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A Review of Technology Integration in ELT: From CALL to MALL

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Review Article

A review of technology integration in ELT: From CALL to MALL

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Abstract

This is an attempt to give a bird's-eye view of ways in which ELT has been reconciled with technology. It succinctly chronicles a series of common technological tools, applications, and approaches, starting from the excitement offered by CALL which predated MALL and its associated allies. It shows how ELT has shaped up under the auspices of modern information and communication technology (ICT) which has driven a transformation from traditional teacher-centered and text-bound classrooms into student-centered and interactive paradigms. The paper argues that despite this refinement, technology per se is not a recipe for success in learning and teaching English as a foreign or second language (L2). Technology integration into L2 pedagogy relatively lacks a solid theoretical framework; it requires reconciliation between theory and practice which is an ongoing debate. The paper concludes with a contention that the onus is on pedagogues to innovatively re-appropriate accessible ICTs and make informed choices that best fit the particularity of their teaching situations.

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Bilgisayar destekli dil öğreniminden mobil destekli dil öğrenimine: Teknolojinin İngilizce öğretimine entegrasyonu

Öz

Bu çalışma İngilizce öğretiminin teknoloji ile bağdaştırılmasının farklı yönlerine ilişkin genel bir çerçeve çizmektedir. Çalışmada, CALL' dan (Bilgisayar Destekli Dil Öğrenimi) başlayarak MALL (Mobil Destekli Dil Öğrenimi) ve ilgili unsurlar ekseninde, çeşitli yaygın teknolojik enstrümanlar, uygulama ve yaklaşımlar özetlenmektedir. Çalışma genel anlamıyla dil sınıflarını öğretmen merkezli ve kitap güdümlü olmaktan öğrenci merkezli ve daha etkileşimli bir ortama dönüştüren modern bilgi ve iletişim teknolojilerinin İngilizce öğretimini nasıl şekillendirdiğini gözler önüne sermektedir. Bütün bu gelişmelere rağmen, İngilizceyi ikinci ya da yabancı dil olarak öğrenmek için teknolojinin tek başına yeterli olmadığı bu çalışmada ifade edilmiştir. Teknolojinin yabancı dil pedagojisine entegrasyonu, görece sağlam bir kuramsal çerçeveden yoksundur, ve bu konuda kuram ve uygulamanın uyumlu bir şekilde işlemesini sağlamak gerekmektedir. Çalışmanın sonucunda, yenilikçi bir biçimde bilgi ve iletişim teknolojilerini uyarlamada ve eğitim durumlarına en uygun olan seçimleri yapmada asıl sorumluların pedagoglar olduğu ifade edilmiştir.

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Introduction

The information and communication technology (ICT) has penetrated into most aspects of human life giving possibilities for recording things from birth to death. In the field of foreign language teaching and learning, this proliferation did not go unnoticed. The succession of ICTs in the second half of the 20th century inaugurated a period of technology-enhanced language learning (TELL). Language pundits and pedagogues have drawn on a range of technological resources to help students learn easily and innovatively. Language researchers view ICTs not only as motivational and assisting tools but also essential appliances for language learning and teaching. Prior research has shown that technology impacts language curricula, teaching methodology, and learning (Chapelle & Voss, 2016). This integration, if undertaken properly, provides laudable benefits to the 'digital' generation: multiple choices for formal and informal language learning, scaffolding, gamification, and much more (Blake, 2016; Ibrahim, 2018; Zappavigna, 2012; Vurdien & Puranen, 2018). Using digital ICTs has become a second nature to most of today's learners. It enables them to study on their own more than what they learn in classrooms (Chapelle & Voss, 2016; Blake, 2016). Arguably, technology not only exposes language learners to the real world with its complexity but also brings it to them either through audio-visual aids in the classroom or online platforms. Motteram (2013) argued that language learning is "enhanced, but is also being changed, by the ways that technology is used by creative language teachers in the many different classrooms throughout the world" (p.188). All over the history of ELT, teachers have exponentially laid heavy reliance on various ICTs. They left no stone unturned in their search to make L2 teaching a success (Chapelle & Voss, 2016). They have increasingly manipulated technology to facilitate things which have been a desire. However, incorporating technology into ESL/EFL contexts is not always straightforward. A flawless formula of technology-integration has not surfaced although it has been an enduring fascination for decades.

