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Technology and Language Learning: from CALL to MALL

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Introduction

This thesis focuses on the application of technology in the process of language acquisition. Today technology is used in many areas of everyday life, including education. Thus, both language instructors and learners should know how to use it in terms of benefits. As will be described in my thesis, technology has brought various benefits to the field of language acquisition. The main topics of this work are Computer-Assisted Language Learning (CALL) and Mobile-Assisted Language Learning (MALL). Computer technology and mobile devices (i.e. laptops, tablets and smartphones) are two of the areas of technology linked to education. The terms CALL and MALL describe the use of the related technology in language acquisition. Computers started to be adopted in educational settings in the mid 20th century, whereas the use of mobile devices dates back to the early 21st century. These two areas of technology are bound to each other as mobile devices would not have existed without the invention of the computer. Mobile technology has greatly increased its features and it often replaces the use of desktop computers.

Studies of CALL and MALL are often limited to theory or report surveys, and do not explain how to use technology for learning. Indeed one of the main challenges of this thesis was to find real tools and resources to show how computers and mobile technology can be used in the language acquisition process. The thesis offers a theoretical background, including an overview of learning theories and approaches in language teaching, but it also provides practical information about how to make use of computer and mobile technology for educational purposes. Thus, this work can also be seen as a manual with examples of real tools and resources which can be used by both instructors and learners.

Before analysing the thesis content, it is necessary to specify that in this thesis the terms language teaching, language learning and language acquisition refer to foreign/second language acquisition. Although some scholars argue that foreign language and second

language indicate different concepts, this work deals with the acquisition of a language different from the native one in any context.

The thesis is divided into four chapters. Chapter 1 provides the background of technology and language learning and is made up of two parts. The first part of the chapter focuses on educational technology and its developments over the years. Educational technology is a broad field which includes how technology is designed and adopted for educational purposes. The second part is devoted to language learning theories, methods and approaches in language teaching. Furthermore, the second part also has a reflection on the use of technology in compliance with language learning theories. Chapter 1 makes an important assumption: the use of technology in education is influenced by its developments as well as the principles of mainstream language learning theories and teaching approaches.

Chapter 2 deals with CALL. In Chapter 1 it was seen that various tools can be used for educational purposes, especially in relation to language acquisition, but the computer stands out as the most effective one. The term CALL refers to the use of computer technology to support language acquisition and it is an area of educational technology. Since the mid 20th century, the computer has been applied in language learning in many ways, especially after the introduction of multimedia technology and the internet. Indeed, in this chapter it is possible to find many tools and resources for improving each skill and area of language learning. Computer technology and the foundation of CALL have allowed for the development of the next phase: mobile devices in language acquisition.

Chapter 3 is devoted to MALL, which is a recent area of the educational field based on Mobile-Learning (shortened as M-Learning) and CALL. MALL indicates the use of mobile devices to support language acquisition. Research in this area is not very wide, but it is constantly increasing as mobile devices have improved their features and offer almost the same experiences as computer technology. Moreover, mobile devices have

an interesting feature, which can be summarized in one word: portability. That means that education has become a process without the restriction of time or space; the only requirement is internet access. With reference to language acquisition, there are details about the use of the general features of mobile devices as well as of specific programs called apps.

Chapter 4 contains a survey which aims to investigate MALL from a users' perspective. As MALL is becoming a common phenomenon among language learners, it is interesting to know the real opinion of mobile device users. In the previous chapters I rely on literature and papers; in this chapter I collected real data about MALL and language learners. Moreover, it is possible to understand whether mobile devices can be considered as a common tool of educational technology as computers.

Chapter 1
Technology and Language Learning

In recent years technology has spread widely through many areas of everyday life. It has also affected the area of education and brought new opportunities for teachers and learners. Educational technology is a broad field concerning the use of technology in educational settings, such as schools or universities, and for independent study at home. Educational technology covers various areas: implementing technology in education; developing, designing and managing tools and materials for learning; the process of learning with technology (Reiser 2001: 53; Aziz 2010; Kaware and Sain 2015: 25). Educational Technology can be applied to different subjects, but language education has perhaps been the most strongly affected (Li 2017: 6-7). In this Chapter I will explain how technology has evolved and has been applied to education, with a great emphasis on language learning. I will then present in depth the most relevant theories of language learning linked to the application of technology, as technology cannot be applied without theory (Li 2017: 3).

1.1 A historical overview of technology in education: focus on language education

Before analysing the history of technology in education, it is necessary to provide a brief explanation of terminology. Educational Technology, Technology in Education and, less often, Instructional Technology indicate the same field (Reiser and Ely 1997: 64). In the 1950s the term audiovisual instruction was coined to indicate the use of sound and sight stimuli to support the learning process (Podolskiy 2012: 383). The term instructional media indicates all the means to deliver education to learners: that means teachers, books, computers, various devices and audiovisual aids (Reiser 2001:54).

The early 20th century

The first use of technology in education dates back to the 1900-1910s, thanks to interest in using audiovisual aids such as educational films (Reiser 2013: 16). During the 20th century this field found a breeding ground in North America. Indeed many school museums and bureaus of visual education (whose modern-day equivalent is media center) were established in the USA to provide schools with visual instruction materials i.e. portable museums exhibits, stereographs, slides, films, printed materials. Projectors were adopted in schools as learning tools, combined with a great variety of instructional films (Reiser 2001: 55; Reiser 2013:16). The increasing use of visual media as a learning tool led to the rise of the visual education movement in the early 1920s.

In the 1920s and 1930s innovations in the area of radio broadcasting, sound and motion pictures made the radio a new tool for delivering education and transformed the visual education movement in the audiovisual education movement. During World War II audiovisual materials were used in the military services and in industry. They were useful and effective not only for propaganda, but also for military training and for preparing citizens to work in industry. Thanks to this success, in the post-war era interest in audiovisual instruction grew along with its implementation in schools. The audiovisual movement had a great impact on language education. Texts, drawings, photos, audio and video became common tools for language learning and teaching. In light of the audiovisual movement and new technologies, written texts started to be accompanied with videos, pictures and audios (Salaberry 2001: 40-41). In the 1920s and 1930s the most relevant language learning theories were the traditional grammar translation method and the direct method. The grammar translation method focused on the ability of understanding the target language and the study of grammar, whereas speaking and communication were set aside. As the grammar translation method was deemed by many to be highly ineffective, it was replaced by a new, opposite approach (Ariza 2011: 64). The direct method was considered a modern approach to language learning as it focused on the ability to speak and advocated oral practice, although it was

limited to teacher-answer and student-response. The use of the source language is avoided and verbal inputs are supported by using objects and visuals. Thus, audiovisual aids mirror the main focus of the Direct Method (Ariza 2011: 64; Otto 2017: 11).

The Post-world era: new devices, new opportunities

During the 1950s television started to be used as an instructional tool, as well as radio (Salaberry 2001: 41). Moreover, many television channels for education were instituted. In the 1960s the low quality of these channels decreased the interest in instructional television, even though cultural and information programs were still produced (Reiser 2001: 55-58). Television also influenced language education, since audiovisual aids played an important role. In the same period, the audio-lingual Method rose and it emphasized the ability to speak and understand (especially through repetition), and therefore films and audiotapes suited for the development of these abilities (Otto 2017: 11). Furthermore, in schools and universities the first language laboratories were built. Language labs are rooms equipped with electronic devices which allow learners to access authentic materials for language learning as well as practising listening and speaking (Peel 2017). Language labs and their equipment became a common tool for language teaching and learning, especially in the 1960s and 1970s (Salaberry 2001: 43).

The introduction of computers was a turning point in the field of education. During the 1950s mainframe computers began to appear in universities and in 1952 the first commercial and fully-electronic mainframe computer was built by IBM (Otto 2017: 12; "IBM", n.d.[1]). Furthermore, computer-based projects for educational purposes started to be implemented. The University of Illinois implemented a computer-based project, in which students could listen to recorded lectures and interact with various resources . Stanford University professors P. Suppes and R.C. Atkinson developed an experiment for teaching math and reading to elementary school children (Kaware and Sain 2015: 26). At the same time, computers were applied to language education and linguistic

[1] https://www.ibm.com/ibm/history/exhibits/mainframe/mainframe_FT1.html
https://www.ibm.com/ibm/history/exhibits/mainframe/mainframe_intro.html

programs for text analysis such as digital corpora started to be available. In 1961 the Brown Corpus of Standard American English was developed and represented the first electronic corpus (Fotos and Browne 2004: 4). The Brown Corpus contained more than one million words from a wide range of genres such as politics or literature (Francis and Kucera 1964). Today there are many corpora available online and for free, such as the Corpus of Contemporary American English (COCA) and British National Corpus (BNC).

Between the 1960s and the 1970s computers were more elaborate than previous models: they supported multiple terminals such as keyboards and floppy disks (Crompton 2013: 7; Otto 2017: 12). Computer-based learning projects continued to be implemented, for instance in New Jersey Institute of Technology and University of Guelph in Canada. In Europe interest in educational technology also rose, for example the UK Council for Educational Technology supported various projects regarding computer-aided learning (Kaware and Sain 2015: 26). In the late 1960s, Computer-Assisted Language Learning (CALL) was initiated through some high-profile projects: Programmed Logic for Automatic Teaching Operations (PLATO) by University of Illinois at Urbana-Champaign, the Tutorial Russian Project by Stanford University and the Time-shared, Interactive, Computer-Controlled Information Television (TICCIT) by the University of Texas and the Brigham Young University (Otto 2017: 12). CALL will be examined in detail in Chapter 2.

The computer takeover

In the 1980s interest in computers for educational purposes spread widely as micro-computers were launched on the market and computer-technology became available to a larger public. These computers were small, easy to use and able to store as much data as larger computers. In the late 1980s, the number of computers available in schools for students greatly increased not only in the USA, but also in Europe and other industrialized countries (Nazimuddin 2015: 185). However, CALL was still not very

popular and audiotapes and videotapes kept their status as the main technological tools for language learning and teaching. Nonetheless, authoring software appeared and enabled teachers to create their own language programs. Moreover gaming software started to be applied to language learning. There was also interest in finding new solutions to test learners' level and outcomes, and therefore testing software was developed. Computer Assisted Language Testing (CALT) was successful for various reasons: shorter testing times, less expensive, more objective and safe (Otto 2017: 14-15). Over the years, CALL has become a broad field with different applications. An overview of CALL typology is provided in Chapter 2 and it includes a section for CALT.

In the last decade of the 20th century a new generation of computers became available and brought new opportunities. Computers were equipped with new devices for input/output and multimedia such as microphones and CD/DVD players. Indeed, CDs and DVDs slowly replaced audiotapes and videotapes. Moreover, the development of the Web allowed for the diffusion of the internet outside institutional and governmental settings. Through computers, the internet offered various opportunities: access to authentic materials, ease communication with people regardless of time and space, researching and acquiring information. Therefore, there was an increase in the materials and formats delivered by computer (Teeler and Gray 2000: 2-3, 5; Bonaiuti 2006: 14-15). In relation to language learning, authentic materials for communication addressed the need of acquiring not only language knowledge, but also communicative competence, including the appropriate use of language according to the target culture. Thus, computers and the Web supported language study and the acquisition of communicative competence (Otto 2017: 17-18). Nonetheless, many schools were cautious about adopting the computer as a learning tool and the amount of hours spent on this device was limited, as was the chance for students to access the internet (Reiser 2001: 60). Furthermore, computers and related technologies were still considered expensive and books continued to be the common medium of instruction, although they were often accompanied by CDs or other multimedia materials (Otto 2017: 16-18).

Computers were adopted especially in settings such as higher education institutions, business and industry, and the military. For these sectors, providing information and training courses via computer meant reaching learners (who were too distant or could not attend regular classes) at a low cost: learners could easily receive instruction and support and perform various tasks (Reiser 2001: 60-61).

Educational technology today

Since 2000 technology has impacted even more on everyday life and is used in every field, including education. Computers constantly improve their features and fully-equipped laptops became popular with a wider audience. Since 2007 new kinds of technology have been available i.e. smartphones, tablets and less-sophisticated devices called ebook readers. Mobile devices (such as laptops, tablets and smartphones) are usually lighter, smaller and offer many functionalities usually featured by handheld computers. As in the past, these new innovations are also exploited for educational purposes (Persson and Nouri 2018: 188; Dabas 2018: 570). Moreover, in the early 21st century, the internet entered its second phase: Web 2.0. In the second generation of the World Wide Web, web pages are dynamic and interactive and users can easily communicate, collaborate and share materials on platforms such as blogs, forums and social networks. Moreover, the number of websites and materials have considerably increased. (Bonaiuti 2006: 19-26). Thus, a great variety of tools and resources support education and help to make it more accessible to people who otherwise would not have the chance to study. Interaction, telecollaboration and access to the target language and culture are elements of the latest theory regarding language acquisition. Therefore, using technology for language learning and teaching means encompassing all these elements (Salaberry 2001: 48-49, Otto 2017: 19-20). Mobile technology and Web 2.0 have paved the way to new forms of education, such as Mobile-Learning and Mobile-Assisted Language Learning (MALL). M-Learning and MALL will be analysed in Chapter 3.

To sum up, technology has offered many tools and devices for education, especially in reference to language education. A summary is outlined in Table 1:

Time Frame	Tools and Devices
1910s-1940s	Projectors, Stereographs, Films, Radio, Audiovisual Aids
1950s	Television, Radio, Audiovisual Aids
1960s-1970s	Mainframe Computers
1980s	Microcomputers, Audio- and Videotapes
1990s	Multimedia Technology, Web
2000s	Mobile Devices, Web 2.0

Table 1. Overview of the technology available in different time frames

Furthermore language teaching and learning has exploited technological tools in accordance with the most relevant language learning theories. CALL and MALL are two specific fields which include the two dimensions of language and technology, in other words computer and mobile devices. Over the years, new terms have been coined to indicate the use of technology in language learning, such as Technology-Enhanced Language Learning (TELL), Computer-Enhanced Language Learning (CELL), Web-Enhanced Language Learning (WELL). All these terms indicate the same sphere, but they emphasize a different medium or represent a subcategory: TELL embraces all types of technologies; WELL focuses on the use of the internet (Li 2017: 4, 13). In this thesis, I will analyse CALL and MALL as they are considered the most common classifications of educational technology for language learning. MALL is closely connected to CALL and, to some extent, it is an evolution of CALL. Mobile devices derived from computer technology, and therefore there has been a shift from using desktop computers to using mobile devices in language education. Figure 1 tries to explain the relationships between the terms used in this section.

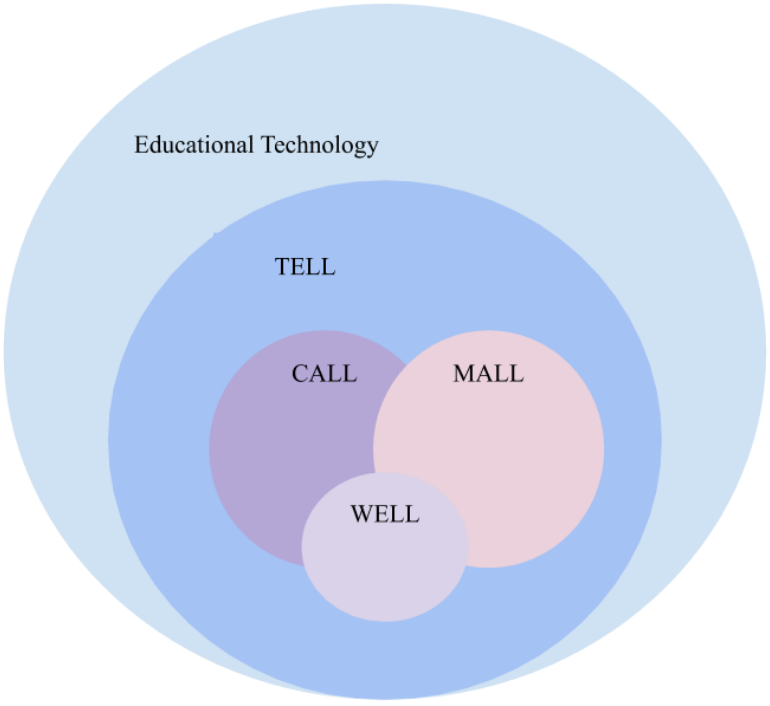


Figure 1. The relationships between the areas of educational technology.

As shown in Figure 1, CALL and MALL are part of technology for supporting language acquisition (TELL). TELL lies within the broad field of educational technology. Thus, CALL and MALL are areas of educational technology.

1.2 Language learning and teaching

As I have already mentioned, technology is used in relation to what the language learning theories suggest. That means technology is embedded in teaching approaches when it is effective for delivering content in compliance with the principles of the language learning theories. In the following sections I have enlisted the traditional language learning theories: behaviourism, cognitivism and socio-cognitive perspective. After I have summarized the most famous methods and approaches in language

teaching. Lastly there is a reflection on the application of technology linked to language learning theories.

1.2.1 Language learning theories

Here below there is an overview of the three most relevant language learning theories, which have developed during the 20th century and the early 21st century.

Behaviorism

According to Lightbown and Spada (2013: 103) behaviorism is a theory which explains the learning process in terms of imitation, practice, reinforcement i.e. feedback on success, and habits. Behaviourist theory was strongly influenced by the work of behavioral psychologists, such as John Waltson and B.F. Skinner, and structural linguists (Kern and Warschauer 2000: 3). Behaviorism was the most influential learning theory on second language acquisition between the 1940s and 1950s, especially in North America. Indeed, the behaviorist theory contributes to shape the widely-used audio-lingual method. The audio-lingual method focused on speaking skills, which were improved through repetition and pronunciation practice. Therefore, learning activities regarded mostly mimicry and memorization i.e. learning dialogues and sentence pattern by heart (Lightbown and Spada 2013: 103-104). Reading and writing played a minor role: reading was seen as an aid to support the learning of correct structures; writing regarded the production of formally corrected sentences and paragraphs (Kern and Warschauer 2000: 3).

In brief, according to behaviorism, learning takes place when there is a response to a stimulus in an environment. The response can be followed by a positive (reward) or negative (punishment) reinforcement. The former suggests that the response suits the stimulus and the environment and it will occur again; the latter means that the response will not be repeated in that given stimulus and environment. Therefore, the learning

process becomes a process of generalization: the same behaviour is applied to situations with similar features. In the behavioristic view, learning is a habit process and little attention is paid on what happens in the mind of learners (Li 2017: 9).

As language development is seen as a habit, habits in the first (or native language) may be adopted while acquiring a second language. In other words, the first language can interfere with the second language, in a positive or negative way. Therefore, contrastive analysis of the differences between first and second language was applied by behaviorism to understand the most effective way to present a second language. Various researchers demonstrated that errors by learners are not always predictable due to their first language or the contrastive analysis between first and second language. Thus, contrastive analysis was abandoned and contributed to undermine the status of behaviorism (Kern and Warschauer 2000:3; Lightbown and Spada 2013: 104). However, there is evidence that more advanced second-language learners can identify similarities and differences between the first and second language. That does not deal with the concept of habit, but with the ability of seeing the features of a language (Lightbown and Spada 2013: 104).

During the 1960s, behaviourism as well as contrastive analysis were considered inadequate to explain the whole process of language acquisition. As can be seen in the next section, studies in the field of cognitive psychology and linguistics will promote new theories and views on language acquisition (Lightbown and Spada 2013: 104).

Cognitivism

In the early 1960s behaviorism started to be criticized and replaced by new theories, which belong to the field of cognitivism. Psychologists and educators started to rely on models of cognitive sciences which focused on thinking, language production, problem-solving, and information processing. Thus, many scholars abandoned behaviourism and embraced new theories, which emphasize the role of cognitive

process in learning. Furthermore, there was a shift at the instructional level: learners have to directly interact with materials and be active agents of their learning process; learning does not mean passive repetition of materials presented as the perfect model to imitate (Ertmer and Newby 2013).

One of the main contributors of cognitive theory is the linguist Noam Chomsky. His works addressed both first and second language acquisition. According to him, every person since childhood has the biological equipment which allows him/her to acquire a language: people are biologically programmed to learn a language and environment has only a limited effect on language acquisition (Lightbown and Spada 2013: 104-105). In Chomsky's view, people tend to learn more in comparison to what they hear. Moreover they hear mistakes, incomplete sentences and different accents. Nonetheless, human beings have the capacity to identify the underlying rules of language thanks to the chunks of natural language they are exposed to (Lighbown and Spada 2013: 20, 105). Every language has a small and essential number of rules which make up basic sentence structures, i.e. Universal Grammar (UG). These rules are combined with a set of transformational rules which allow the modification of basic structures i.e. deletions, additions, substitutions, word-changes. A limited number of rules allows to generate an endless number of grammatically correct utterances; this concept is embedded in the Transformational-Generative (TG) grammar. People can produce millions of sentences they have never heard before, and this cannot be possible if learning a language means imitating it. Therefore, people have an innate knowledge of the language's rules and can apply these rules to create new sentences (Seville-Troike 2012: 40). The process of language acquisition is linked to the information elaboration by the brain: words and sentences are recognized when certain parts inside mind are activated due to some stimuli (Ertmer and Newby 2013).

In brief, cognitivism explains language acquisition in terms of coding and structuring information received from the environment. Human beings are biologically programmed to carry out these processes. Explanations and exercises are elements

which encourage the learner to activate his/her mind to code, retrieve and elaborate information. The verb retrieve indicates that new information is linked to prior one and everything in the mind is organized to shape knowledge. Thus, transfer means exploiting previous knowledge to acquire new information and not simply repeating the same scheme as described by behaviourism Appropriate coding, retrieving and organising can be fostered thanks to various techniques such as analogies, hierarchical relationships, and matrices (Ertmer and Newby 2013). This description of language acquisition supported by cognitivism should be seen as criticism of behaviorism. Chomsky underlines that the main problem regarding behaviourism is the poverty of the stimulus: the environment does not provide all the materials acquired by people, as well as they are able to produce correct sentences regardless of what they hear, including mistakes. Thus, behaviorism is a limited theory for explaining language acquisition.

Socio-cognitive perspective

The socio-cognitive theory is the most recent theory which tries to explain second language acquisition. The socio-cognitive theory relies on two important assumptions i.e. the social and the cognitive dimension. Matsuoka and Evans (2004: 3) defined the hybrid nature of language as "the social is related to what is going on in the outside world; the cognitive is related to what is going on in the inside world".

Language is a social phenomenon. Language is the means for constructing, performing and communicating ideas, feelings, actions and intentions in context populated by other human beings. Moreover, people are biologically predisposed to acquire a language because it is an essential social tool (Atkinson 2002: 526). The social dimension of language is also linked to its grammar and function. The different language forms are acquired in context, as these forms are conventions matched to particular settings. Therefore, grammar is learnt with rules of appropriate use es (Hymes 1971: 10; Ochs, Schegloff, & Thompson, 1996: 3). According to Halliday, language has three functions: ideational, interpersonal and textual. Ideational function describes the use of language to

express content; interpersonal function regards the use of language to maintain relationships; textual information indicates the production of discourse relevant for the context. In other words, linguistic competence should be accompanied by communicative competence: people should be able to correctly speak a language and use it according to the context (Kern and Warschauer 2000: 5; Atkinson 2002: 527).

As it has been widely described by cognitive psychology and linguistics, language is a mental activity. The human brain is highly developed for storing, understanding and producing language with attention to the different contexts i.e. gesturing, different modes, politeness strategies, turn-taking. According to connectivism, human beings have the potential meanings and structures to understand and produce language, but they need to be activated (Atkinson 2002: 529).

It is now possible to identify the socio-cognitive dimension of language and its acquisition. Language is a tool for living and interacting in the outside world, but it should be used appropriately in reference to both grammar form and context. Thus, language acquisition is affected by use. Teaching and learning have to consider interactive activities to promote language acquisition. Language is also a mental activity, as its acquisition is processed by the brain when it receives inputs and activates areas devoted to language (Atkinson 2002: 538; Matsuoka and Evans 2004: 3, 5-6).

1.2.2 Methods and approaches in language teaching

I have previously reported the traditional language learning theories; these theories have shaped methods and approaches in language teaching. In other words, how languages are actually taught and learnt in light of behaviourism, cognitivism and the socio-cognitive theory. Methods and approaches in language teaching have various features, which belong to one or more language learning theories. Furthermore, these methods approaches can be similar or completely opposite. Knowing the main elements of methods and approaches in language teaching is useful to understand how technology

can be applied; for example: in the task-based approach, a part of the class activity can be carried out by writing, recording or creating a slide presentation on a computer or mobile device. Last but not least, here are described the most common methods and approaches in language teaching and this is not meant to include all the existing approaches.

The grammar-translation method

The grammar-translation method aims to exercise the mind to read in the target language and communication does not play any roles. This method emphasizes the study of grammar and translation as a means of comprehension (McHugh and Ariza 2011: 64). Thus, lessons focus on these two aspects: learning word-lists with translation and lists of grammar rules, reading a text line by line and translating it in the source language, reading comprehension, filing-gap exercises (Lightbown and Spada 2013: 154). Today this approach is not widely used, nonetheless some elements of it are still employed such as translating passages, verb conjugation, memorization of grammar rules (McHugh and Ariza 2011: 64).

The audio-lingual method

The audio-lingual method was developed after World War II, as the United States government required a new method to train its students to effectively speak a language. Indeed, there was evidence that the traditional grammar approach did not work. Thus, the audio-lingual approach started to be implemented in USA schools as a new way to teach foreign languages (McHugh and Ariza 2011: 65). audio-lingual method is based on behaviorism: learning means repeating dialogues and fixed structures, with emphasis on speaking and mastering correct grammar forms. Through repetition, language is supposed to become a habit, where mistakes are considered bad habits. Grammar is expected to be used correctly, although it is not explicitly taught. The use of source language is avoided. A typical lesson includes reading aloud dialogues, repeating

patterns and drillings. The instructor is seen as the model to imitate (Richards and Rodgers 1990: 49-53, 56; Lightbown and Spada 2013: 154-156). The audio-lingual method was very popular in the 1960s; moreover language labs in schools were set up and allowed students to study by listening to audiotapes and repeating dialogues about everyday life (McHugh and Ariza 2011: 65). Today the audio-lingual method is not considered effective: learners cannot use the language in real life as they only remember the dialogue learnt by heart. Furthermore, the audio-lingual method does not foster neither accuracy nor fluency (McHugh and Ariza 2011: 65; Lightbown and Spada 2013: 156).

