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Toward Integrative CALL: A Progressive Outlook on the History, Trends, and Issues of CALL

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Abstract

With the advancement of technology now allowing complex and intricate simulation gaming and virtual reality (VR), current trends and issues in language learning extend their research on the topic of digital literacy, aiming to find the ways in which the use of technology fosters, or perhaps hinders, overall performance of language learning. While there have been many published articles that claim the successful utilization of technology and digital media into the classroom, there are considerably few that deliver a successful integration of theory into practice. To address this issue, this paper provides a historical review of Computer-Assisted Language Learning (CALL), overviewing the shifting process in which the contemporary model of CALL is established. By addressing the dissonant relationship between SLA theory and CALL as a theoretical limitation, this paper argues that a modern CALL orientation can be re-conceptualized when considering the evidence derived from integrative sets of SLA theories.

Computer Assisted Language Learning (CALL) is a relatively new discipline that emerged from the field of Computer Assisted Instruction (Warschauer & Healey, 1998). It wasn't until recently that CALL established a more in-depth body of research in multidimensional settings, thereby introducing some of the new frameworks of language learning¹ through an interdisciplinary approach. The first surge of publications began around the 1980s (Warschauer & Healey, 1998), with much of the earlier works in CALL taking an exploratory approach, for example, by identifying gaming prototypes and how they are incorporated into the classroom (Peterson, 2010).

Amongst the various types of proposed computerized games, simulation gaming and virtual reality (VR) have received great attention, becoming the major trends in the field of CALL today (Ranalli, 2008; Coleman, 2002). While there are many types of published studies that claim the beneficial utilizations of games in the classrooms, many of them share the similar premise that simulation gaming/VRs are beneficial primarily due to the motivational aspects of language learning. The argument generally states that since simulation and gaming facilitates more communicative and learner-centered elements of learning, it is instructionally engaging for the learners and thus develops an instrumental motivation (Jones, 1982, p.10).

¹ The term “learning” is used in a general sense in considering the process, not in terms of the Krashen and Terrell (1983) and Krashen’s (1985) distinction between “learning” and “acquisition.”

While motivation certainly plays a significant role in language learning, many practitioners fail to address the potentialities of simulation gaming outside the scope of motivation. This is perhaps because current simulation games are not designed specifically for the purpose of second language (L2) learning; thus, the potentialities of language learning have gone largely unrealized (Ranalli, 2008). Since there is an apparent lack of an anticipated relationship between contemporary CALL and second language acquisition (SLA) theories, researchers often focus on a particular segment of SLA theory to explain potential utilization of CALL practices (Chapelle, 2009). Because of this, the field of CALL experiences what Chambers (2010) calls the “quest for identity” (p. 113), further proposing the need to establish principles and evaluation supported by multidisciplinary views of language learning.

With this in mind, the purpose of this paper is to address the trends and issues proposed by various domains of CALL, considering why current approaches focus on motivation as the most often enlisted theory to support the use of simulations and gaming. While extensive research on CALL design, development, and evaluation have been proposed, I argue in this paper that a modern CALL orientation can be re-conceptualized when considering the evidence derived from integrative sets of SLA theories: in particular, the conjugation between cognitive SLA and sociocultural theory of learning. First, I will review the historical dimensions of CALL, highlighting the origins of two fundamental CALL frameworks: the traditional and the contemporary CALL approaches. After reviewing these two frameworks, I will then focus particularly on the contemporary CALL framework to analyze some of the potential issues related to this orientation. In order to consider CALL beyond the scope of motivation, I will also consider a new approach with an attempt to make sense of contemporary CALL from a multidimensional viewpoint.

History of CALL: Traditional vs. Contemporary

Over the four decades in the history of CALL research, the field has progressed through developmental stages, from traditional to contemporary, in utilizing technology into the language learning classrooms. These stages were greatly influenced by not only the technology specifically available across these decades, but also by how languages were viewed and taught.

According to Warschauer (2004), the developmental stages of CALL as a field of study can be categorized into three distinct phases: Structural CALL, Communicative CALL, and Integrative CALL (Warschauer, 2004), depending on the prototype of the proposed language learning activities (see Table 1 below). While Warschauer (2004) distinguishes Structured and Communicative CALL, in this paper they will be combined and referred to as “traditional CALL,” since the principle use of computers during these phases shared similar premises: the computer was used in an “ad hoc” and a marginal fashion, rather than considering it as a central element of language learning (Warschauer & Healey, 1998, p. 57).

