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Running head: TECHNOLOGY RESHAPING THE EFL CLASSROOM

Technology Reshaping The EFL Classroom

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Research Report submitted in partial fulfillment of the requirements for the degree of
Master in English Language Teaching for Self-Directed Learning

Directed by Nohora Bryan and Ana María Ternent de Samper

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Chía, Colombia

October 2015

TECHNOLOGY RESHAPING THE EFL CLASSROOM

Declaration

I hereby declare that my research report entitled:

Technology Reshaping The EFL Classroom

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- is neither substantially the same as nor contains substantial portions of any similar work submitted or that is being concurrently submitted for any degree or diploma or other qualification at the Universidad de La Sabana or any other university or similar institution except as declared and specified in the text;
- complies with the word limits and other requirements stipulated by the Research Subcommittee of the Department of Foreign Languages and Cultures;
- has been submitted by or on the required submission date.

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Acknowledgements

I would like to thank my professors, Nohora Bryan and Ana María Ternent de Samper. Thanks to my family and friends. Above all, I want to give thanks to God for blessing me in many ways. I mostly wish to thank my amazing boyfriend Felix Andrés Burgos. He is my best friend and stronger supporter.

Abstract

Technology Reshaping the EFL Classroom is a systematic review focused on recent studies from 2011 onwards which analyses the relationship between Computer Assisted Language Learning (CALL), Self- directed learning (SDL) and/or Self- regulated learning (SRL) in the foreign language classroom. The research is divided in two phases. The first phase provides a characterization of the studies selected. The second phase is an in-depth review of the definitions of SDL and/or SRL, and an analysis of the evidence of learning outcomes that these studies present.

In regards to phase I there are positive and negative results. On the positive side there are compelling analyses and explanations of the positive effects of the implementation of CALL (or its associated areas) in learning environments. For instance, a few investigators argued that there had been an important improvement in language skills, metacognitive competence, or in lexical knowledge. On the negative side, the studies fail to report crucial information about their methodological designs. The in-depth review results (phase II) demonstrate that the majority of studies employ mostly SRL rather than SDL. The term autonomy also appears as part of the aim of two of the studies analyzed. Regarding the evidence of learning outcomes in studies mediated by CALL with respect to SRL and/or SDL in foreign language teaching and learning environments, it was found that only four studies (out of the eight investigations selected for this review) provided research models where outcomes were identifiable. The outcomes of interest in the studies fall broadly into 3 categories: improvement of reading comprehension and annotation abilities, improvement in vocabulary learning and co-sharing, and improved self-study behaviors.

Key words: Computer Assisted Language Learning; Self directed learning ; Self regulated learning; Learning Outcomes.

Resumen

Esta tesis es una revisión sistemática de la literatura en estudios que se han producido en el periodo 2011-2015. Se analiza la relación Aprendizaje del Lenguaje Asistido por Computador (CALL, por su acrónimo en inglés), Aprendizaje Auto-Regulado (SRL), y/o Aprendizaje Auto-Dirigido (SDL) en ambientes de aprendizaje del estudio de la lengua extranjera. La investigación se divide en dos fases. La primera de ellas ofrece una caracterización de los estudios seleccionados. La segunda fase es una revisión detallada de las definiciones de SDL y / o SRL y un análisis de la evidencia de los resultados de aprendizaje que ofrecen dichos estudios.

En lo que respecta a la fase I hay resultados positivos y negativos. Algunos de los aspectos positivos es que los estudios contienen análisis y explicaciones convincentes sobre la implementación de CALL (o de sus áreas asociadas) en ambientes de aprendizaje. Por ejemplo, los investigadores aseguran que ha habido una mejora importante en las habilidades de lengua, competencias meta-cognitivas, o en áreas de conocimiento lexical. En cuanto a los aspectos negativos, los estudios no informan sobre elementos cruciales relacionados con los diseños metodológicos. Los resultados de la revisión detallada (fase II) demuestran que la mayoría de los estudios están relacionados directamente con SRL en lugar de SDL. El término autonomía también aparece como parte de los objetivos de dos de los estudios analizados. Con respecto a la evidencia de resultados de aprendizaje en estudios mediados por CALL con respecto a SRL y/o SDL en ambientes de enseñanza o aprendizaje de la lengua extranjera, se encontró que sólo cuatro estudios (de las ocho investigaciones seleccionadas para esta revisión de literatura) proporcionan modelos de investigación donde los resultados fueron identificables. Los resultado de interés de los estudios caben dentro de tres categorías: mejoramiento de

comprensión lectora y habilidades de anotación, promoción del aprendizaje de vocabulario y colaboración, y la promoción de conducta de autoestudio.

Palabras claves: Aprendizaje del Lenguaje Asistido por Computador (CALL); Aprendizaje Auto-Regulado (SRL) y/o Aprendizaje Auto-Dirigido (SDL); Resultados de aprendizaje.

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List of Abbreviations

CALL	Computer Assisted Language Learning
CELL	Computer-Enhanced Language Learning
CBLT	Computer-based language testing
CMC	Computer Mediated Communication
CRI	Computer Supported Reading Instruction
DRASS	Digital Reading Annotation System
FLL	Foreign Language Learning
FLT	Foreign Language Teaching
FLTL	Foreign Language Teaching and Learning
LLSs	Language Learning Strategies
SDL	Self-directed learning
SLR	Systematic Literature Review
SRL	Self Regulated- learning
TELL	Technology-Enhanced Language Learning
VLSs	Vocabulary Learning Strategies

Chapter 1: Introduction

1.1 Introduction to the study

Advances in new technologies and a growing access to the Internet have produced a series of changes in the classroom as they provide opportunities for learning and interaction that have not been available in the past. In the field of the foreign language teaching and learning, teachers are currently using and implementing technological tools that aim to promote effective teaching and to improve students' learning processes. In this context, Computer Assisted Language Learning (CALL) appears as a unique discipline in the current educational field, which constitutes "any process in which a learner uses a computer and, as a result, improves his or her language" (Beatty, 2010, p. 7). Over the past few years, CALL has received considerable scholarly attention, which is demonstrated by the important number of publications and conferences in the field. Such reports have not only reflected the field's accomplishments and its influence on the teaching profession, but they have also offered pertinent observations about the uses of technology in the foreign language classroom. Therefore, it is important to note that CALL is a rich and diversified field that continues to evolve.

The intent of this thesis is to analyze the manner in which research informs our understanding of the impact of CALL in the classroom. In other words, if teachers are using CALL tools to foster students' motivation, creativity and enthusiasm to become more active and committed to their learning process, it is important to gain a better understanding of the evidence that empirical research offers concerning the impact and outcomes of CALL. In particular, this thesis explores recent literature on foreign language teaching and learning that investigates how CALL is related to self-directed learning (SDL) and/or self-regulated learning (SRL), two concepts commonly associated with learning autonomy.

The research employs a systematic literature review in order to pursue such exploration. Systematic reviews “focus attention on the quality (or lack of quality) of existing research; help prevent duplication of research efforts; and provide additional insights through the comparison of individual pieces of research” (Victor, 2008, p. 1). Therefore, this systematic review targets recent studies on CALL, SDL, and/or SRL, identifies their main theoretical and methodological constructs, informs how researchers define SDL and SRL in their studies, and analyses the evidence of learning outcomes of such reports.

The thesis is divided into five chapters. Chapter 1 outlines the need for analysis, provides a problem statement and problem significance. At the same time, the chapter gives the main research question and objectives of the research. Chapter 2 provides a literature review focusing specifically on CALL, SRL, and SDL, as these constitute the main theoretical concepts behind this thesis. Chapter 3 explains the importance of systematic reviews and offers the steps followed to obtain the data for analysis in this research. Chapter 4 offers a characterization of the studies obtained and provides an analysis of the findings, which is divided into two phases. The first phase identifies key aspects of the studies selected to present a general perspective of the topic. The second phase is an in-depth analysis on the results of the body of literature on the topic. Finally, Chapter 5 offers the main conclusion and the pedagogical implications of this research.

1.2 Problem statement

Learners in the 21st century learn differently from students of older generations due to their constant interaction with computer and mobile-mediated environments. In the digital age, technology has modified standard forms of reading and writing that challenge the traditional notion of literacy, and drive the attention to digital and multimodal literacies (Dudeney, Hockly, & Pergun, 2013). Therefore, one good reason for teachers to consider integrating technology into

their classroom is that it allows learners to engage in tasks that resemble the technological and social world where they now live.

In the context of foreign language teaching and learning, technology-based tasks should not only focus on the development of students' linguistic and communicative competences, but also include computer-mediated contexts where communication and interaction take place. In the words of McLoughlin and Lee (2008), new pedagogies that emphasize such development involve "engaging learners in apprenticeship for different kinds of knowledge practice, new processes of inquiry, dialogue, and connectivity" (p. 12). However, the plethora of technological tools, such as, multiplayer online gaming environments, discourse facilitation systems (e.g., chat or email software), learning platforms (e.g., Blackboard or Moodle), relation management systems (or social networks), among others (McLoughlin & Lee, 2008) represents a great challenge for teachers who constantly look for options to engage students in effective learning processes.

Chapelle (2003) argues that different trends in CALL have helped to provide a general understanding about the practices and potential possibilities in the field. Among those trends, a technologist vision of language teaching predicts that, "much of the instructional time learners spend will consist of interaction with a computer" (Chapelle, 2003, p. 4). The main implication of this prediction is that an online learning environment in itself guarantees that learners will become autonomous by entering into processes of self-direction and self-regulation. This perspective towards technology, therefore, raises questions about issues of autonomy and self learning because students struggle while getting accustomed to a technology-based learning process that requires more responsibility, dedication, and reflection.

Given the need for integration of technology to teaching and learning processes, research in CALL has produced a considerable body of literature that analyzes the development of the field, recommends the implementation of tools in learning environments, and proclaims the positive impact of technologies in language learning tasks (Levy & Stockwell, 2006). However, as Felix (2005) and Hubbard (2005) warn, it is difficult to determine the real effectiveness of technology in the L2 classroom if research lacks rigorous methodologies that, in turn, provide ambiguous and overgeneralized results.

Reviews of CALL literature have critiqued the lack of information about the subjects' previous experience before tasks or applications being investigated are introduced into the classroom (Hubbard, 2005). This deficit of information is problematic as the researchers do not report what level of computer proficiency the students have that could have had a direct impact on the results. Another issue in such studies is that the experiments were conducted with only a brief exposure to the tasks used for the investigations. By the same token, Felix (2005) found that common issues of CALL research are related to misleading titles, poor description of research design, failure to investigate previous research, and overambitious reporting of the results. Moreover, Felix considered that the replication of well-designed studies and realistic projects based on the effectiveness of CALL needed to be addressed in the future. In a more recent systematic review of CALL, Macaro, Handley, and Walter (2012) found that studies that have focused on CALL and ESL have lacked of "sufficient evidence of its effectiveness" (p. 24). One of the most critical aspects of the review is that there is little evidence of the impact of technology on vocabulary development, grammar and writing. Finally, most reviews have concluded that the majority of the studies under scrutiny presented issues of generalizability and validity.

As the literature in CALL continues to be profusely produced, it is pivotal that research be characterized by rigorous methodologies and evidence of the results to help teachers to “make decisions about whether and how to use (technological tools)” (Ducate & Arnold, 2011, p. 14). In other words, research results must allow practitioners to become aware of the practices and pedagogical principles inside and outside the new computer-mediated environments. In addition, studies must provide effective means of understanding how students become successful learners by self-regulating and self-directing tasks in environments mediated by technology. Therefore, there is a need to constantly evaluate the theoretical considerations, research designs, methodologies and language in CALL-based reports.

1.3 Problem’s significance

The field of Foreign Language Learning (FLL) has not been unaware of the opportunities and challenges that computers and technology provide. One of the main benefits of technology for FLL is that it “helps shape how interactions take place and how language is used in each setting” (Levy & Stockwell, 2006, p. 2). In other words, if society as a whole implements new forms of communication through the use of technology, language teaching and learning must effectively respond to such new communicative environments. Therefore, it is necessary to reflect on the real impact of CALL on teaching and learning a foreign language.

The introduction of Web 2.0 learning platforms has meant a transition from structured tasks towards interaction and collaboration (Beatty, 2010). In this stage it is worth highlighting the perception towards learners’ relation with technology. Chapelle (2003) draws attention to how present-day English language learners constantly move in physical and virtual spaces of collaboration (for instance, by using forums, blogs, or social networks). At the same time, the

current technological trends have allowed language learners to be exposed to a variety of technology-shaped registers, which function in virtual spaces such as chats or email.

Chapelle (2003) explains that research and results of studies on CALL must provide answers to teachers, students, and lab developers regarding the best ways to structure learning tasks, successful strategies for using technology, and successful software design strategies. Moreover, the responsibility of CALL researchers is to equip policy makers with ideas and concepts that aim to transform educational curricula (Macaro et al., 2012) and national and international standards (Lord & Lomicka, 2011). As has been explained in the previous section, systematic reviews of CALL research have identified gaps that affect the way in which different audiences understand the role of technology in the classroom. In the words of Ducate and Arnold (2011), “it is important to take stock and reflect on our field’s accomplishments as well as identify questions that remain not or only partially answered” (p. 13). Therefore, while this research paper recognizes the labor of investigators on CALL, it intends to identify potential problems that such studies display.

Besides focusing on the structure of the reports, the thesis directs its attention to the manner in which CALL, SDL, and SRL have been integrated. It is important to consider that although self-regulation and self-direction are theoretical models that preceded computer-mediated environments, such models provide essential information about how students can take control over their own learning. In the context of new educational environments mediated by technology, “pedagogic change and greater personalization of learning are both necessary for student centered, self regulated and independent learning” (McLoughlin & Lee, 2010, p. 30). In other words, teachers must be able provide students the necessary scaffolding to support their learning. Therefore, integrating SDL and/or SRL as part of a learning process mediated by

technology should empower learners to define, create and shape their own learning trajectories.

1.4 Strategy selected to address problem

This paper uses a systematic literature review of papers published between 2011 and 2015 in order to identify evidence based on rigorous research of the relationship between CALL, SDL, and/or SRL. Traditional literature reviews allow investigators to understand and give an account of previous research on a topic being researched. As Okoli and Schabram (2010) explain, there are four purposes of a literature review: “it synthesizes the understanding a student has on their particular subject matter, it stands as a testament to the student’s rigorous research dedication, it justifies future research (including the thesis itself), and it welcomes the student into scholarly tradition and etiquette” (p. 3). However, a stand-alone literature review does not collect or analyze any primary data. Therefore, in order to conduct a rigorous review of the methodologies, theories and empirical evidence of results in different studies, a systematic literature review is preferred. Different from traditional literature reviews that focus on the state of the art of an specific field or concept, the systematic review aims to inform practitioners about issues that may affect the quality of reporting rigorous research. Systematic reviews are also an alternative for researchers who want to be rigorous while identifying, selecting and explaining previous research on a given topic.

More specifically, this paper explores a body of research on CALL, SDL and SRL using a systematic method of literature review that provides specific steps to maximize results in the search of scholarly articles, apply categories of exclusion and inclusion, and provide a succinct report on the findings.

1.5 Review question(s) and objective(s)

This systematic review has been developed into two phases. The first phase focuses specifically on the following research question:

- What are the main characteristics (i.e., the population, study dates, education sector, country of studies, and aims and findings) found in studies on CALL, SDL and/or SRL from 2011 onwards?

The second phase, which considers the in-depth review of the research addresses the following questions:

1. How are the concepts of SDL and SRL defined and used in studies focused on CALL?
2. What is the evidence of learning outcomes in studies mediated by CALL with respect to SRL and/or SDL in foreign language teaching and learning environments?