The silent way

The Silent Way approach was developed in the 1970s by Caleb Gattegno, in light of the cognitive theories. According to him, language learning takes place through activities of problem-solving and discovering. The learner is at the center of the learning process, which is guided by the instructor with the aid of tools like charts (McHugh and Ariza 2011: 66). Richards and Rodgers (1990: 99) summarized the main features of silent way as follows. Learning is accomplished through discovering and creating: the learner is an active participant who uses the tools provided by the instructor to acquire knowledge. Thus, learning implies tools in the form of physical objects, as well as a problem-solving attitude towards the activities.

Suggestopedia

Suggestopedia is a teaching approach elaborated by the bulgrian psychiatrist Lozanov in the 1970s. Language acquisition is fostered thanks to drama, art and physical exercise. The learning environment plays a crucial role: there must be a relaxed atmosphere, with comfortable seating arrangement and smooth music. Learners do not have to feel pressure and should feel confident, as their feelings affect the learning process. Drama, songs and plays provide content and the practice learners need. Suggestopedia has not

been a very popular approach, as it does not suit large classes and useful materials are hard to find (McHugh and Ariza 2011: 65-66).

Total physical response

The psychologist James Asher developed the approach Total Physical Response (TPR) in the 1970s on the basis of his observation about language acquisition in childhood. He noticed that children learn better in a free- movement environment, as they interact with gestures and then with words. Thus, TPR associates language acquisition with movement. Instructors start to deliver content end exercises by asking their students to react non-verbally, but physically. Students interact verbally when they feel ready. Gesture, voice, mime, pictures realia i.e. real objects are the tools used by both instructors and students. TPR is ideal for beginners and children classes (McHugh and Ariza 2011: 66-67).

The natural approach

The natural approach has been mainly influenced by the work of linguist Stephen Krashen. According to Krashen, language learning is a subconscious process of acquisition. The acquisition takes place when we receive a comprehensible input which activates the process. Studying a language means correcting and editing our knowledge, thus studying works as a monitor. Learners start to use a language when they are ready, as a natural process. Instructors organize activities which give their students comprehensible inputs: students are encouraged to understand the meaning from context rather than reacting to it (McHugh and Ariza 2011: 71).

In more details, the natural approach is based on Krashen's Monitor Theory. This theory of language acquisition is made up of five hypotheses. The acquisition-learning hypothesis distinguishes acquisition (spontaneous process with the exposure of comprehensible inputs) and learning. The monitor hypothesis defines studying as

responsible for correcting and editing the system acquired by natural exposure to target language. The natural order hypothesis regards the acquisition of correct grammar forms. The input hypothesis states that acquisition takes place when one is exposed to comprehensible language with extra information. That extra information represents the shift to a higher level of knowledge. The affective filter hypothesis regards the elements which prevent acquiring new information; these elements can be attitudes, emotions, self-confidence and anxiety (Krashen 1982: 15-32; Richards and Rodgers 1990: 131-134).

According to the natural approach, lessons should be designed to deliver as much vocabulary as possible, as vocabulary is seen as the key for comprehension and oral production. Grammar explanations or form repetitions do not take place within the class environment, which is devoted to listening and speaking activities (McHugh and Ariza 2011: 71). As already mentioned, learners are not forced to speak as their language development follows a progression. When students feel ready, they start to respond by using fixed patterns and later they use more complex and personal utterances. Instructors are in charge of providing a constant flow of inputs, creating a friendly atmosphere, explaining the principles of their teaching approach (Richards and Rodgers 1990: 136-138). Classroom activities are supported by visual aids (McHugh and Ariza 2011: 72).

The communicative approach

The Communicative Language Teaching (CLT) approach is the mainstream approach to language teaching and learning, supported also by the Council of Europe. Today the focus is not exclusively on mastering the grammar of a language, rather on the ability to communicate in different situations. Thus, according to CLT, the main goals of studying a language are: becoming communicatively competent, and learning the four skills in light of the interdependence between language and communication. Communicative

competence is developed by using language (especially orally) in given social contexts (Richards and Rodgers 1990: 64-66; McHugh and Ariza 2011: 72).

The CLT approach was a result of the works by Hymes and Halliday. According to Hymes, language acquisition is linked to culture and communication: a learner should know how to produce utterances appropriate to the different contexts. Moreover, Halliday underlined that language acquisition should include understanding language functions[2] (Richards and Rodgers 1990: 70-71).

CLT approach is based on three main principles, which explain the conditions for effectively language acquisition: communication, task and meaningfulness principles. The communication principle states that language acquisition happens thanks to activities involving communication. According to the task principle[3], completing activities linked to the real-world promotes language acquisition. The meaningfulness principle requires learners to be engaged in activities that promote authentic and meaningful use of language (McHugh and Ariza 2011: 72).

The learning process is student-centered, indeed learners acquire language when they actively use it. Activities should mirror real life situations, and therefore encourage learners to use real-life language. Class-activities are usually designed as tasks to complete by using the language; the idea of learning by using the target language to do something is summarized in the principle of "learning by doing". The role of the instructors regards organizing, facilitating and evaluating these activities. Classroom arrangement is non-standard. Among text-based materials, there are also "task-based" materials like games, realia i.e. authentic materials such as newspapers and magazines: these materials are effective in promoting interaction (Richarhs and Rodgers 1990: 76-80). The main features of CLT approach were summarized by Finocchiaro and Brumfit (1983) by comparing the CLT approach with the audio-lingual method:

[2] For more information about the theories by Hymes and Halliday , see section 1.2.1 Language learning theories, Socio-cognitive perspective.
[3] For more information about tasks and language acquisition, see the part of this section devoted to the task-based approach.

Communicative Language Teaching
● Meaning is paramount.
● Dialogs, if used, center around communicative functions and are not normally memorized.
● Contextualization is a basic premise.
● Language learning is learning to communicate.
● Effective communication is sought.
● Drilling may occur, but peripherally.
● Comprehensible pronunciation is sought.
● Any device which helps the learners is accepted - varying according to their age, interest, etc.
● Attempts to communicate may be encouraged from the very beginning.
● Judicious use of native language is accepted where feasible.
● Translation may be used where students need or benefit from it.
● Reading and writing can start from the first day, if desired.
● The target linguistic system will be learned best through the process of struggling to communicate.
● Communicative competence is the desired goal (i.e. the ability to use the linguistic system effectively and appropriately).
● Linguistic variation is a central concept in materials and methodology.
● Sequencing is determined by any consideration of content, function or meaning which maintains interest.
● Teachers help learners in any way that motivates them to work with the language.
● Language is created by the individual often through trial and error.
● Fluency and acceptable language is the primary goal: accuracy is judged not in the abstract but in context.
● Students are expected to interact with other people, either in the flesh, through pair and group work, or in their writings.
● The teacher cannot know exactly what language the students will use.
● Intrinsic motivation will spring from an interest in what is being communicated by the language.

Table 2. Features of the CLT approach (Finocchiaro and Brumfit 1983: 91-93; Richards and Rodgers 1990: 67-68)

The task-based approach

The task-based approach (or task-based learning, task-based language teaching) is strongly linked to the communicative language teaching (CLT) approach, and some scholars consider it a subset of CLT (Ellis 2013: 1). Task-based approach focuses on language use: learners have to be involved in communicative tasks which can be completed only by using the target language (Willis 2005; Ellis 2013: 2-3). The term task indicates a goal-oriented activity with a purpose; a communicative task means an activity completed by using the target language and whose outcome can be appreciated by others, for example: comparing pictures or texts, solving a problem, creating a poster (Willis 2005). There are six types of tasks: listening, ordering and sorting, comparing, problem solving, sharing personal experiences, creative tasks (Willis 1996: 26-27). The task-based approach is mainly a learner-centered approach, however there might be room for focusing on form instruction (Ellis 2013: 4).

According to the task-based approach, four conditions guarantee that the learning process takes place. These conditions are summarized in the table 3:

Exposure	Learners receive comprehensible inputs of real language in use.
Use	Learners have to use language in various activities.
Motivation	Learners are interested in taking part in activities (by reading, writing, listening and speaking).
Instruction	There should be the chance of focusing on forms. Despite the previous conditions, this one is desirable but not essential.

Table 3. Conditions for language learning (based on Willis 1996: 11)

Task-based learning does not mean that students are told to complete tasks without any instruction; lessons should have an outline which assure them to acquire fluency as well

as accuracy in completing tasks by using the target language. The steps to follow are summarized in table 4:

Pre-task	Introducing and planning the activities; giving guidelines to the students; setting a fixed time for completing the activities.
During task (or task cycle)	There are three sub-phases 1. Complete the activity 2. Preparing to report the completed activity in front of a public i.e. the class 3. Reporting the activity in front of the class and receiving a comment by the instructor.
Post-task (or language focus)	There are two sub-phases 1. Analysis and evaluation of the activity 2. Repetitions and explanations, if it is necessary.

Table 4. Phases of a task-based learning lesson (based on Willis 1996; Ellis 2003; Willis 2005)

1.2.3 Technology and language pedagogy

Over the years, the field of language acquisition has faced various changes. The difference regards the technology available, role played by the learner and instructor, new approaches to language acquisition (Li 2017: 12-13). As shown in the previous section, technologies applied in education have increasingly become more elaborate over the years. In the early stages of educational technology, audiovisual materials were the main technological tool available. Later computers with a limited set of functions were used, and educational software started to be developed. A turning point was stated by the introduction of multimedia technology and the internet. Multimedia technology allowed its users to benefit from not only video and audio materials in the format of CDs, tapes and videotapes, but also the chance to record themselves. The internet

brought a variety of benefits to language education. It provides loads of online and downloadable materials, both as authentic or ad hoc for learners; many websites devoted to language learning are available including online courses; learners can take part in online exchange of find an online-tutor; language instructors can have their own platform where students can interact and study. Moreover, both multimedia technology and the internet are applied to traditional desktop computers as well as recent mobile technology i.e. small laptops, tablets and smartphones (Ertmer and Newby 2013).

Another important change regards the role of the learner and the instructor. Today's learners are more responsible for the learning path, especially with the aid of technology. According to various social-psychology studies, learners are influenced by the culture in which they grow up: if they are used to technology, they exploit it for various aspects of life including education. In more details, learners are now accustomed to multi-tasking, interactive and multi-stimuli experiences, which should be reflected in education. Furthermore, learners prefer to put in practice what they are studying, as learning is no longer an abstract activity. In this sense, technology can provide tools and environment to create the shift from idea to concreteness. In reference to the role of the instructor, he/she is not seen as the unique source of information available but the organizer and facilitator of the learning process: that means the instructor provides learners with the tools and conditions necessary to learn (Li 2017: 12-13).

Last but not least, language acquisition theories and approaches to language teaching have faced various changes. At first, language learning consisted of passive repetition of structures. Later, thanks to studies in both psychology and linguistics, second language acquisition was seen as a social activity: learning a language means using it to interact with other people in contexts related to the real world. Furthermore, we as human beings are biologically programmed to learn languages. Approaches to language teaching mirrored the new views on language acquisition: the appropriate use of language in different situations overtakes the form; the study curriculum must be

tailored to learners' needs; language has to be seen as a social activity which is trained through communication activities (King 2016: 4). The theory evolution is summarized in Figure 2:

Figure 2. Theory development for language learning (King 2016: 4)

Technology for language education has been influenced and has influenced these three aspects. I have already stated that a turning point was determined by multimedia technology and the internet. These two innovations have been applied in regard with the latest language teaching approaches and learning theories: the learning experience is multi-modal and interactive; interaction as the key for learning is supported by various

forms of internet-based communication i.e. emails, chats, university or course platforms, social networks, online conferencing, virtual exchanges. The possibility of publishing written messages and other materials, such as video or audio recording, persuades learners to do their best and to show off their skills. It has also been argued that the use of technology for language education supports the acquisition of skills useful for the future job market: critical thinking, problem-solving, creativity and collaborative working. Problem-solving activities engage learners in real-life situations, in which they have to use their skills to find a solution with the available tools. These tools can be offered by technology, but the effective use is affected by the creativity and reasoning of the learners. Moreover, involving learners to cooperate is collaborative working. Collaborative working can take place via technology thanks to the aforementioned internet-based forms of communication. Thus, collaborative working does not require people to be physically next to each other, indeed they can be geographically distant and participate at different times. In addition, collaborative working does not have cross-cultural barriers. As you might have already noticed, the learner plays a key role in his path towards language acquisition. He/she is encouraged to actively do something with the language. In addition, the instructor should exploit technology to foster communication activities as well as teach to his/her students how to use internet resources to effectively learn. I have reported that the latest language teaching approaches and learning theories underline the importance of communication, learner autonomy and centeredness. Using technology for communicative activities, collaborative working and learners involvement in their learning path mirrors new approaches and theories.

In Chapter 2 and Chapter 3 I will analyse in greater detail the application of computer technology and mobile technology for language acquisition. Although there are still examples of traditional activities such as stimulus-response association (like game-based activities) and repetition, there is a clear shift to collaborative and communication activities. Classroom courses are not the only environment for language acquisition, as computer and mobile technology offer a digital, real-world environment.

Furthermore, technology offers materials and tools which have changed learners' and instructors' attitudes towards language acquisition. Indeed, in Chapter 2 and Chapter 3 the benefits of technology for language education will be illustrated.

Chapter 2
Computer-Assisted Language Learning (CALL)

In this chapter I will offer details about Computer-Assisted Language Learning (CALL). Generally speaking CALL refers to the use of computer technology to support language acquisition. This field grew out of technological innovations and the growing interest in using computers for education. Thanks to the first applications of computer technology in education, approaches, materials and tools started to be available to support various subjects. Language acquisition was one of the most affected, as computers (especially multimedia technology and the internet) offer many advantages to both learners and instructors.

This chapter is divided into two sections. The first section illustrates how CALL deals not only with computer technology, but also with other areas of educational technology. The second section focuses on CALL. I will provide an overview of CALL and the development of this field. Furthermore, I will explain how CALL can be applied so as to foster the various skills and areas with examples of real resources available for download or online. Last but not least, I will briefly evaluate the advantages of using CALL.

2.1 Towards Computer-Assisted Language Learning (CALL)

In the following sections I will present three fields of technology and education relevant for CALL. As you will see, CALL overlaps with other areas of technology and education as it includes different tools for and approaches to language acquisition.

2.1.1. Information and Communication Technology (ICT)

Information and communication technology (ICT) is a broad concept which does not have a single definition. ICT is a branch of computer science which concerns processing, transmitting and storing information. Thanks to developments in computer technology and the internet, ICT can be implemented for working, distance learning, online services such as e-banking or e-government (Celebic and Rendulic 2011: 2).

In relation to education, ICT includes the tools, materials and principles related to educational technology. The term "tools" refers to modern technology, i.e. media, computers, tablets, smartphones, and other digital devices, social networks, virtual areas and softwares. ICT has several applications: increasing access to information and education, building learner networks, training teachers, providing high-quality materials for education, managing students (Kaware and Sain 2015: 27-29).

2.1.2 Computer-Assisted Instruction (CAI)

Computer-Assisted Instruction (also known as Computer-Aided Instruction or Computer-Aided Learning) lies within the application of programmed-instruction technologies. CAI supports the teaching and learning process by presenting materials and monitoring learners' outcomes via computer technology. The materials' presentation takes place as a combination of texts, graphics, sounds and videos (Sharma 2017: 102).

CAI has some key features. Using a computer for teaching and learning provides the opportunity to record and assess progress. Moreover, taking tests via the computer ensures security and anonymity. Computers and related tools can make studying interesting and engaging thanks to various stimuli such as audio and video. Moreover, using authentic audio and video files creates a bridge between the study environment and the real world (Nazimuddin 2015: 186; Sharma: 2017: 103). However, CAI tools and materials should be well designed. Furthermore, teachers and learners can only

benefit from CAI if they know how to use it appropriately (Nazimuddin 2015: 187; Sharma 2017: 104).

2.1.3 E-Learning

E-Learning developed during the 1990s and the term refers to the use of technology to deliver education. E-learning is an umbrella term as it includes various tools and approaches. A key point is the exploitation of the internet to deliver content anywhere at any time. Thus, E-learning requires: the internet, multimedia technology (i.e. integration of image, audio and video) and a well-designed platform to host and deliver content. E-learning suits not only traditional school education, but also work and governmental training. E-learning offers the same advantages of CAI, but it emphasises the web-based part of the computer-aided education i.e. many resources available for free, easily updated, accessible to a huge number of participants with no restrictions regarding time or venue (Bonaiuti 2006: 28-29; Lawless 2018).

2.1.4 The building bricks of CALL

Computer-Assisted Language Learning (CALL) describes the application of computer technology to language learning. Therefore, CALL is related to the areas described above: ICT (the technological aspect), CAI and E-learning (approaches to deliver education via technology). CALL has developed within ICT, as ICT deals with computer technology and CALL is one of its many applications. CAI regards the use of the computer for teaching and learning, but not with a language focus. On the other hand, CALL concerns the same concept but exclusive to language (Beatty 2011:10). Furthermore, in the next sections I will show several ways for applying computer technology to language learning and teaching. Although E-learning is a relatively recent system for delivering education, it has a link with CALL. Indeed many E-learning projects concern language learning and teaching, and therefore these projects form part

of the CALL dimension. Furthermore, E-learning appears to have been quite successful in fostering foreign language acquisition (van Huyssteen 2007: 106)

Generally speaking, CAI, E-learning and CALL are fields related to educational technology. CALL is the field which focuses on language education and encompasses elements of CAI and E-learning, as they are general applications of technology for education. Thus, it is possible to lay out these relationships as follows:

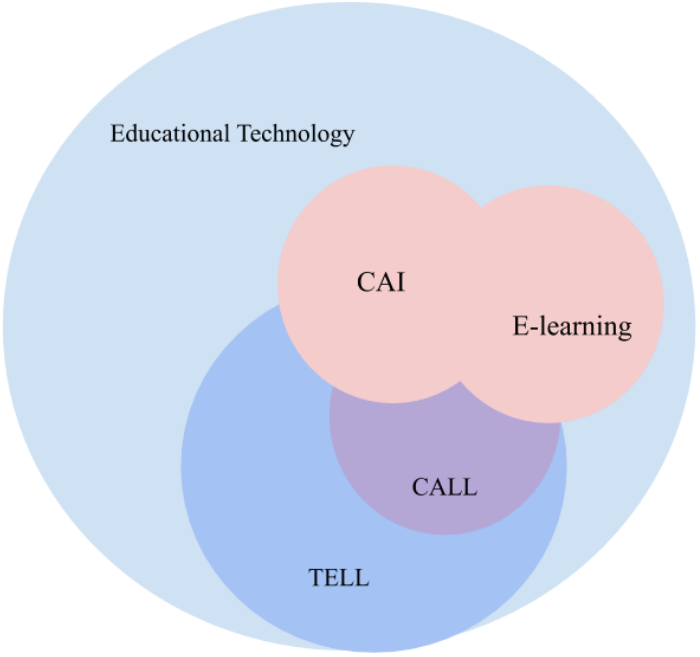


Figure 3. The link between educational technology and CALL

2.2 An overview of Computer-Assisted Language Learning (CALL)

2.2.1 A definition of CALL

According to Levy (1997: 1), Computer-Assisted Language Learning (CALL) can be defined as "the search for and study of applications of the computer in language

teaching and learning." This definition has been widely accepted and used by many scholars, but it needs to be updated. The CALL field has broadened over time and it now includes other areas which were not considered by Levy in 1997. Indeed Kern (2006: 184) questions certains definitions of CALL. He compares the definition provided by Levy and the one by Egbert ("CALL means learners learning language in any context with, through, and around computer technologies", 2005: 4) to underline a variation in the topics and foci of CALL. According to Kern (2006), Levy viewed CALL as the simple application of computers for language learning whereas Egbert's definition emphasizes language learners and the relationship between computer technologies and the learning process. Moreover, Kern (2006: 185) stresses that CALL should not only be related only to computers and software, as continual technological innovations made it possible to exploit different devices and tools of information and communication technology. Davies (2006: 460) states that the use of computers in language learning and teaching includes two areas of applications: use of generic software and tools; use of software and tools specifically designed for language education. In his view, the second area represents the field of CALL. However, I believe that his view is too restrictive. As will shown in the thesis, also resources and tools not specifically developed for language acquisition can be implemented for language education. Therefore, these resources and tools must be encompassed in the field of CALL. Furthermore, my opinion is also supported by scholars such as Fotos and Browne (2004), Warschauer and Healey (1998): although they do not say it explicitly, they consider applying various types of resources and tools to language learning as part of CALL.

In lieu of these considerations and the following sections about CALL, I would argue that CALL concerns the following: how computers, related technologies and the internet are applied to language learning and teaching; the design of materials and specific tools for language learning; the process of language learning and teaching through computers and networks.

2.2.2 The development and evolution of CALL

According to various scholars (Warschauer and Healy 1998; Kern and Warschauer 2000; Davies 2006; Levy and Stockwell 2006; Beatty 2011) the development of CALL may be divided into three distinct phases: Behavioristic CALL, Communicative CALL, Integrative CALL. However, these phases must not be considered as isolated units. Introducing a new phase does not mean rejecting the previous one, as the old one is seen as the basis for new principles and methods (Kern and Warschauer 2000: 7). The history and development of CALL has been shaped by two phenomena. Firstly, changes in the theories and approaches to language learning and teaching have been reflected in the use of technology for language education. Secondly, the different phases of CALL were clearly affected by the kind of technology available: Behavioristic CALL was designed for mainframe, Communicative CALL for PC and Integrative CALL for multimedia and internet-based technology (Warschauer and Healey 1998: 58, Kern and Warschauer 2000: 7). Thus, changes in the educational field have kept up with technological innovations.

The first phase of CALL dates back to the 1950s, when CALL systems started to be conceived, but they were implemented only between the 1960s and 1970s (Warschauer 1996: 3; Beatty 2011: 18-19). This phase was called Behavioristic CALL as it was influenced by the so-called behavioristic theories of learning (Warschauer 1996: 3; Warschauer and Healey 1998: 57). Repetition was considered an effective learning method, and therefore computers delivered repetitive language drills as well as instructional materials. As the learning software was based on drill and practice, the computer was seen as a tutor. Its success, which is still influencing the most recent CALL applications, was determined by various factors. Learners were believed to greatly benefit from repeated exposure to the same materials. Moreover this repeated exposure is carried out by the computer, which does not get tired, provides immediate neutral feedback and offers materials according to the learner's level. Different CALL tutoring systems were designed for mainframe computers, such as PLATO (Warschauer

1996: 3, Warschauer and Healey 1998: 57; Hubbard 2009: 3). However, these systems were unsophisticated since they accepted only one response per item and did not recognize response variations. In addition, with the rejection of the behaviorist approach to language learning and the introduction of microcomputers, a new phase of CALL took place (Warschauer 1996: 3, Kern and Warshauer 2000: 8-9).

Before analysing the second and third phases of CALL development, it is important to introduce the effect of Cognitive and Sociocognitive approaches to CALL. Cognitivism affected language education by awarding a new role to the learner. He/She is seen as an active agent of his/her learning process, who uses previous knowledge to test him/herself and get new understandings. Cognitive theories suggested that learning is a process of discovery and development, in which learners are active participants . In this new view, the computer offers tools and resources, whereas the learner is the controller in a virtual environment (Warschauer and Healey 1998: 57; Kern and Warschauer 2000: 9). Sociocognitivism emphasized language use in authentic contexts, and therefore it also stressed the interaction of humans via computer instead of with computer. Computers, thanks to the network established by the internet, allow for authentic interaction which can take place through email, chat, or forum (the so-called Computer-mediated Communication). As I have already reported, CMC encourages language use not only in pairs but also in a discourse community made up of language learners and target language speakers. Moreover, CMC (especially the asynchronous mode) enables learners to reflect on how they use the language and on their learning path. Furthermore, learners can be engaged in authentic contexts while developing their language skills: different kinds of activities are integrated with the aid offered by technology. Sociognitivism shifted the focus from the interaction between learners and computers to what learners do while at the computer, such as interacting with other people via the internet (Warschauer and Healey 1998: 58, Kern and Warschauer 2000: 10-11).[1]

[1] These new concepts introduced by Cognitivism and Socio-cognitive perspective are also supported by the Common European Framework of Reference for Languages (CEFR). It is a project of Council of Europe developed during the nineties, which aims to promote a new approach to language acquisition focusing on communicative language competence in real life (both written and oral forms), being

Between the late 1970s and the 1980s the communicative language approach (CLT) to teaching and learning shaped Communicative CALL. CLT was seen as an innovative approach which emphasizes interaction both as means and goal of learning a language. That means learners are encouraged to communicate by receiving and producing utterances, be actively involved in learning activities, understand the appropriate use of language in different contexts, use the feedback on their outcomes to improve themselves. The language syllabus is designed to train each skill with grammar and vocabulary content which learners would actually use (Richards and Rodgers 1990: 66; Richards 2006: 2-3, 9-11).

The features of Communicative CALL were proposed by John Underwood in 1984 (1984:52). Communicative CALL software focused on using forms, teaching grammar implicitly, encouraging learners to generate utterances, avoiding evaluations or rewarding, using only the target language and offering what it was not already included in books. Therefore, Communicative CALL promotes interactivity, authentic communication and creativity, i.e. generating new utterances instead of manipulating prefabricated expressions (Warschauer and Healey 1998: 57). CALL programs in this phase offered skill practice activities in a non-drill format: paced reading, text reconstruction and games. However, the computer was not only a tutor but also a stimulus and a tool. The computer as stimulus invites learners to discuss, write and think critically, whereas the computer as tool enables learners to use and understand language through word processors, spelling and grammar checkers or concordances. Nonetheless the distinction between Behavioristic CALL and Communicative CALL is not absolute, as differences concern which software is used and how a software is used. Indeed drill and practice programs can be involved in communicative activities (Warschauer 1996: 4-5). As in the previous phase, CALL was criticized for not using the full potential offered by the computer, and educators sought new methods for integrating the different aspects of the language learning process. Therefore, CALL had to face the new challenge of developing a software and materials which encompassed

action-oriented i.e. learning by doing, being learner-centered. More information are available at https://www.coe.int/en/web/common-european-framework-reference-languages

the various aspects of language learning (Warschauer 1996: 5, Warschauer and Healey 1998:58).