Rationale

Using technology in L2 learning and teaching is currently no novelty. The term Technology-enhanced Language Learning (TELL) has been used for decades, resulting in plenty of food for thought in several disciplines: sociolinguistics, psycholinguistics, education, etc. A number of claims have been made in favour of TELL (Chapelle & Voss, 2016; Chapelle, 2016; Kern, 2006; Vurdien & Puranen, 2018; Watson, 2001; Whittaker, 2014; Zhao, Byers, Puge & Sheldon, 2002). Such assertions maintain that technological tools and applications espouse different learning styles, provide a wealth of learning and teaching resources, and promote independent learning. Although technology integration goes unchallenged today, there has been no single ICT tool or application that fits all language teaching/learning contexts. There is still a flawed understating of ICT effectiveness on L2[1] pedagogy, and when using it with no scope and sequence, it arguably becomes misleading (Lewis, 2015). This paper revisits common trends of technology-based English learning with a dogged focus on technologies that coincided with emergence of the post-method era. It highlights theoretical background which

[1] The term second language (L2) refers to any language other than the first language. However, in this paper it refers to English language being the lingua franca of the world.

has guided technology integration throughout the development of L2 theories and approaches. The review expands our understanding of the ICT contributions to the cause of L2 education. It specifically familiarizes language teachers and researchers– especially the novice ones– with the ongoing debate on the phenomenon. It also brings to the foreground new avenues for further research.

Technology integration

Technology integration is generally defined as purposeful manipulation of any kind of modern technology in language pedagogy. Sometimes, a distinction is made between technology integration and technology use (Garrett, 2009; Qin & Shuo, 2011; Stockwell & Hubbard, 2013); and sometimes the terms are used interchangeably. While integration implies the presence of stipulated and scheduled ICTs, the term technology use indicates utilizing tools, applications, and platforms with no primary intention to learn L2; learning results from such unintentional use. As it indicates purposeful usage, the term technology integration is equated to CALL and its associated allies – MALL, WELL, TELL, etc. (more details in the following section). In this paper, the concept is defined in terms of a reiteration of technology uses on a daily basis taking into consideration the structured, systematic as well as chancy and patchy utilization of modern ICTs.

Qin and Shuo (2011) suggested two salient aspects of using technology in English instruction: (a) Technology is a tool for teaching English and (b) English is taught via technology. The authors postulated that teachers and learners in the former aspect use technology with an eye to promoting English teaching/learning. For example, learners use a word processor to draft, redraft, and correct essays; and teachers may use PowerPoint, for example, to prepare lectures and presentations, and so forth. In such instances attention basically rests on technology itself, and technology awareness becomes a psychological burden. In turn, it leads teachers and students to feel inadequate in technological literacy, and this feeling may be a source of anxiety and unease. In the latter aspect, however, technological tools, applications and platforms become the environment in which language materials are presented. Teachers and learners do not necessarily consider what software or hardware they employ to process the language materials or present these materials. They basically focus on the target language and its culture but not technology itself.

Research on technology integration

The word 'technology' hosts many variables which interact within a digital ecosystem. It represents the utilization of digital tools, applications, and platforms for language learning and teaching purposes (Nimehchisalem, 2014; Wilkinson, 2016; Blake, 2016). Technology integration has been researched for long under several labels. The capacious Computer-Assisted Language Learning (CALL) was first termed in the last quarter of the 20th century. Carol Chapelle and Mark Warschauer were among the premier writers who addressed it meticulously. As the term suggests, CALL is basically dependent on 'computer' as a delivery medium of applications. However, the terminology was latterly unexclusive to the 'canonical' desktop and laptop devices labelled 'computers' but other possible technological facets used in L2 education (Kern, 2006). In its broader definition, CALL includes a number of technologies

such as PCs, mobile phones, electronic whiteboards, all of which have computers of different sorts embedded in them. Other associated terms were coined later on: Internet-Assisted Language Learning (IALL), Web-enhanced language learning (WELL), Technology-Enhanced Language Learning (TELL), and Mobile-Assisted Language Learning (MALL).