1.5.1 General objective

To give an account of the key aspects, definitions of SDL and SRL, and learning outcomes of research studies from 2011 onwards focused on CALL in the foreign language classroom

1.5.2 Specific objectives

- To characterize aspects of research studies from 2011 onwards focused on CALL in the foreign language classroom. Specifically, the population, study dates, education sector, country of studies, aims and findings.
- To identify the definitions of SRL and SDL present on studies focused on CALL in the foreign language classroom.

- To analyze the evidence of learning outcomes and pedagogical principles present on the studies mediated by CALL with respect to SRL and/or SDL in foreign language teaching and learning environments.

Chapter 2: Relevant Theoretical Bases for the Review and Other Reviews

2.1 Introduction

This section presents a general outline of three conceptual areas: CALL, self-directed learning, and self-regulated learning. The chapter provides a theoretical overview and general constructs and definitions of the aforementioned terms.

2.2 Theoretical framework

2.2.1 Defining Computer Assisted Language Learning (CALL)

Beatty (2010) defines CALL as “any process in which a learner uses a computer and, as a result, improves his or her language” (p. 7). However, one of the major issues in the field is that, due to the advances and transformations in technology and education, publishing companies, researchers, and educators have labeled CALL in different ways. For instance, it is worth mentioning teaching techniques such as *computer-enhanced language learning (CELL)*, *technology-enhanced language learning (TELL)*, and applications such as *computer-based language testing (CBLT)* and *computer-supported reading instruction (CRI)*. These labels show the viewpoint from which these different approaches are located and their active interaction within the field. The different ways in which CALL has been traditionally understood suggest that conceptualizing the term is a demanding process.

The introduction of computers in language learning can be traced back to the early 70s, when the American government provided resources to the teaching and translation of Russian during the Cold War (Beatty, 2010). Since then, the relationship between the computer and language tasks has evolved according to the technological advances of the former and the pedagogical principles of the latter. Table 1 displays a general description of the historical development of CALL.

Table 1 Warschauer's chart of evolution of CALL

<i>Stage</i>	<i>1970s-1980s: Structural / behavioristic CALL</i>	<i>1980s-1990s: Communicative CALL</i>	<i>21st Century: Integrative CALL</i>
Technology	Mainframe	PCs	Multimedia and internet
English Teaching Paradigm	Grammar-Translation & Audio-Lingual	Communicative Language Teaching	Content –Based, ESP/EAP
View of Language	Structural (a formal structural system)	Cognitive (a mentally-constructed system)	Socio-cognitive (developed in social interaction)
Principal Use of Computers	Drill and practice	Communicative exercises	Authentic discourse
Principal Objective	Accuracy	And Fluency	And Agency

Taken from: Yang (2010, p. 909)

From Warschauer's chart it is possible to say that the evolution of CALL is mainly determined by teaching approaches that have benefited from the use of computer at different proficiency levels. In the first stage of CALL development, structural-behavioral approaches, which emphasized the use of repeated drilling and practice, are mediated through the use of simple tasks that "provide positive or negative feedback to learners on the formal accuracy of their responses" (Yang, 2010, p. 910). The introduction of desktop or personal computers played an important role in the second historical stage, These new machines allowed universities and other institutions to use storage devices, such as video disks or CD-ROMs, that provided complex language programs of instruction that went beyond textual approaches (Beatty, 2010). In this stage, there was a transition from behaviorism to a constructivist model of instruction that allowed learners to construct meaning from the different tasks offered. Finally, the third stage in Warschauer's chart focused on current and future computer technologies. More than focusing on the machine, this stage points to the development of word processors, the access to and use of internet, and the proliferation of mobile applications related to language learning.

2.2.1.1 Research on CALL

Ducate and Arnold (2011) explain that CALL research started to appear in the late 1980s and the early 1990s. According to the authors, the CALL research agenda mainly focused on technological, psycholinguistic, sociocultural and ecological approaches. The difference among these approaches resides in the analysis of the relation between computational tools and language learning processes. For instance, technological approaches explore capabilities of hardware and software, and how students and teachers employ and react to new technologies. Psycholinguistic approaches have analyzed the cognitive perspectives related to input, output and interaction that takes place in language learning. Sociocultural theories have influenced CALL research as they have aimed to analyze the “social aspect of learning facilitated by the mediation of tools, including language” (p. 11). Finally, the ecological approach, which should be considered a new trend in CALL research, aims to provide explanations in regards the unity between computers, networks, and the social activities around learning.

2.2.2 Self-directed learning (SDL)

Originating at the core of adult education and socio-pedagogical theories (Pilling-Cormik & Garrison, 2007; Saks & Leijen, 2014), SDL is a model that explains the processes that help the student take control over her/his own learning. In other words, SDL provides a conceptual framework to understand the manner in which learners’ make decisions and intuitively follow steps to reach their own learning objectives. SDL is part of a broader conceptual framework called self-direction in learning, which encompasses SDL and self-direction as concepts. According to Saks and Leijen (2014), self-direction in learning refers to “both the external characteristics of an instructional process and the internal characteristics of the learner, where the individual assumes primary responsibility for a learning experience” (p. 191). Therefore, SDL

must be understood as the interaction between internal and external processes that impact the learner's experience and attitudes towards learning.

Adult education theorist Malcolm Knowles explains that SDL "is a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (Knowles, 1975, as cited in Peters, 1998, p. 163). Knowles' definition integrates three dimensions that constitute SDL: self-management, self-monitoring, and motivation (Garrison, 1997; Pilling-Cormik & Garrison, 2007).

Self-management refers to the contextual or external activities that occur within the learning process. In this dimension, SDL learners are able to identify which materials, approaches, and time constraints will potentially appear while developing their tasks. In this sense, self-management provides the connection between the specifics of the task and its objectives with metacognitive strategies that are used.

Self-monitoring appears as part of the realm of the cognitive responsibilities within the leaning process (Pilling-Cormik & Garrison, 2007). Self-monitoring indicates the metacognitive processes that are applied while carrying out tasks. In other words, it is the learner's capacity to identify what works and what does not, and to make decisions regarding the strategies that might not be fulfilling their function. Garrison (1997) explains that to self-monitor "is to ensure that new and existing knowledge structures are integrated in a meaningful manner and learning goals are being met" (p. 24). In this model, responsibility to construct meaning (or cognitive responsibility) appears as an essential component of SDL. This means that new learning must assimilate and accommodate new concepts with previous knowledge (Garrison, 1997).

Motivation is an essential dimension of SDL as it manifests itself in the interest and focus that learners show during the learning process. In the SDL model proposed by Garrison (1997), the distinction between entering motivation and task motivation is important. In the former type of motivation, learners connect their intrinsic motivation with external factors, that is, the learner analyses whether tackling the task will help him/her reach specific objectives. Task motivation is the stage where there is a direct connection with self-management, which means that the learner has initiated a process of active learning (Garrison, 1997).

One aspect that enters into this complex description of SDL dimensions is the one on personal autonomy. Candy (1991) explains that personal autonomy must be seen as the overall goal of education at all levels. Within SDL, personal autonomy indicates independence, freedom of choice, and reflection. It is necessary to clarify, however, that autonomy must not be considered as a separate process of the external conditions of the learning environment. As Garrison (1997) suggests, SDL processes are characterized by constructive processes of learning where there is a constant negotiation between the learner and the teacher.

It is important to return to the properties of the learning strategies that the learner proposes, as they are key aspects of SDL. According to Loyens, Magda and Rikers (2008), two levels of processing occur as the learner applies his/her own learning strategy: “deep-level processing is aimed at seeking meaning in the subject matter, while in surface learning the reproduction of the content is the first matter of importance” (p. 415). On the one hand, the main attributes of deep-level processing are metacognitive processes of elaboration and identification of the principles behind the subject matter. On the other hand, surface learning is characterized by rehearsal and memorization.

In sum, self-directed learners are able to independently create a series of strategies that have an impact on their learning process. It is worth indicating that by making decisions in an autonomous manner, applying, revising and modifying specific learning processes, and by re-incorporating such strategies in future tasks, learners actively engage in self-direction.

2.2.3 Self-regulated learning (SRL)

SRL traces its origins back to the fields of cognitive psychology. Therefore, SRL has traditionally focused on the cognitive and behavioral aspects that take place during the learning process. In this sense, individuals are considered to be self-regulated “to the degree that they are metacognitively, motivationally, and behaviorally active participants in their own learning process” (Zimmerman, 2001, p. 5). In other words, SRL is a learning process in which learners establish their learning goals and plans and subsequently regulate and determine the results of such process (Narciss, Proske & Koerndle, 2007)

In addition to this definition, two other components have characterized the conceptual framework of SRL, namely the feedback loop and the aspects related to how and why learners self-regulate. Zimmerman (2001) explains that learning processes are characterized by feedback loops. Put differently, this loop refers to processes of monitoring where the learner determines the effectiveness of the strategies used when completing a task. By doing so, the learner responds to this feedback “in a variety of ways ranging from covert changes in self-perception to overt changes in behavior” (p. 5). The second common component within definitions of SRL refers to “how and why students choose to use a particular self-regulated process, strategy or response” (p. 6). In this regard, theoretical perspectives on psychology and education have provided a rich variety of answers to such inquiry. However, it is certain that motivation plays an essential component in such attempts to understand how and why students self-regulate.

The different aspects that constitute the main definition of SRL are mainly supported in a model for self-regulated learning proposed by Zimmerman in the late 90s. Such model is based on a cycle based on phases of forethought, volition, and self-reflection (Figure 1). This model provides three essential characteristics of a self-regulated learner. First, a self-regulated learner is able to improve his/her ability to learn through the selection of metacognitive and motivational strategies. Second, the learner is able to select, create and/or organize learning environments that allow him/her to reach learning objectives, Finally, SRL learners are able to determine the form and amount of instruction they need (Sha, Looi, Chen & Zhang, 2011).

Figure 1 Zimmerman's model for self-regulated processes

Forethought	Influential processes and beliefs that precede efforts to learn and set the stage for such learning.
Performance or volitional control	Processes that occur during learning efforts and affect concentration and performance.
Self-reflection	Processes that occur after learning efforts and influence learners' reactions to that experience

Adapted from: Lewis & Vialleton, (2011, p. 207)



Something that must be added about Zimmerman's model is that in SRL there is a constant back and forth between the personal realm (or private world) and the external environment (Pilling-Cormik & Garrison, 2007). This means that SRL is affected not only by the individual's thought process but also by the immediate learning environment, that is, the school. It is important to note that, in current SRL models, school systems are considered essential to accompany self-regulating processes. Beishuizen and Steffens (2011) argue that learning institutions must change their methods of traditional apprenticeship towards cognitive apprenticeship, which consists in equipping learners with processes where work which models cognition and metacognition . For the authors, such cognitive modeling helps students and instructors to develop ideal learning environments.

In sum, in SRL students have a proactive role in the control over their own learning when they select their own learning goals, adapt their learning environments, and use cognitive and meta-cognitive strategies. In this process, the interaction between the learner’s cognitive processes and the instruction that the school offers is based on constant negotiation and accommodation.

2.3 Conclusion

The appearance of computers and, therefore, the constant development of digital technologies has produced an increased awareness of the need to understand how new tools can assist language education. Thus far, several empirical studies have investigated CALL, and the opportunities the field offers to engage learners in new learning environments. As computers are now an integral part of language education there is a common inquiry as to how SDL and SRL can be linked to e-learning, but the terms are not clearly distinguished in literature. As a matter of conclusion of this section Figure 2 displays a comparison between both terms (Saks & Leijen, 2014).

Figure 2 Comparisons and similarities between SDL and SRL

SDL	SIMILARITIES	SRL
	<ol style="list-style-type: none"> 1. both are seen in two dimensions <ol style="list-style-type: none"> a) external/process/event b) internal/personality/aptitude; 2. both have four key-phases: <ul style="list-style-type: none"> defining tasks – setting goals and planning – enacting strategies – monitoring and reflecting; 3. active participation; 4. goal-directed behavior; 5. metacognition 6. intrinsic motivation 	
	DIFFERENCES	
<ol style="list-style-type: none"> 1. originates from adult education 2. practiced mainly outside traditional school environment; 3. involves designing learning environment; 4. involves planning learning trajectory 5. broader macro-level construct. 		<ol style="list-style-type: none"> 1. originates from cognitive psychology 2. practiced mainly in school environment; 3. task usually set by teacher; 4. narrower micro-level construct

(Taken from Saks & Leijen, 2014, p.193)

Chapter 3: Research Design

3.1 Introduction: What is a systematic literature review?

Instead of traditional reviews, which provide a general overview of literature on a given topic (Boote & Beile, 2005), a systematic literature review is a method of investigation that allows identifying and evaluating research. Gough, Oliver, and Thomas (2012) explain that “reviewing research systematically involves three key activities: identifying and describing the relevant research (‘mapping’ the research), critically appraising research reports in a systematic manner, and bringing together the findings into a coherent statement, known as synthesis” (p. 5).

Although it is true that any type of published research must follow specific protocols that are valid and reliable, it is important to determine if investigations available to the public were conducted in a consistent and rigorous manner. In this sense, systematic reviews not only provide an explicit account of methods implemented on studies, but also they become means to accumulate solid evidence from research (Victor, 2008).

Literature on systematic reviews (Gough et al., 2012; Okili & Schabram, 2010; Khan, et al., 2003; Torgerson, 2003) strongly suggest following a sequence of steps or stages in the review process. The following list specifies the steps to follow in this systematic review.

1. *Framing questions and purpose of the review*: This stage includes the research question(s) and purpose of the systematic review. As Khan, et al., (2003) explain such questions must be specified in a clear and unambiguous manner. This is one of the most important steps since it allows the configuration of the search protocol.
2. *Protocol Design*: At this stage the researcher establishes the bases of the search in the following way:

- a. *Search criteria*: Includes the terms to be identified within the search and the type of databases where the search will be performed.
 - b. *Searching for the literature*: Mainly conducted electronically, this stage involves performing the search by including the criteria previously established.
 - c. *Inclusion and exclusion criteria*: In this step categories of inclusion or exclusion are identified in the studies selected. It is important to mention that the criteria are established before the search of literature.
 - d. *Data extraction*: Once the articles for the review have passed through the inclusion/exclusion filter, the information they contain is extracted according to pre-established categories on a data extraction sheet. This stage is where reviewers determine the quality of the studies under scrutiny.
 - e. *Synthesis of studies*: Researchers summarize the information and the evidence obtained from the data extraction stage.
3. *Writing the review*: The data obtained is interpreted in the form of a report to be published.

3.1.1 Framing questions and purpose of the review

The following section presents the manner in which this systematic review was conducted after following the steps previously explained.

This stage includes the research question(s) and purpose of the systematic review. As Khan, et al., (2003) explain such questions must be specified in a clear and unambiguous manner. This is one of the most important steps since it allows the configuration of the search protocol. Establishing the research question and refining the objectives for this review (see section 1.3 in this paper) allowed conceiving and implementing the main protocol of this investigation.

3.1.2 Protocol design for the systematic review

Before initiating the review, and to guarantee transparency in the process, the researcher established the search and the inclusion and exclusion criteria. Based on the main objective and research question of this thesis, the protocol allowed determining procedures of search and retrieval of articles, application of inclusion and exclusion criteria, extraction of data, and synthesis of the studies.

3.1.2.1 Search Criteria

For the purposes of this investigation, the search was limited to articles published between 2011 and 2015. The reason behind this decision is that, due to the rapid technological advances in interfaces applied to foreign language learning/teaching, articles that extend back several years are considered dated information. In terms of the language of search, English was preferred rather than other languages.

Based on the research question and objectives for this paper, the researcher selected six terms to be implemented in the search to obtain the data for this systematic review. These terms aim to narrow down the search in the fields that databases provide:

- “Computer Assisted Language Learning”(“CALL”)
- “Foreign language learning”(“FLL”)
- “Foreign Language Teaching” (“FLT”)
- “Foreign Language Teaching and Learning” (“FLTL”)
- “Self directed learning” (“SDL”)
- “Self regulated learning” (“SRL”)

The databases selected specialize in fields that potentially include research in foreign language teaching, computer assisted language learning and technology. The databases presented in Table 2 include peer-review journals focused in the fields of education, linguistics, computing and technology, and psychology.