The third phase is called Integrative CALL and it is based on two technological innovations of the 1990s: multimedia technology and the internet (Fotos and Browne 2004: 6). Multimedia technology has made available videos, sounds, graphics and animation. Hypertext and hypermedia are two important elements within multimedia technology (Kern and Warschauer 2000: 12; Fotos and Browne 2004: 6). Hypertext is a feature of electronic texts, in which some items are underlined and typed in a different color (usually blue) and give access to other information by clicking it. This kind of connection is defined as hyperlink. The access can lead to a new, separate page or a smaller window on the screen such as a dictionary page. The idea of hypertext is based on footnotes and annotations in traditional textbooks. Hypermedia exploits the same principle of hypertext but its difference is in the kinds of materials. Indeed hypermedia regards linking various materials such as text plus audio files or text plus pictures. For example, the words of a text can be linked to an audio file in order to learn and practice pronunciation (Beatty 2010: 42-43). Thanks to multimedia technology, Integrative CALL combined together various aspects and skills linked to language learning, as every activity can integrate reading, writing, listening and speaking in real-word settings, i.e. language used in authentic contexts. However, a wide range of materials (such as video, audio and written materials) and the integration of activities are possible thanks to the internet.

The rise of the internet transformed the computer into a displaying and information-processing tool: learners can access an endless source of different materials as well as sharing information with other people. Furthermore the internet allows for Computer-Mediated Communication (CMC), which allows language learners to interact or participate in online projects with other learners or target language speakers regardless of time and space (Warschauer 1996: 5-6). Sociocognitive theories have been clearly mirrored in two essential Integrative CALL concepts i.e. learning languages by

using them in authentic contexts and integrating different skills into multidisciplinary activities. That has been possible with the support of multimedia technology and the internet. Furthermore, computers and other technological devices have gained a new role and become part of the learner's curriculum from two different perspectives: he/she uses the computer as a learning tool and acquires technological education simultaneously (Warschauer and Healey 1998: 58).

To sum up, CALL has developed over the years as a medium for teaching and learning with a great variety of tools and materials. Today this offer is provided especially by multimedia technology and the internet, rather than CDs and videotapes. Thus, the internet and all its tools and resources should be considered part of the CALL field.

2.2.3 CALL typology

CALL includes different programs, tools and materials delivered through various media, thus it is complicated to divide these elements into categories. Many scholars have tried to create a classification but each of them had a specific focus. According to Davies and Higgins (1985) CALL has two categories linked to the type of activities: programs for traditional exercises such as multiple-choice and gap-filling; simulation programs e.g. action mazes or text manipulation. Jones and Fortescue (1987) divided CALL into three categories: grammar and vocabulary; four skills i.e. reading, writing, listening and speaking; adventures and authoring programs. Hardisty and Windeatt (1989) identify four categories based on place and purpose of use: school (exercises); office (generic software such as word processor, spreadsheet, database and communication programs); library (concordancers); home (games and simulations). Warschauer has described in many works (1996, 1998, 2000) a categorization of CALL based on historical phases, which have been affected by learning theories and technological innovations: Behavioristic CALL, Communicative CALL and Integrative CALL. Similar categories were reported by Bax (2003: 20-23) with different names: restricted CALL; open CALL; integrated CALL. However, the historical categorization is suitable for

describing the development of CALL over the years. Today it would be more useful to have categories based on features as described by Davies (2006). In the next sections, there is an overview of CALL based on features.

Early CALL

Early CALL regards programs designed for mainframes and early microcomputers (1960s-1970s). These programs had content and exercises as plain text and the user could interact with the program by entering the answer on a keyboard. Although the programs were quite basic, they attempted to analyse the learner's errors and provided feedback (Davies 2006: 461). One of the most successful programs was CLEF- French Grammar Package, which was developed by a consortium of Canadian universities and distributed as CDs software[2].

Multimedia CALL

Multimedia CALL was based on multimedia technology, which was the result of innovations in computer technology and related devices. Multimedia CALL programs were designed to accept and send various stimuli i.e. sound and video. Therefore, many interactive videodiscs and CDs such as Montevidisco and EuroTalks' Word talk were elaborated (Davies 2006: 462-463; Davies et al. 2012). With the creation of the WWW, many resources started to be available online or for download and CDs and videodiscs became outdated. For example, the famous language service company Rosetta Stone stopped selling CD-ROM courses and started to offer online courses under a paywall. Thus, the idea of exploiting sound and video in CALL is still adopted, but in different formats such as online services and tools (see web-based CALL).

[2] www.camsoftpartners.co.uk

Web-based CALL

As the internet spread in the early 1990s, the Web started to play a significant role in offering resources and tools for language learning and teaching. Today many websites offer materials and courses, often for free (Davies 2006:465). Courses held on web-based platforms fall in the area of E-learning or Distance Learning (Fotos and Browne 2004: 10). Over the years, online courses for language learning have become quite popular. These courses have different formats: they are available for free or by subscription, and they can be accessed anytime thanks to the internet and a computing device (Davies et al. 2012; Walker and Davies 2012). For example, the website of the broadcast company DW-Deutsche Welle[3] has many free courses for German language, organised by level and topic. Rosetta Stone[4] is one of the oldest companies in the field of language education. Although it was first released in CD-format, it later became an online service by subscription. Courses are highly interactive, include many listening and speaking activities, and they are available for a wide range of languages from European to Asian languages such as Vietnamise. Moreover, learners are tutored by a native speaker. Universities often deliver language courses through their platforms too . The University of Padova offers on Moodle CLA[5] language courses for self-study or for supporting in-class activities. Instructors use it for homework and in-class activities. YouTube[6] is recognized as a source for authentic materials, some of which are designed for language learners. Indeed YouTube also hosts language courses, such as the multilingual Pod101 or Extra.

Massive Open Online Courses (MOOCs) represent another format for online courses, as well as an interesting and growing phenomenon in the area of distance education. The term MOOC describes the main features of these courses: they attract thousands of participants (massive), are open to anyone interested in them, are delivered online and mirror classroom courses (Tracey 2013). MOOCs are an innovative and cheaper

[3] www.dw.com
[4] www.rosettastone.com
[5] elearning.unipd.it/cla/
[6] www.youtube.com

alternative to traditional learning; moreover they support autonomy, collaborative learning and interactivity (Motzo and Proudfoot 2017: 87). MOOCs have some key features: lessons are designed for the web i.e. they are prerecorded and accompanied by written materials; participants are encouraged to take part in the virtual class by posting on a forum and collaborate in online projects; outcomes are usually assessed through multiple-choice exams or essay questions; courses run for a fixed period of time and take place weekly, like a traditional class (Rollins 2018). These courses are created by universities and companies and available on third-party websites, by subscribing via email or social network account. Platforms such as edX[7] and FutureLearn[8] have several language MOOCs designed for general knowledge or specific areas such as Business or Healthcare; for example Deutsch am Arbeitsplatz by Open University on FutureLearn and Italian Language and Culture series by Wellesley College on edX.

Another important dimension to consider in relation to web-based CALL is Computer-Mediated-Communication (CMC). CMC refers to human communication supported by computer (Simpson 2002: 414). Thanks to the internet, CMC became a multimodal way of communicating and it affected educational and professional settings all around the globe. CMC takes place in synchronous and asynchronous mode. The former relates to real-time interaction and encompasses text-based online chat and conferencing; the latter describes an intermittent communicative event i.e. conversation among distant people at different times. Asynchronous CMC includes emails, discussions forums and mailing lists (Simpson 2002: 414). In brief, many applications allow CMC such as emails, blogs, chats, wikis, collaborative writing projects, podcasting, video and audio resources, social networks, video and online games.[9] In

[7] www.edx.org
[8] www.futurelearn.com
[9] Projects structured to promote interaction among language learners and supported by technology lie in the field of telecollaboration. Telecollaboration is a teaching and learning practice, which encourages learners to use the language to do something in a real-world setting provided by technology. That means language acquisition takes place according to the parameter of real-use in real communication, mirroring the latest approaches to language acquisition: Socio-cognitive perspective, Communicative Language Teaching. (Dooly and O'Dowd 2018: 16-19)

relation to education, these applications help developing writing, reading, listening, comprehension and collaborative skills (Thorne 2008: 330-332).

It is important to stress that, as will be seen in Chapter 3, web-based CALL activities, resources and tools are also designed to be mobile-friendly. That means the same activities and resources can be fully or partially available for smartphones and tablets; e.g. Rosetta Stone is accessible on both computers and mobile devices. Users connect to their personal account via the internet and data is always updated, regardless of the device.

Game-based CALL

Gaming is a common activity used to promote language learning as it involves reading, writing, listening and interaction at the same time, as well as collaborative working i.e. learners work together by using the target language to reach a goal. Game-based CALL has been available thanks to multimedia technology; moreover CD-format or downloading has been replaced by online videogames. The majority of online video games provide a virtual environment i.e. a simulation of a real or fictional world in which participants have to cooperate and to interact in written form (Warschauer and Healey 1998: 60; Peterson 2010: 76-78).

Game-based CALL regard both videogames explicitly developed to foster language acquisition and generic videogames (Peterson 2010: 72-73). The Carmen Sandiego[10] series was very popular to foster not only language learning, but also other subjects such as geography e.g. Where in the World is Carmen Sandiego?. It was originally released as CD-format; today it is an online-game. On the other hand, there are many examples of generic videogames supporting language learning. For instance, World of Warcraft[11] is a famous web-based video game which promotes collaboration and communication: every participant is a fictional character living in a virtual world and interacting with

[10] www.carmensandiego.com
[11] https://worldofwarcraft.com/

other participants in order to survive. As participants are from all over the world, they communicate using different languages. Consequently, participants can improve their language skills.

CALL authoring programs

Authoring programmes allow the instructor to modify or create their personal materials, activities and courses (Davies 2006: 464). Initially authoring tools were limited to CD programs or software downloaded on computer; today authoring tools are usually web-based. Furthermore, there is a wide range of online tools to meet the abilities of users. One of the most popular authoring programs is Hot Potatoes[12]. The Hot Potatoes suite includes six packages which can be downloaded for free from the official website. With Hot Potatoes, instructors can create interactive exercises such as multiple-choice, gap-filling, short-answer and publish them on the WWW. TrackStar by 4Teachers.org[13] is a web-based tool for modifying web pages and creating exercises. There are also programs for building a full online course, such as Elucidat[14]. Elucidat is a web-based system which enables users to create their own courses with content and exercises. It is easy to use (as it has templates ready to be used) and offers many features, but it requires an expensive year-subscription: indeed Elucidat addresses institutions, schools and companies. Good alternatives for free or pay-per-feature are LCDS[15] by Microsoft and Adapt[16].

Computer Assisted Language Testing (CALT)

Computer assisted language testing (CALT) or Computer Aided Assessment (CAA) is a growing sub-field of CALL. Although testing is not a learning experience, it is considered an integrative part of the teaching and learning process. Thus, it has to be

[12] https://hotpot.uvic.ca/index.php
[13] http://trackstar.4teachers.org/
[14] https://www.elucidat.com/
[15] https://www.microsoft.com/en-us/learning/lcds-tool.aspx
[16] https://www.adaptlearning.org/

included in the CALL field as testing. Moreover, journals and associations related to CALL usually treat CALT as a part of CALL (Douglas 2006: 465). CALT refers to using computer technology to assess language knowledge: tests in the form of grammar, vocabulary, listening and writing exercises presented via computer. Using a computer for language assessment has various benefits: greater security, control of time, automatic scoring and reporting. Furthermore, participants receive different tests and this reduces cheating (Hubbard 2009: 11-12). The most interesting feature of CALT is adaptive testing: the computer monitors the test-taker's performance and adapts to it. In other words, every test is targeted to the test-taker's level and items become easier or harder according to the results of the previous questions (Hubbard 2009: 11-12; Chapelle and Voss 2016: 118).

Generally speaking, language tests are designed according to two directives: method and purpose. Method is identified in terms of traditional pen-and-pencil tests and performance tests. Pen-and-pencil tests evaluate separate components of language (such as grammar or vocabulary) and receptive understanding (like reading comprehension). Performance tests evaluate language in an act of communication i.e. speaking and writing. Purpose distincts achievement tests and proficiency tests. Achievement tests check the progress of learners during or at the end of a course, to establish if the learners have reached the set goals. Thus, achievement tests should be designed according to the content of the course. Learners can also be involved in a process of self-evaluation; in this case it is a self-assessment test. Proficiency tests aim to understand the use of language in potential situations and it is particularly useful for testing communicative abilities (Mcnamara 2000: 5-7). Computer technology can be programmed to deliver any kind of test according to the mentioned directives.

As previously mentioned, CALT has many advantages. Each learner can work at his/her own pace without the pressure of the instructor or peers. Furthermore, the test can be adapted to the level and outcomes of the learners as well as the feedback. Computers give the opportunity to use multimedia materials during tests, and therefore various

skills and areas of language learning can be evaluated. Moreover, thanks to multimedia materials, test-takers can deal with language in authentic situations (Hubbard 2009: 12). Another useful function offered by CALT is time recording. The computer can record how much time a test-taker spends on each item and evaluate his/her weaknesses. Last but not least, CALT reduces cheating and improves security. The computer system generates more versions of the same tests, indeed each taker receives a test tailored to his/her own level (Chapelle and Voss 2016: 118). The ability of a test system to identify the test-taker's level is defined reliability, whereas validity indicates that a test effectively measures the language skills of the test-takers (Mcnamara 2000: 9, 61-62).

There are several examples of CALT. For example, TOEFL[17] is a test which assesses the level of English in terms of reading, writing, listening and speaking. The test is completely delivered through the internet and guarantees score validity. The training materials can be downloaded from the official website and online-classes are offered as well. Websites, which promote English language and culture such as the British Council [18] or Cambridge English[19], offer free online tests to check the level of English knowledge along with studying materials. These resources fit both autonomous learners and language-class students.

2.2.4 CALL activities and resources

CALL offers the chance to carry out many activities carried out through various media, in order to deal with different skills and aspects of language. As should already be clear, this variety of materials instructional media is a consequence of multimedia technology and the internet (Fotos and Browne 2004: 9). In this section I offer some examples of these activities with software, tools, and internet-based platforms and resources.

[17] www.ets.org/toefl
[18] learnenglish.britishcouncil.org
[19] www.cambridgeenglish.org

Vocabulary and grammar

Vocabulary is an essential part of language learning (Warschauer and Healey 1998: 60). There are usually two different approaches to acquire vocabulary: intentional learning and incidental learning. Intentional or systematic vocabulary learning regards memorizing items from word-lists and glossaries accompanied by translation or other kinds of associations such as opposite (for example cold-hot) or set words (for example knife-spoon-fork). Various researches have shown that this approach usually suits beginners and learners who are not regularly exposed to the target language. Incidental vocabulary learning regards vocabulary acquisition which takes place during other activities i.e. reading and writing, without explicitly focusing on vocabulary. Another concept linked to incidental vocabulary learning is inferring meaning from context. In brief, this expression describes the strategy of guessing the meaning of an item through the context; this strategy is employed when it is not possible to check a dictionary (Read 2000: 39-44; 52-53).

As described by Stockwell and Levy (2006: 187-188) technology can support both approaches. It is possible to read online texts with annotations, translations and glossaries (also in the form of hyperlink), or finding packages of word-lists and glossaries. Moreover, the instructors can also create these resources with a word processor or other online tools. In reference to incidental learning, both autonomous learners and classroom students can benefit from free online newspapers, magazines and other reading materials, as well as music and movies. These activities can promote incidental vocabulary learning. Another way to foster incidental vocabulary learning is participating in CMC activities such as virtual exchange and chats: there is evidence that learners benefit from communication even from the perspective of vocabulary.
An interesting tool for vocabulary acquisition, which belongs to intentional learning i.e. repetition, is represented by flashcards. A flashcard is usually a piece of cardboard whose sides bear a word, number or image plus information on that item; today flashcards are also available as digital format. Flashcards exploit visualization to foster

vocabulary acquisition as well as improving memorization. They are suitable for learners of every age: children, teenagers and adults (Pachina 2019). Many websites offer premade flashcards or authoring tools, such as Quizlet[20]. Thanks to Quizlet, learners can practise vocabulary of different fields or create their own set of flashcards, without printing anything. Flashcards appear on the computer screen and learners interact through mouse and keyboard (Shvidko 2015).

According to Stockwell and Levy (2000: 185-186), grammar can be delivered through computer technology in three different forms. The first form is the traditional grammar-drilling: grammar exercises, previosusly available on CDs, are now offered by many websites for free. They can also be created by language instructors with an authoring program (see section 2.2.3 CALL Typology, CALL authoring programs).

The second form is the learn-centered grammar instruction, which focuses on the ability of the learner to understand the rules of the target language. The learner can do that autonomously with the aid of a computer. This second form is linked to the learning approach called learning by researching. Learning by researching is considered an activity with great benefits for the learners and it is related to two different concepts. The first concept regards information literacy: researching on the web allows learners to improve their knowledge as well as their ability to select useful and appropriate materials (Fotos and Browne 2004: 10). Secondly, autonomous language analysis improves its acquisition. According to Johns (1991: 2) languages are data which learners investigate to discover languages' rules and features. Since computers can store, manipulate and retrieve a huge amount of information, they give learners the tools to analyse linguistic data and create their personal explanations of how languages work. These analysing tools are online encyclopedias, websites for language teaching and learning, concordance programs, and online dictionaries. Corpora are software or online programs, which can scan large amounts of texts and present the most relevant information regarding use, grammar or syntax (Warschauer and Healey 1998: 61).

[20] www.quizlet.com

Moreover, concordance programs can be combined with online dictionaries for retrieving information on specific items (Fotos and Browne 2004: 10).

The third and last form is called communicative language instruction. Learners acquire grammar rules in real communicative events: through CMC activities, learners can notice their own mistakes, receive a correction, observe how others use grammar structures and recycle already used constructions (Stockwell and Levy 2006: 186-187).

Reading and writing

Computers have also brought advantages in the area of writing (Warschauer and Healey 1998: 61). Writing activities can be carried out with CALL software, or online and installed word processor plus tools for text analysis i.e. spelling checker and grammar checker. For instance, Microsoft Word and Google Docs are both word processors with spelling and grammar checker available in many languages. There are also online resources for fostering writing skills. USA Purdue University developed the project Online Writing Lab (OWL)[21] for improving writing skills and it addresses both native speakers and learners of English as Second Language (ESL). BBC Learning English[22] offers web-based and self-study courses for writing, such as Go The Distance: Academic Writing. In these cases, learners can check autonomously their abilities regarding writing. However, also in face-to-face language courses the computer is used to foster and improve writing skills. Teachers often require their students to write essays and email on the computer and share them on ad hoc platform (Fotos and Browne 2004: 9), such as the Moodle platform[23] adopted by many universities to deliver content and offer a virtual environment.

It is usually recognized that computers are effective for improving writing skills. As learning takes place also through communication, learners are encouraged to exchange

[21] owl.purdue.edu
[22] www.bbc.co.uk/learningenglish/english/
[23] moodle.org

emails or discuss on LANs (Local Area Network)[24] i.e. among students of a language course or posting on chats and forums (Fotos and Browne 2004: 9). Moodle, which I have already mentioned, allows students not only to share their works but also to take part in online forums and communicate with each other. Moreover, there are many online cultural exchanges which enable learners to interact with other learners or native speakers by emails or other channels. Outside the school environment, learners can participate in online forums such as Wordreference Forums[25]. In Wordreference Forums, available in many languages, people discuss grammar, translation or cultural topics with learners or expert speakers. Thanks to Web 2.0, collaborative writing has become a useful way to improve writing skills. Collaborative writing has many benefits: it involves interaction in authentic environments; it encourages participants to perform as it is a shared work; it promotes reading and writing in an ongoing circle. Collaborative writing takes place via various channels such as chats, forum, blogs, wikis, shared documents. Social networks like Facebook and Twitter allow short text entries i.e. post-reply. The genre of fanfiction i.e. fictional stories based on a character, a series of books or a television show has created networks of potential authors, who share their pieces of writings on the internet: fanfiction can be another form of collaborative writing (Blake 2016: 135-136). These activities can be performed by learners autonomously or can be part of a classroom course. In this case, instructors can create ad hoc virtual spaces for his/her students.

Speaking and listening

Listening has greatly benefited from technology. Multimedia technology has offered various audio and video materials, and the range of these resources has increased after the rise of the internet. Moreover, new features linked to videos have drastically changed the way of developing listening skills. Indeed it is possible to add captions i.e. subtitles and glosses to videos, which improve listening skills and foster comprehension

[24] LAN is a communication network for connecting computer in a building, like a school, or a small group of buildings (https://www.britannica.com/technology/local-area-network)
[25] forum.wordreference.com

and vocabulary acquisition (Hubbard 2009: 5). Although YouTube, which hosts an unlimited amount of videos, there are many collections for educational purposes such as Clilstore[26] by European Union and Deutsch Aktuell: Video-Thema by Deutsche Welle. Videos are suitable for both autonomous learners (as many video materials have built-in captions and exercises) and classroom activities; instructors can create playlists, tailored to their programs, and add captions and glosses through services such as Zaption or Thinglink (Blake 2016: 132-133). As the videos are often authentic materials, they also help in studying informal language and target culture (Hubbard 2009: 5-6; Blake 2016: 133).

Technology can also assist the improvement of speaking in different ways. Oral communication with another person is a good way to improve speaking; it is possible through services such as Skype or Video conferencing systems (e.g. Wimba), or other tools. Italki[27] is a website which provides learners the chance to hire a language teacher or to find a partner for a linguistic exchange.

Multimedia technology and new computer tools such as microphones and voice recorders have enabled learners to exploit computers to improve their pronunciation skills (Warschauer and Healey 1998: 60). Automatic Speech Recognition (ASR) plays an important role, as it allows learners to record themselves through the computer microphone and then it checks the pronunciation (Hubbard 2009: 6). ASR is provided by various softwares and websites. For example, a useful speaking-training software is MyEt[28] by the education company L-Labs. MyET can be downloaded and installed on a personal device to train speaking skills and check pronunciation autonomously. Many resources for speaking improvement are available online, for instance the educational website Pod101[29] has mini-courses focused on pronunciation for European, African and Asian languages. I have previously mentioned the website Italki: indeed one can compare one's pronunciation with and receive feedback from an instructor or expert

[26] multidict.net/clilstore/
[27] www.italki.com
[28] tw.myet.com
[29] languagepod101.com

speaker. Dictation is an underrated activity in the field of CALL. However, there are several computer applications such as Online Dictation[30], and Speechlogger[31] which transcribe learners' speech and enable them to check their pronunciation, fluency and accuracy without peer or instructor's feedback (Blake 2016: 131).

2.2.5 Future directions of CALL

In this section I will briefly outline the possible future of CALL. In the first part, I will describe the influence of Artificial Intelligence (AI) and its application to CALL. The second part is devoted to a short overview of mobile devices and language learning, as Chapter 3 Mobile-Assisted Language Learning (MALL) will provide a deeper analysis of this new field.

Artificial Intelligence and CALL

Generally speaking, Artificial Intelligence (AI) refers to the exploitation of computational systems i.e. computers to solve problems. This could be possible through complicated formulae and algorithms elaborated by scientists and researchers and applied to computer technology. Today it would be more correct to use the terms Machine Learning. Machine Learning describes the use of large sets of data to train computers to create models for problem-solving and predicting outcomes of future events. In other words, computers are programmed to find solutions for various problems based on statistics. Machine learning is used in various fields, for instance self-driven car or Facebook ad system (Austin 2019).

As reported by Douglas (2006: 465) and Austin (2019), AI and Machine Learning have already been applied to language learning, as they have helped to make the learning process via computer customized. For example, adaptive testing is an application of AI and Machine Learning. Moreover, related fields such as computational linguistics,

[30] dictation.io
[31] speechlogger.appspot.com

Natural Language Processing (NLP), Human Language Technologies (HLT) have started to shape a new type of CALL called Intelligent CALL (ICALL). ICALL systems combine language practice with artificial intelligence, exploiting computational linguistics, NLP and HLT. Therefore, I will give a brief explanation of these three dimensions.

Computational Linguistics (CL) is a multidisciplinary field, which compromises computer science and linguistics. CL integrates theoretical linguistics, mathematical linguistics and software engineering. The main topic of the CL field is decoding and reproducing natural language according to statistical or rule-based models, in order to facilitate human-computer interaction (Lappin 2014). Although findings in CL research have not been directly applied to CALL, they have influenced NLP and HLT (ten Hacken 2003: 23).

NLP is a branch of AI which studies the interaction between humans and the computer using natural language. Moreover, it aims to develop systems for understanding and making sense of the natural language. NLP has improved over the years thanks to the machine learning approach i.e. using statistics. Today NLP has been used for various applications: automatic translation services like Google Translate; advanced grammar checker e.g. Grammarly; Interactive Voice Response (IVR); personal assistant application such as Ok Google or Alexa by Amazon (Garbade 2018). In relation to language learning and CALL, NLP has contributed through applications such as concordancing, text-alignment, speech recognition and system, lemmatization and parsing (Nerbonne 2019: 12-13).

HLT or simply Language Technology (LT) is a subfield of AI, which outgrew in the late nineties from research into NLP. LT regards the computational methods and computer technology for processing human language. Briefly, LT aims to develop systems which are able to analyze, produce, modify and translate written and oral language i.e. text and speech. In order to develop these systems, LT relies on mathematical models of human language and machine learning . In reference to CALL

and language learning, LT has been applied for speech recognition, speech synthesis, text categorization, text summarization, text indexing, text retrieval and text data mining (Uszkoreit 1997: 2-3 ; 2016). Therefore, it is now possible to give an exhaustive definition of ICALL. ICALL is an improved version of traditional CALL, as it exploits the benefits of AI (in particular of NLP and HLT) to foster language acquisition. Indeed ICALL provides the following: adaptive learning and testing; an interactive learning process (as learners can interact with the computer through both written and oral expression); a learning experience which tries to mirror real situations thanks to virtual reality. Although some AI features have already been exploited in traditional CALL, such as speech recognition or immediate feedback, ICALL is still on the way to be widely implemented (Kennan and Munday 2018: 22-26).

