it was found that achieving full integration is possible by placing more emphasis on the uses of these technologies in that these technologies have already become vital tools in sharing information of any kind and medium. By taking a look at the wide usage of social communication tools such as chatting platforms, discussion forums and handheld devices, and by examining their capabilities in carrying teaching materials that are visually and aurally enriched, it can be stated that these tools have one great distinguishing feature: These tools differ greatly from other CALL technologies for they are mainly seen as general-purpose means of communication rather than programs/devices designed specifically for foreign language education. Having already established their places within the daily lives of people (Students and teachers, to be exact), these technologies may be easily adapted to CALL within the framework of integration/normalization, with proper facilitations that would preserve their familiarity among its current users. However, it must be iterated that adequate amount of cases of both qualitative and quantitative kind must be carried out regarding these recent tools, in order to hold a generalized opinion of the effectiveness of these technologies, which might result in a faster and healthier transition to a CALL practice model that is more suitable for integration and full normalization.

Notes

1. Despite that the students showed appreciation of the utilization of such a means of telecollaboration, it has been observed within the same study that students failed to integrate the use of the technology unless provided explicit directions regarding the issue by the language instructor. This pedagogical implication is addressed in the paper with the suggestion that teachers may have to design an effective task model for the student to integrate their use of online communication (Ware & O'Dowd, 2008, p. 54).

2. An assessment on the achievement levels of students was also conducted with proficiency tests as pre-tests and post-tests, which resulted in an increase in students' overall achievement scores. However, as it is stated in the research, no significant evidence was found to determine whether this improvement was a

direct result of IWB use in the classroom. Therefore, this finding was not included within the review of literature of this research.

Conflict of Interest

Author has no conflict of interest to report.

References

Abdous, M. H., Camarena, M. M., & Facer, B. R. (2009). MALL technology: Use of academic podcasting in the foreign language classroom. *ReCALL, 21(1),* 76-95.

AbuSeileek, A.F., & Abu Sa'aleek, A.O. (2012). Computer assisted language learning: Merits and demerits. Language in India, 12 (4), 23-36.

Alzahrani, M. G. (2017). The Effect of Using Online Discussion Forums on Students' Learning. *Turkish Online Journal of Educational Technology-Tojet, 16(1),* 164-176.

Armstrong, K., & Retterer, O. (2008). Blogging as L2 writing: A case study. *AACE Journal, 16(3),* 233-251.

Bax, S. (2003). "CALL – past, present and future", *System 31*, 1:13-28.

Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? Computers and Education, 39, 395-414.

Berer, M. & Rinvolucri, M. (1981). *MAZES: a problem-solving reader*, London: Heinemann.

Blake, C. (2009). Potential of text-based internet chats for improving oral fluency in a second language. *The Modern Language Journal, 93(2),* 227-240.

Brierley B. & Kemble I. (1991), *Computers as a tool in language teaching*, New York: Ellis Horwood.

Bush M. & Terry R. (Eds.). (1997). *Technology-enhanced language learning*, Lincolnwood, Illinois: National Textbook Company.

Coghlan, B. F. (2004). Addressing the barriers to technology interaction: A case study of a rural school. Unpublished Doctoral Dissertation, Department of Curriculum and Instruction, Mississippi State University, Mississippi.

Comas-Quinn, Anna, Mardomingo, Raquel & Valentine, Chris (2009). Mobile blogs in language learning: making the most of informal and situated learning opportunities. *ReCALL, 21(1)* pp. 96-112.

Cord-Maunoury, B. (2000). Analyse du site Polar FLE. *ALSIC, Vol.3, Numéro 2, Décembre,* (239-254).

Davies G. & Steel D. (1981). First steps in Computer-Assisted Language Learning at Ealing College of Higher Education. *Paper presented at the CAL 81 Symposium, University of Leeds*, 8-10 April 1981. Published as part of an article, Micros in modern languages, *Educational Computing, October 1982:* 30-31.