Stage	1970’s-1980s: Structural CALL	1980’s-1990s: Communicative CALL	21 st Century: Integrative CALL
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	Fluency	Agency

Table 1. The Three Stages of CALL, adopted from Warschauer (2004, p. 22)²

Many studies conducted during the Structural CALL period treated the computer as a tutor, providing students with instrumental practice through tutorials, drills, and modeled dialogues (Warschauer & Healey, 1998; Kern & Warschauer, 2000). This approach was frequently utilized in the earlier development of CALL research, proposing computer and technology as alternative materials/resources for students to digitally work on the question-answer exercises. Structural CALL was originally termed as “Behavioristic CALL,” modified from the original work of Warschauer’s CALL introduction, advocating the stimulus-response orientation of language learning through computerized instruction (Warschauer, 1996).

Meanwhile, Communicative CALL originated through the conjugation of CALL and Communicative Language Teaching (CLT), where learners could collaborate and interact using the targeted languages. In this framework, scholars believed that language learning was facilitated through learners becoming members of a community of practice, emphasizing the value of authentic communication rather than drills and exercises. The practices often included text-based online communication, using emails and chatting systems to mediate conversations between learners (Warschauer, 1997). Although Communicative CALL involved students’ choice, control, and interactions, many researchers and developers of programs viewed computers as an additional mediating tool or teaching aid, which was instrumental to language learning classrooms.

With an advancement of technology including VRs and three-dimensional (3D) multi-player games, Integrative CALL (also known as contemporary CALL) focuses on the environment in which interaction takes place. In this framework, researchers often draw upon sociocultural theories of learning, mainly named as Kolb’s (1984) experiential learning and Lave and Wenger’s (1991) situated learning, which emphasize that learning occurs in a communicative context through concrete and direct experiences. Learning in this approach is generally exploratory, thus learners’ autonomy, engagement, and, most importantly, motivation are often found to be the most critical elements of contemporary CALL research (cf. Rahimi & Yodollahi, 2011; Ushioda, 2000; Schwienhorst, 2002; Mohammadi, Ghorbani, & Hamidi, 2011; AbuSeileek, 2012).

It is essential to note that the three stages of CALL did not occur in a “rigid sequence” (Warschauer, 2004, p. 21), nor were the periods of time outlined above indicative of complete

² Note. From “Technological change and the future of CALL,” By M. Warschauer, 2004, In S. Fotos & C. Brown (Eds.), *New perspectives on CALL for second and foreign language classrooms*, (pp. 15-25). Copyright 2004 by Copyright Holder.

shifts in methods from one period to the next (Warschauer, 1996). Both traditional and contemporary CALL frameworks have been accompanied by extensive research that contributes to our understanding of how computer and technology can be used in alliance with language learning. Current CALL research focuses more on how additional languages are learned and how such learning might be supported by technology, rather than focusing on the use of technology in language classrooms (Egbert, Hanson-Smith, & Chao, 2007).

Furthermore, it is vital to see that the trends and issues in CALL research relate to the evolution of scholars' notions about how language is learned, including multiple domains of linguistic theories and language teaching. Ever since the socio-constructivist approach was introduced and favored among the scholars and field practitioners in the late 1990's, there is a tendency to view language learning as a social construct, rather than looking at discrete elements of language and how to teach them better (e.g., how best to teach grammar, reading, writing, speaking and listening, etc.). With the socio-constructivists' beliefs, scholars concentrated on socially imbedded nature of language and how to increase learners' opportunities to language in an authentic context. This resulted in more studies that look at providing immersive environment where the community of learning resides. While more diversified, ecological views of how language is learned contributed in the field to develop new approaches and pedagogies of language teaching, there seems to be a lack of a consistent set of principles that would guide our current CALL practices. Levy and Stockwell (2006) in their published book *CALL Dimensions* state a similar premise, highlighting the four areas of contemporary CALL research:

The richness and diversity of CALL, when viewed in its entirety, is a result of many factors. These include the number and range of technological tools available with the potential use in CALL applications; an increasingly sophisticated understanding of how languages are learned (although lacking a single, overarching theory to rely on as a guide); environmental factors that lead to a variety of priorities, resources, and objectives for different learners in different settings; and particular challenges that arise as a result of the attributes or qualities of the target language. (p. 1-2)