The shift from CALL to MALL

In the last fifteen years, new devices have become available on the market, the so-called mobile devices: laptops, tablets and smartphones. Mobile devices grew out of computer technology and have many functionalities which usually characterised computers. Moreover, mobile devices offer new advantages as they are personal, portable and cheaper. Due to their features, in a few years mobile devices have spread widely all over the globe. Thus, as with computers, the educational field has started to exploit mobile devices to deliver content, and new areas have emerged such as M-learning and MALL. M-learning refers to the process of learning with the support of a mobile device, whereas Mobile-Assisted Language Learning (MALL) describes language acquisition supported by a mobile device. MALL, through a great variety of tools, has rapidly caught the attention of language learners and teachers (Jarvis and Achelleos 2013: 1-2, 9-10; Kannan and Munday 2018: 16-17). More details will be provided in Chapter 3 Mobile-Assisted Language Learning (MALL).

2.2.6 Why use CALL?

Generally speaking, CALL has brought many opportunities to language instructors and students, as well as autonomous learners. However, everything has a flip side: although CALL has various advantages, it is also hindered by some challenges.

Advantages of CALL

CALL resources are often available online for free, especially after the WWW (Scott and Beadle 2014: 28). Furthermore, CALL activities can be carried out in every place with a computer and an internet access i.e. CALL takes place in synchronous and asynchronous mode, regardless of the venue (Warschauer and Healey 1998: 59). CALL requires basic computer equipment, which is usually owned by the majority of schools as well as students or autonomous learners (Scott and Beadle 2014: 28).

According to various studies about technologies and its effects on learners' engagements (Schindler et al. 2017), learners may be more motivated and engaged when they use the computer as a learning tool. For example, web conferencing usually has a positive effect on students as they are interested in interacting with other participants via various tools, in order to share ideas or collaborate for a project. Online collaborative projects (i.e. telecollaboration) make participants feel engaged in an environment with other peers and motivated to interact and produce good-quality texts (Schindler et al. 2017: 7-10). Computers can give learners a great sense of autonomy and encourage them to learn as much as possible (Coghlan 2014). Indeed in the previous sections I emphasized how learners can autonomously train their skills thanks to computer technology.

CALL is recognized as helping develop transversal skills. Indeed, CALL supports the acquisition of a foreign language (i.e. writing, reading, listening, speaking, vocabulary and grammar), as well as increasing cultural awareness, communicative and digital skills, thanks to the various activities and tools exploited by CALL such as multimedia

materials and the internet (Scott and Beadle 2014: 20-21, 28). Moreover, through multimedia and internet resources learners deal with authentic materials, and therefore with language actually used in authentic situations. Furthermore, computers provide a virtual environment for simulating interaction in real settings such as Social Networks or collaborative projects (Dina 2013: 251). One of the main benefits for language students and instructors is that exercises, especially repetitive ones, can be completed with the support of a computer instead of using pen and pencil. Computers can offer various stimuli and improve the learning experience, even regarding tasks usually considered boring (Coghlan 2014). In addition, CALL activities can be personalized according to the learners' level (Warschauer and Healy 1998: 59).

Thanks to CALL, language learners can assess their progress in an anonymous environment, and therefore they may feel less pressure. Moreover, feedback is targeted and constructive. In the CALL perspective, feedback should not judge the learners but help them to reflect on their learning path and improve their outcomes (Scott and Beadle 2014: 22).

Challenges of CALL

Both instructors and learners should be aware of how to select and use CALL tools and resources successfully. Especially for instructors, it is necessary to receive some kind of training (Scott and Beadle 2014: 24). However, there is still some resistance to CALL on the part of instructors. Some instructors are still rejecting using computers and their tools since they feel that their role is threatened. Moreover, they do not have any interest in acquiring the necessary ICT skills (Bax 2003: 25; Dina 2013: 251). For instance, using a word processor can offer many benefits to both instructors and learners: the former can easily correct tasks and adding glosses, the latter can have an assistant to avoid mistakes and get immediate feedback (Levy 2009: 778). Another challenge regards financial resources. Some schools as well as learners might face problems in purchasing computers and keep them updated (Coghlan 2014; Scott and Beadle 2014:

28). Indeed concerns about the real efficacy of using CALL is motivated by costs and lack of financial resources (Garrett 2009: 721).

Evaluation of CALL

In conclusion, CALL can effectively support learners in studying a language as it offers many advantages. However, these benefits rely on the appropriate use of computer technology. Technology is not effective or ineffective in education; its effects are strictly linked to how it is used. Therefore, the responsibility of using CALL appropriately falls on teachers and learners (Kern 2006: 188-189; Garrett 2009: 721). As reported by Levy (2009: 779) technology can serve language acquisition; it is an aid but not responsible for the learning process.

Chapter 3

Mobile-Assisted Language Learning (MALL)

This chapter is devoted to Mobile-Assisted Language Learning, usually shortened as MALL. First, I will give some details about Mobile-Learning (M-Learning), which is an evolution of E-Learning enabled by the latest innovations in technology. Moreover, MALL will be defined by the means of the features of M-learning and the background of CALL. I will then analyse mobile technology. Due to its features (especially smartphones) mobile devices may be effective tools for education. In the second part of this chapter, I will focus on MALL. MALL encompasses both the use of the general features of mobile devices and that of specific programs called apps. As there are many apps available for language acquisition, I will review the most popular ones.

3.1 Mobile-Learning (M-Learning)

3.1.1 A definition of Mobile-Learning

There have been various attempts to define Mobile-Learning (M-Learning), despite its short existence. Crompton (2013: 3-4) offers an overview of the most relevant definitions of M-Learning, but all of them are vague and do not provide enough details . However, it emerges that all these definitions underline the size of the device (handheld, palmtop), which supports the learning process, and the mobility of the learner. Indeed these are two features of M-Learning. M-Learning should be considered an approach to learning enabled by the innovations in mobile technology and education (McQuiggan et al. 2015 : 31). As I will explain in Section 3.1.2, mobile technology refers to personal, portable and internet-connected devices such as mobile phones, tablets and laptops. As for E-Learning and CALL, in M-learning and MALL the internet also plays an important role (Oller 2012: 1). The report by GSMA Mobile Education (2011: 3) provided a comprehensive definition of MALL: a learning process which takes place

through portable devices such as smartphones, netbooks or tablets, or handheld gaming devices. The learning process involves both teachers and students interacting with each other and with the devices, any time and anywhere. The learning experience is easily contextualized and personalized.

As reported in the previous definition, M-Learning is characterized by some key features closely linked to the idea of using personal and portable devices. Through mobile devices, learners can access materials and carry out activities regardless of time and location. Moreover, learning is not limited to the time spent in school (GDSA 2011: 4; McQuiggan et al. 2015: 33). M-Learning is also quite flexible and customizable. Indeed mobile devices can track learners' paths and help them focus on the materials and activities which meet their needs (McQuiggan et al. 2015: 34; Nail and Ammar 2017: 4). Mobile technology can be a cost-effective alternative to traditional educational approaches: it is not necessary to spend money on paper and multimedia materials, and mobile devices such as phones and tablets may often be bought at affordable prices (GDSA 2011: 4; Nail and Ammar 2017: 4).

3.1.2 Mobile technology and the rise of the smartphone

The term mobile technology refers to both portable and personal devices. Naismith et Al. (2004: 7) classified technology for education according to four parameters: portable, personal, static, shared. Portable means that a device can be easily moved; personal indicates a device for private use; static is the quality of being fixed; shared describes something experienced by more than one person[1]. A classification of technology for education is summarized in the following figure:

[1] The definition of portable on www.merriam-webster.com

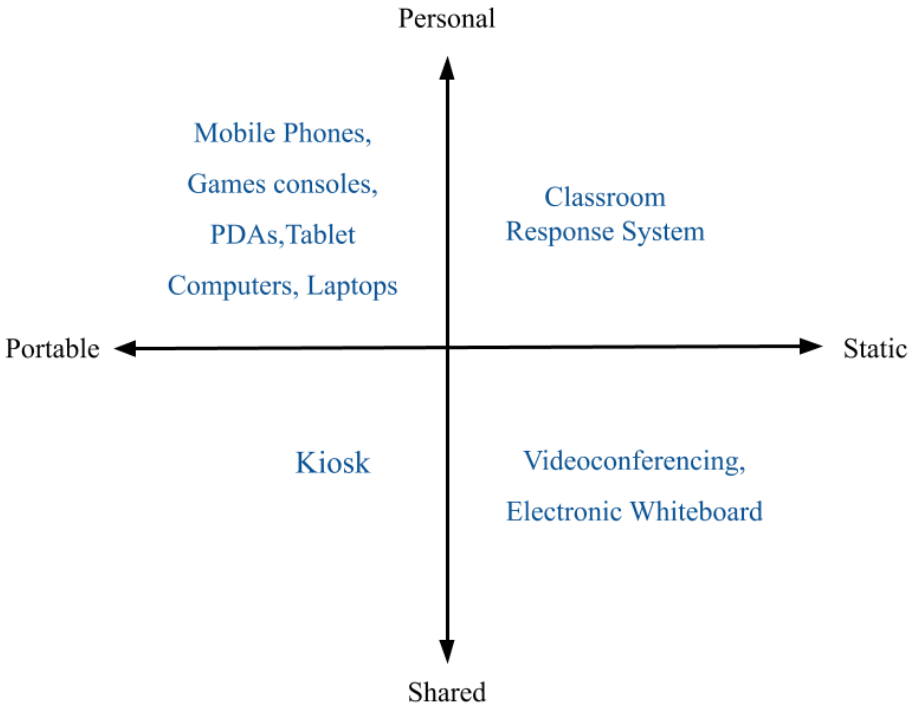


Figure 4. A classification of technology for education (based on Naismith et al. 2004: 7)

The most relevant section of the figure regards portable and personal devices i.e. mobile technology: mobile phones, game consoles, Personal Digital Assistants (PDAs), Tablet computers, Laptops. As this classification is based on the review by Naismith et al. (2004: 7), some considerations are necessary. In the last fifteen years, the features of mobile devices have improved considerably, also with the help of new internet-linked services. Today mobile devices are not only easy to carry, but they offer a great variety of multimedia content and have internet-access. The most common mobile devices are considered to be laptops, tablets and mobile phones (McQuiggan et al. 2015: 68-79). The diffusion of these devices is confirmed by the GSMA report (2019): in 2018 67% of the global population had a mobile device services subscription (around 5.1 billion), which is the web-based account to access the internet via mobile technology . Smartphones accounted for a large part of these subscriptions (60%). Thus, most internet connection regards smartphone use.

Mobile phones have been reported as one of the most relevant 21st century gadgets by many newspapers and magazines, such as Time (2016) and the Economist (2015). Moreover, the greatest innovation in mobile technology is the smartphone: it encompasses the size and features of the mobile phone with many functionalities of computer. Today there is a great interest in using mobile phones for various activities, including the field of education (Levy and Stockwell 2006: 215; Becker et al. 2017: 40). I will briefly explain the evolution of mobile phones and the success of the smartphone. It has to be borne in mind that the mobile phone evolution regards the innovations in phone technology and telecommunication systems i.e. radio waves and the internet.

Mobile phone history dates back to the 1940s, when rudimental radio-telephones were limited to war and industrial purposes. There was little research on mobile phones and it is necessary to wait until the 1970s to see the first example of mobile phones. Indeed in 1972 Motorola laid the foundations of mobile phone technology with the invention of the first prototype cellular. During the 1970s and 1980s other companies such as Panasonic and Nokia started to produce cellulars, which had only one function: voice calls. At the same time, the telecommunication industry in the most developed countries improved its services. A turning point took place in the 1990s, when phones began to be built with a keyboard and offer other functions such as SMS and limited internet access for sending and receiving emails (Farley 2005: 22-32). Since the 2000s new mobile phones have been launched on the market with a colour screen, games, a digital camera and a better internet connection (Cardeño 2013: 20). In 2007 Apple launched the first fully-equipped smartphone: the iPhone. Since then, many other companies have started to develop and sell smartphones, which are much more complicated devices than the first mobile phones which had appeared before.

Over the years, smartphones have been improving their features and combine together the functionalities of a small computer and a mobile phone. In comparison to the early models of 2007, today smartphones have larger screens, higher resolution, an improved touch-screen technology, virtual keyboard, enlarged storage capability (Godwin-Jones

2011: 2, 2017:3). Although all these aspects are quite important, the key point regarding the smartphone is the internet connectivity. Many functions of smartphones are linked to internet access: chatting, emailing, surfing on social networks or services such as online banking. Indeed, the voice call is the least important feature and smartphones are used as a portable computer the size of a phone. They have provided the possibility to carry out many everyday activities and turned into a must-have commodity (Godwin-Jones 2017: 3-4). Over the years, many people began to develop a kind of addiction to this device. The attachment to the smartphone and its features is also confirmed by The Psychological Society (2017). In its top-twenty most stressful events for Britons, Losing Smartphone ranked 14th and recorded a 5.79 score, just a few points under Terrorist Attack (5.84). Moreover, in 2008, the term nomophobia (no-phone-phobia) was coined to indicate the fear of being without one's mobile phone (Bahl and DeIullis 2015: 764). Moreno and Traxler (2016: 78) hold an interesting view about the smartphone, as "an extension of human cognition, sense and memory". Godwin-Jones (2017: 4) defined the smartphone as a "digitale appendage", which can play a significant role in education.

Generally speaking, the spread of mobile devices (especially smartphones) is due to technological innovations i.e. developments in hardware, software and network systems, as well as psychological factors. Nonetheless, this spread has been considered a positive factor in order to offer new ways of delivering education. The GSMA report (2018, 2019) has shown that mobile technology supports mobile-based solutions in the framework of UNESCO Development Goals. As mentioned in Section 3.1.1 A Definition of Mobile-Learning, mobile technology has interesting features which can be applied to education. In the following section I will focus on mobile technology for language learning.

3.2 Mobile-Assisted Language Learning (MALL)

A recent definition of Mobile-Assisted Language Learning was provided by Kukulska-Hulme (2018: 742) "Mobile-assisted language learning (MALL) is the use of smartphones and other mobile technologies in language learning, especially in situations where portability and situated learning offer specific advantages". In other words, MALL represents language acquisition supported by a mobile device. Mobile devices are portable devices such as laptops, tablets, MP3/4 and mobile phones (Kukulska-Hulme and Shield 2008: 273). Section 3.1.2 Mobile technology and the rise of Smartphone encompasses an overview of mobile devices. MALL has its roots in M-Learning and CALL (Stockwell and Hubbard 2013: 5). Indeed M-Learning regards the application of mobile devices for educational purposes, whereas CALL describes the use computer technology (including internet services) in language learning. Thus, MALL is a branch of M-Learning and an evolution of CALL. Stockwell and Hubbard (2013: 5) outlined the relationships among CALL, M-Learning and MALL as in Figure 3.1

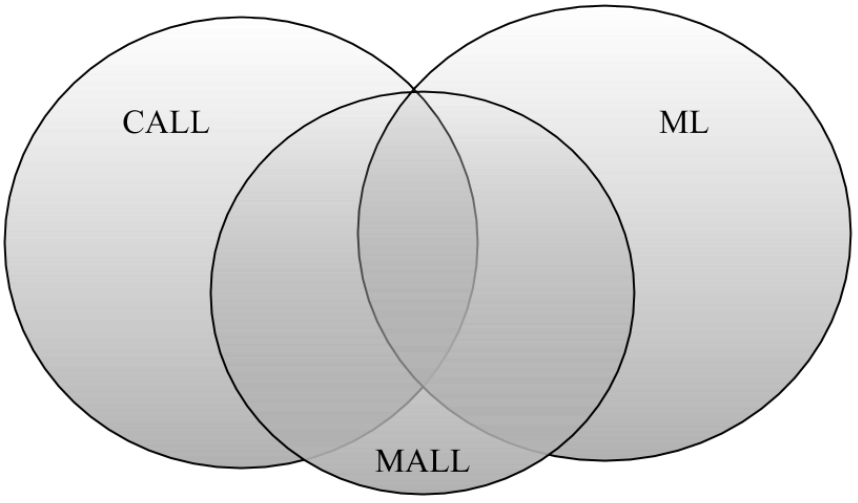


Figure 5. Relationships between CALL, M-Learning and MALL (based on Stockwell and Hubbard 2013:5)

3.3 Using mobile devices for language education

Mobile devices can be used for educational purposes in two different ways. Mobile devices can be used to run specific applications for education or they can be exploited for their functionalities which are not designed explicitly for education (Kukulska-Hulme 2018). Moreover, the use of mobile devices can fit classroom activities as well as support autonomous learners. I will give an overview of the different activities which can be carried out with mobile devices. In the first part, I will focus on the general features of mobile devices which can support language learning. With the term "general features" I refer to those features which are common for mobile devices and are not explicitly designed for language acquisition. In the second part, I provide an overview of the most popular applications (usually shortened as apps) for language learning.

3.3.1. General features

Vocabulary and Grammar

According to Godwin-Jones (2018), many mobile apps focus on delivering vocabulary and grammar. Anki[2] and Memrise[3] are flashcard apps with many features for learning and improving vocabulary through repetition, multimedia glosses and gaming. Many flashcard-websites developed for desktop computers have a mobile-friendly version, such as Quizlet (Godwin-Jones 2018b: 11). With reference to grammar, apps such as Learn English Grammar UK[4] by the British Council offer explanations and exercises with immediate feedback. However, mobile devices have features not specifically addressed to language learning which can be exploited for this purpose (Kukulska-Hulme 2016: 11).

[2] https://apps.ankiweb.net/
[3] https://www.memrise.com/
[4] https://learnenglish.britishcouncil.org/apps/learnenglish-grammar-uk-edition

Online reading materials, ebooks, podcasts or video transcript created for language learning can have a glossary or dictionary links i.e. hypermedia which help in comprehension and acquiring new vocabulary. However, materials without a glossary or other support can be examined thanks to online dictionaries. Online dictionaries, such as Merriam Webster[5] and Oxford Online Dictionaries[6], usually suit mobile devices, therefore learners can check meaning and other information anytime and anywhere (Kukulska-Hulme 2018: 744). Learning new words while reading, listening to or watching something is defined as incidental learning. Incidental learning takes place as a byproduct of other activities, and it is unplanned and spontaneous (Kelly 2012: 1517-1519). With mobile devices, it is possible to create one's own dictionary or glossary with adding pictures, audio or video resources by using specific applications like ThingLink[7]. Creating a dictionary or glossary is both an autonomous activity or a class project (Godwin-Jones 2018b:11). An interesting way to acquire vocabulary is by changing the language setting of your mobile device or only some applications (Godwin-Jones 2018b: 10). Thus, the device users may learn new words and phrases thanks to their constant exposure accompanied by images.

With reference to grammar, online researching is a valid tool to study as well as looking for exercises. For example, Grammaropolis[8] offers game-based activities for grammar study (Godwin-Jones 2018b: 11). Online dictionaries and corpora can be visited with a mobile device; they are both good tools for studying grammar. For example, The British National Corpus[9] can be searched to retrieve information about words' and phrases' use in context or collocations (Godwin-Jones 2017; Godwin-Jones 2018b: 11).

[5] https://www.merriam-webster.com/
[6] https://www.oxfordlearnersdictionaries.com/
[7] https://www.thinglink.com/
[8] https://www.grammaropolis.com/index.php
[9] http://www.natcorp.ox.ac.uk/

Reading and Writing

Thanks to the internet, an endless source of reading materials are available for free or under subscription. These materials are usually mobile-friendly: web pages, online newspapers, magazines, comics, ebooks, various documents. These materials can be browsered online or downloaded for off-line use. Furthermore, mobile devices usually have the default application Google Play Books[10]: it is possible to download inexpensive or free ebooks in different languages. With mobile devices, reading can take place on a regular basis without restrictions of time and place: indeed people, who do not stay often spend time in front of a desktop computer, can read on public transport, waiting room or comfortably laying on the sofa (Kukulska-Hulme 2018: 744).

Writing skills can also be improved with mobile devices, despite smaller screen size. Posting on social networks (which are usually browsered via mobile device) is an effective way to practice writing and it stimulates conversation: social networks become the digital environment for circular writing activities. Interaction on social media takes place in context and it is linked to real language use, therefore it is possible to learn the socially and pragmatically appropriate use of language (Godwin-Jones 2017; Godwin-Jones 2018b: 12). Furthermore, instructors can use social networks for class activities as they can create a private group for their students and encourage them to share posts. The same activities can be carried out with a What's Up group. Spelling is accurate as built-in virtual keyboard suggest the right form of the words.

Speaking and Listening

As with CALL, mobile devices offer the chance to train both listening and speaking skills. In reference to listening skills, many websites have up-to-date podcasts and videos available also on mobile devices. These materials can be authentic or developed for learners. In any case, podcasts and videos can be used for self study or to create

[10] https://play.google.com/books

in-class activities. Instructors can create listening activities without a desktop computer or a computer lab, as both instructors and students are likely to bring their own devices i.e. laptops, tablets or smartphones (which is the most probable option). On general websites, like YouTube, or news websites, such as ARD Tagesschau.de[11] and CNN[12], there are authentic materials to train like a native-speaker. Some websites, such as BBC Learning English[13], and specific channels on YouTube, like Pod101[14][15], select audio and video materials addressed to learners. Although these websites were developed for desktop computers, they have a mobile-friendly version. Moreover, many websites have a related application which can be downloaded on mobile devices. Last but not least, materials for listening skills often have the off-line function i.e. downloadable. Thanks to mobile devices, listening activities can be carried out both on a casual basis and as part of a routine: driving in the car, sitting in the bus, doing houschoires, studying (Kukulska-Hulme 2018: 744).

Mobile devices can support the development of speaking skills. One of the most widely used tools of mobile devices regarding speaking skills is voice-recorder and video camera. Recording can be used in several ways. Learners can record themselves to analyse and assess their speaking ability or share it on a platform for receiving feedback. Especially for in-class activities or homework, instructors can create a private platform, social network group or What's Up group to share recordings and send voice messages: members can have both a peer review or the instructor's evaluation. As with CALL, virtual exchange websites or voice chats are available also for mobile devices such as Italki[16] or Tandem Language Exchange[17]. These applications enable learners to practice conversation with and get feedback from a native-speaker; it suits autonomous learners. In Chapter 2, I reported that speaking and pronunciation can be trained thanks to automatic speech recognition software. Similar applications are also available for

[11] https://www.tagesschau.de/
[12] https://edition.cnn.com/
[13] http://www.bbc.co.uk/learningenglish/
[14] https://languagepod101.com/
[15] https://www.youtube.com/user/innovativelanguage
[16] https://www.italki.com/?hl=it
[17] https://www.tandem.net/

mobile devices. An alternative way to practice conversation skills i.e. speaking and listening at the same time is exploiting the personal assistant available on many mobile devices such as Siri by Apple Inc.[18] or Google Assistant[19]. You can ask your own device to tell a story or some information and listen to the answer; moreover you can check pronunciation and fluency.

Portable devices represent an important benefit to shy and unconfident learners for improving their speaking skills. They can practice in private spaces with a portable and personal device, unlikely with a desktop computer which is usually a shared family commodity. Constant practising may foster confidence and encourage learners to compare their speaking skills with peers or instructors (Kukulska-Hulme 2018: 744).

3.3.2 Apps for language acquisition

A definition of app

As mentioned above, mobile devices (especially smartphones) are on the rise: they offer many functions such as internet browsing, email management, audio and video recording. Moreover, mobile devices usually run specific programs called apps. The term App is an abbreviation of the word application. An application can be described as a software designed for mobile devices, which is highly interactive with its users. The app market has been constantly growing with overlapping categories. Indeed, mobile apps were originally designed for informational and productivity purposes e.g. emails, calendars, contacts, calculators and weather information. The spread of mobile technology has facilitated the development of new types of apps; a significant part of the app market is dedicated to education apps. Education apps are developed by companies, universities and public institutions, and are available for download on distribution platforms such as Apple Store or Play Store, free of charge or by purchase (Inukollu et al. 2014: 15-16; Rockahr, Griesbaum and Thomas Mandl 2018: 267).

[18] https://www.apple.com/uk/siri/
[19] https://assistant.google.com/intl/en_uk/

A description of apps for language acquisition

Mobile devices can be used for language acquisition. Indeed I previously described how features not specifically designed for language education can be exploited for this purpose. However, mobile devices (and especially smartphones) can run apps specifically addressed to language education. Apps for language learning are apps whose main aim is helping users in acquiring or improving a foreign language. These apps can be designed for only some aspects of language learning or may offer full courses, and they can focus on one or more languages. Apps for language learning should encompass some key features, in order to effectively foster some kind of acquisition. I have identified these features after analysing M-Learning and reviewed some of the most popular apps for language acquisition.

Theory plus practice

An app which tries to foster language learning should not only deliver materials, but also include practical activities: app users need to apply what they study, in order to learn successfully (Tsymbalyuk n.d.). Moreover, in order to engage users in authentic conversation as well as use of the language, an app can offer a platform or network, for example Duolingo gives the chance to create "Clubs" where users can discuss and communicate (Goyal 2018). Thus, communication can be encompassed in an app for language learning and play an important role in the learning process.

Motivation

Motivation is an abstract concept to describe why a person behaves in a certain way. Over the years, various psychological theories try to explain the cause of motivation. With reference to second language acquisition, there are various ways of classifying motivation theories. One of the most famous classifications of motivational theories in second language acquisition identifies extrinsic and intrinsic orientation. The former

regards interest in learning a language for future opportunities (for example useful qualification for a jon) and in a short time; the latter concerns learning a language for a real interest in the target language and culture. There is evidence that learners attitude towards the target language and culture significantly affect the success in language acquisition. That does not mean that language learning takes place only for fun. Intrinsically motivated learners ought to learn effectively and step by step. A high level of engagement helps to continue studying and improving little by little (Ushioda 2008: 20-21). Thus, materials and approaches for language learning should be designed according to these elements.