All these terminologies encompass a range of platforms, materials, and approaches. Owing to lack of a solid theoretical background, CALL has been discussed in light of the development of SLA theories, technological advancements, and methodology (Ibrahim, 2018; Miech, Nave & Mosteller, 1997; Chapelle, 2005; Chapelle & Voss, 2016). Theories and models applied in the literature originate from previously established theories of learning: behaviourism, constructivism, etc. Nevertheless, CALL research depends on not only SLA theory and practice but also computer sciences, instructional design, and human-computer interaction. It is further complicated by the constant ICT advancements. In this regard, Egbert and Hanson-Smith (2000) argued that technology in language education is not based on a theory of its own but on language acquisition and learning theories. This is supported by Miech, Nave and Mosteller's (1997) argument that "computers themselves do not possess theories of learning: Computer programmers and educators, consciously or unconsciously bring those theories to the task" (p. 61). Although several studies were conducted on CALL, it is alleged that research is "scattered across such a wide area that a specific picture of 'what CALL is and does' has not emerged" (Egbert, 2005, p. 3). However, it is now extensively used in SLA (Blake, 2016; Chapelle, 2005; Chun, Kern & Smith, 2016).

Technology and methodology

The vibrant uses of ICTs in L2 contexts correspond to the development of language learning approaches (Wilkinson, 2016; Chapelle & Voss, 2016). The evolution of technology itself and its ubiquity in day-to-day life guided ELT experts, teachers, and practitioners to opt for different applications to achieve fruitful results. Language education theory shifted in emphasis from 'pedagogically-audiolingualism, psychologically-behaviourism and linguistically-structuralism' to social constructivism. Throughout this shift, there have been some models that customarily matched "technological developments with pedagogical and methodological progress" (Davies, Otto& Rüschoff, 2013, p. 34). When applied to technology-integration, this shift manifests itself in what might be encapsulated under the umbrella term "technology and task-based pedagogy" (Jarvis & Achilleos, 2013, p. 2). Sometimes, a promising CALL model encounters technical challenges ensued from hardware/software limitations; and sometimes a lack of technical skills hampers successful CALL models.

Throughout the history of ELT, every teaching method and approach adopted specific technologies to support it. For example, teachers who followed the grammar-translation method relied on the blackboard as a perfect media for the one-way transmission of information. Later on, the blackboard was replaced by OHP which is another medium for the teacher-dominated classroom. Afterward, the audio records were used as tools for the audio-lingual method which favoured learning through oral repetition. Then the multimedia and social networking broadened the spectrum of ELT even further. The shift from CALL to MALL coexisted with evaluation of the concept of method. The repeatedly articulated dissatisfaction with the notion of 'method' brought about a post methodical vision of L2 teaching, also called

'non-method' (Kumaravadivelu, 2006). This new perspective, raised in the last decade of the 20th century, puts emphasis on learners and local identities. The premise of the post-method vision triggered heavy reliance on technology to achieve better learning/teaching results.

It is to be noted that teaching methods, like technology, have been on constant change. The changes of views on language learning, from the behaviourist to integrative learning perspectives and lately the post-method stance, inspired a diversity of ICT applications. Guided by the principles of post-method, the focus is now on the outcomes of learning rather than the process of learning. Prior research shows that ICTs promote learner autonomy (Vurdien & Puranen, 2018) and gamification of the previous drill-and-kill principles (Lewis, 2015; Ibrahim, 2018). It also gives space for teachers (teacher autonomy) to theorize from their practices and practice what they theorize (Kumaravadivelu, 2006). MALL and the post-method perspective are based on the promise of possibly improving efficiency in language learning and teaching; and both gave wide room for autonomous learning and local identities. The two paradigms have afforded genuine opportunities for language acquisition/learning beyond the structured classroom. For more details on tools, techniques, and technology-based activities for EFL classroom, see Wilkinson (2016, pp. 264-269), and for brilliant ideas on how to harness technology for the language skills, see Blake (2016).

Early technology integration

As mentioned above, embedding technology in language education has been associated with SLA theories and pedagogical approaches. The selection of ICTs normally serves the purpose of a given approach to language education (Davies, Otto & Rüschoff, 2013). When discussing technology integration in its early days, behaviouristic CALL is taken as a point of reference. It coincided with the behaviouristic theory of language learning in the 1960s and 1970s. Wilkinson (2016) noted that early tech inventions such as phonograph records, reel-to-reel tapes were capitalized on to improve listening and drill activities. Then, the portable cassette tape recorder became popular for listening and voice recording. Within the trenches of educational technology, behaviourist-learning theories were anchored in drill-and-practice applications, centring on repetitive language drills and games. The drill-and-practice rehearsal was more effective with the help of mainframe computer. It developed isolated and discrete competences (often out of context. Language teachers and professionals who followed the grammar-translation method relied on such technologies. Then the emergence of Overhead Projector (OHP) and early software computer programs eased mechanical drilling. During the 1970s, when the audio-lingual method was at its zenith, language learners used audiotaped materials (in audio labs) to repeat monotonous pattern drills. The audiolingual approach became peripheral towards the closure of the 1970s. Critics contend that it waned in popularity due to lack of focus on communicative aspects of language use – the incapability of language learners in responding to unrehearsed situations.