Issues in CALL

Continuing Popularity of Traditional CALL

While the history of CALL has developed in such a way that mirrors the theoretical discussion of SLA as well as the advancement of technology, there are two fundamental issues in contemporary CALL practices. The first one is the lack of research in contemporary CALL, with many researchers and practitioners still heavily relying on the traditional CALL model. For instance, in the review of current CALL literatures, Stockwell (2007) found that CALL research, published between 2001 to 2005, focuses on the use of technology to mainly teach the following areas of language skills: 1) grammar, 2) vocabulary, and 3) pronunciation (Stockwell, 2007). Out of 206 published studies Stockwell examined through major CALL journals, grammar was found to be the most commonly investigated language skill (more than 40% of the share), which indicates that there is a tendency to focus on grammar acquisition as a primary language learning objective.

In addition, while there is more research that uses Integrative CALL features, including multimedia and online communication tools, some of them still use the traditional model as its

main approach, focusing on grammatical and language accuracy as the main learning objectives. For instance, Li and Topolewski (2002) developed an English as a Second Language (ESL) computer simulation program called *ZIP & TERRY* with a combination of an automatic speech recognition technology in order to: 1) motivate learners to participate, and 2) improve learners' pronunciation accuracy. Since Li and Topolewski were concerned about their ESL students' pronunciation being different from native speakers, they hoped that this simulation with new speech recognition technology would help eliminate students' accents and poor pronunciations (Li & Topolewski, 2002). While *ZIP & TERRY* has many features of contemporary CALL design that could emphasize real-world communication, the researchers still heavily relied on the focus of the traditional CALL method: language accuracy.

It is quite noteworthy to address that although the contemporary CALL approach is available and shown to be beneficial in published literatures today, many practitioners still rely on technology as a tool to provide drills and exercises or as a manager for their courses, rather than the purpose of communication and immersion. For instance, the large-scale study (n=847) examining the English for Speakers of Other Languages (ESOL) teachers' uses and preferences of technology in ESOL classrooms, Meskill, Anthony, Hilliker-Vanstrander, Tseng, and You (2006) found that there is no significant parallel increase in the use of multimedia and Computer Assisted Instruction (CAI) between 1997 to 2003. Furthermore, contemporary CALL specific tools, such as computer simulations, was ranked as the 16th most used out of 21 tools listed, which equates to being used by only 18.4% of participants. In contrast, the top four tools most often reported to be used in 2003 were: 1) word processing (80.75%), 2) audio tape/CD (75.22%), 3) CD-ROM (74.12%), and 4) video VCR/DVD (73.67%). In another words, K-12 ESOL teachers are not implementing contemporary CALL features such as simulations and gaming that are gaining prominence in the research and popular literatures of the field. Despite the potentialities addressed in the field, Meskill et al. (2006) does not go in-depth to argue some of the possible reasons why the ESOL teachers do not seem to integrate contemporary CALL features, besides the lack of available training as a potential factor. However, I conjecture that ESOL teachers are not only unprepared for the contemporary CALL approach due to the lack of training, but they also may be focused on the traditional model of language teaching rather than the contemporary one. In another words, ESOL teachers may not find the contemporary CALL approach as pedagogically appealing.

Distorted Focus on Contemporary CALL Research

The second issue in contemporary CALL is that amongst the few published studies in the area of contemporary CALL, the researchers tend to disregard contemporary SLA theories to support their CALL practices. Often times theoreticians use a set of constructs related to motivation, autonomy, and degree of being engaged in CALL activities as primary benefits in utilizing technology, neglecting the fundamental analyses on how CALL can facilitate the nature of language learning. For instance, in the study of learners' attitudes towards CALL, Rahimi and Yodollahi (2011) argue that the current body of research focuses on how the use of CALL influences learners' autonomy, motivation, and attitudes to sustain language (Rahini & Yodollahi, 2011). In another example, Ushioda (2000) claims that her tandem e-mailing program was motivating to the students, fostering affective learning and learners' autonomy based on the qualitative analysis of learners' perceptions toward her CALL curriculum (Ushioda, 2000). Likewise, many other theorists showed a similar premise: the rationale of utilizing CALL is

primarily affected by learners' autonomy and engagement (Schwienhorst, 2002; Mohammadi et al., 2011; AbuSeileek, 2012).