Generally speaking, learners have a positive attitude in using mobile devices for education. As already mentioned, language learners have good outcomes when they are interested and engaged. Thus, an app should deliver interesting content and makes its users feel engaged. There are many strategies which foster motivation (Dorney 2001: 28). Regarding apps for language acquisition, various elements help in maintaining users' motivation: sounds and pictures, game-based activities, daily reminders, detailed study plan.

Gamification is an essential element in language learning apps and it distinguishes them from traditional textbooks and online courses. Gamification makes language learning fun and easy, as well as it keeps users interested. Indeed, gamification is linked to motivation strategies. It can have different forms such as rewarding and competition. Rewarding for accomplished tasks and goals contributes to make the users feel motivated: virtual currency for buying extra-lessons and activities; special badge which indicate the status of the user. Competition is another common element of language learning apps and it lies within the area of motivation. Indeed some apps such as Duolingo have virtual boards to show the achievements of each user in the form of points and scores. Users see the results of other learners, compete with each other and feel motivated to practice more (Tsymbalyuk n.d.; Chen 2016: 43; Goyal 2018).

Guidance

Guidance is important for two reasons. First, users should receive explanations about how to use the app and deal with its features. As already mentioned in this work, learners should be aware about how to use technology to effectively learn a language. Secondly, language learners might need more explanations or corrections. Thus, an online tutor, a user community or network can be really useful for the learning process of the users and avoid wasting time on researching for explanations and information (Tsymbalyuk n.d.). In reference to this, an app should also give feedback about exercises as it allows learners to reflect and conduct self-evaluation (Chen 2016: 43). Many studies in second language acquisition support the efficacy of explicit metalinguistic feedback. In brief words, learners are positively affected by mistakes if they learn what is wrong and why it is wrong. Apps usually give feedback through visual clues i.e. color changes or other types of highlighting, sound effects. Only a small number of apps deliver text-based feedback (Heil et al. 2016: 42-43).

Revision as a tool for fostering language acquisition

App developers have to consider that the brain cannot retain information for a long time. Thus, another key point is providing revision: users should receive additional tasks and activities to revise previous lessons and to ensure the learning process (Tsymbalyuk n.d.). This feature of apps links with the concept of intake. Intake refers to that part of the input stored in short-term memory which can potentially create relationships with the long-term memory. The intake is a mid stage between receiving an input and its acquisition, thus the intake requires to be processed: the input is stored in the short-term memory for comprehension and immediate recognition, then it is processed in the long-term memory for acquisition (Chi 2016: 77-78). Exercising and reflecting on materials received (the input) can lead to the intake phase of language acquisition. The complete assimilation of the new materials means that acquisition has taken place

(VanPatten and Benati 2010: 98). If we think about apps, sending revision notifications and exercises support the language acquisition.

Design and usability

The design of the app also has a great influence. Indeed a well-designed and intuitive interface, as well as navigation system, appeals to the users and convinces them to keep on using the app (Goyal 2018). Design goes along with usability. Usability describes the ease at which the users can use an application to achieve a certain goal. The official definition of usability is provided by the international standard ISO 9241-11: "the extent to which a product can be used by specific users to achieve specific goals with effectiveness, efficiency, and satisfaction in a specified context of use". Effectiveness means actually learning something; efficiency refers to not wasting time and resources; satisfaction describes the state of fulfillment after an activity. Thus, usability is important as it affects learners' productivity in terms of quality, time and costs (Kumar et al. 2019: 3537-3538). An app with a high level of usability means that people are more likely to use that app and continue to study, compared to those which are not user-friendly (Lynch 2019). Evaluating usability and design is not a fixed process, yet app developers have to keep in mind some directives directives: screen size, capability of delivering and receiving input, personalization, clearness of functionalities and easy browsing, feedback, help or guidance function, possibility of uploading and downloading content (Kumar et al. 2019: 3546-3547; Lynch 2019). A detailed usability guideline to evaluate usability in mobile applications is available in Appendix A.

Personalization

Personalization or customization is an important feature in apps for language learning. Apps usually allowed learners to modify the settings to meet their needs, such as daily goal i.e. the number of items to study or exercises (Chen 2016: 43). In the field of personalization, the ability of an app to adapt to the learners' outcomes can also be

included. Indeed apps usually record learners' activity and provide feedback in the form of tests and revision exercises (Heil et Al. 2016).

Monetization

There is another factor which characterizes apps, not only those for language learning. This factor does not affect the quality of an app but it affects its diffusion among learners: free or under paywall. A free app means that it can be downloaded and accessed for free; it might require its users to watch a commercial or see an advertisement. Paid apps require purchasing for accessing the whole app or to unlock extra features and lessons (Heil et Al. 2016). People usually prefer free apps. Nonetheless, if an app offers something different and works really well, people will buy it. In this case, the overall quality of the app (which can be evaluated according to the features previously enlisted) should be high and comply with the expectations of its users (Lefebvre 2012; Salz 2017).

Outline of most popular apps for language acquisition

In the next sections I will provide an overview of the most frequently downloaded and highest-ranked apps for language learning, according to the platforms Play Store[20] and App Store[21]. These apps have been positively reviewed by many magazines such as the New York Times (article by Ravenscraft in 2019) and Bloomberg (article by Ekstein in 2017). However, detailed information is available below.

Duolingo

Duolingo[22] is one of the most well-known apps for language learning, although it also has a desktop version. Duolingo is easily recognizable thanks to its green owl mascot. It is a free app, but there is a premium version which offers few benefits such as offline

[20] play.google.com/store/apps
[21] www.apple.com/it/ios/app-store
[22] www.duolingo.com

lessons and ad block i.e. the app does not show its users advertisements. On Duolingo users have a wide range of languages available, from mainstream European and Asian languages to less common languages such as Gaelic and Irish. This app is easy to use: once you have set up a profile, you can customize your language course by setting your weekly goals and start. Each course has modules that are devoted to a topic, and each topic trains various skills. Indeed Duolingo encompasses listening, speaking, reading, writing, grammar and vocabulary, and simple translations. Table 5 shows some examples of exercises provided by Duolingo. There is an in-built dictionary: when the user clicks on a word, a small window shows the translation of that word. Explanations regarding grammar are mainly implicit: the learners are asked to observe models and read a brief explanation before applying new information to the exercises. Furthermore, learners have to assess their knowledge for every module through a test, otherwise it is not possible to study other modules. Moreover, they also get feedback about their weaknesses (Duffy 2019, Munday 2019: 87).

Skill/Area	**Activity Description**
Listening and Speaking	Listening to a word or sentence and recording what you hear. You get immediate feedback and are encouraged to repeat the exercise until you achieve a good performance
Writing	Creating a sentence from scrambled items provided by the app
Translation	Translating a short sentence or word, by writing it or assembling it with scrambled items.
Vocabulary	Selecting a picture according to the word on the screen

Table 5. Example of exercises by Duolingo

Duolingo has many good features. First of all, the interface is well-designed and intuitive. It keeps learners motivated by using different tools, such as sounds and pictures, and goal setting. The goal-setting tool enables learners to decide how much time they can focus on language learning; consequently the app tailored content and exercises according to the needs of the learners (Duffy 2019). Motivation is also ensured through points and streaks for continuous use: in other words, each lesson is completed after reaching your personal point goal and streaks indicate the number of days in a row of constant use (Adams 2019). Moreover Duolingo reminds learners to study daily through a notification (Duffy 2019). The app has different levels (from beginner to advanced); therefore learners with a previous knowledge of the language are not forced to start from the basics. Progresses are trackled and proficiency in each module is assessed through tests. As already mentioned, some features must be purchased. However, Duolingo allows learners to earn "Lingots" when they complete some tasks and achieve the daily goal or watched ads. With these lingots, learners can buy bonus lessons regarding various topics such as slang and idioms (Agomuoh 2018).

Duolingo users have also noted some problems. One of the main criticisms of Duolingo regards the use of unnatural sentences in exercises, such as "My horse collects teeth". These sentences do not have any connections to authentic contexts and sound meaningless: the users find them quite useless and a waste of time. Furthermore, some activities are very repetitive (Powers 2019). People who most benefit from the use of Duolingo are mainly beginner or low-level learners. Indeed, Duolingo founder Von Ahn claims that the app helps users to move from beginner to early intermediate (Adams 2019). Another disadvantage of Duolingo regards the voice used by the app. The computerized voice sometimes sounds robotic and it highlights the lack of real conversation in authentic situations. In addition, the computerized voice negatively affects listening and speaking exercises (Scott 2019).

Busuu

Busuu[23] is a well-rated app for language learning. Although it also has a desktop version, it is mainly used as a smartphone app. Busuu offers courses for twelve languages, including Japanese and Arabic. Moreover, the courses are organised and designed according to the Common European Framework of Reference (CEFR)[24] from A1 to B2. If the user has previous knowledge of the language, it is possible to take a placement test in order to check at which level to start. Users can also personalize their study plan and the daily workload. Furthermore, thanks to a partnership with McGraw-Hill Education[25], Busuu users can take the end-of-course test and earn an official certification for some of the languages offered: Spanish, French, Italian, German, Portuguese, Italian and English. Busuu is not only for single users, but it has also created services for institutions and companies. For instance, if students are equipped with the Busuu app and their instructor can access the management platform to assign activities based on the in-class course and track their results (Brown 2019).

Busuu has two main features. On one hand it offers content and various exercises regarding listening, speaking, reading, writing, vocabulary and grammar; on the other hand Busuu encompasses a network of learners (in 2019 the company estimated having 90 million users) who support each other: exercises are corrected by native speakers. For instance, an English person studying French provides feedback to learners of English and receives feedback from French native speakers. In other words, writing and speaking exercises are peer-reviewed. Therefore, Busuu is based on communicative learning and telecollaboration. Furthermore, the difficulty of exercises increases over time and progress is assessed through quizzes. Courses are well structured and the interface is essential and intuitive: a dashboard provides an overview of the content as well as what the user has studied and what he/she is about to study. Each lesson covers a specific topic and includes different kinds of exercises for listening, speaking, reading,

[23] www.busuu.com
[24] https://www.coe.int/en/web/common-european-framework-reference-languages
[25] www.mheducation.co.uk

writing, vocabulary and grammar (Duffy 2017a). Some examples are provided in table 6.

Skill/ Area	**Activity Description**
Writing	Completing a writing task and getting a peer-review from a native-speaker
Speaking	Recording yourself and getting a peer-review from a native-speaker
Vocabulary	Seeing vocabulary flashcards and then taking a quiz

Table 6. Examples of exercises by Busuu

Among the advantages of Busuu, one can include the high-level content. Both written and audio materials are well-designed and not too fiction i.e. they mirror real-life conversations and do not seem explicitly produced for learners; moreover the authentic recorded voice helps users with pronunciation and listening skills. The correction of writing and speaking activities by native speakers also helps to foster authentic language learning (Nushi and Jenabzadeh 2016: 34-35; Brown 2019). The app has an accurate AI- powered system which identifies writing errors: many apps do not detect if the users forget accents or special characters like the circumflex (^) or tilde (~); with Busuu users have to pay attention to the slightest detail (Brown 2019). The section myVocabulary summarizes the terms already studied and it helps users to revise them through tests (Lisandrini 2017).

Busuu can also be criticized. The most interesting features such as unlimited peer-review are included in the premium version, which means behind a paywall. However fees are quite affordable and the contents pay off the tiny investment (Fisher

2020). Learners might miss detailed grammar explanations, as there are only brief grammar tips provided during the lessons (Lisandrini 2017) .

Babbel

Babbel[26] was one of the first language services on the market; the company was established in Germany in 2007. Babbel is considered one of the best apps for language learning, although it requires a monthly, quarterly, biannually or annual membership. However, it is possible to try a free trial. Babbel has courses for fourteen languages and the materials for each language are unique: they are designed according to the features of each language and are not the translation from another course. Lessons are for different levels, from beginner to advanced. There are general courses or separate lesson packages for improving specific language areas. A typical lesson starts with vocabulary accompanied by pictures; then vocabulary is put in context such as sentences and short dialogues. Pop-ups explicitly explain grammar rules. Exercises are not of a great variety and quite repetitive, but they are straight to the point. Furthermore, they include different skills and areas (Duffy 2019; Singh 2019). Some examples of activities are summarized in table 7.

Skill/ Area	**Activity Description**
Reading and Writing	Completing a dialogue with the right words
Listening and Speaking	Listening to and repeating a sentence; the speech recognition system evaluates the pronunciation
Grammar	Completing the sentence by choosing the right grammar form of an item e.g. a verb

[26] www.babbel.com

	or article
Translation	Choosing the correct translation among some written options

Table 7. Examples of exercises by Babbel

Babbel offers various interesting features. Babbel users study materials which are explicitly developed for the features of a specific language, thus materials are usually of good quality. Nonetheless, some courses are defined better-designed and more effective than others (Nushi and Hosein Eqbali 2018 117: 118; Duffy 2019b). Moreover, sentences and structures are linked to authentic contexts: users study only things that they will actually use. The audio files are of high-quality: track are clear and performed by native speakers, and therefore it has a great influence on both learners' pronunciation and listening skills (Philipp 2018; Scott 2019). The membership plans are not expensive; indeed courses are more affordable than a classic class course. As previously mentioned, there are lessons for different levels: if learners have a previous knowledge, they can skip the lower levels. Furthermore, learners can jump or repeat lessons at their will (Duffy 2019). Lessons have a coherent pattern, as the information acquired in the previous lesson builds the next stage of the course. That means each lesson includes older topics and materials and uses them to teach new content (Scott 2019).

On the other hand, Babbel has some drawbacks. As the content is tailored for each language, not every course offers the same kind of experience. That means some language courses are better designed than others. Moreover, some users might not be motivated and be bored as the app exercises are repetitive. One of the main disadvantages is the lack of peer or tutor review, however in late 2019 the company has worked in order to add online tutoring (Duffy 2019b). Babbel might not be the right choice for advanced learners. Indeed beginner and intermediate learners greatly benefit from Babbel courses in comparison to advanced learners (Scott 2019). Although it does

not deal with the quality of the app, users perceive negatively that for each course available on Babbel it is necessary to pay (Scott 2019).

Memrise

Memrise[27] was launched in 2010 as both a platform and a mobile app. It aims to teach vocabulary and it has been developed for twenty languages. Memrise app is very easy to use, as it is based on virtual flashcards: not only written materials, but also video and audio files. Indeed on its website, Memrise defines itself as "the opposite of textbook learning: it's enjoyable and effective". The company also explained on its website that Memrise is built on three principles. First, words are learnt thanks to the link with an item such as a photo or an example sentence. Secondly, vocabulary knowledge is tested through different testing types to keep users interested. Last but not least, the app sends scheduled reminders to encourage learners to revise vocabulary regularly (Zhang 2019: 153).

Learners can use the mobile app for free with some limitations or purchase the Pro version with more features such as offline access. Users can personalize their account by adding personal information; choosing one or more courses; deciding the daily goal; joining or creating users' group to study and compete. Learning statistics is also available to users, so they can autonomously check their progress. Courses are from beginner to advanced levels, but there is not a placement test to indicate which course suits the needs of the learners. Each course requires users to take it from the first lesson; the following lessons remain unlocked until the previous one has been completed. Materials and exercises are organised as thematic units, such as "Have you eaten?" or "What are you thinking?" (Zhang 2019: 152-153). A typical lesson provides a series of virtual flashcards i.e. a written word or sentence accompanied with a video or audio file on a specific topic; then it gives to the learners some easy activities to complete (see table 8 for some examples). When the user completes the vocabulary section, the

[27] www.memrise.com

grammar section becomes unlocked. Grammar explanations are very easy and are immediately followed by an exercise. Every accomplished activity makes the users earn points; two leaderboards show the point earned in comparison to other learners of the same language or the group members (Philipps 2018, Zhang 2019: 155).

Skill/ Area	**Activity Description**
Vocabulary	Watching videos or listening to audio files linked to a word or sentence (a kind of virtual flashcard)
Translation	Matching the word or sentence with its translation
Listening	Listening to a word or sentence and selecting the right written item

Table 8. Examples of exercises by Memrise

Like every app, Memrise has some upsides. It suits beginners especially, as they can acquire a huge quantity of vocabulary. However, the app also provides lesson packages for advanced learners (Duffy 2017b). The vocabulary covers a wide range of topics, from geography to math (Powers 2019). On the other hand, some downsides have to be considered. If you compare Memrise to other apps such as Duolingo or Busuu, Memrise offers less in terms of writing, speaking and grammar. Indeed Memrise focuses on vocabulary and should be considered an aid to improve this language aspect (Zhang 2019: 155). Some courses of Memrise are not developed by the company itself i.e. by users, therefore the quality of these courses is not guaranteed (Duffy 2017b). Another relevant disadvantage is the lack of proper speaking exercise. Indeed the app does not have any recording exercises and neither speech recognition system (Powers 2019).

3.3.3 Is MALL effective?

Benefits of MALL

Mobile devices, especially smartphones and tablets, are constantly attracting more and more digital learners thanks to their features, which almost make them into a replacement of the computer (Sawin 2017). Portability and fast connectivity are combined with high-quality image, video recording, speech recognition and good storage capability. Moreover, smartphones, tablets and the latest generation of laptops offer responsive touch screens. All these elements are potentially make the language acquisition experience multi-sensory (every language skill and area can be trained) and different from using traditional materials and textbooks (Rosell-Aguilar 2014). Since people use mobile devices constantly every day (especially smartphones), it is ideal to exploit them also on educational purpose (Sawin 2017).

Mobile devices can be an easy and cost-effective solution for language learning, as a tool and source of materials. In the previous sections, I have shown how mobile devices can be used effectively to develop listening, speaking, writing, reading skills, vocabulary and grammar. For example, low-budget smartphones and tablets also have good multimedia equipment and good connectivity; mobile-friendly magazines and newspapers have many articles available for free instead of buying an expensive soft copy which will be thrown away (Rosell-Aguilar 2014) . As already mentioned in this chapter, many collaborative writing activities can be carried out with mobile devices with the benefit of continuity: texting, posting on social networks regardless of time or location. Moreover, it is possible to add audio, video and pictures thanks to the built-in tools of mobile devices i.e. video camera and voice recorder. These tools make it easier to take part in virtual exchange for improving speaking and communication. As with computers, the learner has autonomy in shaping his/her learning path, with the advantage of anytime/anywhere. Generally speaking, the main advantages of using

mobile devices are: costs, multimedia technology, interactive experience[28], availability of materials, portability, opportunity to study anytime and anywhere, on-going learning (Rosell-Aguilar 2014; Sawin 2017).

With reference to mobile devices for supporting language classrooms, instructors should consider mobile devices a useful resource and not a threat to their role. According to the communicative approach, language is learnt when it is used through collaborative and communicative activities. Using mobile devices means having a tool and an endless source of materials which support these activities, whereas the instructor should be a guide and facilitator. Indeed he/she should explain how to properly use mobile devices during class activities. Obviously, instructors should know how mobile devices could be applied in the classroom, as well as for homework (Godwin-Jones 2017). Furthermore, instructors should be encouraged to adopt mobile devices in class as students use them continually, and therefore it would be useful to teach them how to use them for education in and beyond the class environment. Instructing students on the ways of using mobile technology for accomplishing various tasks is connected to the recent rise of digital literacies (Sawin 2017).

A focus on apps

An effective app combines together pedagogy, design and usability. I have previously mentioned the importance of design and usability to encourage people to use an app; at the same time pedagogical principles play an important role. In other words, an app should avoid providing purely listening and repeating exercises (Rosell-Aguilar 2014). Every learner looks for an app which suits his/her needs and the right solution may be the use of more apps. Thus, evaluating apps from the perspective of users might be complicated, as every learner has his/her learning style as well as different expectations (Rosell-Aguilar 2014).

[28] With the term "interactive" I mean activities in which language is actually used, such as collaborative writing projects or video projects aimed at language acquisition. Interactivity is a concept linked to the mainstream Communicative Language Teaching approach (Rivers 2000: 4)

Generally speaking, apps are considered a good way to practise vocabulary and grammar, but there is still discussion about how effective apps are to improve skills such as writing or speaking. Apps are usually recognized as a useful tool for beginner learners, indeed there is a decrease in the users as their language level goes up. People tend to use apps several times a week, in their free time. Thus, the learning experience is not seen as an only-in-school activity app users rate positively the opportunity to receive immediate feedback, even though it is not really detailed. The learning experience with the apps is generally well-rated, as users find apps met or exceeded their expectations. Moreover, they state that apps helped them to increase their skills and the time spent on apps for language learning is worthwhile. Another positive factor which encourages learners to use apps is the possibility to study and make mistakes in a private and anonymous environment i.e. the app. Training with apps suits not only autonomous learners, but also those who attend regular classes. Indeed, instructors have started promoting the use of apps outside classes. There is not a particular reason which encourages people to use apps, except for the interest in learning a new language due to personal interest, career or study goals, holiday travel and living abroad (Rosell-Aguilar 2018).

Like the most recent approaches to language teaching focused on communication, apps might be seen as an old approach mirroring the audio-lingual method. Apps usually have audio-lingual and writing exercises with little room for communication, since only in the last years did apps start to offer platforms for communication among users. Nonetheless, apps still have the great advantage of encouraging people to practice for a while everyday. Continuity is an essential element in learning a new language, studying a language one hour a week (probably with no interest or active involvement) will not bring any benefits (Groves et al. 2015).

Chapter 4

Investigating MALL from a users' perspective

In the previous chapter, I analysed the features of MALL and its applications. Up until now, I have based my work on literature. In this chapter I would like to study how people actually use mobile devices for language learning. Therefore, I created a survey to investigate MALL from a user's perspective. Detailed information about the survey can be found in its introduction reported below; a copy of the online questionnaire as it appeared to participants is provided in Appendix B.

> [...] *Mobile-Assisted Language Learning (MALL) is a new approach to language learning whose roots date back to the introduction of mobile devices. In brief, MALL refers to the use of mobile devices (i.e. smartphones, tablets and laptops) for foreign language learning.*
>
> *Mobile devices offer different tools for studying a foreign language:*
> *-General features (e.g. online dictionary, YouTube channels, Social Networks)*
> *-Specific applications (e.g. Duolingo, Babbel)*
>
> *This survey aims to analyse how users study or improve a foreign language with the tools offered by mobile devices. Moreover, the survey will collect general data about how often, where and why we can use a mobile device for language learning, as well as the general opinion of the users.*
>
> *The survey is completely anonymous for study purposes and sensitive data will not be collected.*
> *There are 12 questions and it will take approximately 5 minutes to complete*. [...]

In the next sections, I will analyse the content, method and findings of the survey.

4.1 Survey overview

A survey is a tool "to find out detailed information about a lot of different people or things, usually by asking people a series of questions"[1]. In my questionnaire[2] I designed twelve questions which mirror some of the concepts analysed in Chapter 3. These questions belong to the areas of behavioural and attitudinal questions. Behavioural questions aim to find out what participants do or have done. Behavioural questions usually regard life-styles, habits and personal history. Attitudinal questions are used to investigate what people think; there are four subsets of attitudinal questions: attitudes, opinions, beliefs, interests, values (Dörnyei 2003: 8-9).

The questionnaire contains questions in which the participants had to choose an option already provided, for example by selecting one item or ticking more boxes. In other words, the questionnaire has closed-ended (or closed-format) questions (Dörnyei 2003: 35; Walliman 2011: 97-98). There are five categories of closed-ended questions: multiple-choice items, checklists, rating scales, rank order items, numeric items. In my questionnaire there are two of these categories. Multiple-choice items mean the participants have to choose one or more answers; the possible answers contain as much information as possible. With rating scales, the participants are required to evaluate an item by marking a value of the scale. The scale can be made up of various attributes such as frequency (never-always), intensity (not at all-very much), opinion (strongly disagree-strongly agree). With reference to my questionnaire, the Likert scale has been applied: each possible answer is associated with a number (Dörnyei 2003: 36-37, 43).

In my questionnaire, questions address very specific topics and verify how many participants give a certain answer. This is also possible thanks to the close-ended

[1] https://www.collinsdictionary.com/it/dizionario/inglese/survey
[2] A questionnaire is any set of written questions, whereas survey includes the set of written questions and the process of collecting and analyzing data (https://www.surveymonkey.com/mp/survey-vs-questionnaire/).

questions. Thus, the questionnaire belongs to the area of qualitative research. According to the definition of Dörnyei (2003: 14):

"This makes questionnaire data particularly suited for quantitative, statistical analysis. After all, the essential characteristic of quantitative research is that it employs categories, viewpoints, and models that have been precisely defined by the researcher in advance, and numerical or directly quantifiable data are collected to determine the relationship between these categories and to test the research hypotheses".

However, the questionnaire contains one question (question number 12) which lies in the field of qualitative research. Qualitative data are personal and might have specific content not expected by the designer of the questionnaire. Qualitative data are usually the results of open-ended questions. Indeed question 12 is open-ended, which means there are no options to choose from but a blank space to fill in. Open-ended questions have the benefit of bringing to light new topics not mentioned in the questionnaire (Dörnyei 2003: 14, 47).

Below each question is explained accompanied by its possible answers.

Question 1: Which mobile device do you use most of all to learn a foreign language? [Smartphone; Tablet; Laptop]

I asked the participants to indicate the device they use most. In Chapter 3 I described mobile devices such as laptops, tablets and smartphones. According to various studies, the smartphone is the most common device. Thus, I wished to verify if this statement is also true for language learners.

Question 2: Which of these apps have you used to learn a foreign language? [Busuu; Babbel; Memrise; I haven't used any apps for language learning; Other]

Participants have to indicate if they use an app for language acquisition and which app: Duolingo, Busuu, Babbel, Memrise. As I described in Chapter 3, these apps are the most popular available on Play Store and App Store. There is also the option "Other", that gave the participants the opportunity to report other apps they have used.