Table 2 Databases available for the search

Database
Academic Search Premier
Communication & Mass Media Complete
eBook Collection (EBSCOhost)
eBook Academic Collection (EBSCOhost)
Educational Journals ProQuest
Fuente Académica
Library, Information Science & Technology Abstracts
MasterFILE Elite
Philosopher's Index
Professional Development Collection
Psychology and Behavioural Sciences Collection
Scopus

3.1.2.2 *Searching the literature*

Mainly conducted electronically, this stage involves performing the search by including the criteria previously established. The researcher conducted the search for 6 months from January to July 2015 by using databases provided in the library systems of two universities: Universidad de La Sabana (Bogota, Colombia) and the University of Maryland, Baltimore County - UMBC (Baltimore, MD). Working with the databases of both universities allowed the researcher to maximize and compare the results of the search. Based on the instructions provided in the databases' search manuals, and after an informal interview with a reference librarian at UMBC, the terms were introduced as free-text searches. This means that, the terms would be searched for in the main records (abstracts and keywords) that the databases provide.

Different search combinations were performed, but, in the end, the search was conducted by using quotation marks (“ ”) to limit it to the terms that were introduced. Following the main objective of this systematic review, the search sets combined the terms as it follows:

- “Foreign language learning” OR “foreign language teaching” OR “foreign language teaching and learning”

AND “Computer assisted language learning”

AND “Self-directed learning “*AND OR* “Self-regulated learning”

In order to ensure optimum precision and recall, the search also included strategies such as deleting sections of the terms. For instance, at the beginning the researcher only introduced terms without quotation marks. This proved to be a difficult search because the databases looked for each word in the databases records (i.e., foreign *AND* language *AND* learning). As has been explained before, the use of quotation marks prevents retrieving articles that include only a word of the ‘phrase’ introduced. The results of the search (Appendix A) appear in a flow chart that presents the database (Scopus, Proquest and EBSCO) and the results at every stage of the search when using the different combination of the terms mentioned above.

3.1.2.3 Inclusion and exclusion criteria

The criteria established earlier in the protocol design restricted the selection of articles focused on contents only to those bearing on the research question of this thesis. More specifically, the articles needed to address research on CALL, SDL, and/or SRL in the context of foreign language teaching and learning. Articles that would potentially refer to the use of computer-based learning in other educational contexts were immediately discarded. Other criteria of inclusion required articles with qualitative, quantitative, or mixed methods. Thus, theoretical or reflective studies would be considered inappropriate for this review. Also, articles to be included in the review needed to focus only on populations located in the educational sector. Table 3 displays the specific criteria of inclusion and exclusion implemented in this review. As will be further discussed in Chapter 4, after the search of literature and the application of the inclusion and exclusion criteria, twenty articles were considered for subsequent steps of analysis.

Table 3 Inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
<i>Content</i>	Foreign Language Learning (FLL) or Foreign Language Teaching (FLT) or Foreign Language Teaching and Learning (FLTL)	Other subjects (such as biology or math)
	Computer Assisted Language Learning (CALL)	Computer Based Learning Environments related to other subjects.
	CALL focusing on SRL and / or SDL	No evidence of CALL focusing on SRL and / or SDL
<i>Setting</i>	All educational levels (e.g. primary education)	Educational training focusing on non-language-related topics.
<i>Methodology</i>	Quantitative studies or Mixed method studies or Qualitative studies	Theoretical, reflective or descriptive research that doesn't provide evidence of impact on student's learning. Reports that do not stem from academic settings.
	<i>Types of publication</i>	Journal articles or Systematic Literature reviews reports published between 2011 and 2015

3.1.2.4 Data extraction

Once the articles for the review passed through the inclusion/exclusion filter, the information they contained was extracted according to pre-established categories on a data extraction sheet. It is at this stage where the researchers determined the quality of the studies under scrutiny.

Retrieved reports that met the inclusion and exclusion criteria were analyzed by using the data extraction sheet in Appendix B. This sheet, adapted from the Evidence for Policy and Practice Information (EPPI) Centre (2007), aims to identify contextual information, purposes and theoretical constructs of the studies under scrutiny. At the same time, the instrument helps to assess the methodological quality of the studies by paying close attention to data collection and analysis methods of the reports.

It is worth noting that the EPPI Centre's data extraction tool was adapted in order to focus on the research question and objectives of this paper. In other words, the main objective of this investigation required focusing on the theoretical and methodological constructs, the definition of concepts, as well as on the learning outcomes that the selected studies provided.

Twenty (20) articles were finally obtained after conducting the search within the databases and were assessed by using the inclusion and exclusion criteria. Ultimately, eight papers remained and were considered relevant for this systematic review. In order to provide the analysis for Phase 1, a characterization of the studies (i.e., to identify population, study dates, education sector, country of studies, research methods, data collection, instruments and analysis, aims and findings), was applied on the eight studies by using a data extraction sheet (Appendix B).

3.1.2.5 In-depth review

The main procedure to include studies in the in-depth review consisted in establishing two filters that correspond to the research questions and the objectives of this thesis. In the first filter, and after passing through the inclusion and exclusion criteria, the studies had to provide a theoretical framework or discussion concerning the concepts of SDL and SRL. It is necessary to specify that at this level the interest of the systematic review is to establish how the selected studies defined the concepts of SDL and/or SRL within contexts mediated by CALL. The second filter aims to answer the question if the studies provide evidence of learning outcomes. Therefore, through a characterization of the aims, constructs, technology used, pedagogical principles, outcomes and data collection instruments, it is possible to present whether studies show proof of learning outcomes or not.

3.1.3 Writing the review

Researchers summarize the information and the evidence obtained from the data extraction stage.

The data obtained is interpreted in the form of a report to be published.

Chapter 4: Results and Data Analysis

4.1 Introduction

This chapter provides an account of the screening procedures applied to the studies obtained for this review. The following sections describe in detail the two phases implemented for this investigation. The first phase reports on the characteristics of studies that have been included in this systematic review, that is, research studies from 2011 onwards related to CALL, SDL and/or SRL focused on second/foreign language. The second phase provides an in-depth review that focuses on the definitions of SDL and/or SRL, and presents the evidence of learning outcomes in the selected studies.

4.2 Results of the database search

The initial database search strategy provided 1,151 results of CALL articles only. Once the search within the databases continued, and according to the pre-established search criteria, 248 reports were excluded as they did not focus on foreign language learning, leaving 903 reports for further consideration. After implementing the final search filter, which was focused on the terms CALL, FLL, SRL and/or SDL, 883 reports were excluded. In other words, 20 articles, for which full hard or digital copies were sought through library loans or other means, were selected for the screening of titles and abstracts. From a search yield of 1,151 articles, a characterization of 20 studies of empirical research seems dramatic. However, it is important to remember that the review questions are specifically looking at language learning in CALL studies related to SDL and/or SRL.

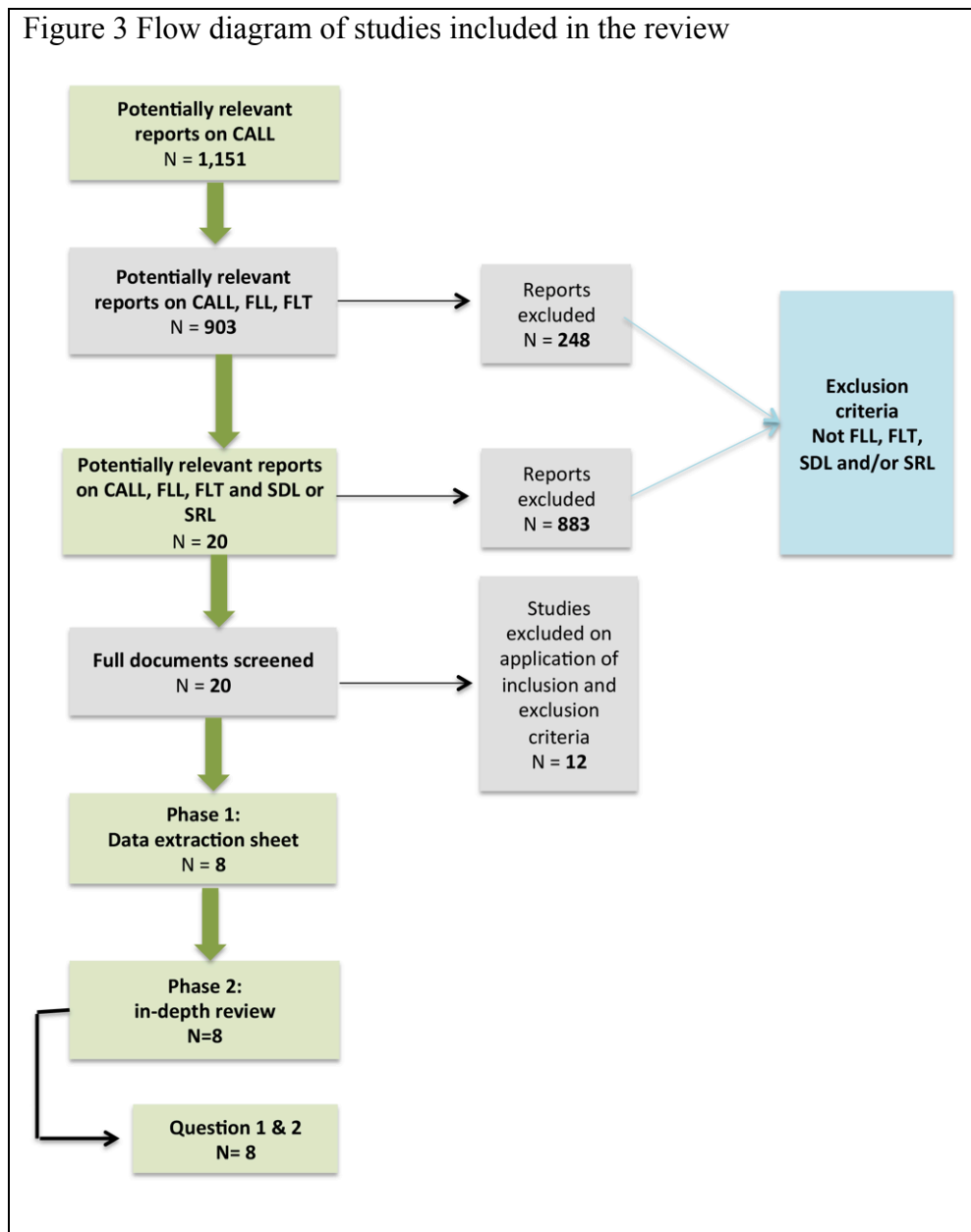
The 20 reports were assessed for eligibility by using the inclusion and exclusion criteria that was designed prior to the search (Table 3). A full list of the studies with reasons for

inclusion and exclusion are found in Appendix B and C respectively. After the application of the inclusion and exclusion criteria, eight papers were considered relevant for this systematic review. In order to provide the analysis for Phase 1, a characterization of the studies (i.e., to identify population, study dates, education sector, country of studies, research methods, data collection, instruments and analysis, and aims and findings) was applied to the 8 studies by using a data extraction sheet (Appendix D). This characterization provides a general picture of the different contexts in which research on CALL has been pursued.

Finally, for the in-depth review, or Phase 2, the 8 studies were analyzed to answer the two questions proposed for this stage. The first question aimed to analyze how the investigations selected theoretically conceptualize SDL and SRL in the context of CALL. The second question intended to obtain evidence of learning outcomes that the studies presented. Figure 3 displays a flowchart outlining the procedure used for the selection of articles for the review.

4.3 Phase 1: Characterization of the studies and interpretation of findings

As it has been previously mentioned, there has been a growing interest in the investigation of the impact of technology in the classroom. In fact, the initial search results for this review demonstrated that the entries of CALL articles in different databases generated a wide number of results, (e.g., 1.151 studies were found during this search by following the pre-established protocol). However, the number of entries is significantly reduced when the concepts SDL and SRL are added to the search (see Figure 3). It is interesting to notice that, despite the fact that learning mediated by computers is highly characterized by self-learning, only few studies deal directly with SDL and SRL as essential contributors to students' independent learning.



It is important to identify some general characteristics of the studies in regards to years and place of production, population, and educational settings. Table 4 provides information about general aspects of the studies reviewed.

Table 4 General aspects of the included studies

Study	Country	Education sector	Population		Gender	Age
			Teachers	Learners		
Lai (2014)	China	University	X	15 students volunteered to participate in the interviews 164 students took part in the online survey.	8 female and 7 male students 124 (77%) were females, and 36 (23%) were males.	18 - 24
Sun (2014)	New Zealand	University	X	46 university students. No particular recruitment criteria to either include or exclude any particular type of students	NI	NI
Chen, Wang, and Chen (2014)	Taiwan	High School	X	32 students.	17 males and 15 females.	NI
Smith, and Craig (2013)	Japan	University	X	180 1st and 2nd year students.	NI	18-24
Lan (2012)	Taiwan	High School	X	61 students.	NI	NI
Kondo, Ishikawa, Smith, Sakamoto, Shimomura, and Wada (2012)	Japan	University	X	Study 1: 88 students, 42 students were included in the MALL group and 46 students were included in a control group. Study 2: 15 students out of the 42 students in the MALL group in Study 1 willingly chose to participate in phase 2. There was no control group.	NI	NI
Lai, and Gu (2011)	China	University	X	279 language learners.	NI	NI
Lee (2011)	USA	University	X	16 students	NI	18 – 22

It is worth noticing that there is a predominance of research in Asian countries, as 6 out of the 8 studies were conducted in Japan, Taiwan or Korea. This fact relates to Macaro et al.'s review (2012) which stated that research in CALL in these countries aims to evaluate educational policies related to the use of technology in the classroom. Regarding the educational setting in which the reviewed studies were implemented, most of these were conducted in higher education rather than in high school or in lower levels of instruction. Another important aspect of

this characterization is that the main focus of these studies was on learners' attitudes or development of skills in relation to the use of technologies.

With reference to the structure of the studies, the researchers presented the main theoretical information related to CALL (Table 5). In the majority of the reports, the investigators emphasized the importance of technology in the context of foreign language learning. Nonetheless, only one of the studies (Craig & Smith, 2013) defined CALL in a more traditional manner. Put differently, the authors considered that CALL is the sum of technological tools "associated with the transmission of information through technology" (p. 253). Lai and Gu (2011) did not provide an exact definition of CALL; however, they considered that the field offers possibilities of research to identify the manner in which ICTs support students' learning outside the classroom.

Six articles located their research not specifically in CALL but in associated fields of technology-based learning. For instance, Sun (2014) and Lee (2011) put emphasis on computer-mediated communication (CMC) as they considered that the computer is a medium of communication between human beings rather than the objects that students use to interact with. Kondo et al. (2010) referred to Mobile Assisted Language Learning (MALL), a growing field that highlights the potential of mobile technologies (e.g. smartphones, tablets, and mp3 players, among others) in formal and informal language learning contexts. Web-Based Language Learning (Chen et al., 2014) also appeared as a field associated with CALL. The importance of web-based tasks is not the use of the computer or other technologies, but the learning potential that network-based teaching environments offer for both teachers and students. Lai (2014) and Lan (2012) did not offer a clear working definition of CALL. However, they located their research at the heart of the debates and challenges, or the application of computer-mediated

learning strategies beyond the classroom. For instance, Lan's study reported on the analysis and implementation of a co-sharing based strategy-learning system embedded within the context of students' learning through computers.