In the 1980s, the communicative CALL surfaced in parallel with the cognitive theories that assumed that humans are different; and based on this assumption, some students learn better by watching movies, animations, and listening to audios; and some by using images. A variety of software simulating real life situations was developed. Examples of this trend included text re-construction programs which prompted rearranging words and discovering

meaningful patterns. The late 1980s and early 1990s witnessed a move toward communicative language teaching, engaging students in real life interaction. This approach underscored computer-based activities to (a) teach grammar implicitly, (b) facilitate generating original utterances (rather than prefabricated patterns) and (c) use the target language predominantly or even exclusively (Gündüz, 2005). Personal computers that coexisted at that time afforded greater possibilities for individualized work. The golden time of CD-ROMs and multimedia computers dates back to this period but that did not replace the established ICTs- television, videotapes, audio cassettes, and language labs. Although the communicative CALL was hailed as superior to the behaviourist CALL, linguists by 1990 viewed it critically. Kenning and Kenning (1990) voiced concern that the computer was used in an ad hoc and disconnected fashion " making a greater contribution to marginal rather than central elements of the language learning process" (p. 90). Detractors of the communicative CALL argued that while working with computers, the focus was not so much on what students did with the machine but rather what they did with each other.

Technology integration in the post-method era

The continuation of ICT advances stimulated ideas for L2 pedagogy refinements and provoked a gradual shift from method to post method (1990s-2000s). Based on this shift, English language classroom were directed to be communicative, interactive, and learner-centred. Continued technology advancements and public uses of the Internet laid the foundation for integrative CALL (Gonzalez & Louis, 2013). Stimulated by the Web 1.0 and Web 2.0, the internet-based tools and applications flooded quite regularly. This invasion of ICTs opened up more opportunities for using English online, providing corpora for analysis (Zappavigna, 2012). Many researchers collected data for their research projects from online chatrooms, forum groups, wikis, blogs, and the like. The accelerating development of technology, especially the social media and networking, guided a shift from the cognitive view of communicative teaching to a more social and socio-cognitive view (Wilkinson, 2016). Cognitive-constructivist approaches gradually found their match in digital technologies, i.e. integrating learners in authentic environments and integrating the skills of language learning and usage (Davies, Otto & Rüschoff, 2013; Wilkinson, 2016). The socio-cognitive approaches enhanced the use of language in authentic social contexts. Methodologies based on tasks (task-based), projects (project-based) or contents (content-based) prompted learner autonomy. New technologies enabled "learners to combine speaking, listening, reading, and writing in ways that resemble more closely how they normally engage with the digital facets of their own lives" (Blake, 2016, p. 129). Compared to the previous phases of CALL, students in the integrative CALL employed a variety of technological tools in an ongoing learning process instead of visiting computer labs once a week for isolated exercises (as it was in the behaviourist CALL). Computers played the role of a tutor providing "instruction, feedback, and testing in grammar, vocabulary, writing, pronunciation, and other dimensions of language and culture learning" (Kern, 2006, p.191).

The dawn of the twenty-first century which coincided with matchless internet applications gave rebirth to CALL, dubbed Intelligent CALL (shortened as iCALL). It is an interdisciplinary field of research drawing on a number of disciplines in applied linguistics and

computing. It applies concepts, techniques, algorithms and technologies from artificial intelligence (Blake, 2016; Gonzalez & Louis, 2013). Owing to its sophisticated underlying technologies, iCALL added a new dimension to the traditional CALL. It is a more structured, operationalized instructional environment than its precursor CALL. The iCALL systems offer a wide variety of interaction. The arrival of Smartphones, tablets and the many other sophisticated appliances and electronic platforms have been a real boon to the 21st language learners. The revival of the Web 1.0 (i.e. Web 2.0 & the nascent Web 3.0) gave ground to new applications such as Twitter, Facebook, Instagram, Skype, etc. which extended potentials of worldwide communication. The multiplicity of ICTs has narrowed the *digital divide* [2] and facilitated ICT-based tasks even in low-tech environments (Gonzalez & Louis, 2013). The gap has been increasingly lessened. This phase of ICT development fostered aspects of language learning such as acculturation (Vurdien & Puranen, 2018), authenticity (Davies, Otto & Rüschoff, 2013; Wilkinson, 2016), and virtual interaction (Chapelle, 2005).