Question 3: Which of these features of mobile devices have you used to learn a foreign language? [Audio and Video; Social Networks; Online dictionaries; Online books, newspapers and magazines; Voice recorder or video camera; I haven't used any general features for foreign language learning; Other]

Participants are asked to say whether they use generic features of mobile devices for language learning. The examples of how these features can improve language skills and area are connected to what I wrote in the previous chapter. Participants can also add other ways in which they use mobile technology for second language acquisition.

Question 4: What have you used your mobile device for (not including apps)? [Vocabulary; Grammar; Reading; Writing; Listening; Speaking; None of the above]

I asked participants for which skills or areas they have used mobile devices, without considering apps. In Chapter 3 I gave an overview of the various tools and resources available for mobile devices for improving the skills and areas of language acquisition. This question aims to verify whether language learners actually exploit mobile devices as was mentioned in Chapter 3.

Question 5: What have you used apps for? [Vocabulary; Grammar; Reading; Writing; Listening; Speaking; None of the above]

I asked participants for which skills or areas they have used apps. In Chapter 3 I describe some famous apps for language acquisition, and how they can improve one or more skills and areas of language use. I was interested in discovering what language learners believe apps are useful for.

Question 6: How important are the following for foreign language learning with mobile devices?

Participants were requested to rate each feature listed (Design and Usability; Content; Free Access) from 1= not important to 5= extremely important. These features were also discussed in Chapter 3: the level of quality, free access, good design and ease of use encourage learners to exploit or avoid some tools and materials. However, learners might have different opinions about how much these elements influence their decisions.

Question 7: How often do you use a mobile device for foreign language learning? [Less than once a week; 1-2 times a week; 3-4 times a week; More than 4 times a week; Every day]

Participants were asked how much time they dedicated to study with a mobile device. As the main benefit of mobile devices is portability, one can suppose that language learning with a smartphone or tablet can easily occur more than once per week. However, I also expected contrary responses.

Question 8: Where do you use a mobile device for foreign language learning? [At school/ university/language center; At home; On public transport; Other]

I asked participants where they study with their mobile devices. As I already stated, portability means that language learning can take place anywhere and anytime. The possible responses regard common places where people are expected to use their mobile devices; however, there is also the chance to give an alternative answer.

Question 9: Where do you use a mobile device for foreign language learning most often?[At school/ university/language center; At home; On public transport; Other]

This question aims to understand the most common place for studying with a mobile device.

Question 10: How and why have you used a mobile device for language learning?[In-class activities for a language course; Self-study for a language course; Autonomously; Other]

Participants were asked to choose the reason behind using a mobile device for language learning. Through their answers, it will be possible to understand if they were encouraged by an instructor or if it was an autonomous decision.

Question 11: Do you think mobile devices are effective for foreign language learning?[Yes; No; Maybe]

This question regards the general opinion of users about their experience and final outcomes after using a mobile device for language learning.

Question 12: Do you have any other comments about mobile devices and foreign language learning?

Participants had the opportunity of adding personal thoughts about mobile devices and language learning.

4.2 Method

As already explained in this section, the questionnaire lies in the area of qualitative research and contains closed-ended questions, i.e. multiple-choice and rating scale questions, except for the last question. Regarding the technical part of the survey, it was designed with the web-based tool Google Forms[3]. Google forms is included in the Google drive office suite[4], available for free on every kind of device: desktop computer, laptop, tablet and smartphone. In order to be used, Google Forms only requires internet access and a Google account[5]. With Google Forms, anyone can easily create different types of surveys and collect data. In addition, it is possible to customize the settings such as the background on the screen and the charts which accompany the results. The survey can be sent in different ways, such as personal email or social network posts.

I shared the survey on social networks, in communities of university students, language learners and friends. As reported in the introduction, it did not take more than five minutes to complete. The survey was available for one month during January 2020 and received 80 responses. The participants are aged between 20 and 35 years old, including both males and females. Their educational background varies in terms of level (high school degree or university degree) and subject (humanities, economics, scientific area).

[3] https://support.google.com/a/users/answer/9302965, https://www.google.com/intl/en-GB_ALL/forms/about/
[4] https://www.google.com/intl/en-GB_ALL/drive/
[5] Google offers free services for private use, the only requirement is a Google Account. A Google Account is a user account created with a personal email for accessing Google services. For more information https://support.google.com/work/android/answer/6371476?hl=en.

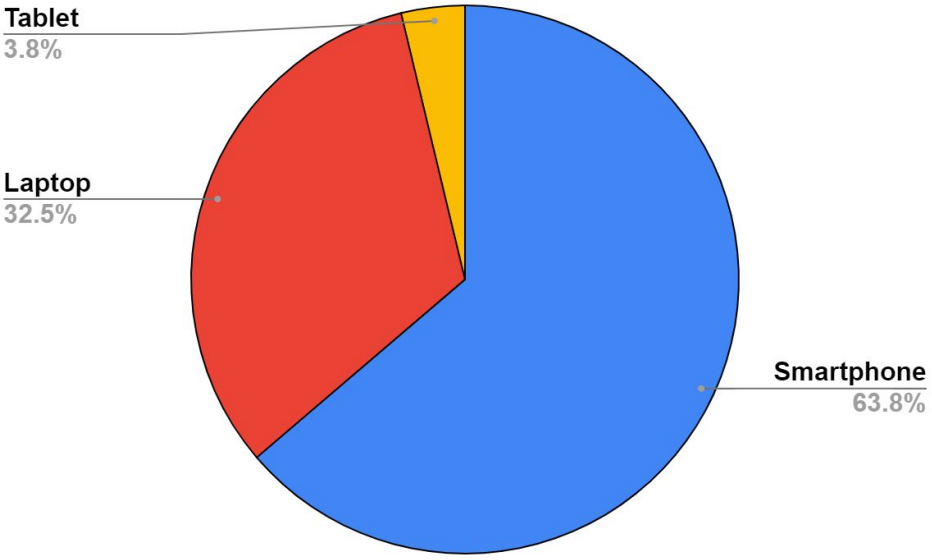
However, this survey aims to understand the use of MALL in general, regardless of gender or qualifications.

4.3 Findings

In this section I will show and comment on the findings for each question. According to qualitative research, findings can be represented more or less accurately by numbers and charts, and summarized by statistical techniques. Thus, for each question results are shown in number format and accompanied by charts. The last question belongs to qualitative research, which means it is not recorded with a number. The answers are opinions by participants, and therefore are quite subjective. Moreover, their interpretation relies on the human interviewer: it is non-standard and less accurate in comparison to quantitative analysis (Walliman 2011: 71-73). Below is the analysis of each question.

Question 1: Which mobile device do you use most of all to learn a foreign language?

As expected, the most frequently used device for language learning is the smartphone (63.7%, which means 51 participants). As mentioned in Chapter 3, the smartphone is commonly used for everyday tasks. Therefore it is also included in educational activities. Moreover, these results reflect the results of GSMA report for 2017 and its predictions for the future.



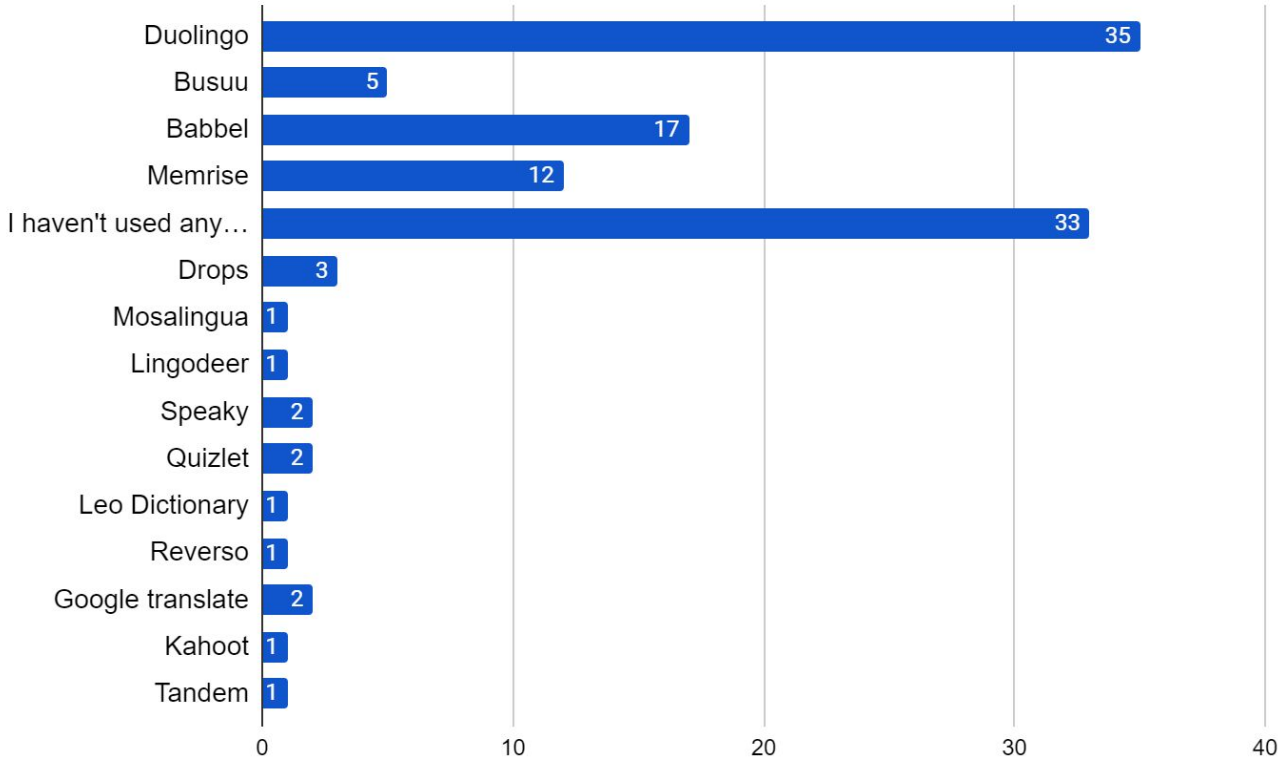
Device	Response %	Response (total 80)
Smartphone	63.7%	51
Tablet	3.7%	3
Laptop	32.5%	26

Figure 6. Results for question 1

Question 2: Which of these apps have you used to learn a foreign language?

For this question, participants could choose more than one option; therefore, every result should be compared to the total number of participants (80). First, it is to notice that 41% of the participants have not used any apps for language learning; thus only 59% have used one or more. Among those who used an app for language learning, the highest score was reached by Duolingo, followed by Babbel (17%), Memrise (12%) and Busuu (5%). It is interesting that Babbel, which is available only under payment, ranked second. A few participants reported using other less popular apps, such as Drops and

Speaky. However, the apps I described in Chapter 3 are confirmed to be the most famous among language learners.



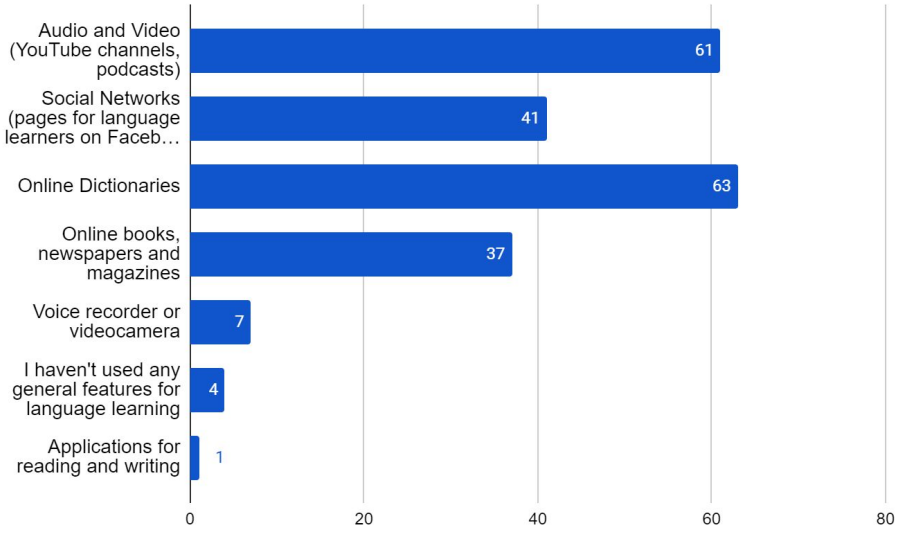
App	Response %	Response out of 80
Duolingo	43.8%	35
Busuu	6.3%	5
Babbel	21.3%	17
Memrise	15%	12
I haven’t used any apps for language learning	41%	33
Other		
Drops	3.8%	3
Mosalingua	1.3%	1
Lingodeer	1.3%	1

Speaky	2.6%	2
Quizlet	2.6%	2
Leo Dictionary	1.3%	1
Reverso	1.3%	1
Google translate	2.6%	2
Kahoot	1.3%	1
Tandem	1.3%	1

Figure 7. Results for question 2

Question 3: Which of these features of mobile devices have you used to learn a foreign language?

For this question, participants could select more than one option. People who have not used any general features for language learning account for 5%. Thus, 76 participants have used at least one general feature for language learning. Online dictionaries are used by 61 of the 76 participants and it is the most common application of a general feature. A slightly lower percentage (73.6%, which means 61 participants) regards Audio and Video. One participant indicated the use of generic applications for reading and writing.

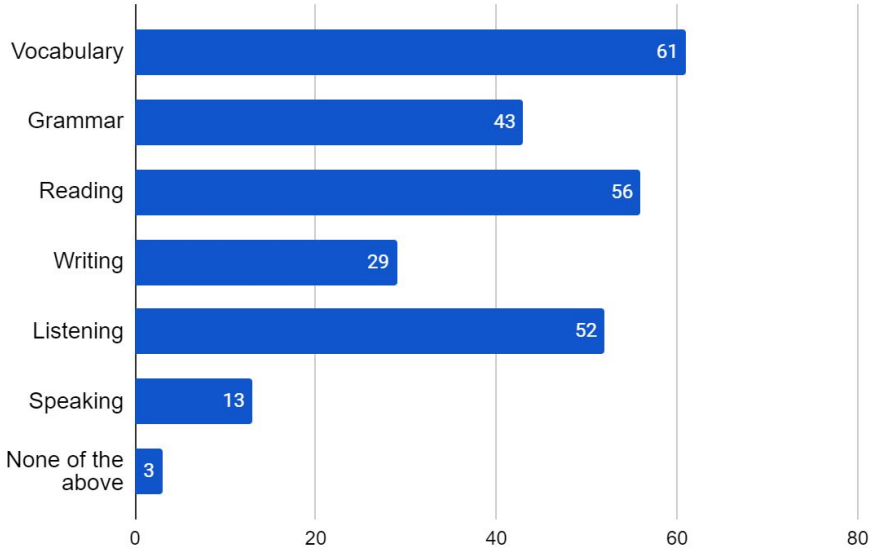


Feature	Response %	Response out of 80
Audio and Video (YouTube channels, podcasts)	73.6%	61
Social Networks (pages for language learners on Facebook, Twitter)	51.2%	41
Online Dictionaries	78.8%	63
Online books, newspapers and magazines	46.3%	37
Voice recorder or video camera	8.8%	7
I haven't used any general features for language learning	5%	4
Other		
Applications for reading and writing	1.3%	1

Figure 8. Results for question 3

Question 4: What have you used your mobile device for (not including apps)?

This question analysed which skills or areas are most improved with a mobile device, not including apps. For this question, participants could choose more than one option. However, vocabulary accounts for the most improved area (76.3%). Speaking slips to the lowest place, with 16.3% (13 out of 80).



Skill/Area	Response %	Response out of 80
Vocabulary	76.3%	61
Grammar	53.8%	43
Reading	70%	56
Writing	36.3%	29
Listening	63.7%	52
Speaking	16.3%	13
None of the above	3.8%	3

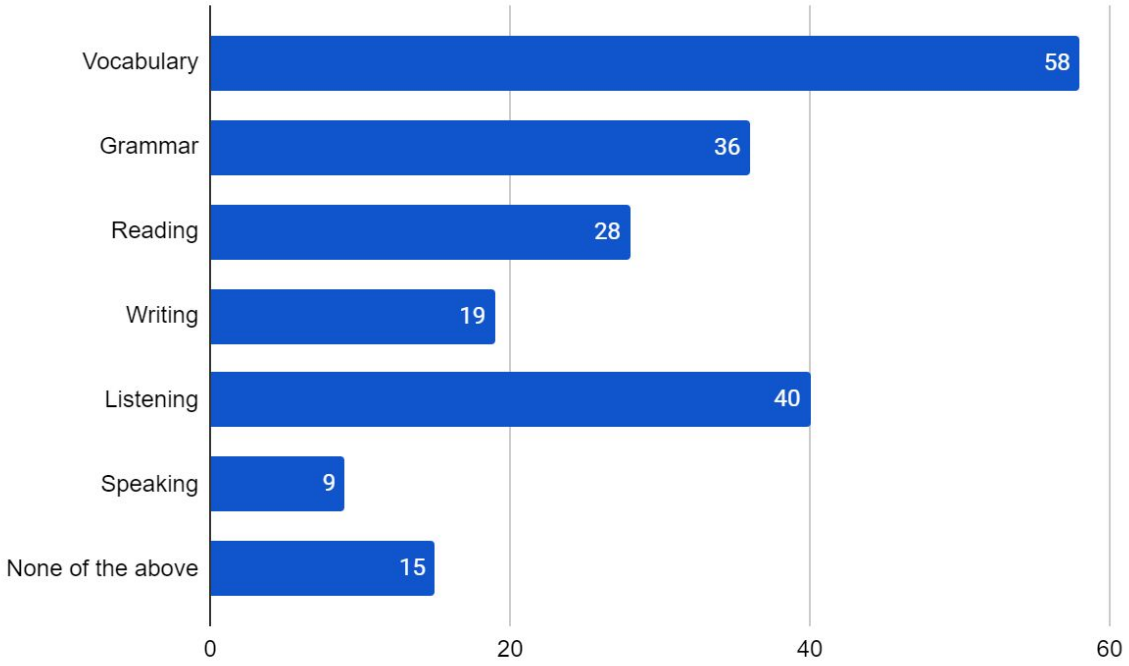
Figure 9. Results for question 4

Question 5: What have you used apps for?

For this question participants were allowed to select more than one option. First it is to notice that 15 participants chose "None of the above". For question 2, 33 participants declared that they did not use any apps for language learning. One can presume that 18 participants have used other types of apps which are not specifically designed for language learning. However, as with the previous question, vocabulary accounts for the largest percentage and speaking for the smallest.

From the users' perspective, it seems that both general features and apps offer a great opportunity to improve vocabulary. However, we have to consider that many activities like reading and listening promote incidental vocabulary learning. Moreover, online dictionaries and other resources like glossaries support systematic vocabulary acquisition. Apps usually have many activities which focus on explicit vocabulary learning, both in written and audio format. Therefore, users may perceive that mobile devices are used especially for vocabulary acquisition. With reference to speaking, very few learners use mobile devices to improve this skill. Although mobile devices have

various tools and resources for improving speaking, it seems that only few people are aware of the potentialities offered for this skill by mobile technology.



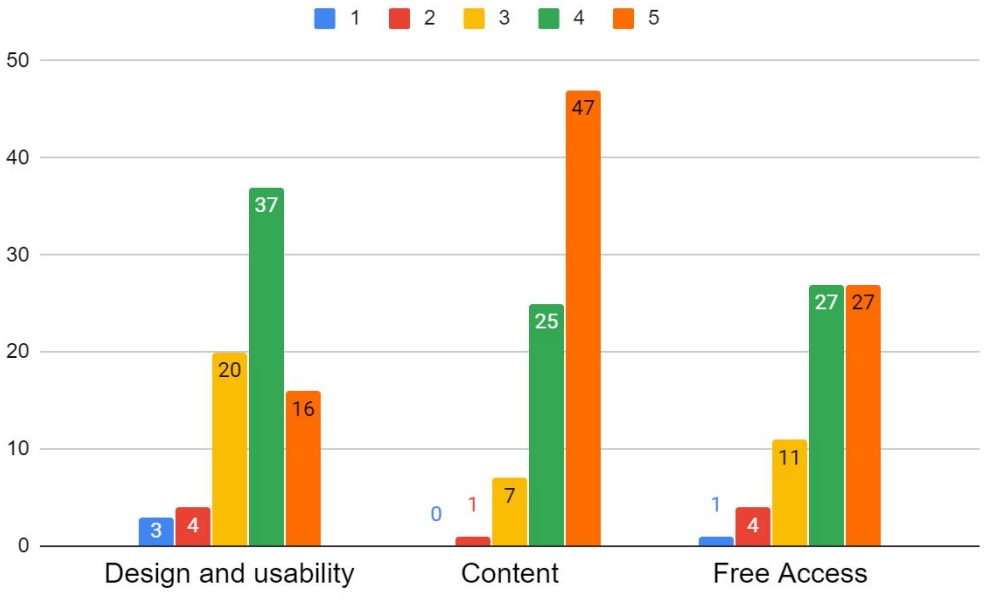
Skill/Area	Response %	Response out of 80
Vocabulary	72.5%	58 out of 80
Grammar	45%	36 out of 80
Reading	35%	28 out of 80
Writing	23%	19 out of 80
Listening	50%	40 out of 80
Speaking	11.3%	9 out of 80
None of the above	18.8%	15 out of 80

Figure 10. Results for question 5

Question 6: How important are the following for foreign language learning with mobile devices?

For this question, participants had to give a mark for every feature, from 1= not important to 5= extremely important. "Content" describes what a resource for language learning contains. "Design and usability" concerns the layout, and ease for accessing and using a tool or resource. The term "Free access" refers to products being free or under a paywall. These elements have been mentioned in Chapter 3, especially regarding apps. The first two elements affect the quality and effectiveness of a tool or resource, whereas the last ("free access") influences its popularity and the opinion of its users: when users pay, they expect a good-quality product or service.

According to the final results, when the participants use a mobile device for language learning they look for good content delivered in an easy and catchy way. At the same time, they prefer not to pay. As shown in the chart and table, the majority of the marks are 4 or 5: more than a half of the participants consider the three elements equally important when choosing a tool or resource. The most important role is played by content, as 47 participants evaluated it as extremely important.

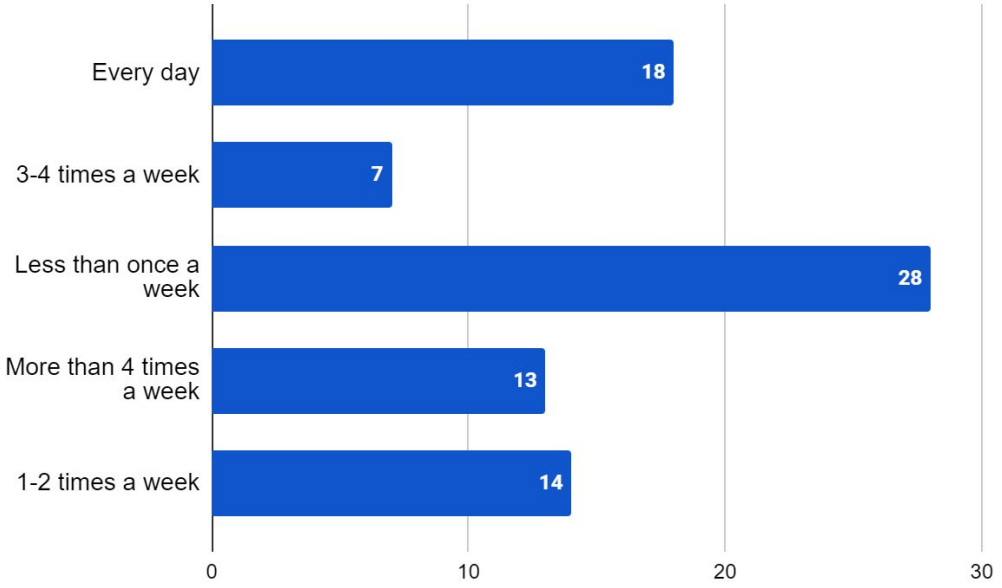


Ranking	Design and usability	Content	Free Access
1	3	0	1
2	4	1	4
3	20	7	11
4	37	25	27
5	16	47	27

Figure 11. Results for question 6

Question 7: How often do you use a mobile device for foreign language learning?

Participants had to indicate the frequency of studying a language with a mobile device. They could select one option. The results show that the highest percentage of people study a language with their mobile device less than once per week. Only 22% do it everyday. Thus, one can argue that even with mobile devices language learners behave as in a language class, which takes place once or twice per week, and obliges them to study not more than once per week. They do not exploit the "anytime, anywhere" feature offered by mobile technology.

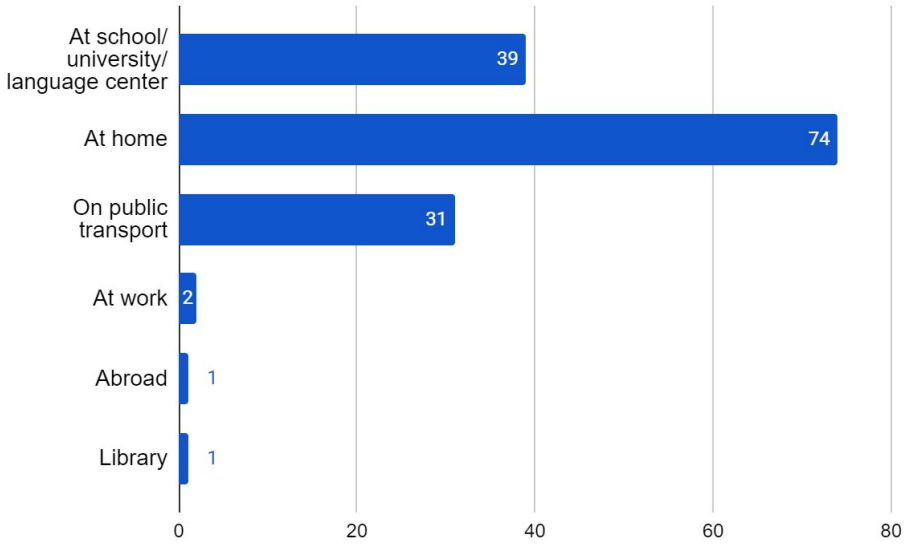


Frequency	Response %	Response (total 80)
Every day	22.5%	18
3-4 times a week	8.8%	7
Less than once a week	35%	28
More than 4 times a week	16.2%	13
1-2 times a week	17.5%	14

Figure 12. Results for question 7

Question 8: Where do you use a mobile device for foreign language learning?