Davies G., Walker R., Rendall H. & Hewer S. (2012). Introduction to Computer Assisted Language Learning (CALL). Module 1.4 in Davies G. (ed.) Information and Communications Technology for Language Teachers (ICT4LT), Slough, Thames Valley University [Online]. Retrieved from http://www.ict4lt.org/en/en_mod1-4.htm [Accessed 07 March 2019].

Davies, G. & Higgins, J., (1985). *Using computers in language learning: a teacher's guide.* London: CILT.

Dina, A-T., & Ciornei, S-I. (2013). The advantages and disadvantages of computer assisted language learning and teaching for foreign languages. Procedia - Social and Behavioral Sciences, 76, 248 – 252.

Ducate 1, L. C., & Lomicka, L. L. (2008). Adventures in the blogosphere: From blog readers to blog writers. *Computer Assisted Language Learning, 21(1),* 9-28.

Gips, A., Di Mattia, P., & Gips, J. (2004). The effect of assistive technology on educational costs: Two case studies. In K. Miesenberger, J. Klaus, W. Zagler, & D. Burger (Eds.), Computers Helping People with Special Needs (pp. 20-213). Springer.

Golonka, E. M., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. (2014). Technologies for foreign language learning: a review of technology types and their effectiveness. *Computer assisted language learning, 27(1),* 70-105. DOI: 10.1080/09588221.2012.700315.

Gunduz, N. (2005). Computer Assisted Language Learning (CALL). Journal of Language and Linguistic Studies, 1(2), 193-214. Retrieved online from http://www.jlls.org/index.php/jlls/article/view/16/18.

Han, W. (2009). Benefits and barriers of computer assisted language learning and teaching. US-China Foreign Language, 6 (9), 40-43.

Hardisty, D. & Windeatt, S., (1989). *CALL*. Oxford: Oxford University Press.

Hazaea, A. N., & Alzubi, A. A. (2016). The Effectiveness of Using Mobile on EFL Learners' Reading Practices in Najran University. *English language teaching, 9(5),* 8-21.

Healey D. & Johnson N. (Eds.) (1995b). *1995 TESOL CALL Interest Section software list,* Alexandria, VA: TESOL Publications.

Healey, D. & Johnson, N. (1995a). *A brief introduction to CALL.* In Healey D. & Johnson N. (eds.). *1995 TESOL CALL Interest Section software list, Alexandria, VA:* TESOL Publications: iii-vii.

Higgins, J. J. & Johns, T., (1984). *Computers in language learning.* London: Collins.

Jones, C. & Fortescue, S., (1987). *Using computers in the language classroom.* Harlow: Longman.

Kartal, E. (2005). The Internet and Autonomous Language Learning: A Typology of Suggested Aids. *Online Submission, 4(4),* 1-7.

Kenning M-M. & Kenning M. J. (1990). *Computers and language learning: current theory and practice.* New York: Ellis Horwood.

Khoshsima, H., Saed, A., & Arbabi, M. A. (2018). Online teachers' attitudes toward using technology in teaching English as a foreign language. *Journal of Applied Linguistics and Language Research, 5(2),* 134-148.

Lai, C. C., & Kritsonis, W. A. (2006). The advantages and disadvantages of computer technology in second language acquisition. Doctoral Forum. 3(1), 1-6.

Lancien, T. (1998). Réseau et Francais Langue Etrangère" in Conférence Virtuelle sur les Applications des TIC dans l'Enseignement du Francais Langue Etrangère,Agence intergouvernementale de la Francophonie, du 7 au 18 Décembre 1998.

Lee, L. (2008). Focus-on-form through collaborative scaffolding in expert-to-novice online interaction. *Language Learning & Technology, 12(3),* 53-72.

Levy M. (1997). *CALL: context and conceptualization.* Oxford: Oxford University Press.

Liu, T. Y. (2009). A context-aware ubiquitous learning environment for language listening and speaking. *Journal of Computer Assisted Learning, 25(6),* 515-527.

Orr, M. (2008). Learner perceptions of interactive whiteboards in EFL classrooms. *Call-EJ Online, 9(2).*

Penning de Vries, B. W., Cucchiarini, C., Strik, H., & van Hout, R. (2019). Spoken grammar practice in CALL: The effect of corrective feedback and education level in adult L2 learning. *Language Teaching Research,* 1362168818819027.