ICALL is characterized by connecting learners, instructors, and researchers with electronic language resources. The evolution of the WWW extended users' roles: from access (Web 1.0), to contribution (Web 2.0) and innovation (Web 3.0). To illustrate, the Web 1.0 which was a read-only platform restricted the users' interaction with it. The Web 2.0 and Web 3.0, however, spawned opportunities of online communication and participation; language learners using these versions of the web are not only consumers but also producers of technology-based materials. For example, learners may "enjoy being producers of videos because they have at their fingertips a variety of digital video tools, which they routinely use to upload recordings to YouTube" (Blake, 2016, p. 131). Such video clips might be commented on, and this feedback is useful for evaluating the contents. That is, iCALL which is at the vanguard of CALL development has provided a much more multimodal context that affords learners greater agency and autonomy (Blake, 2016; Vurdien & Puranen, 2018). These technological advances have made possible to re-orient, re-create, and re-appropriate existing teaching materials, curricula and other relevant issues within the post-method era (Kumaravadivelu, 2006). Nonetheless, the capacious CALL has been recently critiqued (Jarvis & Achilleos, 2013), and mobile-assisted language learning (MALL) was suggested instead. It has gained currency but not replaced CALL.

Limitations

Despite the pervasiveness of technology, there are some challenges that stand in the way of technology-assisted language learning. To begin with, there is no straightforward formula for technology integration or as Nimehchisalem (2014) put it, "no validated framework is available for this purpose" (p. 297). The variability of ICT tools and applications facilitates no clear method of using such appliances which are incredibly updated. The WWW, for instance, is a creation from the 1990s. It predated the many web-based applications, e.g. Facebook in 2004, YouTube in 2005, Twitter in 2006, etc. Based on the development which is already

[2] 'Digital divide' refers to the gap between those who have access to ICT and those who do not or has less fortunate to access it. It is better thought of as a continuum where some contexts have great access and hence make great advantages of ICT while some other contexts lag behind.

underway, researchers predict that it will become even more so in the future. Crystal (2008) speculated that further innovative developments, especially of an interactive kind, will push human languages in unexpected directions. Successful integration of technology requires a balance between pedagogy and technology. Using ICT without 'scope and sequence' becomes misleading, or maybe a recipe for disaster in some contexts (Lewis, 2015; Chun, Kern & Smith, 2016; Webb, 2014; Motteram, 2013).

The conundrum is that the bulk of ICTs are generally multipurpose technologies with layers of complexity. Many ICTs were not primarily invented for language teaching and learning purposes. Only a handful of digital technologies were created specifically for learning purposes – Interactive White Board (IWB) is a case in point. Many technological gadgets and applications do not materialize into useable technologies for language learning and teaching right away. There is a need to adopt and adapt certain ICTs. In Garrett's (2009) words, "there simply is no such thing as an ideal configuration of hardware or an ideal set of software for language learners in general, and there probably never will be" (p. 717). The uses of wearable technologies, Sharples et al. (2009) argued, "may only be suitable for part of the activity, with other parts being better supported by other technologies, or by no technology at all" (p. 237). Similarly, Garrett (2009) maintained that "the full benefits of CALL will not be realized until its use is fully integrated with classroom work on the basis of theoretically motivated research on the kinds of learning activities most enhanced by technology and those best undertaken without it" (p.702).