This distorted focus on contemporary CALL research can be considered due to the lack of studies that focus on language learning outcomes with empirical evidence. To illustrate this point, in the most recent CALL meta-analysis involving many primary studies across major CALL journals, Grgurovic, Chapelle, and Shelley (2013) identified 37 studies from more than 200 CALL research as having statistical evidence regarding language learning outcomes. Since the purpose of Grgurovic et al.'s study was to examine the effect of CALL and its language learning outcomes, it required specific criteria to only include studies (data) which had descriptive or inferential statistics. To select studies for their meta-analysis, they used keyword searches, the use of a database, and a manual search of the major CALL journals including: *Computer Assisted Language Learning (CALL)*, *System*, *CALICO Journal*, *ReCALL*, *Language Learning and Technology (LL&T)*, and *TESOL Quarterly*. Out of more than 200 recently published articles about CALL, only 37 (18.5%) included descriptive or inferential statistics regarding language-learning outcomes. The other 115 or more did not have satisfied data, and the remaining 48 were either: 1) focused on factors outside language-learning outcomes (e.g., attitudes, motivation, study skills, participation), 2) gave test results during the treatment rather than at the end, and 3) failed to provide statistics that were sufficient for their studies (Grgurovic et al., 2013, p. 170)³. Based on the results provided by Grgurovic et al., it is apparent that empirical evidence is particularly lacking in contemporary CALL research, as only 18.5% of the collected studies measured the learners' language-learning outcomes with relevant research designs (e.g., experimental, quasi-experimental design, employment of pre-and post-tests, etc.) and statistical evidence.

To summarize, two major issues in contemporary CALL are: 1) there is still a great popularity on the traditional approach in implementing technology, and 2) the vast majority of research focuses on external elements, such as facilitating learners' motivation and engagement in teaching languages, rather than rationalizing it for the sake of language learning potentials. While motivation in principle is significant, as scholars have discussed substantial evidence of what motivation is and how it is linked to an overall L2 attainment (Gass, Behney, & Plonsky, 2013; Gardner, 2007; Ushioda & Dörnyei, 2012; Dörnyei, 1994; 2007; 2009), the current mainstream CALL research has focused more on the instructional element of motivation, not the instrumental and integrative orientation of motivation (cf. Gardner, 2001). For instance, when researchers and practitioners say that the use of games and simulations make learning fun and engaging, they use games and simulations to motivate students extrinsically to perform a task that is considered difficult, time-consuming, and otherwise boring. In this case, instructors focus on motivation in such a way that provides convenience to language instruction, replacing the value of language learning with material incentives (e.g., reward, coins, medals, etc.). In reality, language learning motivation should come from the realistic desire to communicate in target languages seen in "situated antecedents" (MacIntyre, Clément, Dörnyei, & Noels, 1998) or

³ The aim of Grgurovic, Chapelle, and Shelley's study (2013) was to investigate whether or not SL or FL instruction supported by CALL is effective, compared to the instruction not supported by CALL. Based on the meta-analysis by calculating effect size listed in the collected studies, they found that the overall results favored the technology-supported pedagogy, claiming that CALL instruction outperformed non-CALL instruction.

pragmatic situations, such as “I want to learn to give presentations in a target language so that I can work closely with my clients from the target language speaking country”(cf. Gardner 2007, Dörnyei, 1994). If instructors label language learning as a hard work students obtain through drills, exercises, and rote-memorization, it lacks the ontological nature of why students should obtain a second or foreign language. Even though an electronic device, such as flashcards or memory games, can be more engaging than the traditional paper versions, this use of technology misses the opportunities to use contemporary CALL in more authentic and communicative ways that are intrinsically motivating to learners.

Lack of Theoretical Nexus between CALL and SLA

As one can see, other than the two issues discussed above, a far larger issue in CALL is the lack of “sophisticated understanding of how languages are learned” (Levy & Stockwell, 2006, p.1). Chapelle (1997) similarly states that there is a “dissonance between even the most technically sophisticated work in CALL and SLA research” (p. 20). As was seen in the previous discussion, contemporary CALL focuses mostly on the rationalist tradition, considering why computer/technology is beneficial to language teaching, neglecting pragmatic thoughts of how computer/technology is beneficial to language learning. This could be due to the complexity of linguistics itself, since the theories of how people learn languages can be defined differently by multiple sub-branches of the field (Bailin, 1988; Liddell, 1994; Chapelle, 1997; 2009; Levy & Stockwell, 2006).