Table 5 Theoretical constructs of CALL in the included studies

Study	Definitions associated with CALL
Lai (2014)	CALL is not directly addressed in this study. The author refers to the use of technology for language learning outside the classroom. Self-directed use of technology appears as the main conceptual construct (See definitions of SDL and SRL on Table ...)
Sun (2014)	CALL is used as an umbrella field that includes: Digital communication tools, online-networked applications, and computer-mediated communication (CMC) for language teaching and learning. The study focuses on the application of CMC tools in within a learning management system which "employs a range of information and communication technologies to offer an online platform over the Internet, where a whole course can be planned, facilitated and managed by both the teachers and the learner" (p. 20)
Chen et al. (2014)	The authors prefer to use Web-based language learning (WBLL) rather than CALL. WBLL: "provides language teachers with network-based teaching environments in which they can assign meaningful tasks and use various materials for language learning (...) Additionally, WBLL provides learners with an interface for interaction and gives students and teachers alternative ways to communicate (...) Web-based instruction helps learners complete a series of instructional activities, and helps learners increase the number of opportunities for constructing and sharing their knowledge with others" (p. 103)
Smith & Craig (2013)	CALL "is considered to include any visual, audio, text, or graphic format associated with the transmission of information through technology where learning support, autonomous exploration and practice, teacher guided instruction, or collaboration occurs, either synchronously or asynchronously (Benson, 2008; Craig, 2010; Little, 1991; Miyagi, 2007; Smith, 2010; Warschauer, 1996)" (p. 253)
Lan (2012)	The author does not address CALL directly. The study appeals to the use of E-tools as instruments embedded within strategies for learning vocabulary modules and co-sharing.
Kondo et al. (2012)	The authors prefer to use Mobile Assisted Language Learning (WBLL) rather than CALL. MALL is "formal or informal learning mediated via handheld devices which are potentially available for use anytime, anywhere. Handheld devices include mobile phones and tablet computers with Internet capability and other devices without Internet access such as electronic dictionaries, MP3 players, and game players." (p, 171)
Lai & Gu (2011)	The authors refer to CALL as a field of research that identifies the potentials for language learning. These potentials "are expected both to enhance language instruction inside the classroom and to extend language education beyond the classroom" (p. 317). Information and communication technologies (ICTs) are elements that support learners learning outside the classroom.
Lee (2011)	CALL is associated with Computer-mediated Communication (CMC): "interaction with human beings through a computer (Warschauer, 2003)." (p. 89). A shared and social construction of knowledge has been employed as a theoretical framework to support CALL: "Rather than learning residing in one-way delivery of knowledge from a teacher, it is an active, social, and collaborative process through which learners use a system of symbols (language) or a material tools (computers) to construct knowledge with others in order to accomplish a joint task (Lee, 2004; Pavlenko & Lantolf, 2000)." (p. 89)

The aims of the studies analyzed (Table 6) are consistent with traditional inquiries about CALL (Felix, 2005; Hubbard, 2005). Put differently, the aims of the reports can be divided into three categories: 1) the implementation of technologies and the potential changes in learners' abilities, 2) general attitudes towards the use of technology, and 3) curriculum evaluation. Regarding the first group, the works of Lee (2011), Kondo et al. (2012), Chen et al. (2014), and Lan (2014) analyzed results obtained after the introduction or practice of a specific technology-based learning tool. More specifically, the work of Lee (2011) analyzed how the use of blogs supported students' autonomous ability to interact with L1 speakers. One of the most interesting aspects of Lee's research is the emphasis given to social processes that do not only have an impact in language learning, but also promote intercultural competence. Kondo et al. (2012) analyzed how advanced self-study abilities are potentially fostered by the implementation of a Nintendo DS device. Similarly, the work of Chen et al. (2014) explored how Digital Reading Annotation System (DRAS) techniques, in the form of an HTML-based tool, promoted reading comprehension and annotation abilities. One of the interesting features of this study was its emphasis on social aspects related to the use of the tool, as the authors tried to correlate gender differences with reading comprehension. Finally, the third study in the group, Lan (2012) analyzed the effects of a vocabulary tool (i.e., *Mywordtools*) on lexical learning.

The second group of aims dealt with the general attitudes, perceptions and challenges towards specific or general uses of technological tools in the language learning process. Lai and Gu (2011), for example, intended to determine the perceptions, beliefs, and values towards the use of technology outside the classroom. Moreover, the authors analyzed, through surveys and interviews, the levels of students' computer literacy and their relationship with learning goals. Lai (2014) examined how students perceived teachers' modeling of SDL reflected in the use of

technologies. In this sense, the author aimed to explain how SDL is not an individual process that precedes learning, but a kind of strategy that can be instilled from external sources. Finally, in this second group of research, Sun (2014) identified variables related to the difficulties and challenges that occur in new online learning environments. These variables appear to be in relation to collaboration, behaviors, and strategies implemented toward language learning in such computer mediated spaces.

In the last group of research aims, the work of Smith and Craig (2013) evaluated a CALL learning autonomy course. In this research, the main objective was to analyze the curriculum design of a course characterized by the implementation of CALL and self-access materials. Similarly to the second category of aims, Smith and Craig's evaluation was based on the perceptions that learners in the course provide.

Table 6 Aims and findings as reported in the studies

Study	Aim	Findings
Lai (2014)	To model the influence of teacher behaviors on learners' self-directed technology use.	Different types of teacher support influenced learners' out-of-class self-directed use of technology for language learning in different ways: affection support predicted self-directed technology use through strengthened perceptions of the usefulness of technological resources for language learning, whereas capacity support and behavior support predicted self-directed technology use through enhanced perceptions of facilitating conditions and self-efficacy in using technological resources for language learning. Thus, different types of teacher support have different functions.
Sun (2014)	To investigate the difficulties and challenges that confront online language learners and also on the way they adjust and adapt in this new learning environment.	There are six major difficulties: <ol style="list-style-type: none"> 1. Following the schedule and studying regularly. 2. Getting ahold of classmates and finding suitable time to work together. 3. Pairing/teaming up and working collaboratively. 4. Ensuring constant engagement with the class. 5. Keeping self-motivated and being a self-directed learner. 6. Lack of social interaction

(Table Continues)

Study	Aim	Findings
Chen et al. (2014)	To evaluate how the proposed DRAS with SRL mechanisms can promote reading comprehension and annotation abilities of individual learners, whether gender difference and correlation between reading comprehension and reading annotation ability exist, and how different SRL abilities affect reading comprehension and annotation abilities of individual learners.	<ol style="list-style-type: none"> 1. The proposed DRAS with the SRL mechanism efficiently promoted reading comprehension of learners who set learning goals and self-monitored their progress for reading English-language texts online. 2. Analytical results prove that the proposed DRAS with the SRL mechanism encouraged learners to contribute high-quality annotations, thereby enhancing the reading comprehension of other learners. 3. Analytical results confirm that gender differences in reading comprehension and annotation ability existed when using the proposed DRAS with and without the SRL mechanisms to read English-language texts online. 4. Learners had a positive attitude towards collaborative learning behavior as they cared about the rank of their annotations via the annotation reward mechanism. 5. The SRL abilities of learners in the experimental group were positively correlated with their reading comprehension, indicating that reading comprehension of learners in the experimental group can be evaluated according to their SRL indexes assessed by the proposed system. 6. Although the proposed DRAS with SRL mechanism support positively affects learners to contribute rich reading annotations, the quality of learner-generated annotations cannot be guaranteed. This may affect learner's reading performance.
Smith & Craig (2013)	To enhance learners' autonomous use of CALL in the acquisition of English as a Foreign Language (EFL)	<ol style="list-style-type: none"> 1. Teachers and learners' consciousness was raised about what is expected of users in the autonomous use of CALL in a classroom environment and in a Self-Access Centre. 2. There is improvement in learners' planning, organizing, tracking, and evaluation of their autonomous use of CALL resources, and that regular and critical learner self-reflection is a key factor contributing to a positive shift in study culture.
Lan (2012)	To develop and evaluate a co-sharing-based strategy learning system for L2 vocabulary learning known as "Mywordtools" that is designed specifically for lexical learning	<ol style="list-style-type: none"> 1. Students using Mywordtools practice and share vocabulary learning strategies 2. VLSs outperformed both those who did not use Mywordtools and those who used the platform but without sharing. 3. The sharing strategy helped L2 learners to construct more VLSs, and they consequently performed significantly better than those who did not implement strategy sharing. 4. The use of co-sharing with Mywordtools not only benefits the development of VLSs by EFL students but also helps them to gain more in L2 vocabulary learning.

(Table continues)

Study	Aim	Findings
Kondo et al. (2012)	To discover whether certain MALL practices would foster an advanced form of self-study, self-regulated learning (SRL).	<ol style="list-style-type: none"> 1. Features of self-study in the MALL group were stronger than in the control group. 2. Self-regulated learning was also more evident in the MALL group than in the control group in terms of the specificity of the students' goals, the customized creation of learning tasks, and in-class applications compared with the students' self-reported previous learning behavior.
Lai & Gu (2011)	To understand learners' self-regulated use of technology outside the classroom for language learning.	<p>Four factors affected the participants' selective use of technology for language learning:</p> <ol style="list-style-type: none"> 1. First, participants' self-regulated language learning dispositions were found to be strongly associated with their use of technology to plan and monitor their learning progress. 2. Second, participants' language learning beliefs were associated with their technology-enhanced self-regulation: a stronger belief in seeking language use opportunities beyond the classroom was positively associated with participants' likelihood of using technology to regulate their learning, especially to expand learning resources and to commit to learning goals. 3. Third, learners' proficiency levels, or rather their perceptions thereof, affected whether they used technology to seek language learning resources and opportunities. Participants who had been studying the language for more than four years were found to show a greater tendency, although not statistically significant, to use technology to regulate their social connections and support than those with less than four years of learning experience 4. The participants' limited knowledge about and access to useful technology-enhanced learning materials and venues also constrained their active engagement with technology to support their language learning outside the classroom.
Lee (2011)	To identify how using combined modalities of asynchronous computer-mediated communication (CMC) via blogs and face-to-face (FTF) interaction through ethnographic interviews with native speakers (L1s) supports autonomous learning as the result of reflective and social processes.	<ol style="list-style-type: none"> 1. Blogs afforded students the opportunity to work independently (e.g., content creation) and reflect upon cross-cultural issues. 2. Using blogs gave students a sense of belonging, as they collaboratively shared and exchanged cultural perspectives. 3. Critical reflection relied on the teacher's guidance and feedback, as most of the students were cognitively challenged by not being able to clearly articulate different points of view. It is likely that students were not accustomed to reflecting. 4. Task type fostered autonomy in different ways. While free topics gave students more control of their own learning, teacher-assigned topics required them to critically think about the readings.

Most of the studies were characterized by the application of qualitative and/or quantitative methods. For the present study, research that involved any kind of counting was considered quantitative (regardless of whether statistical procedures were used), otherwise it was considered qualitative (Table 7). Studies that reported the implementation of both methodologies are considered of a mixed nature. In this sense, it is possible to identify that 7 of the studies were conducted using mixed-methods, while one study is of qualitative nature. This is consistent with the results of a review on CALL research conducted by Hubbard in 2004 which informs that in CALL research, “it is (...) recognized that a combination of the two methods is often more informative than either alone” (p. 355).

The studies were classified into three groups of research design: non experimental, experimental or quasi-experimental. In the studies obtained, five studies in total are non-experimental. Two of the studies (Chen, 2014, and Lan, 2012) had quasi-experimental designs, and only one study described its design as experimental (Kondo et al 2012). Interestingly, Kondo et al.’s research investigated two hypotheses by conducting two sub-studies. In the first sub-study, the investigators worked with control and experimental groups in order to determine if, by using a technology device, students would spend more time in self-study situations. The second sub-study was considered a follow-up investigation that did not include a control group. This example displays an ideal scenario for research in CALL. As Hubbard (2004) and Felix (2005) argue, studies that distinguish between initial and subsequent stages over time provide insightful perspectives of the effect and impact of technologies on students’ performance.

The instruments of data collection were diverse and mainly depended on the research aims. As Table 7 displays, researchers employed surveys, tests, records, and blog entries, among others, to collect the data they analyzed. Such diverse use of instruments affects the ability to

compare and contrast these studies. However it is possible to generalize aspects such as the use of quantitative measures that included pre- and post-tests on proficiency limited to a smaller number of subjects for some procedures (Kondo, Ishikawa, Smith, Sakamoto, Shimomura, & Wada, 2012; Chen, Wang, & Chen, 2014). In other cases, there was whole-group observation (Smith & Craig, 2013), or structured and semi-structured interviews (Kondo, Ishikawa, Smith, Sakamoto, Shimomura, & Wada, 2012; Lai & Gu, 2011) online surveys (Lia & Gu, 2011), trial materials, observation, reflexive practice, learner questionnaires, artifacts and learner self-reflections (Smith & Craig, 2013), learning modules (Lan, 2012), blog entries reflective reports, and post surveys (Lee, 2011).

Table 7 Methodological characteristics in the studies

Study	Methodology	Type of Design	Data Collection instrument	Data Analysis
Lai (2014)	Mixed	Non-experimental	Semi-structured interviews and online survey on student use of technology outside the classroom.	Content Analysis: Coding
Sun (2014)	Mixed	Non-experimental	Survey: It consists of two sections with 32 questions in total.	Section 1: Likert scale Section 2: Inductive method was employed to analyze the integrated data and capture the emerging categories.
Chen, et al. (2014)	Mixed	Quasi-experimental	Midterm exams	Midterm exams Statistical analysis SRL indexes: (1)achievement index of learning time,(2) achievement index of effort level in learning courseware, (3) achievement index of reading rate, (4) achievement index of concentrated learning. Pearson correlation analysis
Smith and Craig (2013)	Qualitative	Non-experimental (action research study)	Trial materials, observation, reflexive practice, learner questionnaires, interviews, artifacts and learner self-reflections, reflective journals.	(1) Students' weekly self-reflection entries. (2) Students' responses in teacher assistant interviews. (3) end-of-course evaluations and teacher reflections. (4) Teacher Reflections.

(Table continues)

Study	Methodology	Type of Design	Data Collection instrument	Data Analysis
Lan (2012)	Mixed	Quasi-experimental	(1) Vocabulary performance test, (2) VLS usage records	Two-way mixed- design analysis of covariance Frequency percentages and strategy categories.
Kondo et al. (2012)	Mixed	Experimental	Phase 1:Pre- and post-tests, post Course Evaluation Phase 2: TOEIC tests, Students Thinking About Problem Solving Scale (STAPSS), Interviews conducted at the end of the fall semester	Phase 1:Scores in both pre and post-test Phase 2: The TOEIC scores, Likert scale, Examples of students' responses.
Lai, and Gu (2011)	Mixed	Non-experimental	(1) An online survey. (2) Semi-structured interviews.	(1) Likert-scale Coefficient alpha and item-to- total correlations Correlation analysis and t-test (2) The interview data were analyzed inductively to identify general themes
Lee (2011)	Mixed	Non-experimental	Blog entries, reflective reports, and post surveys.	Descriptive statistics and content analysis

This section identifies the general findings of the studies selected, which report overall positive effects of the implementation of CALL (or its associated areas) in learning environments where an intervention has occurred. The investigators in the studies argued that after learners had been exposed to technological tools in their learning process, there was a significant improvement in language skills, metacognitive competence, or in areas of lexical knowledge. For instance, Chen et al. (2014) explained that, after the introduction of DRAS, students' reading comprehension and annotation abilities were improved. Kondo et al. (2012) argue that MALL self-study techniques were evident in the experimental group but not in the control group. Finally, Lan (2012) claimed that vocabulary-learning systems appeared to have benefited learners after they employed *Mywordtools* when practicing and sharing vocabulary. More specifically, *MyWordTools* was implemented as an instrument to help young students to learn new words by connecting their experiences with the content they were learning. By comparing

the results of a test where learners had to write a story using the vocabulary learned, the researchers identified that the group that had used *MyWordTools* with SRL strategies created more imaginative stories than the groups that were exposed to the vocabulary task without implementing self-regulation.