Additionally, many ESL and EFL contexts are not ripe for ICT integration. The complexity and diversity of modern technology have made it a challenging endeavour in contexts where a lack of teacher training is coupled with ICT inaccessibility. Hence, the onus is on teachers to make informed choices of ICTs that they deploy (Derbel, 2017; Garrett 2009; Zhao, Byers, Puge & Sheldon, 2002). Deciding what is best in any particular situation, Garrett (2009) argued, "will always require a teacher's considered analysis of that situation and detailed information on the…available options" (p.717). Because ICTs are not always used for activities they were originally intended for, educators need to innovatively re-appropriate such ICTs for learning and teaching purposes. The selection, understandably, is affected by (a) educators' understanding of the capacities of technology, (b) the real functions of technology and (c) educational goals and process. Stockwell and Hubbard's (2013) asserted that the techniques of integrating cutting-edge ICT into modern instructional and learning theories such as "constructivism" and "connectivism" need to be thoroughly researched "to ensure that tasks are suited to the affordances of the devices used" (p. 3). Inadequate knowledge about ICT applications prevents teachers and learners from promoting learning of higher order cognitive skills which are difficult to address without technical aids (Derbel, 2017; Nimehchisalem, 2014).

Assessment of digital language learning is another limitation of technology integration. A big deal of research was based on users' perceptions rather than standardized evaluation measurements. Ben Youssef and Dahmani (2008) postulated that "ICTs are… immature by nature; they need a long process of appropriation and exploration of their possibilities by the higher education institutions before observing any significant change" (p. 53). Evaluating the impact of technology on learning and teaching L2, according to Derbel (2017), requires "taking

into account the complexity of learning and teaching with ICTs to measure and confirm the 'alleged' benefits of ICT use and also to foster knowledge and understanding of the use of ICTs in language education in various contexts" (p. 221). In the same vein, Wilkinson (2016) maintains that the use of technology should be informed by relevant L2 learning principles. Practical suggestions on how to select ICT tools for English classrooms and how to improve instructional activities that enhance L2 learning were laid down in Wilkinson's study. The author suggested that for technology-based learning/teaching to be a success, there should be a rubric for activities which involve some kind of technology utilization. Such a rubric should state clearly the purpose of use, choice of content, clarity of voice, image, etc., expected outcomes, grammar and language usage, and so on. Similarly, Nimehchisalem (2014) discussed evaluative criteria and instruments for ELT software evaluation. Besides courseware adaptability, the author drew on Garrett's (2009) suggestions of checking software materials for the accuracy, authenticity, and appropriateness of language.

In a nutshell, although technology has played a significant role in language learning and teaching for years, it is not a panacea for all problems in the field (Blake, 2008; Watson, 2001), and its effectiveness, in practice, depends largely on the way it is handled. In the literature, little is known about integrating new technological resources of learning into an overall plan of learning and teaching (Chun, Kern & Smith, 2016). Watson (2001) and Motteram (2013) asserted that technology should be grounded in pedagogy so as to make it relevant to aspects of input, output and languaging. Likewise, Garrett (2009) assumed that "successful integration of technology will require new perspectives and new theory" (p.714) rather than relying singly on technology. Some researchers found that fruitful integration of ICT is more likely to happen when teachers' general pedagogical approach corresponds, in some way, to the characteristics of the technology (Garrett, 2009; Zhao, Pugh, Sheldon & Byers, 2002).

Conclusion

The influx of technology in L2 instruction has been evident at every stage of ELT. It turned into a tempting area of research since the inception of computer-assisted language learning (CALL). Turning into the twenty-first century, the cell phone with its features of mobility and space-restricted touch screens have provided an impetus for mobile-assisted language learning (MALL) – the mobility of learning and learners. Driven by the mobility of modern life, language learning nowadays is boundless to classroom and textbooks. Learners pass most of their lives using digital ICTs on their own, and this has provided opportunities for self-directed learning. Whereas early technologies were basically employed to convey and store data, modern ICTs have widened the spectrum of innovation by including emails, synchronous chat, asynchronous discussion groups, and the many types of web-based tools. Today L2 pedagogy is associated with computers, mobile devices, and the Internet applications. Language teachers and learners are familiar with a long list of technologies such as IWB, videos, web-based applications (e.g. blogs, wikis, Facebook, Twitter) and there are many in the pipeline. Despite the diversity of ICTs, a thorough approach to technology integration is still a topic of debate. Last but not least, extoling technology without addressing its challenges is a cautionary note. Even though old and new appliances maximize genuine opportunities to learn and teach

L2, ICT does not automatically lead to better language learning. The study concludes with a contention that technology integration is a work in progress that facilitates no conclusion; and watertight theoretical frameworks hardly exist. This warrants further research to explore uncharted areas and find out how technology is precisely manipulated for better learning and teaching outcomes.

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