

## **Computer-Assisted Language Learning (CALL)**

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### **Introduction**

Computer-Assisted Language Learning (CALL) is a sub-field of second language acquisition (SLA) which investigates the role of digital technologies in mediating language learning and teaching. While there has been a history of using technical devices to stimulate or aid learning since the beginning of the twentieth century (i.e., radio, silent film, music, television), most histories of CALL start in the 1950s and trace its development from the use of largescale mainframe computers and behaviourist learning approaches through to the constant innovations of digital technologies and constructivism over the last three decades. During this period computers have radically decreased in size, from mainframes that filled huge rooms to powerful computers in every student's pocket or bag. Likewise, CALL technologies and applications have moved from being a tool to a tutor to a mixture of both in the form of web-mediated applications that offer a more networked or social dimension. The acronym, first more widely used from the early 1980s, suffers somewhat from the limitations of including the word 'computer' in an age of smart phones, tablets, the Internet and artificial intelligence (AI). As the field has matured since the 1990s, the emergence of dedicated national and international teacher associations and their related conferences, book series, research funding streams, special interest groups, and scholarly journals, have sought to address this over evangelical enthusiasm for technology and slowly begun to challenge it with a more evidence-based and critical approach. CALL research now has an international audience with associations or recognisable groups of practitioners in most major countries or regions of the world, and while most of the research is still on English, there are increasing amounts of work in other languages, from Japanese

to Spanish and Chinese. While some of the research still tends to be dominated by experimental studies trying to prove how a technology may 'enhance' a particular aspect of language learning or the latest technological trend, more recent research draws on a wide range of theories and methodologies, to explore the influence on learner identity, motivation and behaviour as well as issues of equity and social justice. Important in this respect is the growing recognition of research on teacher education, as it is only by developing effective CALL teacher educational programmes that new generations of teachers and learners will be best able to critically engage with new generations of digital technologies in and outside the language classroom.

### **General Overviews**

Over the past few decades, there have been several research studies that offer a comprehensive overview of the field of CALL, particularly in regard to CALL theories, foundations, environments, research, practice, and issues surrounding the use of technology. The theoretical foundations of CALL were gradually set out during the 1980s and since then there have been more developments in the area of related sub-fields which have contributed to the establishment of more diversified CALL environments. While these developments continue to provide new perspectives to the field, it should be noted that CALL has been largely impacted by the intersections of current pedagogical developments, applied linguistics, and second language acquisition theories, as well as the ongoing advancement of computer technologies. Having established this background, the following is a list of research studies that provide a brief history as well as a general understanding of the field.

### **Monographs**

While the mainstay of CALL research has been peer reviewed journal articles and edited volumes, full length research monographs have appeared with less regularity due to the smaller scale of many research studies. Exceptions to this trend include key monographs such as Levy's (1997) early seminal work exploring the context of CALL and the pedagogical, theoretical and research factors driving it. Books by Beatty (2013) and Chappelle and Jamieson (2008) are examples of books that combine theory and practice.

Beatty, K. 2013. *Teaching and researching computer-assisted language learning*. New York: Routledge.

This book provides an overview of CALL with particular emphasis on the issues surrounding teaching and researching in the field. The first section introduces the history of CALL and the types of media used in teaching and research contexts. In the second section, there are extensive discussions of the issues regarding collaboration, theoretical models and pedagogical concerns. The third section highlights the trends and issues in CALL research.

Chapelle, C. A., & Jamieson, J. 2008. *Tips for teaching with CALL: Practical approaches to computer assisted language learning*. White Plains, NY: Pearson Education.

A practical reference book that provides research-informed CALL practices and articulates their pedagogical implications. The book later explores specific topics concerning vocabulary, grammar, reading, writing, listening, speaking, communication skills and content-based language learning.

Egbert, J., & Seyed A. Shahrokni. 2018. *CALL principles and practices*. OER. Retrieved from <https://opentext.wsu.edu/call/>

This is an introductory textbook that covers the foundations and principles of CALL. Rather than focusing on the 'how-to' elements of technology integration in language classrooms, the authors first set out the definition as well as the principles of CALL in order to establish guidelines on how to design, develop and evaluate CALL practice.

Levy M. 1997. *CALL: Context and conceptualisation*, Oxford: Oxford University Press.

This early but still seminal book provides an extensive history of the field, examining how the context of CALL is intertwined with other disciplines and evolved into a field we know today.

Levy, M., & Stockwell, G. 2006. *CALL dimensions: Options and issues in computer-assisted language learning*. Mahwah, NJ: Lawrence Erlbaum Associates.

Following an introductory chapter, this book provides a streamlined understanding of the field through the lens of design, evaluation, Computer-Mediated Communication (CMC), theory, research, practice, technology and integration. The book identifies the major areas of CALL research and their implications for designing CALL **learning environments**.