Moreover, researchers reported on the positive perceptions towards the use of technology. For instance, Lan (2012) reported the increased efficacy of an individual technology (i.e. *MyWordTools*) in fostering vocabulary learning and use. Smith and Craig (2013) concluded that specific course designs that foster independent study benefit learners' and teachers' goals. Finally, Lai (2014) argued that users had positive reactions towards technology-enhanced teaching and learning experiences as these allowed learners to engage in out-of-class activities and to improve their learning processes. However, two of the studies found that factors associated with lack of knowledge or access to technologies negatively affected learners' perceptions towards computer-based activities inside and outside the classroom, and their self-study learning processes (Sun, 2014; Lai & Gu, 2011).

It is important to highlight that only four studies fully addressed SDL or SRL in their investigations (Lai, 2014; Chen et al., 2014; Kondo et al., 2012; Lai & Gu, 2011). This means that these concepts are not only considered only as theoretical concepts, but they also allow researchers to design the intervention tools or surveys that they use in their studies using these concepts. As will be further explained (Phase 2), SDL and SRL appear in six of the articles retrieved either as theoretical concepts that support the interventions proposed or as learning outcomes.

4.4 Phase 2: In-depth review results

After outlining the general characterization of the selected studies, this section provides answers to the two questions proposed for this stage. The first question was regarding the different definitions of SDL and/or SRL used in the reports. The second question aims to analyze evidence of learning outcomes that the studies presented.

4.4.1 Review question 1: How are the concepts of SDL and SRL defined and used in studies focused on CALL?

This section provides a comprehensive synthesis of major definitions, trends and issues, relative to SDL and SRL in the studies retrieved. A complete table with the definitions included in the studies selected is provided in Table 8. SDL and SRL were the terms introduced at the moment of conducting the database search. In the titles of the reports retrieved, for example, four of the studies include SDL or SRL (e.g., “...*self-directed use of technology*”; “*developing attitudes and skills for self-regulated learning*”; “...*self-regulated learning mechanism*”; or “*self-regulated out-of-class language learning with technology*”).

Table 8 Definitions of SDL and/or SRL as reported in the studies

Concept	Study	Definition
SRL	Chen, et al. (2014)	Uses Zimmerman definition of SRL: “the degree to which learners are metacognitively, motivationally, and behaviorally active participants in their learning processes.” (p. 104) “SRL helps learners self-examine and self-evaluate their learning performance by monitoring the learning goals they set during learning processes. Once learners set goals, they must be able to revise their learning strategies to achieve these goals.” (p. 104)
	Lan (2012)	Uses Zimmerman definition of SRL: “Self-regulated learning is important to students as it relates to their academic success and lifelong learning. Self- regulating students are not only more likely to succeed academically, but view their futures optimistically. Self-regulation skills include: goal setting, adopting new approaches, process or action monitoring, physical and social context restructuring, time management, and reflection.” (p. 3)

(Table continues)

Concept	Study	Definition
SRL	Kondo et al. (2012)	“Self-regulation involves a number of integrated micro-processes which include goal-setting, strategic planning, the use of effective strategies to organize, code, and store information, the ability to monitor and talk about learning, action and volitional control, effective time management, and ability to sustain self-motivational beliefs in order to create a long-term congenial learning environment.” (p. 170)
	Lai and Gu (2011)	Uses Zimmerman definition of SRL: “a process by which learners direct and coordinate their efforts, thoughts, and feelings in order to achieve their learning goals.” (p. 321) Include dimensions of SRL (Dorney, 2001; Pintrich, 2004): Meta-cognition, Cognition, Motivation and affect,, Environment, Behavior.
SDL	Lai (2014)	Uses Knowles’ definition of SDL: “a process in which individuals take the initiative, with or without the help from others, in diagnosing their learning needs, formulating goals, identifying human and material resources, choosing and implementing appropriate learning strategies and evaluating learning outcomes” (p. 75) Perspectives on SDL (Brockett & Hiemstra, 1991; Candy, 1991; Garrison, 1997): <i>Personal, process, and context attributes</i>
	Sun (2014)	SDL and SRL as properties of learner autonomy: “To encourage and facilitate self-directed, self-regulated learning, online courses have been increasingly equipped with self-access centers incorporating technology to support the development of learner autonomy.” (p. 23) The author does not provide specific definitions of SDL or SRL (she mentions both).
Autonomy Autonomous Learning	Smith and Craig (2013)	The concepts are indirectly associated with autonomous learning. The authors do not provide definitions of SDL or SRL.
	Lee (2011)	SDL is considered as a key principle of autonomous learning: “Self-directed learning refers to learners’ taking responsibility for planning, monitoring and evaluating their own learning. Learners are given certain freedom to make informal decisions and are encouraged to engage in critical thinking and collaborative interaction.” (Footnote, p. 103)

Four studies referred directly to self-regulation or self-regulated learning in their contents (Chen, et al., 2014; Lan, 2012, Kondo, 2012, Lai & Gu, 2011). In relation to SDL, one article appealed to mainstream definitions of the term (Lai, 2014).

In general terms, the investigators used the term self-regulated learning consistently with the definition provided by Zimmermann (2001), that is, “the degree that (learners) are metacognitively, motivationally, and behaviorally active participants in their own learning process” (p. 5). The studies indicated that SRL involves a number of integrated micro-processes which include goal-setting, strategic planning, the use of effective strategies to organize, code,

and store information, the ability to monitor and talk about learning, action and volitional control, effective time management, and ability to sustain self-motivational beliefs in order to create a long-term congenial learning environment.

It is important to take into consideration that each study under the review focused on particular aspects of SRL that speak to the learning contexts where they were intervening. For instance, Chen et al. (2014) explained that SRL is a scenario where learners set their own learning goals and plans, and then regulate and evaluate their own learning process. Specifically, this study used SRL as a pivotal concept to design the web-based tool for reading annotations. Based on a previous study conducted by one of the authors (Chen, 2009), the researchers applied an SRL model to assess self-regulation abilities that affected reading comprehension and annotation skills. According to the authors, the more SRL mechanism students use, the more annotations they will be able to make.

Lan (2012) considered that, as part of a general framework of learning strategies, SRL comprises a series of skills, such as “goal setting, adopting new approaches, process or action monitoring, physical and social context restructuring, time management, and reflection” (p. 3). In the context of this study, Lan used SRL mechanisms as part of the first module of the application of *MyWordTools*. In other words, the author created a learning map where students made plans about their learning and checked their records. The map also arranged a schedule according to the learners’ plan, and delivered the daily materials. However, it must be emphasized that this is the only moment in the study where SRL strategies were implemented.

Kondo et al. (2012) argued that SRL is part of a system of learning strategies for self-study that contributes to learners’ performance. The novelty of these authors’ approach is that they mediated SRL through the use of a technological device (namely, Nintendo DS) “to

accomplish independently-set personal goals by doing self-selected learning activities that the students deemed to be appropriate for their preferred learning styles” (p. 174). As the purpose of their intervention was to foster self-study behavior, the authors designed a five-step learning module based on a SRL framework. In order to evaluate the results of the study, they used a post-course evaluation based on self-efficacy, learning motivation, learning strategies, heteronomy and beliefs, which are terms associated to SRL. The results of the evaluation indicated that SRL was evident in learners who used the MALL device “in terms of the specificity of the students’ goals, the customized creation of learning tasks, and in-class applications” (p. 170).

Finally, Lai and Gu (2011) provided insights on students’ use of technology to self-regulate their language learning. The authors considered that there is a strong link between self-regulation and the use that learners make of technology for their language purposes. However, Lai and Gu looked into the attitudes, beliefs, and perceptions that students have of such SRL processes. The authors conducted a survey based on categories with associated SRL, such as, goal commitment, resource regulation, affection regulation, culture learning regulation, metacognition, and social connection. These indexes indicate the manner in which Lai and Gu conceptualized SRL.

The understandings of the term are consistent with previous studies on SRL and its relation to technology. Those studies concluded that, as students are more exposed to multimodal forms of instruction, “a successful online learner must self-regulate to stay motivated; guide their thoughts, feelings, and actions; and adjust their effort in autonomous online situations” (Artino & Jones, 2012, p. 170).

In regards to SDL, Lai (2014) used mainstream conceptions, which emphasized that students self-direct their learning by planning, monitoring, and evaluating their own processes. Lai located SDL as one of the key components of students' autonomous behavior. The author approached SDL from the perspective of self-directed use of technology for learning outside the classroom. Lai proposed a theoretical model where teacher behaviors influence students' self-directed use of technology in online environments. In this sense, SDL is seen as a particular process that depends on personal attributes (e.g., resource use, strategy use and motivation) and on internal processes (e.g., planning, monitoring, and evaluating) rather than on the use of technology. Lee's study considered SDL as a process that does not depend solely on the use of technology. This is consistent with Fisher and Sharff (1998) who suggest that developers of tools for CALL environments must not anticipate that software or hardware will increase students' self-direction. However, as they go on, new innovative system components in task designs will allow interpreting the manner in which SDL appears in computer-based activities.

It is important to highlight that, despite the fact that the search specifically looked for articles focused in SDL and SRL, three of the articles retrieved (Sun, 2014; Smith & Craig, 2013, Lee, 2011) used one or both terms as key frameworks of autonomous learning. Although they did not necessarily define the concepts, the authors in these studies considered that SDL and SRL are sub-processes of autonomy for students to take control over their own learning. In regards to autonomy, Smith and Craig (2013) utilized self-regulatory learning as part of the theoretical framework to explain some features of autonomy. They defined autonomy as the ability to set goals, create and utilize practice opportunities, and evaluate progress. They incorporated into this definition one more component, which is the ability to overcome temporary motivational obstacles when they arise, which is one of the main components of self-regulated learning.

Sun (2014) argued that to develop autonomous learning it is necessary to incorporate SDL and SRL as key processes. However, it is striking that she did not provide a specific definition of SDL or SRL. Nonetheless, the author identified difficulties associated with self-regulation, which she considered “an inherently problematic area in networked learning, as it obliges learners to develop skills of self-management and adopt better approaches to, and be responsible for, their own learning.” (p. 21). Similarly, in her investigation with students enrolled in a study-abroad program, Lee (2011) aimed to investigate how blogs promote learning autonomy and intercultural competence. In the study SDL was used a key principle of autonomous learning, as it is a process that allows students to take responsibility for planning monitoring and evaluating their learning.

In summary, it is significant to find that the majority of studies referred directly to SRL rather than to SDL. This is consistent with previous research (Saks & Leijen, 2014) that showed how investigations in computer-mediated environments in foreign language learning were likely to focus on SRL because of its robust theoretical development. At the same time, it is important that autonomy also appeared as part of the aim of three of the studies analyzed. Although the concept of autonomous learning is not a central part of this analysis, it is remarkable that SDL and SRL were considered key factors in the development of learner’s autonomy. Nonetheless, the interest in SRL seemed to be primordial for the studies. Future research should address the manner in which SDL processes are integrated with activities that implement technology-based learning.

Finally, it is certain that the use of technology inside and beyond the classroom demands a rethinking of the manner in which new venues of learning are implemented and fostered. The studies reviewed show that SDL and, especially, SRL processes are taken into account in order

to design tools or to gather students' perceptions towards the use of technology for language learning purposes. The manner in which the authors conceptualized SDL and SRL demonstrate that, despite its innovation, technology is a secondary element in students' learning processes. As Egbert (2005) asserts, "the most useful way to look at technology is as a tool that supports learning in a wide variety of ways" (p. 12).

4.4.2 Review Question 2: What is the evidence of learning outcomes in studies mediated by CALL with respect to SRL and/or SDL in foreign language teaching and learning environments?

As it has been previously shown, the studies have addressed aspects of implementation of technologies, attitudes towards the use of technology in the classroom, and curriculum evaluation. A subset of studies (Lai & Gu, 2011; Lai, 2014; Sun, 2014) focused on the general attitudes, perceptions and challenges towards the use of technology in the classroom. In contrast, the work of Smith & Craig (2013) aimed to assess the curriculum of an autonomous learning course that incorporates technology. Although it is certain that those studies appear as the result of students' and teacher's experiences with technology, it is not possible to obtain information about learning outcomes as such studies do not provide measures or comparisons within their methodological designs (Felix, 2005).

Nonetheless, there are four studies (Lee, 2011; Kondo et al., 2012; Chen et al., 2014; and Lan, 2014) where authors demonstrate that learning outcomes were achieved. In the context of this thesis, learning outcomes are defined as "particular levels of knowledge, skills, and abilities that a student has attained at the end (or as a result) of his or her engagement in a particular set of collegiate experiences." (Ewell, 2011, p. 5). For instance, three investigations focused on how technology-based learning tools or models were introduced in the classroom to enhance a

specific skill. The fourth study made comparisons among learners and their experiences to determine how the use of technology directly affected learning processes.

The outcomes of interest in the studies fall broadly into 3 categories. Specifically, Chen et al. (2014) investigated the improvement of reading comprehension and annotation abilities; Lan (2014) was interested in fostering vocabulary learning and co-sharing; and Kondo et al. (2012) and Lee (2011) conducted their studies with the objective of promoting self-study behaviors.

Measurement of the outcomes of interest was done via surveys, questionnaires, test (pre and post) and interviews to obtain information about learners' abilities before the introduction of a technology or a study module or to gather opinions and perceptions that students had in regards the tool being implemented. The authors reported that none of the devices was ineffective or unusable, and that technical difficulties were not reported. For instance, Chen et al. (2014) explained that, after the introduction of DRASS, students' reading comprehension and annotation abilities improved. Kondo et al. (2012) argued that MALL self-study techniques were evident in the experimental group. Lan (2012) claimed that the use of vocabulary-learning strategies appear to be benefited after students employed *Mywordtools* when practicing and co-sharing vocabulary. Finally, Lee (2011) explained that Blogs promoted learner autonomy through self-regulation and self-management, and they also gave students a sense of belonging, as they collaboratively shared and exchanged cultural perspectives

Regarding the pedagogical principles, the frame of reference of Pedagogy 2.0 (McLoughlin & Lee, 2008) helps to understand how the inclusion of technologies generates specific categories that interact within the framework of language learning. According to McLoughlin and Lee, Pedagogy 2.0 is "envisioned as an overarching concept for an emerging cluster of practices that advocates learner choice and self-direction as well as engagement in

flexible, relevant learning tasks and strategies” (p. 15). The authors established three categories of pedagogical principles that appear in Pedagogy 2.0: personalization, participation and productivity.

Personalization emphasizes learner’s self-direction and control over his/her own learning process, which is reflected in the freedom of students to decide how to engage in personally meaningful learning. Participation is also related to levels of socialization and collaboration with experts, community, and peer groups that allow connections that are often global in reach. Productivity refers to the student’s capacity for creating and generating ideas, concepts, and knowledge. Therefore, the ultimate goal of learning in Pedagogy 2.0 is to enable this form of creativity and productivity.

These three pedagogical principles were evident in the studies retrieved. For instance, in their study, Chen et al. (2014) developed a reading annotation tool to foster Taiwanese 7th grade students’ reading comprehension and reading annotation abilities. In their experiment, the researchers provided students with reading units where learners had to select an annotation type (mark-ups of word meaning, antonyms, grammar, phrase, and related links), underline, browse, vote, and highlight. These different strategies aimed at fostering students’ self-regulation, as the teacher was absent after the training. In this study, personalization became an essential principle, as students used the tool to summarize their own ideas about the text. Participation appeared as an important component of the process especially when students rate others’ comments and provide their preferences on a specific type of annotation they deem to be more informative. Finally, productivity results in the processes of creation and generation of ideas and knowledge.

Lan (2012) introduced a vocabulary learning system, called *MyWordTools*, that engaged

6th grade Taiwanese students in selecting strategies to learn specific words that they have chosen. Divided in three stages, *MyWordTools* required that students, 1) select the lexical entries they want to learn, 2) choose the strategy to learn the word, and 3) co-share with other students the strategies that have been used. In terms of the Pedagogy 2.0 principles, the learners demonstrated a level of personalization as they selected the items they wanted to learn, which shows a process of self-regulation. Creating and generating ideas, concepts and knowledge from the use of the tool demonstrated productivity. In terms of participation, the students shared with others the different strategies that had been useful for the vocabulary-learning module.