In fact, the current trends of CALL research particularly fall into this category. Since CALL practice involves cross-disciplinary work, researchers and designers “find themselves at the crossroad among disciplines that appear to offer insights for work in CALL” (Chapelle, 1997, p. 19). Because of this, there is a tendency to theorize contemporary CALL in a vague, but limited manner; indeed CALL advocates themselves have often failed to acknowledge other theoretical perspectives outside their traditions.

These issues were also discussed in the work of Levy and Stockwell’s (2006) CALL Dimension. In this book, the authors argued that there are three issues confronting modern CALL theories and propose the need to reconsider the current practices and theory applications. The first issue is on the “theory-practice nexus” (p. 140); in particular, Levy and Stockwell (2006) note that the current theory-practice relationship is problematic, and thus leads to rather narrow-minded, oversimplified applications of theories. In fact the field of CALL research itself is diverse, deriving from multiple domains of inquiries, namely the theory of learning (e.g., sociocultural theory, constructivist approach), theory of SLA (e.g., interactionism, structuralism), theory of teaching and pedagogy (e.g., task-based language learning, activity theory, communicative language teaching), and theories of curriculum and design (e.g., rationalism, pragmatism). While many theories, traditions, and approaches are available in the field, it is unlikely to find research that contains an interdisciplinary nature of theoretical accounts.

Levy and Stockwell (2006) further argue that, even though there are two studies that share a similar purpose, data set, participants, and even similar results, when the two studies follow the two distinct theoretical traditions such as interactionist versus socio-cultural theorist, their descriptions and interpretation will be much different from one another since they use different units of analysis, evidence, and key terminologies to explain their outcomes (Levy & Stockwell, 2006, p. 136). The problem may then arise, according to Levy and Stockwell (2006),

for those who are not experts in the field, especially the language teachers and CALL designers who may not be aware of the shortcomings of the theory. This may eventually lead to the partial implementation or misuse of the theory than is warranted (p. 140). Practitioners and designers may also fail to see the theory-practice relationships in a much deeper sense, since the different theoretical traditions do not tend to interconnect with each other to deliver outcomes of their studies.

Meanwhile, it has to be stressed that the rich diversity of CALL research and its establishment is a positive phenomenon. Diversity in contemporary CALL research may potentially offer a variety of pedagogical choices and range of instructional methods. Because of this diversity, there is a shared notion that language learning is a complex process (or a set of phenomenon), thus multiple theories are needed to explain the different parts of the process. However, according to Levy and Stockwell (2006), the issue is on the CALL designers and language teachers' perspectives of theory application. As indicated previously, due to the diverse nature of CALL research, it is a challenge for practitioners to choose a theory for their practical implementation. Levy and Stockwell (2006) in particular show concerns about the CALL design and its development, noting that some designers may possibly take one or two easily-applicable theories for a marketing platform in order to rationalize their already existing programs/products. Chapelle (2009) and Garrett (1991) also exhibited a similar concern even among CALL researchers today, arguing that they "draw on whatever perspectives might help them to grapple with the many new possibilities presented by technology" (Chapelle, 2009, p. 742). This can be particularly problematic, since the CALL researchers and practitioners may fail to see more in-depth understanding of the modern CALL framework before its implementation, relying solely on the rather narrow-minded approach to CALL programs.

With reference to the two issues presented above, the issues of the theory-practice relationship may have already been seen in the current trends of CALL research, where practitioners tend to focus more on the motivational accounts of learning/teaching for utilizing CALL, rather than the focusing on the impact on language learning as a whole. To consider the potential benefits of CALL outside the scope of motivation, further investigation is necessary; in particular, examination of the theory of SLA with reference to the two main paradigms: psycholinguistic and socio-cultural SLA traditions, is needed. This is also related to the need to explain CALL research with a pragmatic goal; the emphasis is to find out how technology or a computer-assisted environment can be beneficial for creating language learning opportunities and to examine how SLA is successfully demonstrated. Having said that, there needs to be a guiding, interdisciplinary framework, or what Levy and Stockwell (2006) call an "overarching" theory, of SLA to support contemporary CALL research on design, application, and evaluations. To establish this, the following section will review SLA theories with an attempt to address its relationship to CALL, showing how SLA and CALL are interconnected.