Pusack J. & Otto S. (1990). Applying instructional technologies. *Foreign Language Annals 23, 5*: 409-417.

Robert, Ed, Taylor. (1980). The Computer in the School: Tutor, Tool, Tutee. *American Journal of Physics - AMER J PHYS. 50.* 10.1119/1.12996. (Cited in: Warschauer, M. (1996). Computer-assisted language learning: An introduction. In S. Fotos (Ed.), Multimedia language teaching (pp. 3-20). Tokyo: Logos International.).

Romano, M. T. (2003). Empowering teachers with technology: Making it happen. Scarecrow Press, Oxford.

Ruschoff, B. (1993). Language learning and information technology: state of the art. CALICO Journal 10, 3: 5-17.

Satar, H. M., & Özdener, N. (2008). The effects of synchronous CMC on speaking proficiency and anxiety: Text versus voice chat. *The Modern Language Journal, 92(4),* 595-613.

Schneider, E.W & Bennion, J.L., (1984). *Veni, vidi, vici, via videodisc: a simulator for instructional courseware.* In Wyatt, D.H. (ed.). *Computer assisted language instruction.* Oxford: Pergamon.

Sengul, M., & Turel, Y. K. (2019). Teaching turkish as a foreign language with interactive whiteboards: a case study of multilingual learners. *Technology, Knowledge and Learning, 24(1),* 101-115.

Shyamlee, S.D. & Phil, M. (2012). Use of technology in English language teaching and learning: An analysis. Proceedings of the International Conference on Language, Medias and Culture, Singapore, 150-156.

Singhal, M. (1997). The internet and foreign language education: Benefits and challenges. The Internet TESL Journal, III (6). Retrieved online from http://iteslj.org/Articles/Singhal-Internet.html

Sun, Y. C. (2009). Voice blog: An exploratory study of language learning. *Language Learning & Technology, 13(2),* 88-103.

Tabatabaee, G. A., & Rezvani, E. (2019). Effects of using english podcasts on idioms and vocabulary learning of iranian efl learners. *Indonesian Journal of Learning and Instruction,* 2(01).

Tafazoli,D. & Golshan, N. (2014). Review of Computer-Assisted Language Learning: History, Merits & Barriers. *International Journal of Language and Linguistics.* Special Issue: Teaching English as a Foreign/Second Language. Vol. 2, No. 5-1, pp. 32-38.

Tanner, M., & Landon, M. (2009). The effects of computer-assisted pronunciation readings on ESL learners' use of pausing, stress, intonation, and overall comprehensibility. *Language Learning & Technology, 13(3),* 51-65.

Taylor M.B. & Perez L.M. (1989). *Something to do on a Monday.* La Jolla, CA: Athelstan.

Taylor R. (1980). *The computer in the school: tutor, tool, tutee.* New York: Teachers College Press.

Underwood, J. (1984), *Linguistics, computers and the language teacher: a communicative approach.* Rowley, MA: Newbury House.

Wang, S. (2012). The exploration of the advantages and disadvantages of network English teaching. Proceedings of the International Conference on Education Technology and Management Engineering, 154-158.

Ware, P., & O'Dowd, R. (2008). Peer feedback on language form in telecollaboration. *Language Learning & Technology, 12(1),* 43-63.

Warschauer M. & Healey D. (1998). Computers and language learning: an overview. *Language Teaching 31:* 57-71.

Warschauer, M. (1996). Computer-assisted language learning: An introduction. In S. Fotos (Ed.), *Multimedia language teaching* (pp. 3-20). Tokyo: Logos International.

Warschauer, M., & Meskill, C. (2000). Technology and Second Language Teaching and Learning. In J. Rosenthal (Ed), Handbook of Undergraduate Second Language Education, Mahwah, NJ: Lawrence Erlbaum.

Warschauer, M., (2000). CALL for the 21st Century. *IATEFL and ESADE Conference*, 2 July 2000, Barcelona, Spain. Retrieved from http://www.gse.uci.edu/markw/cyberspace.html