Kondo et al (2012) introduced a 5-step learning module mediated by the use of a Nintendo DS device to help learners increase their listening and reading comprehension abilities in the TOEIC test. The ultimate goal of the implementation of this learning module was to inculcate in students' self-study habits that will take them on the path of self-regulated learning. In terms of personalization, students selected the learning activities that are related to their learning styles. Nonetheless, aspects related to productivity or participation did not appear emphasized in the study. It is implicit that the results of pre and posttests in reading comprehension abilities would have appeared as part of the productive process. However, the researchers did not provide further information about this strategy.

4.4.2.1 Additional considerations

In her review and critique of CALL research practices, Felix (2005) listed a series of issues that affected the manner in which such research was conducted. Some of those issues have been applied in this analysis as a manner to complement aspects related to the good reporting and research practices that the field requires. The first category refers to *misleading titles*. It is worth mentioning that there were examples of good titles in the eight studies. In other words, these

titles do refer to the aims, problems or results of the study. For instance, Lan's study title *The Effect of Technology-Supported Co-Sharing on L2 Vocabulary Strategy Development* presented an accurate description of the contents of the paper, especially because it indeed determined the effect of the tool being implemented.

A second category of problems is the reporting of the time of exposure (or time on task) of students for the tool or course being analyzed. This was a critical element in the majority of the studies, especially those where there was a clear intervention of a technological tool. For instance, Lan (2011) reported that the work with *MyWordTools* occurred during a 5-week period. Nonetheless, the author does not mention the time implemented for the training of the students with the tool. Kondo et al. (2014) implemented the Nintendo DS based on a previous survey where all the participants "had had some experiences with the (device), and their experiences were positive" (p. 173). A similar situation occurs in Chen et al.'s (2014) study. Besides this information, the authors did not provide any other information regarding the training in the use of the device. Considering the levels of complexity of the materials, students' knowledge and familiarity with technological devices cannot be taken for granted. It is certain that, because of the exposure to technologies, students might be able to understand the caveats of the tools, but training and sufficient time of exposure are considered important for the success of the research (Hubbard, 2005).

The third category of problems refers to researchers' failure to investigate or continue previous research as a way to validate or generalize results. One of the main exceptions in the group of studies that included an intervention is the study of Chen et al. (2014). The authors thoroughly explained that the implementation of the DRAS annotation system is the application of "SRL assistive mechanisms" (p. 104) that had been conducted in a previous study. One of the

works that investigated the perceptions of students towards the use of technology (Sun, 2014) built on the research of previous studies (including one of the same author) that had focused on particular attitudes about online learning environments.

Felix's fourth category takes into consideration that studies do not provide a succinct section of discussions or limitations. In this review, the majority of interventions provided future venues of research on the topic they had analyzed. Kondo et al. (2012) could be considered as an exception as they did not directly address issues or limitations in their study. However, in the conclusion they provide questions about how MALL practices could be further incorporated into students' learning processes.

Chapter 5: Conclusions and Pedagogical Implications

5.1 Significance of the results

Given the rapid growth of technology in the last decade, there is a need to understand how students can best utilize SRL and SDL strategies to achieve academic success within online environments. In regard to the EFL landscape, Illich, (cited in Benson, 2001), argues that the use of technology allows creating institutions which serve personal, creative, and autonomous interaction. This means that there is a growing interest in promoting self-direction and self-regulation in the context of e-learning. The assumption is that, by implementing SRL and/or SDL, students would be motivated and able to plan and to take control over their learning processes.

In this sense, it is important to recognize that, at the theoretical level, some of the articles retrieved in this study have provided insights regarding issues and promises for research on CALL and self-learning. For instance, SDL and, especially, SRL are established as an important field of inquiry and empirical research in relation to technology and language education. The literature recovered shows that some experimental studies have mainly focused on SRL rather than on SDL strategies and their impact on learning outcomes and academic achievement.

Although it is certain that students benefit from such strategies, it is important to reiterate that self-learning skills do not depend on the technology itself. Indeed, researchers in the field have pointed out that well-structured course designs (Hsu et al. 2009), applications designed for mobile interfaces (Sha et al., 2012), and internet-based learning environments, where the role of the instructor is not discounted, are ideal spaces for fostering SRL and SDL. Also, as Bartomolé and Steffens (2011) suggest, educational technologies based on constructivist theories (e.g.,

virtual environments, personal learning environments, and some Web 2.0 tools) are primordially apt for self-regulated learning and self-directed learning.

5.2 Limitations of the present study

This study intended to include a representative, if not exhaustive, number of studies. Several factors, however, may have contributed to a bias in the results. For instance, only English language journals were examined, which excludes work in other languages. It is important to recognize that there might be a body of excellent work in the field that appears in other publications not included in online databases. The study is intended as a cross-section of the work done in CALL, SDL and/or SRL, and it cannot include the whole universe of studies that have been recently conducted in each of those areas. This problem is compounded when considering that only a small proportion of activity in the classroom actually appears in academic journals. Nonetheless, the study does aim to provide some indication of the issues associated with technology use in the field of CALL, SDL and/or SRL and, to that end, such a cross-section can be useful.

5.3 Further research

It is noteworthy that a large body of research on CALL, e-learning, blended learning, online tuition, and related issues was found during the process of searching and screening. However, there was an apparent scarcity when the different terms for the search were combined: “CALL” and/or “SDL” and/or “SRL. Studies that were not included in the analysis, but that may be of value for further research include:

1. Studies of the use of CALL but not in the domain of language learning.
2. Studies based on autonomous learning but not on CALL.
3. Studies based on SDL and/or SRL but not on CALL.

More research efforts are needed to determine the relation between the use of new technologies, SDL and SRL in foreign language learning environments. Since many of the studies were conducted in Asian countries, and a large proportion of the participants were university students, more research is needed in different cultural contexts and different student populations. This will allow determining whether the research findings are generalizable for those different contexts. Finally, regarding the method employed in this thesis, it is important to say that the systematic literature review is a path to build on existing knowledge, re-investigate established findings in different settings, replicate excellent studies using more subjects, and design new projects in areas and languages that have not yet been included.

5.4 Conclusion

This study helped to enhance the depth of our understanding of current trends in research about students' use of technology for language learning, SDL and SRL. It could also potentially serve as a useful framework to guide the development of intervention programs to enhance students' use of technology for language learning.

Previous reviews of CALL (Macaro et al., 2012, Felix, 2007; and Hubbard, 2004) had provided information about studies conducted in the past. Similar to those reviews, this thesis finds positive and negative aspects of such research. On the positive side, the studies provided compelling analyses and explanations on the effects of technology in the foreign language classroom especially at the level of strengthening language skills and metacognitive strategies in the learning process. Similarly, the studies demonstrated that learners show levels of comfort and enjoyment when interacting, individually or in groups, with the technological tools in the classroom environment.

On the negative side, the studies fail to report information about previous experiences that learners had with technology. It is true that a new generation of students have varying degrees of technology use and access. However, CALL instruments require specific management and understanding, which may differ from the regular use of technological tools (Hubbard, 2007). Furthermore, the majority of the studies provide a ‘novel’ approach in the introduction of new technologies in the classroom. Although novelty in research is an important factor, researchers in CALL strongly recommend that more replication of previous studies is important to “determine the generalizability of findings” (Ducate & Arnold, 2011, p. 13) to demonstrate the effectiveness of technology-based approaches. Therefore, this study shows that it is important to strengthen good research practices in the field of CALL. That is why the agenda must turn towards the re-thinking the criteria and data collection and interpretation methods. As Blin (2004) suggests, “new paradigms are called for, which should offer guidelines to carry out adequate judgmental and empirical studies” (p. 382) in such an area.

One of the objectives of this thesis was to find how researchers in the studies defined SRL and SDL. It is important to remember that due to their close affinity in the field of autonomous learning, both terms tend to be confused. This investigation found that the authors define SDL and SRL consistently with canonical definitions. Moreover, the majority of studies refer directly to SRL rather than to SDL. It is important to note that although autonomous learning was not a central part of the search conducted in this study, the concept appears as the framework in three of the studies analyzed. As it has been previously stated, SDL and SRL have strong links with self-learning, which must be a complement of technology in educational settings, especially in the foreign language classroom.

The works analyzed in this thesis demonstrate that teachers are starting to distance themselves from the conception that learning occurs only with the physical interaction within the classroom. Recent teaching theories suggest that the unidirectional model of education (i.e., the teacher-centered classroom) must change towards one where students are able to take control over their learning process. Undoubtedly, technology has helped teachers and learners to find venues where independent processes of learning take place. Notwithstanding, it is important to consider that the use of technology alone cannot guarantee that learners will effectively learn or develop skills. As it happens with traditional school practices, students must not only learn specific content, but they ought to be exposed to metacognitive skills to make their learning process meaningful.

It is important to insist that self-directed and self-regulated learning are processes that must be honed with the aid from parents, teachers and institutions. SDL and SRL characteristics, such as independence, motivation, or self-discipline, require time and practice. Computer-based learning environments have the potential to incorporate such characteristics especially when learners are away from the classroom. However to make the learning experience meaningful and productive, students must “take control in planning their learning pace (...), monitoring their learning comprehension (...), and making judgments of various aspects of their learning process” (Song & Hill, 2007, p. 35). These characteristics belong to the realm of SDL which must be considered one of the first steps in students independent learning.

As the studies in this review have shown, the use of technological devices or the introduction to online tasks aim to foster advanced forms of self-study, which are based on SDL and SRL. The main implication of these studies is that, in the foreign language classroom, self-direction and self-regulation help students to set concrete learning goals, focus their attention in

specific tasks, and adapt the strategies that they implement as they advance in their learning.

Such regulatory processes, which are essential elements of SRL, appear mostly on the landscape of online learning environments (Broadbent & Pun, 2015).

Regarding the evidence of learning outcomes, it is necessary to emphasize that only four studies (out of the eight investigations selected for this review) provided research models where such outcomes were identifiable. This does not necessarily mean that the other articles did not provide important information about CALL, SDL, and/or SRL, as such studies made available frameworks where the importance of technology in foreign language learning environments is highlighted. For this research it was necessary that aims, constructs, technologies, and methodologies presented in the studies provided proof of learning outcomes. Nonetheless, it is pivotal to continue investigating the pedagogical principles that are behind the learning environments mediated by computers.

Finally, a Systematic Literature Review is a complex and demanding process that requires establishing a well-constructed protocol, as the success in retrieving studies highly depends on it. This type of literature review not only provides a general understanding of a field's state of the art, but also it helps to determine how research directly contributes to practitioners' work in educational contexts.

References

- Artino, A. R., & Jones, K. D. (2012). Exploring the complex relations between achievement emotions and self-regulated learning behaviors in online learning. *The Internet and Higher Education, 15*(3), 170-175. doi:10.1016/j.iheduc.2012.01.006
- Bartomolé, A., & Steffens, K. (2011). Technologies for self-regulated learning. In R, Carneiro, P. Lefrere, K. Steffens, & J. Underwood (Eds.), *Self-regulated learning in technology enhanced learning environments* (Vol. 5, pp. 21-31), Rotterdam, The Netherlands: Sense Publishers.
- Beatty, K. (2010). *Teaching and researching Computer-Assisted Language Learning* (2nd ed.). London, England: Pearson Education Limited.
- Beishuizen, J., & Steffens, K. (2011). A conceptual framework for research on self-regulated learning. In R, Carneiro, P. Lefrere, K. Steffens, & J. Underwood (Eds.), *Self-regulated learning in technology enhanced learning environments* (Vol. 5, pp. 3-20), Rotterdam, The Netherlands: Sense Publishers.
- Benson, P. (2001). *Teaching and researching learner autonomy*. Harlow, Essex: Person Education Limited.
- Benson, P. (2007). Autonomy in language teaching. *Language Teaching, 40*(1), 21-40. doi: 10.1017/S0261444806003958
- Benson, P. (2013). Learner autonomy. *TESOL Quarterly, 47*(4), 839-843. doi:10.1002/tesq.134
- Blin, F. (2004) CALL and the development of learner autonomy: Towards an activity theoretical perspective. *ReCALL, 16*(2), 377–395. doi:10.1017/S0958344004000928
- Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational Researcher, 34*(6), 3-15. doi:10.3102/0013189X034006003
- Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies and academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education, 27*, 1-13. doi: 10.1016/j.iheduc.2015.04.007
- Candy, P. C. (1991). *Self-direction for lifelong learning: A comprehensive guide to theory and practice*. San Francisco, CA: Jossey-Bass Publishers.
- Chapelle, C.A. (2003). *English language learning and technology*. Amsterdam, The Netherlands: John Benjamins Publishing.
- Chen, C.-M, Wang, J.-Y., & Chen, Y.-C. (2014). Facilitating English-language reading performance by a digital reading annotation system with self-regulated learning mechanisms.

Educational Technology & Society, 17 (1), 102–114. Retrieved from:
<http://www.jstor.org/stable/jeductechsoci.17.1.102>

Ducate, L., & Arnold, N. (2011). Technology, CALL, and the net generation: Where are we headed from here?. In L. Ducate, & N. Arnold (Eds.), *Present and future promises of CALL: From theory and research to new directions in language teaching* (Vol. 5, pp. 1-22). United States: CALICO.

Dudeney, G., Hockly, N., & Pegrum, M. (2013). *Digital literacies: Research and resources in language teaching*. Harlow, UK: Pearson.

Dickinson, L. (1995). Autonomy and motivation: a literature review. *System*, 23(2), 165-174. doi: 10.1016/0346-251X(95)00005-5

Egbert, J. (2005). *CALL essentials: Principles and practice in CALL classrooms*. Alexandria VA: Teachers of English to Speakers of Other Languages.

Ellis, R.D. (2012). *Language teaching research & language pedagogy*. Malden, MA: Wiley- Blackwell

EPPI-Centre (2002a) *Core Keywording Strategy: Data Collection for a Register of Educational Research*. Version 0.9.7. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

EPPI-Centre (2003a) *Core Keywording Strategy: Data Collection for a Register of Educational Research*. Version 0.9.7. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

EPPI-Centre (2003b) *Review Guidelines for Extracting Data and Quality Assessing Primary Studies in Educational Research*. Version 0.9.7. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Ewell, P (2001). *Accreditation and student learning outcomes: A proposed point of departure* (National Center for Higher Education Management Systems Report). Retrieved from Council for Higher Education Accreditation website:
http://www.chea.org/pdf/EwellSLO_Sept2001.pdf

Felix, U. (2005). Analysing recent CALL effectiveness research: Towards a common agenda. *Computer Assisted Language Learning*, 18(1), 1-32. doi:10.1080/09588220500132274

Fischer, G., & Scharff, E. (1998). Learning technologies in support of self-directed learning. *Journal of Interactive Media in Education*, 98(4), 1-32, Retrieved from: www-jime.open.ac.uk/98/4

- Garrison, D.R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly*, 48(1), 18-33. Retrieved from <http://www.researchgate.net/publication/249698827>
- Gough, D., Oliver, S., & Thomas, J. (2012). Introducing systematic reviews. In D. Gough, S. Oliver, & J. Thomas (Eds.), *An introduction to systematic reviews* (pp. 1-16). London, UK: Sage Publications Ltd.
- Hubbard, P. (2005). A review of subject characteristics in CALL research. *Computer Assisted Language Learning*, 18(5), 351-368. doi:10.1080/09588220500442632
- Irie, K., & Stewart, A. (2012). *Realizing autonomy: Practice and reflection in language education contexts*. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan.
- Jossberger, H., Brand-Gruwel, S., Boshuizen, H., & Wiel, M. (2010). The challenge of self-directed and self-regulated learning in vocational education: A theoretical analysis and synthesis of requirements. *Journal of Vocational Education and Training*, 62(4), 415-440. doi: 10.1080/13636820.2010.523479
- Khan, K.S., Kunz, R., Kleijnen, J. & Antes, G. (2003). Five steps to conducting a systematic review. *Journal of the Royal Society of Medicine*, 96, 118-121. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC539417/>
- Kondo, M., Ishikawa, Y., Smith, C., Sakamoto, K., Shimomura, H., & Wada, N. (2012). Mobile assisted language learning in university EFL courses in Japan: Developing attitudes and skills for self-regulated learning. *ReCALL*, 24(02), 169-18. doi: 10.1017/S0958344012000055
- Lai, Ch. (2015). Modeling teachers' influence on learners' self-directed use of technology for language learning outside the classroom. *Computers & Education*, 82, 74-83. doi:10.1016/j.compedu.2014.11.005
- Lai, C., & Gu, M. (2011). Self-regulated out-of-class language learning with technology. *Computer Assisted Language Learning*, 24(4), 317-335. doi:10.1080/09588221.2011.568417
- Lamb, T. E., & Reinders, H. (Eds.). (2008). *Learner and teacher autonomy: Concepts, realities, and responses*. Amsterdam, The Netherlands: John Benjamins.
- Lan, Y.-J. (2013). The effect of technology-supported co-sharing on L2 vocabulary strategy development. *Educational Technology & Society*, 16(4), 1-16. Retrieved from: <http://www.jstor.org/stable/jeductechsoci.16.4.1>
- Lee, L. (2011). Blogging: Promoting learner autonomy and intercultural competence through study abroad. *Language Learning & Technology*, 15(3), 87-109. Retrieved from: <http://llt.msu.edu/issues/october2011/lee.pdf>

Levy, M., & Stockwell, G. (2006). *CALL dimensions: Options and issues in Computer-Assisted Language Learning*. Mahwah, NJ: Lawrence Erlbaum Associates.