The Relationship between CALL and SLA

According to Egbert et al. (2007), a theory of CALL is a theory of language acquisition, and CALL theories will not exist independently from SLA, regardless of the changes in technology. It is important to note that the use of technology, such as emailing and course management software, does not simply constitute CALL environments like the "full integration of technology into language learning" conditions of CALL do (Garrett, 2009, p. 719). While there is a need to investigate the relationship between SLA and CALL, or how SLA may be

facilitated in the CALL environment (Peterson, 2010), contemporary CALL research generally lacks evidence supported by SLA theories (Levy & Stockwell, 2006) since the SLA field itself does not agree with CALL on the basic premise of how language is learned (Chapelle, 1997; Truscott & Smith, 2011).

This diverse view of language learning in the field significantly affects not only views about how language should be taught in the classroom, but also how CALL is rationalized for its potential benefits. In order to “help make sense of the intensively interactive and linguistically rich environments afforded by technology” (Chapelle, 2009, p. 741), contemporary CALL should be re-conceptualized and evaluated from the integrative theories of SLA. As a matter of fact, although the numbers of publications are still quite low, there are a few studies that reviewed the relationship between SLA and CALL (cf. Chapelle, 1997; 2009; Doughty & Long, 2003; Warschauer, 2004), providing a work-in-progress conceptual framework to evaluate current CALL practices. With an attempt to bridge CALL and SLA, Chapelle (2009) provided a case-by-case analysis between SLA theories and CALL implications, providing the instances of how each SLA theory can provide example implications for contemporary CALL practices.

Upon examining SLA theories from the diverse field of linguistics, two main approaches to language acquisition emerged: natural SLA and instructed SLA. As an example of this, according to Krashen and Whiteside’s (2007) historical review of SLA, the original purpose of SLA research was defined as “to help improve language instruction and to better control the variables that went into instructed SLA” (p. 908). In this definition, both theoreticians and practitioners are interested in how language is learned and how such learning can be facilitated through instructional materials and resources. However, this definition of SLA is not always agreed upon by different groups of linguists due to the fact that there are two beliefs in SLA: 1) SLA as a natural process, and 2) SLA as something needing instruction. The distinction between natural SLA and instructed SLA can also relate to the famous work of Krashen and Terrell’s (1983) acquisition-learning hypothesis, which distinguishes between acquisition and learning, offering the ways in which two distinct competences, acquisition (e.g., implicit knowledge of a language) and learning (explicit knowledge about a language), can be incorporated jointly in the classroom for different tasks and objectives (Krashen & Terrell, 1983).

Within the branch of natural SLA, there are generative linguists who focus on how language is learned rather than how language should be instructed to promote language acquisition. However, generative linguists, including Chomsky (1957, 1964, 2008) and his associate Carroll (2001), claim that innate mental structures are primarily responsible for language acquisition. Because of this notion, the focus of generativists is on the innate process of learners, such as examining “prewired linguistic capacities of learners” (Chapelle, 2009, p. 742), rather than taking the environment into consideration, the context in which learning is nurtured. According to Chapelle (2009), generativists’ theory is rather limited when applying it to CALL due to their emphasis on learners’ mental capacities rather than materials or tasks themselves (p. 742). Furthermore, even if we were to accept generative linguists’ claims about language learning, the approaches to CALL would look much like Structural CALL models proposed by Warschauer (cf. Warschauer, 2004), emphasizing drills and exercises or the translations of target languages.

In examining the relationship between SLA theory and CALL, Chapelle (2009) further reviewed work within the fields of cognitive linguistics, psycholinguistics, human learning (e.g.,

skill acquisition theory), and sociocultural linguistic theories. In the case of cognitive linguistic perspectives, Chapelle (2009) for instance cites Chomsky's Universal Grammar (UG), autonomous induction theory, and the concept-oriented approach to provide an example implication for CALL, arguing that the emphasis on the natural sequences and development in CALL instruction might be able to "speed up the process of acquisition" (Chapelle, 2009, p. 743). A similar argument can be seen in Krashen and Terrell's (1983) "Natural Order Hypothesis," which states that grammatical structures are acquired in a predictable order (p. 28). By considering the prototypical approach in acquiring language, Krashen and Terrell (1983) further argue that both second-language acquisition and first-language acquisition take similar developmental sequences regardless of the learners' age. To exemplify such claims into CALL practice, Chapelle (2009) adds:

Exercises based on students' use of corpora for investigating grammatical patterns provide rich activities for individual hypothesis testing. These cognitively based theories suggest some orders of acquisition of grammatical forms, providing concrete suggestions about sequencing that could be exploited in grammatically based curriculum (Chapelle, 2009, p. 743).