For this question, participants could select more than one option and indicate the places where they study a language with a mobile device. The highest percentage, 92.5% (74 out of 80 participants) reported that they study with mobile devices at home. However, some of them also use one at school, university or a language center (39 participants) and on public transport (31 participants). A few participants (4) reported using mobile devices for language learning in other places: the workplace, library and abroad. "Abroad" could refer to travelling, studying or living in another country. However, the next question will define the most popular place for mobile technology and language learning.

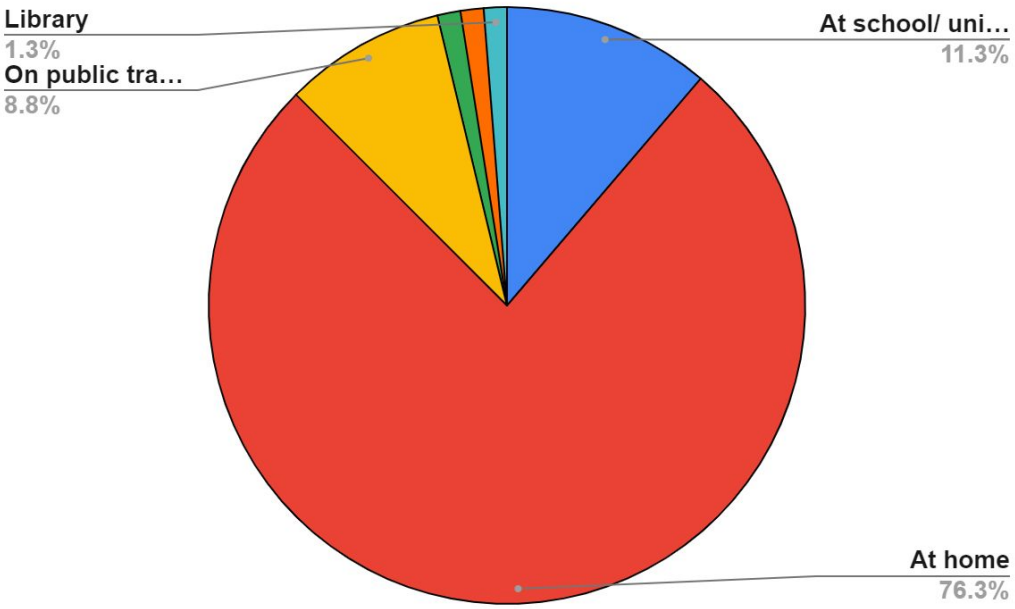


Place	Response %	Response out of 80
At school/ university/ language center	48.8%	39
At home	92.5%	74
On public transport	38.8%	31
Other		
At work	2.6%	2
Abroad	1.3%	1
Library	1.3%	1

Figure 13. Results for question 8

Question 9: Where do you use a mobile device for foreign language learning most often?

With this question, participants had to select the most common place where they have used a mobile device for language learning. Surprisingly, the option "At home" has the highest percentage (76.3%). It seems that the participants did not take advantage of the portability of mobile devices. One can suppose that language learning is still seen as an activity to carry out in the classroom or home environment. Only 16 participants stated that they study with mobile devices at school, university or language center and on public transport. Three participants use mobile devices for language acquisition most often in other places i.e. the workplace, abroad and the library.



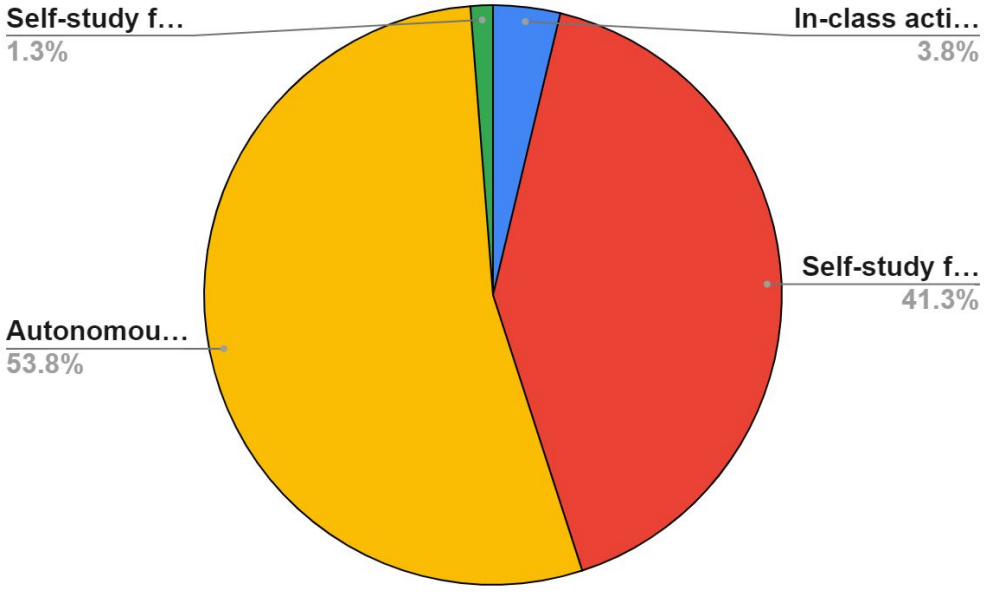
Place	Response %	Reponse (total 80)
At school/ university/ language center	11.3%	9
At home	76.3%	61
On public transport	8.8%	7
Other		
At work	1.2%	1
Abroad	1.2%	1
Library	1.2%	1

Figure 14. Results for question 9

Question 10: How and why have you used a mobile device for language learning?

Participants were asked to select the modality according to which they have decided to use a mobile device for language learning. The highest figure (53.8%, 43) regards autonomous learners, followed by those who use the mobile device to support a

language course (41.3%, 33). As described in Chapter 3, mobile devices might be seen as a cheap and easy-to use alternative to books and desktop computers, as well as a multimodal way of studying thanks to multimedia technology and the internet. Only a few participants (3) were instructed to use mobile devices for in-class activities. Thus, it seems that instructors are still skeptical about using technology in class. As mentioned in Chapter 3, there are many ways to implement mobile technology in the language classroom, but many instructors still do not encourage its use.

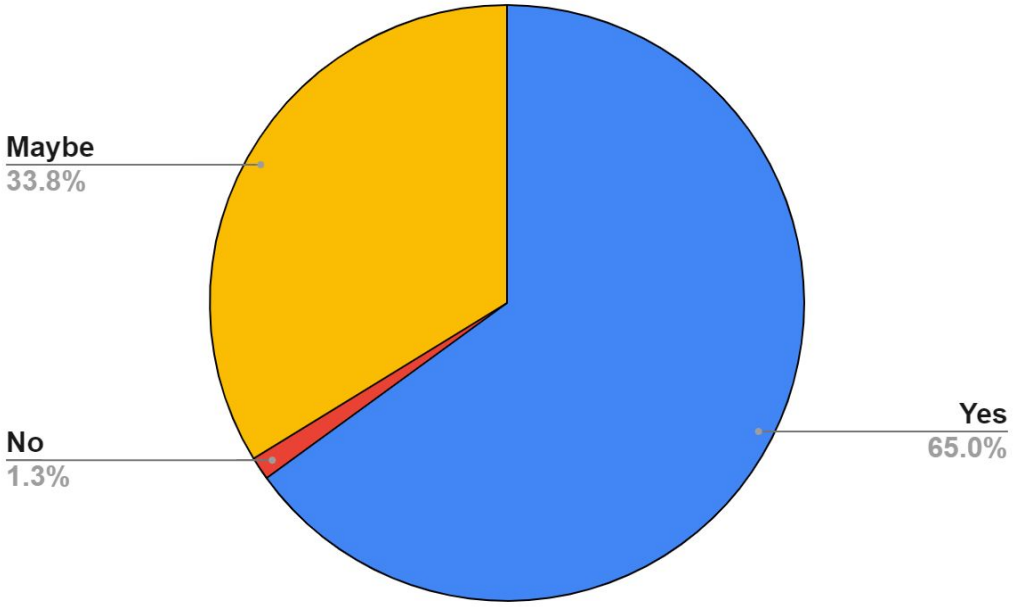


How/Why?	Response %	Response (total 80)
In-class activities for a language course	3.8%	3
Self-study for a language course	41.3%	33
Autonomously	53.8%	43
Other		
Self-study for a language course and autonomously	1.3%	1

Figure 15. Results for question 10

Question 11: Do you think mobile devices are effective for foreign language learning?

Participants gave their general opinion about the effectiveness of mobile devices in language learning. More than a half of the participants (52) think that mobile devices are effective for language learning, whereas one third (27) do not have a firm view. Only one participant holds a negative view on the effectiveness of mobile devices for language learning. Thus, we can say that mobile devices have the potential to become officially recognized as tools for language learning, but there is still a long way to go.



Opinion	Response %	Response (total 80)
Yes	65%	52
No	1.3%	1
Maybe	33.8%	27

Figure 16. Results for question 11

Question 12: Do you have any other comments about mobile devices and foreign language learning?

Participants could add some personal thoughts about the use of mobile devices for language learning; twelve people added some comments. After reading these comments, I divided the content into three themes.

The first theme regards comments which compare studying a language with a mobile device and with a classroom course. The comments are displayed in the table below:

- These devices are useful if somebody wants to approach a new language, but I believe they're quite approximated in terms of deep learning
- Replacing a teacher is almost impossible. An app is useful for exercises, but it should be free and without continuous ads (when you are studying, ads are annoying). This is impossible.
- If you don't have compulsory lessons, it's hard to be constant.
- Mobile devices are a very useful tool for people who start studying a foreign language and cannot attend a specific course for various reasons. They can be used as a support when approaching a language autonomously or as complementary tools to language learning in schools and universities. Their features often represent free access to reading and listening materials which help students improve those skills they acquire during in-class activities.

Figure 17. Results for question 12: theme 1

According to these comments, participants think that studying a language with a mobile device is something limited and useful only for exercises. Mobile devices are considered useful especially by those who need some background knowledge of a new language. Moreover, studying constantly with a mobile device (especially with apps) is hard, in comparison with compulsory classes. It also emerged that mobile devices

cannot be a replacement for instructors and traditional classrooms. As mentioned in Chapter 3, learners have gained more autonomy and it is also their responsibility to find new tools and methods to improve their skills. Unfortunately, although some applications send regular reminders, it is up to the learners to be responsible for their learning path. Mobile devices are not meant to replace instructors; rather they are meant to offer solutions and alternative ways to deliver education. Furthermore, it is a matter of fact that even people attending regular classes might not learn to speak a language effectively. Only the last comment shows that mobile devices are intended to be a support for language acquisition, with tools and resources suitable for both autonomous learners and in-class activities.

The second theme in the comments regards the tools and resources available on mobile devices. It is possible to read these comments below:

- It could be effective if the app is used constantly, but it should also be well-structured and full of various contents, as learning books for students are
- It would be great if there will be more free contents and the possibility to have more interactive videos to learn the exact pronunciation, especially for Nordic languages
- Most of the apps use either text or images. It would be interesting to use other media such as video and audio within the app itself.
- They should be more user oriented

Figure 18. Results for question 12: theme 2

In these comments, it emerged that apps and other tools should be well-designed and easy to use, and offer good content. The quality of the content is compared to that offered by traditional textbooks. Moreover, multimedia technology is positively evaluated. With reference to apps, they are expected to have more video and audio materials. One participant also pointed out the importance of free content, as well as the interest in more materials and resources for less-studied languages like Scandinavian

languages. In Chapter 3 I underlined the importance played by technology thanks to multimediality and the internet: the former refers to new formats available (i.e. audio and video), the latter refers to endless resources. Furthermore, there is an exhaustive overview of apps for language acquisition which shows their most important elements. Design, usability, content and monetization are some of these elements, which have also been analysed in question 6 of the questionnaire. As shown by the results of question 6, these elements are very important for language learners and should be taken into consideration also by instructors and designers of educational materials and apps.

The last theme regards two generic opinions about mobile device and language learning. One participant finds mobile devices useful, because he/she can study during downtime and avoid wasting time. The other participant considers using mobile technology for learning a language "fun and easy".

- I think mobile devices are very useful, you can improve yourself during downtime
- I think it's a fun and easy way to learn a new language

Figure 19. Results for question 12: theme 3

To sum up, mobile technology has started to be used for language acquisition, especially smartphones. Mobile devices are exploited for both apps and general features. Regarding general features, many language learners use mobile devices for reading, listening and vocabulary activities, although multimedia technology and the internet have drastically changed the content of these activities. Moreover, apps are considered good for practicing and improving vocabulary, grammar and listening. Production activities i.e. writing and speaking do not play an important role for both general features and apps. As reported in Chapter 3, mobile technology can support writing and speaking in several ways but many language learners do not see this potentiality. One can presume that writing and speaking are considered activities which require traditional approaches to language acquisition, including an instructor which gives feedback on the production of learners.

Therefore, it is possible to say that mobile technology has the potential to deliver language acquisition according to the communicative approach (i.e. using language in written and oral form) but it is generally used for receptive and repetitive activities. Tools and resources on mobile devices are expected to be well-designed and of good quality, in order to encourage their implementation. At the same time, language learners prefer to have free access to various resources. In Chapter 3 I described various features of mobile technology: the most interesting one is portability. Portability makes the learning process possible anytime and anyway. After the survey, it has emerged that language learners still prefer to study with a mobile device at home, instead of exploiting the chance of studying in less unusual settings (like public transport) and avoiding wasting time.

With reference to frequency, the large majority of language learners usually study a language with a mobile device less than once per week. Furthermore, language learners use mobile devices especially for autonomous learning or as a support for a language course. The implementation in class activities instead is not very popular: as with computer technology (Chapter 2), instructors are still skeptic about mobile technology in the language classroom. However, many language learners appear to have a positive view of the effectiveness of general features and apps. Thus, mobile technology could be a useful aid in language acquisition. With the term "aid" I would like to underline that the efficacy of mobile technology depends on how it is used, as reported in Chapter 3. For example, if learners study a language once per week, they could not expect a very high proficiency. Unlike general features, apps usually send daily reminders to encourage but not oblige learners to study. It is their decision whether to study or not. In this survey, 47 participants declared they have used apps for language acquisition, but only 18 participants study with a mobile device everyday: that means many language learners use to ignore daily reminders and decide autonomously when to study.

Conclusion

My thesis has offered an overview of technology applied to language acquisition, both from the historical and typological perspectives. Moreover, I have explained how to effectively use technology to foster language education. My main focus has been on today's most widespread technologies i.e. computers and mobile devices. In Chapter 1 I presented the evolution of educational technology in the field of language acquisition. At first, tools and materials were quite simple such as pictures displayed with a projector or rudimental audio materials. Later, technology developed and introduced new devices: radio, television, audio and video tapes. The technological innovation, which most influenced the field of education in the 20th century, was the computer. Computer technology started to be applied for education in the U.s.a. after World War II, including language acquisition. Furthermore, during the 1980s and the 1990s computers drastically improved their functionalities thanks to multimedia technology and the internet. Multimedia technology and the internet has increased the possibilities for both instructors and learners.

In the early 2000s, technology improved in terms of size, storage, connectivity, and new devices were available on the market: laptops, tablets and smartphones. As with computers, these devices started to catch the attention of the educational field, including language acquisition. However, language learning and teaching rely not only on technology, but also on theory. Thus, technology is applied to language education according to language learning theories and approaches to teaching. Over the years, the communicative language teaching approach has gained the approval of many scholars as an effective way of fostering language acquisition. The communicative language teaching approach emphasizes communication and interaction as the two elements which help to effectively learn a language.

With reference to technology and language pedagogy, it is possible to say that the roles of instructors and learners have changed. Instructors are a sort of guide who explain the most appropriate way of studying and therefore of using technology. Instructors should be trained to use technology and consider its benefits: indeed some instructors are afraid of technology as a threat to their work. Today learners are encouraged to develop their autonomy and responsibility for their learning paths. This has been possible also with the support of technology. Indeed, technology is an aid, a tool and a source of information which helps instructors and learners, but it is not in charge of the language acquisition. For instance, technology can be exploited for communicative activities in the framework of the communicative approach: online exchanges, forums and chats, collaborative writing projects.

Chapter 2 focuses on one of the two main areas analysed in this thesis: Computer-Assisted Language Learning (shortened as CALL). CALL is an area of language education devoted to language acquisition supported by computer technology. This area has faced various changes due to developments in both technology and language learning theories, as illustrated in Chapter 1. CALL has brought various tools and resources, which implies both benefits and challenges. Benefits concern the chance to study at any time of the day (you only need to be in a place with a desktop computer); the sense of engagement; learner's autonomy; free and authentic resources; developing transversal skills i.e. language acquisition, cultural awareness and digital skills; communication in real-world settings; the possibility of personalizing the learning experience.

In Chapter 3, there is a shift to an evolution of computer technology i.e. mobile devices. Mobile devices are regularly used in everyday life and their diffusion is increasing daily, thus they started to be exploited also for education. Mobile technology has many functionalities of computers, plus an interesting feature defined as portability. Portability means that a mobile device can be taken anywhere and used anytime; the only limitation might be internet connection. Thus, the process of learning does not

require sitting on a desk in front of a desktop computer and books. With reference to language acquisition, a new area of educational technology has been founded: Mobile-Assisted Language Translation (shortened as MALL). The term MALL describes language acquisition supported by mobile devices and it is based on CALL and Mobile-Learning. MALL is quite recent, as mobile devices started to be developed at the beginning of the 21st century. Many tools and resources developed for computer technology were adapted for mobile devices; moreover specific programs called apps were elaborated. In comparison with CALL, MALL could immediately benefit from latest innovations regarding multimedia technology and the internet, as well as new perspectives on language learning and teaching.

In the thesis, I divided the tools of mobile devices into two categories: general features and apps. General features regard those functionalities not explicitly created for educational purposes, whereas apps are developed with the aim of fostering language acquisition. Apps offer a digital environment for language acquisition and are designed to fit the constraints of mobile devices i.e. smaller screen size. I described how to use general features for language education, as well as I reviewed the most popular apps for language learning. Both categories have shaped the benefits and issues of using mobile devices for language acquisition. Benefits offered by mobile devices are similar to those offered by computer technology. One of the most relevant is the element of portability, which amplifies the concept of studying regardless of time and place. Indeed the size, lightness and wireless technology of mobile devices have made it possible to bring them anywhere: at school, at workplace, on public transport. With reference to apps, they have created a private and anonymous environment specifically addressed to language learning, and encourage (through daily reminders) learners to study a little everyday.

In the last chapter I conducted a survey to study MALL from a users' perspective. In brief, I outlined a questionnaire whose questions aim to verify some aspects emerged in Chapter 3. The survey confirmed that mobile devices are used for language acquisition, especially smartphones. Although mobile devices offer many functionalities (both in

terms of general features and apps), they are used especially for listening, reading vocabulary and grammar activities. Using mobile devices for communicative activities, such as writing and speaking, is still not very popular. In other words, mobile devices are used for passive and repetitive activities and rarely for communicative tasks. Furthermore, language learners prefer free resources, which should also be well-designed. Although the thesis underlined the convenience of portability, language learners study with mobile devices most of the time at home. That means they do not exploit them in situations such as being a commuter on public transport or while waiting for a lecture. Moreover, the study with mobile devices takes place less than once per week, even if they can be used anywhere at anytime. Regarding effectiveness, mobile devices have been evaluated positively. An issue concerning MALL relates to the role attributed to mobile devices. Mobile devices, as well as computers, are an aid to support language acquisition. Their effectiveness relies on the appropriate use by learners and instructors.

Appendix A

Usability guideline (Kumar et al. 2019: 3549- 3551)

Content Organization - The learning content must be organized logically. - All tasks must be in sequential order. - Use Acrobatx to create pdf of lecture notes for mobile devices. - Use section and dividers to organize content in respective sections. - Display only when and where it is needed. - Ensure that only necessary information is displayed. - Do not display more than six lines on any page. - Avoid long text and use simple sentences for menu options.	- Prioritize one primary section on the screen. - Establish a level of importance (high to low) and infuse this approach in all pages of the app. - The structure of learning contents should be in small and homogenous chunks and fit well within one screen. - Recommend learner to any related materials or links. - Possible learning materials to be put in ordered lists. - Must have an index page as part of the content to direct and welcome users.
Navigation - Make navigation self-evident from the start page. - Open a new page in a new window, leave the current page unchanged. - Include an index page that provides a link to all other relevant pages. - Eliminate broken navigation links. - Place emphasis on links to seek attention from users. -Eliminate directing users into pages that have no navigation options. - Avoid too many images with links. - Ensure that items that are not clickable do not have characteristics that suggest they are clickable.	- Ensure that important content can be accessed from one link. - Use color changes to indicate to users when a link has been visited. - Ensure that embedded links are descriptive. - Provide navigation options to move between different pages. - Navigation options should be on easy to find places on the page. - Maintain consistency in navigation options used. - Make important items reachable from the index page. - Announce major changes of the app on the home page. - Minimize the number of clicks.

Layout - Use a tabular structure for the input field. - Distinguish clearly and consistently between required and optional entry fields. - Use no more than two buttons on the page. -Meaningful and short names for buttons to be used. - Height and width of the display area should not exceed the screen size. - Necessary input and button dimensions must be large enough for touch and designed for finger-friendly target taps. - Content must be responsive and fit within the viewport. - Place content on the central part of the screen. - Place important items at the top center of the viewport. - Content must be aligned appropriately for the learner and distinguish it from other parts of the page.	- Visually align page elements, either vertically or horizontally. - Place content on the central part of the screen - Place important items at the top center of the viewport. - Content must be aligned appropriately for the learner and distinguish it from other parts of the page. - Visually align page elements, either vertically or horizontally. - Arrange content vertically using tabs. - Extensive scrolling should be minimized. - Facilitate fast scrolling by highlighting major items. - Limit white space by making adequate use of the entire screen. - Group related elements. - Include index page that provides a link to all other relevant pages.
Consistency and Standards -The app must follow the standard app design methodology and criteria. - The application should practice aesthetics integrity, that is, how well an app's appearance and behavior integrate. -Standardize common task sequence. - The design should be consistent with other similar applications so that users can easily adapt it. - The language of interaction should be similar to that used in other mobile learning applications. - The adopted design, images, and icons should be consistently used throughout the application. - Where text input is needed, allow the learner to interact with the application through an input	- Use standard navigation pattern similar to other apps. - Ensure that all tab labels are clearly descriptive of their function or destination. - Ensure that navigation tabs are located at the top of the page and look likes a clickable version of real-world tabs. - Eliminate horizontal scrolling. - Provide vertical scroll bars where needed. - Provide content-tree links to users to move freely. - Temporarily hide navigation bar when displaying full-screen content. - Avoid overcrowding a navigation bar with too many controls. - Appropriate, meaningful and consistent toolbar

dialog box. - Appropriate working menus to be named semantically.	icons to be used. -Use sitemaps, should there be many pages.
Visual Representation - Use optimized images. - Use of images will slow the application, be mindful of using images. - Only use images to facilitate learning. - Ensure that all clickable images are either labeled or readily understood by typical users. - Avoid using background images that make it difficult for users to read text. - Provide alternative text labels for images and icons.	- Useful, consistent and meaningful icons to be used. - Use of visual effects can enhance learning, however, should be kept to a minimum. - Use images and visuals that emulate real-world objects. - Use appropriate symbols to facilitate learning - Use of appropriate color to enhance, distinguish and highlight content.
Help and Feedback - Error messages should be used to help recover from errors. - Error messages should be precise, indicate the error and suggest a solution for recovery. - Mobile learning apps should inform the user of the status. - Use haptic feedback to seek attention and engage users with the use of pickers, switches, sliders, etc. - Use of appropriate animations to provide feedback. - Provide appropriate feedback while users are waiting. - Indicate approximate time required to download an image or document at a given connection speed.	- Prevent data loss by reminding users of unsaved data. - Provide sufficient reminders for learners for online activities. - Avoid notification overkill (too many notifications delivered in a very short time span). - Provide the user with a real-time communication facility for the learner. - Make app appear fast with skeleton screen. - Allow content to be dragged and dropped on controls when applicable. - Use interactive animations. - Support both portrait and landscape orientation. - Use intuitive gestures that are most natural for the app.
Learner Experience Optimizers - Provide remember options for learners for logging in/out.	- Provide links with different colors for visited, unvisited and new links. - Provide search fields to allow learners to search

- Help menu to assist learners if problems occur. - Provide tooltips when dealing with button and inputs. - Provide zoom in and zoom out features. - Provide alerts and alarms for new messages, saving changes, updates and sudden exiting of pages.	for content using keywords. - Provide recent search history. - Use of autocomplete in the search box.
Customization - Provide the user with options to customize the app as per their preference. - Allow the user to choose the workspace area and its settings.	- Provide assistance to users who need additional help from the app, e.g. FAQs, help links.
Selection Based Command - Provide selection based prompts for input. - Wherever possible replace text input with list selection. - Provide radio buttons for mutually exclusive options.	- Provide checkbox to enable multiple selections. - Use checkboxes to enable multiple selections. - Enable auto-complete features. - Provide reasonable default values. - Dynamically validate field values when navigating back and forth after an error.
Accessibility -Implement search recognition system in the app. - Add illustrations or audio files to the text to enhance its perception by disabled people. - Make app easier for users to re-engage when they return to it after an interruption. - Ensure that double-clicking on a link will not cause undesirable or confusing results, thus, catering for novice users.	- Allow smart gestures to be used for faster learning pace e.g. screen taps, double taps, drag, rotate, press and drag. - Provide client side image maps instead of server side image maps. - Enable users to access a page from any other page of the app.

Appendix B

Questionnaire sample

MALL from a users' perspective

My name is Serena Lenci and I am a student at the University of Padova, Italy. I am carrying out this survey as part of a study for my master's thesis.