Lewis, T., & Vialleton, E. (2011). The notions of control and consciousness in learner autonomy and self-regulated learning: A comparison and critique. *Innovation in Language Learning and Teaching*, 5(2), 205-219. doi:10.1080/17501229.2011.577535

Little, D. (1991). *Learner Autonomy 1: Definitions, Issues and Problems*. Dublin, Ireland: Authentik.

Little, D., Ridley, J., & Ushioda, E. (Eds.). (2003). *Learner autonomy in the foreign language classroom: Teacher, learner, curriculum and assessment*. Dublin, Ireland: Authentik.

Lord, G., & Lomicka, L. (2011). Calling on educators: Paving the way for the future of technology and CALL. In L. Ducate, & N. Arnold (Eds.), *Present and future promises of CALL: From theory and research to new directions in language teaching* (Vol. 5, pp. 441-469). United States: CALICO.

Loyens, S.M.M., Magda, J., & Rikers, R.M.J.P. (2008). Self-directed learning in problem-based learning and its relationships with self-regulated learning. *Education Psychology Review*, 20, 411-427. doi:10.1007/s10648-008-9082-7

Macaro, E., Handley, Z., & Walter, C. (2012). A systematic review of CALL in English as a second language: Focus on primary and secondary education. *Language Teaching*, 45(1), 1-43. doi:10.1017/S0261444811000395

McLoughlin, C., & Lee, M. J. (2010). Personalised and self regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology*, 26(1), 28-43. Retrieved from <http://eric.ed.gov/?id=EJ877551>

McLoughlin, C., & Lee, M.J.W. (2008). The three P's of pedagogy for the networked society: Personalization, participation, and productivity. *International Journal of Teaching and Learning in Higher Education*, 20(1), 10-27. Retrieved from <http://www.isetl.org/ijtlhe/>

Narciss, S., Prose, A., & Koerndle, H. (2007). Promoting self-regulated learning in web-based learning environments. *Computers in Human Behavior*, 23(3), 1126-1144. doi:10.1016/j.chb.2006.10.006

O'Malley, J. M. and Chamot, A. V. (1990). *Learning Strategies in Second Language Acquisition*. London, UK: Macmillan.

Okoli, C., & Schabram, K. (2010). A guide to conducting a systematic literature review of information systems research. *Sprouts: Working Papers on Information Systems*, 10(26), 1-49. Retrieved from <http://sprouts.aisnet.org/10-26>

Oxford, R. 1990. *Language learning strategies: What every teacher should know*. Rowley, MA: Newbury House

Pemberton, R., Li, E. S. L., Or, W. W. F., & Pierson, H. D. (Eds.). (1996). *Taking control: Autonomy in language learning*. Hong Kong, China: Hong Kong University Press.

Peters, O. (1998). *Learning and teaching in distance education: Analyses and interpretations from an international perspective*. London, UK: Kogan Page.

Pilling-Cormick, J., & Garrison, D.R. (2007). Self-directed and self-regulated learning: Conceptual links. *Canadian Journal of University Continuing Education*, 33(2), 13-33. Retrieved from <http://ejournals.library.ualberta.ca/index.php/cjuce-rcepu/article/view/19964/15474>

Saks, K., & Leijen, Ä. (2014). Distinguishing self-directed and self-regulated learning and measuring them in the e-learning context. *Procedia Social and Behavioral Sciences*, 112, 190-198. doi:10.1016/j.sbspro.2014.01.1155

Sha, L., Looi, C.-K., Chen, W., & Zhang, B.H. (2011). Understanding mobile learning from the perspective of self-regulated learning. *Journal of Computer Assisted Learning*, 28, 366-378. doi:10.1111/j.1365-2729.2011.00461.x

Smith, K., & Craig, H. (2013). Enhancing the autonomous use of CALL: A new curriculum model in EFL. *CALICO Journal*, 30(2), 252-278. doi: 10.1558/cj.v30i2.252-278

Song, L., & Hill, J. R. (2007). A conceptual model for understanding self-directed learning in online environments. *Journal of Interactive Online Learning*, 6(1), 27-42. Retrieved from <http://www.ncolr.org/jiol/issues/pdf/6.1.3.pdf>

Sun, S. Y. (2014). Learner perspectives on fully online language learning. *Distance education*, 35(1), 18-42. doi: 10.1080/01587919.2014.891428

Torgerson, C. (2003). *Systematic reviews*. London, UK: Continuum.

Ushioda, E. (2011). Why autonomy? Insights from motivation theory and research. *Innovation in Language Learning and Teaching*, 5(2), 221-232. doi: 10.1080/17501229.2011.577536

Victor, L. (2008). Systematic reviewing in the social sciences: Outcomes and explanation. *Enquire*, 1(1), 32-46. Retrieved from <https://www.nottingham.ac.uk/sociology/pdfs/enquire/volume-1-issue-1-victor.pdf>

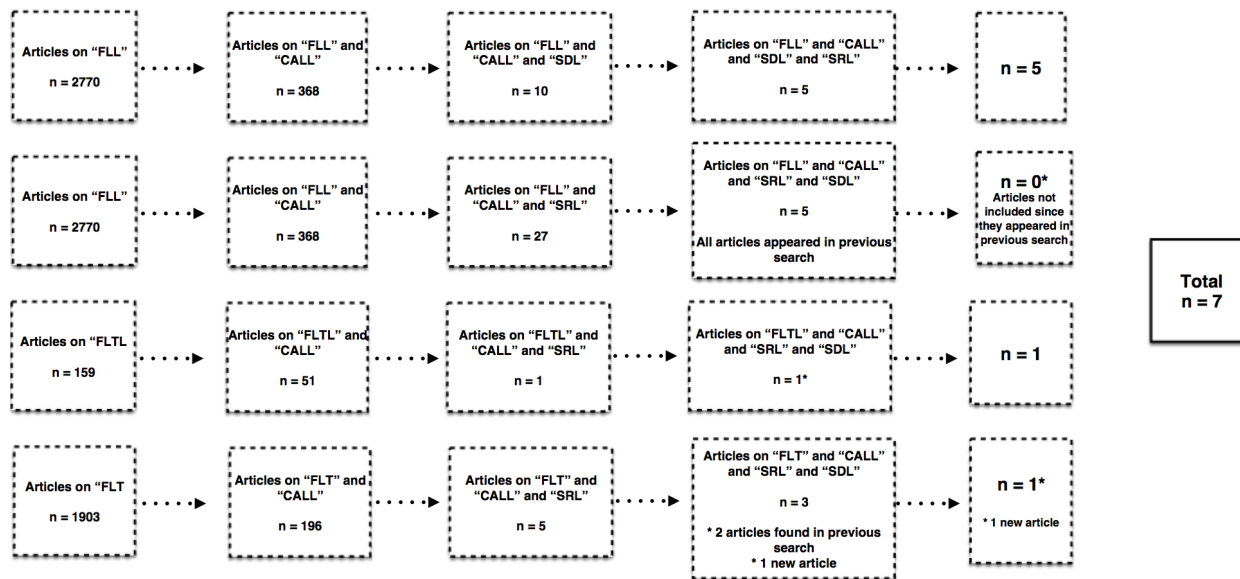
Wenden, A. & J. Rubin. (1987). *Learner strategies in language learning*. Englewood Cliffs, NJ: Prentice Hall.

Yang, Y. (2010). Computer-assisted foreign language teaching: Theory and practice. *Journal of Language Teaching and Research*, 1(6), 909-912. doi:10.4304/jltr.1.6.909-912

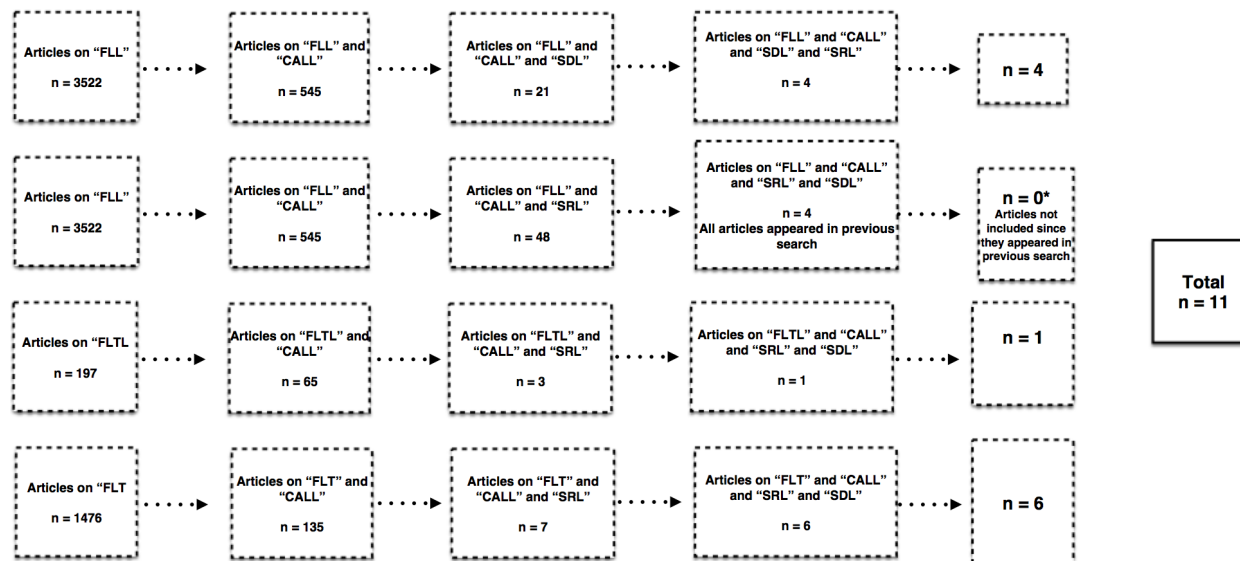
Zimmerman, B.J. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B.J. Zimmerman, & D.H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed., pp. 1-38). Mahwah, NJ: Lawrence Erlbaum Associates.

Appendix A: Flow charts that presents the database results of the search conducted between January to July 2015 (Scopus, Proquest and EBSCO)

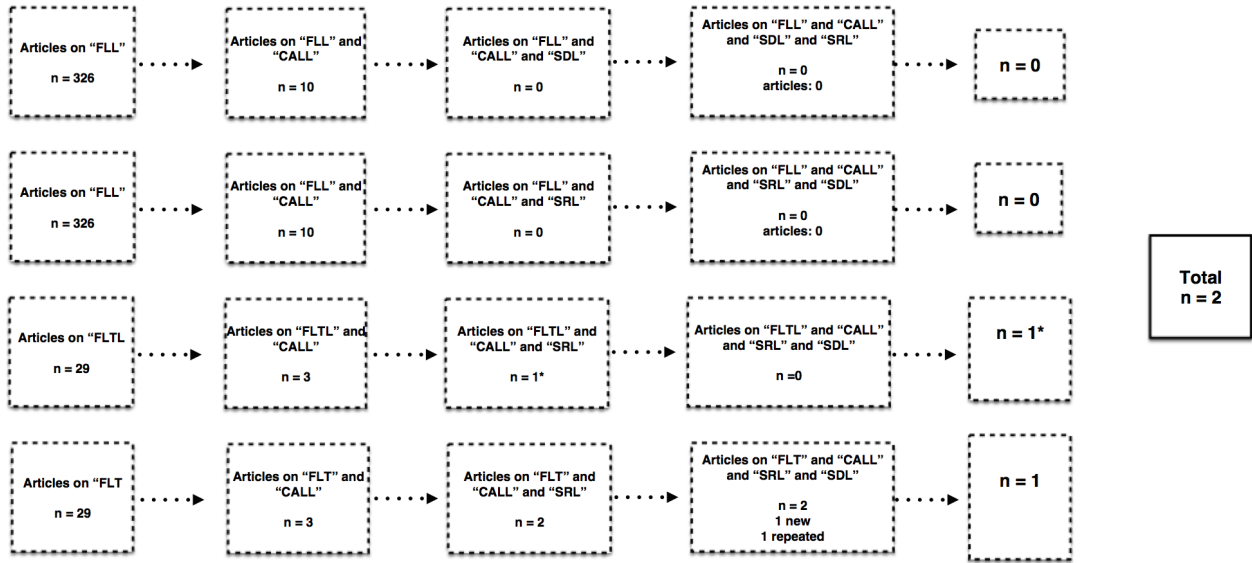
Scopus



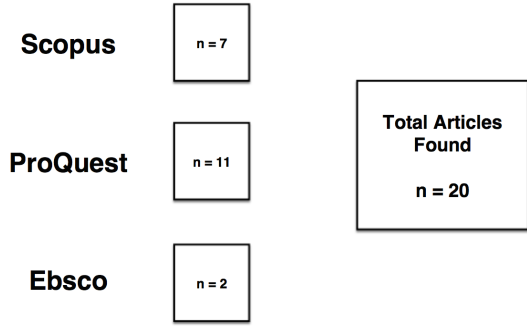
Proquest



EBSCO



Total (Scopus, Porquest and EBSCO)