Chapelle (2009) further underwent a thoughtful discussion between CALL and SLA, providing a detailed analysis of how different theoretical approaches to SLA can be exemplified in CALL practices. While this attempt was innovative for creating a nested relationship between SLA theories and CALL practices, Chapelle's review on SLA theories, in particular, the example implications of generative and cognitive linguistic theories may only be applicable to grammar-based curriculum, known as traditional CALL. A similar argument was also addressed in Warschauer (2004) and Thomas, Reinders, & Warschauer (2014), where CALL typically reflects extant belief about SLA upon utilizing technology. Chapelle (2009) noticed that this was a limitation derived from SLA theories, arguing that "each theory focuses on a set of phenomena, whereas CALL activities can span a broad range of learning opportunities" (Chapelle, 2009, p. 747). As a result, Chapelle (2009) claimed that there needs to be an integrated set of SLA theories to evaluate CALL, thus proposing six characteristics of materials as theoretical implications derived from four areas of SLA theories: 1) language learning potential, 2) meaning focus, 3) learner fit, 4) authenticity, 5) positive impact, and 6) practicality (Chapelle, 2001; 2009).

Despite the issues discussed above, there are a few recent publications regarding the use of technology in the classroom that were thoughtfully rationalized by SLA theories. For instance in the past decade of primary research on contemporary CALL, particularly the use of digital games, simulation and virtual worlds, researchers claim that the use of simulation gaming and VRs can be beneficial since students are engaged and collaborate more in the gaming environment, and thus provided the potential to support the cognitive and linguistic development in proposed CALL programs (cf. Peterson, 2011; 2012a; 2012b; 2012c; 2013; Reinders, 2012; Zhao & Lai, 2009; Gánem-Gutiérrez, 2006). Although the numbers of publications are still quite low, these studies took an innovative approach to rationalize CALL by bridging between different sub-branches of SLA; in particular, the studies attempt to theorize CALL from the integration of sociocultural and cognitive/psycholinguistic models of language learning.

Concluding Remarks

Despite the advancements in technology throughout history, CALL practices and rationales have historically been influenced by the practices of SLA. However, the idea of how integrative sets of SLA theories can influence contemporary CALL was rarely considered. Since the use of technology directly mirrors practitioners' beliefs about how language learning occurs and how such learning can be best facilitated with a CALL environment, some CALL practices today continue to follow the traditional approach, claiming that language learning is the objective of CALL. This resulted in affecting how theorists and practitioners viewed, and subsequently treated, computers in the classroom, constraining the potentialities of CALL to the motivational elements.

While affective aspects of learning language in CALL are certainly fundamental to sociocultural theory of learning, an examination of affective elements alone neglects a much more diversified, ecological view of how language is learned from SLA points of view. Since SLA theories come from a range of various disciplines, there needs to be a counter-theoretical cohesion or even conversation between theorists of CALL and SLA to explore how language learning is afforded within the CALL environment. Nonetheless, due to the apparent dissonance between SLA and CALL discussed in this paper, the contemporary CALL practices today tend to inadequately implement SLA, often deserting the nature of language learning within the environment. Furthermore, this disconnection between CALL and SLA has resulted in the lack of research to examine the process in which language learning occurs during the implementation of CALL programs and ultimately triggers the lack of empirical evidence regarding how a particular CALL program can be successfully utilized in language-learning classrooms.

Now that we reside in the era of Integrative CALL that views language as a social construct (Warschauer, 2004), contemporary CALL can now serve as an environment where communicative events and their functional reality can be served. Based on the relevant work of CALL in relation to SLA (Warschauer, 2004; Chapelle, 2001; 2009; Doughty & Long, 2003), as well as its exemplary practices found in recent literatures (cf. Peterson, 2011; 2012a; 2012b; 2012c; 2013; Reinders, 2012; Zhao & Lai, 2009; Gánem-Gutiérrez, 2006), modern CALL orientation can be re-conceptualized when considering the evidence derived from integrative sets of SLA theories: in particular, the conjugation between cognitive SLA and sociocultural theory of learning. In order to make sense of the quested identity of contemporary CALL practices today, much focus is needed to explore the process of learners with and within the CALL environment.

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