Mobile-Assisted Language Learning (MALL) is a new approach to language learning whose roots date back to the introduction of mobile devices. In brief, MALL refers to the use of mobile devices (i.e. smartphones, tablets and laptops) for foreign language learning.

Mobile devices offer different tools for studying a foreign language:
-General features (e.g. online dictionary, YouTube channels, Social Networks)
-Specific applications (e.g. Duolingo, Babbel)

This survey aims to analyse how users study or improve a foreign language with the tools offered by mobile devices. Moreover, the survey will collect general data about how often, where and why we can use a mobile device for language learning, as well as the general opinion of the users.

The survey is completely anonymous for study purposes and sensitive data will not be collected.

There are 12 questions and it will take approximately 5 minutes to complete.

If you have any questions, you can contact me at: serena.lenci@studenti.unipd.it

Thank you very much for your time!
*Required

1. 1. Which mobile device do you use most of all to learn a foreign language? *

   Mark only one oval.

   - ◯ Smartphone
   - ◯ Tablet
   - ◯ Laptop

2. 2. Which of these apps have you used to learn a foreign language? *

(for the option "Other" please specify the app)

Tick all that apply.

- [ ] Duolingo
- [ ] Busuu
- [ ] Babbel
- [ ] Memrise
- [ ] I haven't used any apps for language learning
- [ ] Other: _____

3. 3. Which of these features of mobile devices have you used to learn a foreign language? *

(for the option "Other" please specify the feature)

Tick all that apply.

- [ ] Audio and Video (e.g. YouTube channels, Podcasts)
- [ ] Social Networks (e.g. pages for language learners on Facebook, Twitter)
- [ ] Online dictionaries
- [ ] Online books, newspapers and magazines
- [ ] Voice recorder or videocamera
- [ ] I haven't used any general features for foreign language learning
- [ ] Other: _____

4. 4. What have you used your mobile device for (not including Apps)? *

Tick all that apply.

- [ ] Vocabulary
- [ ] Grammar
- [ ] Reading
- [ ] Writing
- [ ] Listening
- [ ] Speaking
- [ ] None of the above

5. 5. What have you used Apps for? *

Tick all that apply.

- [ ] Vocabulary
- [ ] Grammar
- [ ] Reading
- [ ] Writing
- [ ] Listening
- [ ] Speaking
- [ ] None of the above

6. 6. How important are the following for foreign language learning with mobile devices? (1= not important, 5= extremely important) *

Mark only one oval per row.

	1	2	3	4	5
Design and Usability	◯	◯	◯	◯	◯
Content	◯	◯	◯	◯	◯
Free Access	◯	◯	◯	◯	◯

7. 7. How often do you use a mobile device for foreign language learning? *

Mark only one oval.

- ◯ Less than once a week
- ◯ 1-2 times a week
- ◯ 3-4 times a week
- ◯ More than 4 times a week
- ◯ Every day

8. 8. Where do you use a mobile device for foreign language learning? *
(for the option "Other" please specify)

Tick all that apply.

- [ ] At school/ university/language center
- [ ] At home
- [ ] On public transport
- [ ] Other: _____

9. 9. Where do you use a mobile device for foreign language learning most often? *
(for the option "Other" please specify)

Mark only one oval.

- ◯ At school/ university/language center
- ◯ At home
- ◯ On public transport
- ◯ Other: _____

10. 10. How and why have you used a mobile device for language learning? *
(for the option "Other" please specify)

Mark only one oval.

- ◯ In-class activities for a language course
- ◯ Self-study for a language course
- ◯ Autonomously
- ◯ Other: _____

11. 11. Do you think mobile devices are effective for foreign language learning? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe

12. 12. Do you have any other comments about mobile devices and foreign language learning?

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Riassunto

La mia tesi, dal titolo *Technology and language learning: from CALL to MALL*, tratta il tema della tecnologia usata nell'apprendimento delle lingue straniere. Come suggerisce il titolo, le due aree prese in esame sono quelle dei computer e dei dispositivi mobili. La tecnologia è ormai usata in moltissimi campi, incluso quello dell'educazione. Di conseguenza, si sono sviluppate anche aree di studio specifiche per analizzare come sviluppare e applicare la tecnologia per scopi educativi.

La tesi è divisa in quattro capitoli. Il primo capitolo, *Technology and language learning*, è diviso in due parti e fornisce la teoria su cui basa la tecnologia applicata alle lingue straniere. La prima parte è dedicata all'evoluzione della tecnologia educativa (*educational technology*) per l'apprendimento delle lingue straniere. L'espressione tecnologia educativa indica lo studio dell'applicazione di vari strumenti tecnologici per fini educativi, l'ideazione e sviluppo di strumenti e materiali per scopi educativi, il processo di apprendimento con il supporto della tecnologia. La tecnologia educativa riguarda dispositivi e programmi sia generici che espressamente sviluppati per l'apprendimento.

Dal punto di vista storico ed evolutivo, l'applicazione di tecnologie per scopi educativi risale alla prima metà del XX secolo. In questa fase gli strumenti a disposizione erano alquanto basilari, ad esempio clips e brevi animazioni trasmesse con il proiettore oppure l'uso della radio. Negli anni cinquanta venne inventata la televisione, attraverso la quale venivano trasmessi programmi di divulgazione culturale. Nelle scuole cominciarono e essere comuni i laboratori linguistici: classi attrezzate con materiale video e audio per aiutare gli studenti ad imparare e migliorare le lingue straniere. Nello stesso periodo, i computer (per meglio dire, i mainframe computers) cominciarono ad essere usati per attività didattiche, ad esempio fornire un aiuto per imparare a leggere. Negli anni sessanta vennero sviluppati sistemi computerizzati orientati all'apprendimento e analisi

linguistica, ad esempio i corpora elettronici. Negli anni sessanta e settanta i computer divennero più elaborati e vennero creati programmi specifici per l'apprendimento delle lingue (i primi esempi di CALL): PLATO dell'Università dell'Illinois; TICCIT dell'Università del Texas e della Brigham Young University. Negli anni ottanta, vennero costruiti e lanciati sul mercato computer più piccoli e capaci di processare ugualmente una gran quantità di informazioni. Il numero di computer a disposizione nelle scuole aumentò in tutte gli stati industrializzati. Tuttavia, i libri (spesso accompagnati da materiale audio e video) rimasero lo strumento principale per l'apprendimento. Negli anni novanta, due invenzioni modificarono notevolmente i computer e il loro utilizzo: la tecnologia multimediale e internet. Per tecnologia multimediale si intende la possibilità di usufruire di testo, immagine, audio e video attraverso gli strumenti del computer. Internet è una rete che funziona sia da fonte di informazione che da mezzo di comunicazione. La sua diffusione a livello globale e al di fuori di organi istituzionali è stata possibile grazie al World Wide Web (WWW), un sistema informatico che ha organizzato le informazioni su internet in pagine e raccolte di pagine (siti web). I siti possono essere trovati tramite un motore di ricerca, un'applicazione che associa a una parola o stringhe di parole al sito col contenuto più pertinente. Grazie alla tecnologia multimedia e a internet, il computer è diventato uno strumento di apprendimento interattivo e da la possibilità di accedere a moltissimi strumenti e materiali, anche gratuitamente. Dall'inizio del XXI secolo, sono a disposizione nuovi dispositivi le cui funzioni riprendono quelle del computer: laptop, tablet e smartphone. Questi dispositivi vengono chiamati dispositivi mobili, poiché la leggerezza e grandezza ridotta rende possibile portarli ovunque, così come connettersi a internet.

Non bisogna considerare solo l'evoluzione della tecnologia, ma anche i cambiamenti nelle teorie dell'apprendimento e dell'insegnamento delle lingue. Le teorie più importanti nell'apprendimento delle lingue sono tre. Il comportamentismo vede l'apprendimento delle lingue come un'imitazione di un modello, fornito dall'esterno. Secondo il cognitivismo, gli esseri umani hanno le strutture biologiche che permettono

di apprendere una lingua; l'apprendimento di una lingua è visto come un processo di elaborazione di informazioni. Le informazioni vengono acquisite dall'esterno e rielaborate in base a ciò che già si conosce. La teoria socio-cognitiva sostiene che imparare una lingua significa imparare costruzioni linguistiche così come l'uso di queste costruzioni in modo appropriato a diverse situazioni; l'apprendimento avviene poiché gli uomini sono programmati biologicamente ad imparare una lingua come strumento di comunicazione necessario per vivere. In riferimento ai metodi di insegnamento, oggi si ritiene che il più efficace sia l'approccio comunicativo (*communicative language teaching approach*). La lingua va insegnata tramite l'uso e in riferimento a situazioni reali; l'insegnamento della grammatica non occupa più un ruolo di primo piano; le lezioni sono incentrate sullo studente e sul suo apprendimento. Un'altra teoria si collega all'approccio comunicativo: l'insegnamento e apprendimento basato su attività (*task-based approach*). L'apprendimento ha luogo tramite attività pratiche, quindi le lingue vanno insegnate fornendo agli studenti attività da completare usando la lingua di arrivo (*target language*).

L'uso della tecnologia ha influenzato il ruolo dello studente e dell'insegnante, così come l'approccio usato per l'insegnamento e apprendimento. Tramite la tecnologia, lo studente è più indipendente, mentre l'insegnante ha nuovi strumenti da usare. Inoltre, l'insegnante non è più visto come l'unica fonte di informazioni, ma diventa una guida che spiega agli studenti come usare i nuovi strumenti a disposizione in modo efficace per fini educativi. La tecnologia può essere usata in modi utili secondo l'approccio scelto. Ad esempio, secondo l'approccio comunicativo, la tecnologia può essere usata per partecipare a progetti di scrittura creativa online, oppure vedere e usare materiale audiovisivo autentico come un filmato di Youtube.

Il secondo capitolo si focalizza su un'area della tecnologia educativa relativa all'apprendimento linguistico chiamata CALL. CALL è l'abbreviazione di *Computer-Assisted Language Learning* e, come suggerisce il nome, indica l'uso del computer nell'apprendimento linguistico. CALL si basa su ambiti dell'informatica e tecnologia

educativa: ICT, CAI e E-Learning. Le tecnologie dell'informazione e dell'educazione (*Information and Communication Technology*, abbreviato ICT) fanno parte dell'informatica e si occupano dell'elaborazione e trasmissione dell'informazione. L'istruzione assistita dal computer (*Computer-Assisted Instruction*, abbreviato in CAI) riguarda l'uso del computer (più nello specifico software) per lo studio. E-Learning (abbreviazione di *Electronic-Learning*) indica l'apprendimento attraverso l'uso di dispositivi elettronici; rispetto a CAI si concentra soprattutto sull'uso di strumenti forniti dal web. CALL racchiude in sé tutti questi aspetti: è un'area della tecnologia educativa e presuppone l'uso di tecnologie computazionali; riguarda l'uso di computer (software, internet) per imparare qualcosa, nello specifico le lingue straniere.

CALL può essere analizzato dal punto di vista storico (ossia l'evoluzione di quest'area in termini di comportamentismo, cognitivismo e socio-cognitivismo), e dal punto di vista della tipologia di strumenti e programmi disponibili. Dal punto di vista storico, CALL secondo il comportamentismo *(behavioristic CALL*) consisteva di programmi molto semplici e con attività ripetitive. CALL durante la fase comunicativa (*communicative CALL*) sosteneva programmi e materiali focalizzati sull'uso della lingua in situazioni autentiche; lo studio della grammatica aveva un ruolo minore. Nella fase più recente (*integrative CALL*), CALL vede la tecnologia multimediale e internet come gli strumenti che possono meglio aiutare lo studente ad apprendere una lingua. Attraverso questi due elementi, è possibile accedere a moltissime informazioni (spesso gratuitamente) non solo in forma di testo, ma anche in formato audio e video. Dal momento che la comunicazione in situazioni simili alla realtà aiuta l'apprendimento linguistico, è utile comunicare con altre persone nella lingua di studio per email, su forums o tramite progetti online. Ciò è reso possibile grazie a internet. Grazie alla tecnologia multimediale, la comunicazione può avvenire anche in forma audio e video. La comunicazione che avviene grazie al supporto del computer è definita Computer-Mediated Communication e abbreviata in CMC. In breve, CALL ha attraversato varie fasi in cui è stato influenzato sia dalla tecnologia a disposizione che dalle teorie su apprendimento e insegnamento delle lingue.

Dal punto di vista della tipologia, è possibile individuare sei categorie. *Early CALL* si riferisce ai primi programmi disponibili, molto semplici e ripetitivi. *Web-based CALL* è una categoria molto ampia che descrive tutte quelle risorse e strumenti disponibili grazia al web, ad esempio: siti specifici per le lingue straniere, dizionari online, canali Youtube, interi corsi di lingua online. *Game-based CALL* si riferisce all'uso di videogame e giochi online per imparare una lingua. Questi videogame e giochi online sono sia generici che espressamente creati a scopo didattico. *Authoring CALL* descrive gli strumenti e software che possono essere usati soprattutto dagli insegnanti per creare i propri materiali, da usare in classe o come compito a casa. Oggi molti strumenti e programmi appartenenti a *authoring CALL* sono disponibili online, anche in forma gratuita. *CALT* (forma abbreviata di *Computer-Assisted Language Testing*) indica l'uso del computer per esaminare e valutare le conoscenze linguistiche. In questo ambito, il computer ha portato diversi vantaggi: più sicurezza, meno probabilità di copiare, possibilità di controllare efficacemente il tempo impiegato, test che si adattano al livello dei partecipanti, possibilità di feedback anonimo e immediato.

Il computer può essere usato per imparare e migliorare diverse abilità linguistiche, sia per attività organizzate da un insegnante che autonomamente. Il vocabolario può essere migliorato attraverso diverse risorse reperibili online, ad esempio le flashcard digitali. Molti materiali da lettura sono accompagnati da glossari o rimandi un dizionario esterno. Moltissimo materiale audio e video è disponibile online per migliorare l'ascolto; questi materiali sono sia fatti ad hoc per chi studia sia autentici (per esempio telegiornale, canzoni, clip di film). La capacità di scrivere può essere migliorata autonomamente grazie al semplice word processor del computer oppure attraverso alcuni siti dedicati alla correzione di testi; la comunicazione scritta beneficia anche di altri strumenti come lo scambio di email, la partecipazione a forum online oppure a progetti di scrittura (ad esempio i *fandom*). La videocamera ha reso possibile mettersi in contatto con altre persone e poter conversare come se fossero faccia a faccia. Alcune siti

sfruttano questa possibilità per mettere in contatto studenti di lingue o studenti e insegnanti e praticare il parlato.
CALL è un'area in continuo cambiamento. Negli ultimi anni si è sviluppato un nuovo settore che applica l'Intelligenza Artificiale (indicato in inglese come *Artificial Intelligence*, AI) a CALL: ICALL (acronimo per *Intelligent Computer-Assisted Language Learning*). Inoltre, come è già stato detto, dall'inizio del XXI secolo sono arrivati sul mercato dei nuovi dispositivi definiti dispositivi mobili. I dispositivi mobili offrono molte funzionalità del computer in un formato più piccolo e maneggevole. Infatti i dispositivi mobili possono facilmente essere portati in giro, in uno zaino o nella tasca della giacca.

CALL ha portato diversi vantaggi. L'uso del computer può rendere lo studente più autonomo e responsabile per il suo percorso di apprendimento. Inoltre l'uso della tecnologia serve a sostenere non solo l'apprendimento della competenze linguistiche e comunicative, ma anche le competenze digitali (le competenze digitali sono utili per lo studio e per il mercato del lavoro). Dal punto di vista economico, è sufficiente un computer di fascia media dotato delle funzioni base; molte risorse per studiare sono disponibili online in forma gratuita. Il computer dà la possibilità di accedere ad ambienti virtuali che simulano o sono collegati alla realtà, di conseguenza si entra in contatto con la lingua usata in situazioni vere, autentiche. Tramite il computer, lo studio può diventare "personalizzato": è possibile studiare secondo il proprio ritmo e livello, sostenere test in forma anonima e non doversi sentire sotto pressione, ricevere feedback dettagliati per riflettere su come migliorarsi. Comunque, non tutti possiedono le conoscenze per studiare con il computer in modo efficace. Inoltre, alcuni ritengono il computer uno strumento la cui manutenzione è costosa e richiede tempo. Tuttavia, secondo CALL, il computer fornisce un ottimo supporto all'apprendimento linguistico.

Il terzo capitolo è dedicato a MALL. MALL è l'acronimo di *Mobile-Assisted Language Learning* e forma un'area della tecnologia educativa rilevante per l'apprendimento delle lingue straniere. Come si deduce dal nome, MALL riguarda l'uso dei dispositivi mobili

per imparare le lingue straniere. Questa area fonda le sue basi in altri due ambiti della tecnologia educativa, CALL e Mobile-Learning (solitamente abbreviato in M-Learning). CALL è stato ampiamente analizzato nel secondo capitolo; M-Learning descrive l'apprendimento fatto per mezzo di dispositivi mobili e può essere paragonato all'E-Learning. I dispositivi mobili sono una categoria di tecnologie piuttosto recenti; con il termine dispositivi mobili si fa riferimento a laptop, tablet e smartphone. Lo smartphone rappresenta il più usato tra i dispositivi mobili, così come sta superando anche l'uso del computer tradizionale. I dispositivi mobili offrono molte funzioni disponibili sui desktop computer, ma hanno il vantaggio di essere più piccoli e leggeri. Di conseguenza, il concetto di studiare ovunque a qualsiasi ora è potenziato: lo studio non è più limitato al luogo in cui si trova il computer come la casa, la biblioteca o la scuola. Si può studiare a casa e a scuola così come sul treno o in sala d'aspetto. I dispositivi mobili, così come è accaduto con il computer, hanno quindi iniziato a essere usati per lo studio anche delle lingue straniere.

A differenza di CALL, la storia e sviluppo di MALL sono molto più brevi. Infatti i dispositivi mobili sono disponibili da circa quindici anni; inoltre MALL ha potuto immediatamente beneficiare di tecnologie multimediali e di internet. MALL viene anche applicato secondo le teorie sull'apprendimento ritenute più efficaci.

I dispositivi mobili, così come i computer, possono essere usati per migliorare varie abilità legate alla lingua. Gli strumenti per l'apprendimento delle lingue disponibili sui dispositivi mobili sono divisi in due categorie: funzioni generiche (*general features*) e app (l'abbreviazione della parola inglese *application*). Le funzioni generiche sono tutte quelle funzioni non esplicitamente create per scopi educativi, ma che possono essere adattate. Per esempio, i dispositivi mobili permettono di visitare moltissimi siti web: di conseguenza è possibile studiare regole la grammatica di una lingua su un sito specifico o consultare il dizionario online. L'abilità di lettura e comprensione può essere esercitata grazie a moltissime risorse *mobile-friendly* come quotidiani, riviste o testate online. Alcuni programmi di default dei dispositivi mobili (come Google Play Books o

Adobe Acrobat Reader) permettono di leggere libri sul proprio tablet o smartphone. Grazie a siti come Youtube o ai podcasts online anche l'abilità di ascolto può essere migliorata. Benché svantaggiati per via delle dimensioni ridotte, i dispositivi mobili offrono funzioni riguardanti la scrittura: email, messaggistica istantanea, social network (i messaggi sono corti e perfetti per la grandezza dei dispositivi mobili), l'accesso a forum e chats così come progetti di scrittura. In riferimento ai social network, è interessante sapere che su social come Facebook sono disponibili molte pagine e profili dedicati allo studio delle lingue straniere. I dispositivi mobili permettono di migliorare anche la capacità di esprimersi parlando: infatti laptop, tablet e smartphone sono dotati di videocamera e registratore vocale, che possono essere usati in vari modi. Alcuni siti che mettono in contatto studenti e insegnanti o persone interessate ad imparare una lingua (una sorta di scambio culturale) via video sono stati adattati anche per i dispositivi mobili e in alcuni casi sono diventati delle app. Il registratore vocale, ma anche la videocamera, può essere usata per registrarsi mentre si parla e analizzare eventuali errori e fluidità. Una classe può organizzarsi per esercitare sia lo scritto che il parlato scambiandosi messaggi e audio su piattaforme online o gruppi What's up, ricevendo così anche un feedback.

Le app sono programmi scaricabili sui dispositivi mobili gratis o a pagamento. Ci sono moltissime app per imparare le lingue: alcune funzionano come veri e propri corsi di lingua, mentre altre si concentrano su uno o due aspetti. Queste app forniscono spiegazioni in modo sintetico, preferendo passare subito alla parte pratica: in altre parole, gli utenti sono spinti a concentrarsi soprattutto sull'applicazione dei concetti spiegati. Gli utenti delle app sono motivati a continuare a studiare attraverso diversi elementi: organizzazione del contenuto in moduli di difficoltà crescente, valutazione costante dei progressi fatti, invio di promemoria giornalieri. Inoltre, i contenuti delle app devono essere interessanti e presentati in modo accattivante. Un modo per indurre gli utenti a studiare è quello di aggiungere elementi di *gamification* alla app. In altre parole, inserire elementi ludici che rendano le attività più stimolanti e coinvolgenti: ad esempio creare un classifica degli utenti con i migliori progressi (per indurre gli utenti a

studiare e migliorarsi); regalare punti da usare per “acquistare” virtualmente lezioni aggiuntive .

MALL offre molti benefici simili a quelli di CALL. Tuttavia, i dispositivi mobili sono più comodi e usati nella vita di tutti i giorni, proprio per il fatto che è possibile portarli ovunque. Di conseguenza, è più facile studiare costantemente tutti i giorni, senza problemi di luogo e tempo. Inoltre, i dispositivi mobili sono solitamente meno costosi dei computer. In riferimento alle app per imparare le lingue, queste hanno catturato l’attenzione di molti utenti poiché forniscono un ambiente di studio anonimo e personalizzabile che incoraggia a studiare tutti i giorni. MALL presenta il problema comune della tecnologia educativa: chi la vuole usare, sia per studiare che per insegnare, deve sapere come farlo nel modo più efficace. I dispositivi mobili, così come il computer, sono strumenti di supporto allo studio e all’insegnamento e non sono responsabili del risultato finale.

Nel quarto capitolo viene presentato un sondaggio condotto per verificare come le persone usano i dispositivi mobili per imparare le lingue. Il questionario di questo sondaggio è composto da dodici domande e raccoglie dati di tipo quantitativo. I dati quantitativi riguardano informazioni generiche su tendenze, motivazioni, frequenza e possono essere rappresentati da un numero. In questo questionario le domande sono a risposta multipla e si dividono in due tipi: risposta unica o multipla; scala di valutazione. La domanda a risposta unica o multipla significa che il partecipante deve selezionare una o più opzioni, come indicato. La domanda a scala di valutazione chiede al partecipante di selezionare un valore, i cui estremi rappresentano due concetti antitetici, che rappresenti il suo giudizio su un argomento. L’ultima domanda del questionario è di tipo qualitativo. I dati qualitativi sono più complessi di quelli quantitativi, poiché non sono oggettivi e difficilmente possono essere espressi in forma numerica. Infatti, i dati qualitativi sono espressi in forma verbale. L’ultima domanda è di tipo a domanda aperta e chiede ai partecipanti una riflessione o opinione sull’argomento del questionario (ossia MALL). In questo modo è possibile raccogliere

informazioni interessanti e inaspettate, che contribuiscono ad arricchire le conclusioni ottenute dai dati quantitativi.

Il questionario è stato realizzato e distribuito attraverso Google Forms. Google Forms fa parte degli strumenti Google; per l'uso privato è gratuito e richiede solo l'accesso tramite un indirizzo email. Google Forms dà la possibilità di inserire sia domande chiuse che aperte, e personalizzare il layout. Il sistema di Google si occupa anche di raccogliere le risposte e generare dei grafici riassuntivi utili per l'analisi dei dati. Il questionario è stato distribuito attraverso diversi canali (email, social network).

Al sondaggio hanno partecipato 80 persone con diversi background culturali. I partecipanti sono sia uomini che donne, con un'età media compresa tra i 20 e i 35 anni. Il sondaggio è stato condotto in forma anonima, ossia le persone coinvolte non hanno dovuto indicare il proprio nome e neppure dare altri dati anagrafici.

Dai risultati del sondaggio, è emerso che i dispositivi mobili sono usati per imparare le lingue, soprattutto lo smartphone. Sia le funzioni generiche che le app sono usate soprattutto per attività ricettive (vocabolario, grammatica, lettura e ascolto), mentre attività di produzione orale e scritta hanno un ruolo marginale. Gli utenti si aspettano che gli strumenti e contenuti disponibili sui dispositivi mobili siano ben disegnati, di qualità e possibilmente gratuiti. Nonostante la portabilità, la maggior parte degli utenti preferisce studiare con il proprio dispositivo mobile a casa, benché sia possibile farlo ovunque (ad esempio sui mezzi pubblici, per passare il tempo). Inoltre, lo studio avviene una volta a settimana, anche se come è stato detto con i dispositivi mobili non ci sono vincoli di luogo e ora. La maggior parte dei partecipanti al sondaggio ha dichiarato che i dispositivi mobili sono usati per lo studio autonomo o come aiuto per un corso; pochi lo usano durante un corso per attività organizzate dall'insegnante. In ogni caso, i partecipanti hanno valutato positivamente i dispositivi mobili come strumento per imparare le lingue.

In conclusione, la tecnologia educativa nell'ambito dell'apprendimento delle lingue ha una lunga storia. I computer e i dispositivi mobili hanno influenzato il ruolo di studenti e insegnante; allo stesso tempo sono uno strumento utile ed efficace secondo le ultime teorie dell'apprendimento e insegnamento delle lingue. Inoltre, i dispositivi mobili stanno catturando l'attenzione di molti studenti. Infatti, i dispositivi mobili offrono molte funzioni dei computer, ma sono più comodi e familiari in quanto fanno parte della nostra quotidianità. I dispositivi mobili stanno conquistando un posto di rilievo tra le tecnologie applicate all'apprendimento delle lingue, grazie alle loro caratteristiche. Questa visione è confermata dal sondaggio riportato in questa tesi.