Appendix B: Appendix B: Studies included (n=8) with reasons for inclusion

Study	Reasons for Inclusion
Chen, C.-M, Wang, J.-Y., & Chen, Y.-C. (2014). Facilitating English-language reading performance by a digital reading annotation system with self-regulated learning mechanisms. <i>Educational Technology & Society</i> , 17 (1), 102–114. Retrieved from: http://www.jstor.org/stable/jeductechsoci.17.1.102	CALL and SRL
Kondo, M., Ishikawa, Y., Smith, C., Sakamoto, K., Shimomura, H., & Wada, N. (2012). Mobile assisted language learning in university EFL courses in Japan: Developing attitudes and skills for self-regulated learning. <i>ReCALL</i> , 24(2), 169-18. doi: 10.1017/S0958344012000055	MALL (Mobile Assisted Language Learning) and SRL
Lai, Ch. (2015). Modeling teachers' influence on learners' self-directed use of technology for language learning outside the classroom. <i>Computers & Education</i> , 82, 74-83. doi:10.1016/j.compedu.2014.11.005	SDL and CALL
Lai, C., & Gu, M. (2011). Self-regulated out-of-class language learning with technology. <i>Computer Assisted Language Learning</i> , 24(4), 317-335. doi:10.1080/09588221.2011.568417	CALL and SRL
Lan, Y.-J. (2013). The effect of technology-supported co-sharing on L2 vocabulary strategy development. <i>Educational Technology & Society</i> , 16(4), 1–16. Retrieved from: http://www.jstor.org/stable/jeductechsoci.16.4.1	CALL, SDL and learning strategies
Lee, L. (2011). Blogging: Promoting learner autonomy and intercultural competence through study abroad. <i>Language Learning & Technology</i> , 15(3), 87-109. Retrieved from: http://llt.msu.edu/issues/october2011/lee.pdf	CMC (Computer Mediated Communication) and autonomous learning
Smith, K., & Craig, H. (2013). Enhancing the autonomous use of CALL: A new curriculum model in EFL. <i>CALICO Journal</i> , 30(2), 252-278. doi: 10.1558/cj.v30i2.252-278	CALL and autonomous learning
Sun, S. Y. (2014). Learner perspectives on fully online language learning. <i>Distance education</i> , 35(1), 18-42. doi: 10.1080/01587919.2014.891428	CMC (Computer Mediated Communication) and autonomous learning

Appendix C: Studies excluded (n=12), with reasons for exclusion

Study	Reason for exclusion
Chang, M. M., Lin, M. C., & Tsai, M. J. (2013). A study of enhanced structured web-based discussion in a foreign language learning class. <i>Computers & Education</i> , 61, 232-241.	CMC (Computer Mediated Communication) not SDL and/or SRL
Gharbavi, A., & Mousavi, S. A. (2012). Do Language Proficiency Levels Correspond to Language Learning Strategy Adoption?. <i>English Language Teaching</i> , 5(7), p110.	Not CALL
Göker, S. D. (2012). Reflective Leadership in EFL. <i>Theory and Practice in Language Studies</i> , 2(7), 1355-1362.	Not CALL, SDL and/or SRL
Gu, Y. (2013). Strategy-based instruction: A learner-focused approach to developing learner autonomy. <i>Language Teaching Research</i> , 17(1), 9-30.	Not CALL
Murphy, L. M., Shelley, M. A., White, C. J., & Baumann, U. (2011). Tutor and student perceptions of what makes an effective distance language teacher. <i>Distance Education</i> , 32(3), 397-419.	Not SDL and/or SRL It is a study to determine the attributes, skills and expertise/knowledge needed by distance language teachers.
Sadeghi, K., & Dousti, M. (2012). The Effect of length of exposure to CALL technology on young Iranian EFL learners' grammar gain. <i>English Language Teaching</i> , 6(2), p14.	Not SDL and/or SRL
Shen, H., Yuan, Y., & Ewing, R. (2015). English learning websites and digital resources from the perspective of Chinese university EFL practitioners. <i>ReCALL</i> , 27(02), 156-176.	Not SDL and/or SRL It is based on teacher's perceptions.
Schuster, S. (2012). Learner autonomy: a theoretical phantasm?.	Not CALL
Taie, M. (2015). English Language Teaching in South Korea: A Route to Success?. <i>Theory and Practice in Language Studies</i> , 5(1), 139-146	Not CALL, SRL and/or SDL. It is an attempt to investigate the status of English language teaching (ELT) in South Korea.
West, R. E. (2011). Insights From Research on Distance Education Learners, Learning, and Learner Support: As published in <i>Distances et Savoirs (D & S—7/2009. À la croisée des recherches</i> , pages 571 to 584). <i>American Journal of Distance Education</i> , 25(3), 135-151.	Not CALL, SDL and/or SRL It is a review of the second edition of the Handbook of Distance Education
Zhang, H., Song, W., & Burstson, J. (2011). Reexamining the Effectiveness of Vocabulary Learning via Mobile Phones. <i>Turkish Online Journal of Educational Technology-TOJET</i> , 10(3), 203-214.	Not SDL and/or SRL
Zhang, H., Song, W., Shen, S., & Huang, R. (2014). The effects of blog-mediated peer feedback on learners' motivation, collaboration, and course satisfaction in a second language writing course. <i>Australasian Journal of Educational Technology</i> , 30(6).	Not SDL and/or SRL

Appendix D: Data Extraction Sheet – Summary characteristics

Note/Key:NI The information was ‘not indicated’ in the paper. Sex M = Male; F = Female; Mix = Mixed; NI = Not indicated Method Quant = Quantitative;

Qual = Qualitative; Mixed = Mixed methods. The information is organized by years from the most recent study to the oldest one

Study	Aim	Methodology	Type of Design	Data Collection instrument	Data Analysis	Learners	Finding
Lai (2014)	To model the influence of teacher behaviors on learners' self-directed technology use.	Mixed	Non-experimental	Semi-structured interviews and online survey on student use of technology outside the classroom.	Content Analysis: Coding	15 students volunteered to participate in the interviews 164 students to take part in the online survey.	Research found five types of teacher behaviors that influenced student’s use of technology outside the language class for learning.
Sun (2014)	To investigate the difficulties and challenges that confront online language learners and also on the way they adjust and adapt in this new learning environment.	Mixed	Non-experimental	Survey: It consists of two sections with 32 questions in total.	Section 1: Likert scale Section 2: Inductive method was employed to analyze the integrated data and capture the emerging categories.	46 university students. No particular recruitment criteria to either include or exclude any particular type of students	Results identified six major difficulties:(1) following the schedule and studying regularly, (2) getting hold of classmates and finding suitable time to work together, (3) pairing/teaming up and working collaboratively, (4) ensuring constant engagement with the class, (5) keeping self-motivated and being a self-directed learner, and (6) socializing.

(Table continues)

Study	Aim	Methodology	Type of Design	Data Collection instrument	Data Analysis	Learners	Finding
Chen, Wang, & Chen (2014)	To evaluate how the proposed DRAS with SRL mechanisms can promote reading comprehension and annotation abilities of individual learners, whether gender difference and correlation between reading comprehension and reading annotation ability exist, and how different SRL abilities affect reading comprehension and annotation abilities of individual learners.	Mixed	Quasi-experimental	Midterm exams	Midterm exams Statistical analysis SRL indexes: (1)achievement index of learning time,(2) achievement index of effort level in learning courseware, (3) achievement index of reading rate, (4) achievement index of concentrated learning. Pearson correlation analysis	32 students	(1)Reading comprehension and annotation abilities of the experimental group were significantly improved. (2)Gender differences in reading comprehension and annotation ability existed when using the DRAS with and without the SRL mechanisms. (3)Significant differences existed in the reading comprehension and annotation abilities of learners with good and poor SRL abilities. (4)The reading annotation ability of learners in the experimental group was significantly correlated with reading comprehension.
Smith & Craig (2013)	To enhance learners' autonomous use of CALL in the acquisition of English as a Foreign Language (EFL)	Qualitative	Non-experimental (action research study)	Trial materials, observation, reflexive practice, learner questionnaires, interviews, artifacts and learner self-reflections, reflective journals.	(1) Students' weekly self-reflection entries. (2) Students' responses in teacher assistant interviews. (3) end-of-course evaluations and teacher reflections. (4) Teacher Reflections.	180 1st and 2nd year students.	(1) Teachers' and learners' consciousness was raised about what is expected of users in the autonomous use of CALL in a classroom environment and in a Self-Access Centre. (2) There is improvement in learners' planning, organizing, tracking, and evaluation of their autonomous use of CALL resources, and that regular and critical learner self-reflection is a key factor contributing to a positive shift in study culture.

(Table continues)

Study	Aim	Methodology	Type of Design	Data Collection instrument	Data Analysis	Learners	Finding
Lan (2012)	To develop and evaluate a co-sharing-based strategy learning system for L2 vocabulary learning known as “Mywordtools” that is designed specifically for lexical learning	Mixed	Quasi-experimental	(1) Vocabulary performance test, (2) VLS usage records	Two-way mixed-design analysis of covariance Frequency percentages and strategy categories.	61 students	(1) Students using MWT practice and share vocabulary learning strategies (2) VLSs outperformed both those who did not use MWT and those who used the platform but without sharing. (3) The sharing strategy helped L2 learners to construct more VLSs, and they performed significantly better than those who did not implement strategy sharing. (4) The use of co-sharing with MWT not only benefits the development of VLSs by EFL students but also helps them to gain more in L2 vocabulary learning.
Kondo et al (2012)	To discover whether certain MALL practices would foster an advanced form of self-study, self-regulated learning (SRL).	Mixed	Experimental	Phase 1: Pre- and post-tests, post Course Evaluation Phase 2: TOEIC tests, Students Thinking About Problem Solving Scale (STAPSS), Interviews conducted at the end of the fall semester	Phase 1: Scores in both pre and post-test Phase 2: The TOEIC scores, Likert scale, Examples of students’ responses.	Study 1: 88 students Study 2: 15 students There was no control group.	(1) Features of self-study in the MALL group were stronger than in the control group. (2) SRL was evident in the MALL group than in the control group in terms of the specificity of the students’ goals, the customized creation of learning tasks, and in-class applications compared with the students’ self-reported previous learning behavior.

(Table continues)

Study	Aim	Methodology	Type of Design	Data Collection instrument	Data Analysis	Learners	Finding
Lai & Gu (2011)	To understand learners' self-regulated use of technology outside the classroom for language learning.	Mixed	Non-experimental	(1) An online survey. (2) Semi-structured interviews.	(1) Likert-scale Coefficient alpha and item-to-total correlations Correlation analysis and t-test (2) The interview data were analyzed inductively to identify general themes	279 language learners.	Students are strategic users of technology and are using technology to regulate various aspects of their language learning. This study further identified various factors that affected the participants' selective use of technology for language learning.
Lee (2011)	To identify how using combined modalities of asynchronous computer-mediated communication (CMC) via blogs and face-to-face (FTF) interaction through ethnographic interviews with native speakers (L1s) supports autonomous learning as the result of reflective and social processes.	Mixed	Non-experimental	Blog entries, reflective reports, and post surveys.	Descriptive statistics and content analysis	16 students	(1) Blogging promoted learner autonomy through self-regulation and self-management. (2) Using blogs gave students a sense of belonging, as they collaboratively shared and exchanged cultural perspectives.

Appendix E: Primary characteristics of in-Depth Analysis (Second Question)

<i>Study</i>	<i>Aim</i>	<i>Constructs</i>	<i>Technology</i>	<i>Pedagogical Principle</i>	<i>Outcomes</i>	<i>Data collection instrument</i>
Lai (2014)	To model the influence of teacher behaviors on learners' self-directed technology use.	Self-directed technology use	Not Applicable		<ul style="list-style-type: none"> - Teacher behaviors that provide affection, capacity and behavior support were found to predict self-directed technology use. - Affection support influenced self-directed technology use through strengthened perceived usefulness. - Capacity support and behavior support influenced self-directed technology use in similar ways, both predicting self-directed technology use through enhanced facilitating conditions and computer self-efficacy. 	Semi-structured interviews and online survey on student use of technology outside the classroom.
Sun (2014)	To investigate the difficulties and challenges that confront online language learners and also on the way they adjust and adapt in this new learning environment.	Online participation Collaborative e-learning/group work Content of online courses Learning strategies and styles	Not applicable	Participation	Results identified six major difficulties: (1) following the schedule and studying regularly, (2) getting hold of classmates and finding suitable time to work together, (3) pairing/teaming up and working collaboratively, (4) ensuring constant engagement with the class, (5) keeping self-motivated and being a self-directed learner, and (6) socializing.	Survey: It consists of two sections with 32 questions in total.
Chen et al. (2014)	To evaluate how DRAS with SRL mechanisms can promote reading comprehension and annotation abilities of individual learners. To determine whether gender difference and correlation between reading comprehension and reading annotation ability exist.	Reading comprehension performance Reading annotation abilities	Digital Reading Annotation System (HTML based tool)	Personalization Annotation can be used to summarize important ideas in an article and is an explicit expression of knowledge in the form of comments. It enhances ESL learning.	Reading comprehension and reading annotation abilities of experimental group significantly improved. Females improved their reading comprehension abilities in comparison to males. Males' annotation abilities increased. Reading comprehension and annotation abilities of learners with good SRL are higher than those of poor SRL.	Assessments of learners' annotation and reading comprehension abilities (Pre-experiment and post-experiment) - Information collected from DRAS activities.

(Table continues)

<i>Study</i>	<i>Aim</i>	<i>Constructs</i>	<i>Technology</i>	<i>Pedagogical Principle</i>	<i>Outcomes</i>	<i>Data collection instrument</i>
Smith & Craig (2013)	To enhance learners' autonomous use of CALL in the acquisition of English as a Foreign Language (EFL)	Autonomous learning	Not applicable	Curriculum evaluation	- Teachers' and learners' consciousness was raised about what is expected of users in the autonomous use of CALL in a classroom environment and in a Self-Access Centre. - There is improvement in learners' planning, organizing, tracking, and evaluation of their autonomous use of CALL resources, and that regular and critical learner self-reflection is a key factor contributing to a positive shift in study culture.	Trial materials, observation, reflexive practice, learner questionnaires, interviews, artifacts and learner self-reflections, reflective journals.
Lan (2012)	To develop and evaluate a co-sharing-based strategy learning system for L2 vocabulary learning. To analyze whether V vocabulary Learning Strategies (VLS) are learnable.	Vocabulary performance Strategy used (Practice, note taking, key words, contextualization, grouping, imagery, recombination, deduction, analysis, physical, translation, transfer)	Mywordtools (VLS system)	Productivity Scaffolding Self-construction Participation Co-sharing	- VLS is learnable - Scaffolding-based self-construction and co-sharing appear to be able to effectively enhance young L2 learners' VLS development and vocabulary learning. - Through co-sharing, young L2 learners seem to be able to develop the VLSs beyond their cognitive stage	- Vocabulary performance pretest and posttest - VLS implemented in three randomly assigned groups. - Interviews with group of students who did not use MyWordTools
Kondo et al. (2012)	- To investigate whether the use of a MALL device with a learning module, designed within a principled SRL framework called 'Academic learning cycle phases', will result in students spending more time on self-study. - To determine whether students will continue to engage in independent self-study with the MALL device after they complete the learning module.	Listening and reading sections in TOEIC Time invested in self-study SRL Framework: motivation, beliefs, strategies, heteronomy and self-efficacy.	Nintendo DS device.	Personalization SRL phases: Forethought (self-motivation): analyze tasks, set goals, and plan strategies to achieve goals. Performance control: self-instruction self-determination, and self-observation. Self-reflection: Students make self-judgments by evaluating their own learning and analyze their results	- Self-study behavior improves with the application of the learning module of the MALL method. - Once the teacher's intervention was eliminated, their self-study behavior decreased both qualitatively and quantitatively.	Phase 1: - TOEIC pretests and posttests - Post course evaluation Phase 2: -TOEIC pretests and posttests -Analysis of logs data from Nintendo DS.

(Table continues)

<i>Study</i>	<i>Aim</i>	<i>Constructs</i>	<i>Technology</i>	<i>Pedagogical Principle</i>	<i>Outcomes</i>	<i>Data collection instrument</i>
Lai & Gu (2011)	To understand learners' self-regulated use of technology outside the classroom for language learning.	Use of technology	Not applicable	Learning processes	Students are strategic users of technology and are using technology to regulate various aspects of their language learning. This study further identified various factors that affected the participants' selective use of technology for language learning.	-An online survey. - Semi-structured interviews
Lee (2011)	To identify how using combined modalities of asynchronous computer-mediated communication (CMC) via blogs and face-to-face (FTF) interaction through ethnographic interviews with native speakers (L1s) supports autonomous learning as the result of reflective and social processes.	Intercultural learning	Blogs	Productivity Personalization Participation	- Blogging promoted learner autonomy through self-regulation and self-management. - Using blogs gave students a sense of belonging, as they collaboratively shared and exchanged cultural perspectives.	Blog entries, reflective reports, and post surveys