Thomas, M., & Schneider, C. (2020). *Language Teaching with Video-Based Technologies: Creativity and CALL Teacher Education*. London & New York: Routledge.

This book includes critical perspectives on CALL and focuses on research arising from a large-scale project examining the use of machinima (or short videos made in 3D virtual worlds) to explore the potential for new approaches to CALL teacher training courses. The book also explores project-based language learning (PBL) and creative forms of CALL pedagogy.

### **Edited Volumes**

Edited volumes in CALL have been particularly influential as they often bring together a diverse range of scholars from national and international contexts to provide an overview of a particular part of the CALL field. Given the diverse range of contributors and perspectives, edited volumes have been influential in shaping innovations and developments in CALL across a range of topics from second language teacher education to niche areas such as games and virtual worlds. Notable collections include handbooks (Chapelle & Sauro, 2017; Kruk & Peterson, 2020; Thomas, Reinders &

Warschauer, 2014), practitioner perspectives (Hubbard & Ioannou-Georgiou, 2017; Fotos & Browne, 2004), as well as substantive multi-volume readers (Hubbard, 2009) that aim to collect seminar research in the field.

Chapelle, C. A., & Sauro, S. 2017. *The handbook of technology and second language teaching and learning*. Oxford: Wiley-Blackwell.

This handbook covers the extensive and multifaceted implications of technology in the field of second language teaching. In particular, the authors draw attention to CALL applications for developing specific language skills and establishes clear guidelines on how to evaluate technology for effective second language learning. The handbook also explores recent research endeavours in the area of contemporary CALL environments.

Fotos, S., & Browne, C. M. 2004. *New perspectives on CALL for second language classrooms*. Mahwah, NJ: Laurence Erlbaum Associates.

A practical introductory text that provides an overview of the field in addition to hands-on applications of CALL in educational institutions. By connecting theory to practice, the book offers resources that can be used for the development and integration of specific CALL curriculum and activities.

Hubbard, P., & Ioannou-Georgiou, S. (Eds.). 2017. *Teaching English reflectively with technology*. Faversham, UK: IATEFL

This edited volume includes a collection of research-informed CALL projects that were undertaken in various international teaching contexts. The particular emphasis of this volume is on the reflective aspects of teaching with technology, providing analyses of what worked and what did not in different types of classrooms in order to further improve future CALL practices.

Hubbard, P. (Ed.). 2009. *Computer assisted language learning, Volume 4: Present trends and future directions in CALL*. Critical Concepts in Linguistics Series. New York: Routledge.

This is the fourth volume of the *Computer-Assisted Language Learning: Critical Concepts in Linguistics* series that includes a collection of 74 state-of-the-art articles written by the leading CALL experts in the field. The fourth volume primarily focuses on contemporary trends and issues in the field, while also providing future directions for CALL research.

Hubbard, P. (Ed.). 2009. *Computer assisted language learning, Volume 3: Computer Mediated Communication for Language Learning*. Critical Concepts in Linguistics Series. New York: Routledge.

This is the third volume of the *Computer-Assisted Language Learning: Critical Concepts in Linguistics* series that includes a collection of 74 state-of-the-art articles written by the leading CALL experts in the field. The third volume highlights the issues surrounding Computer

Mediated Communication (CMC) in language learning, providing the foundations of CMC research as well as topics surrounding the effective use of synchronous and asynchronous CMC for language learning.

Hubbard, P. (Ed.). 2009. *Computer assisted language learning, Volume 2: CALL and Language Skills*. Critical Concepts in Linguistics Series. New York: Routledge.

This is the second volume of the *Computer-Assisted Language Learning: Critical Concepts in Linguistics* series that includes a collection of 74 state-of-the-art articles written by the leading CALL experts in the field. The second volume includes a list of key research that directly involved CALL with language skills, namely, speaking and listening, reading and writing, grammar and vocabulary developments.

Hubbard, P. (Ed.). 2009. *Computer assisted language learning, Volume 1: Foundations of CALL*. Critical Concepts in Linguistics Series. New York: Routledge.

This is the first volume of the *Computer-Assisted Language Learning: Critical Concepts in Linguistics* series that includes a collection of 74 state-of-the-art articles written by the leading CALL experts in the field. The first volume provides theoretical foundations as well as the general overview of the state of CALL research, followed by the research trends, designs, and evaluation of CALL pedagogies.

Kruk, M., & Peterson, M. (Eds.). 2020. *New technological applications for foreign and second language learning and teaching*. Hershey, PA: IGI Global.

A collection of scholarly publications highlighting a wide range of new technological developments and applications into foreign and second language teaching and learning. Focusing on the pedagogical aspects of technology integration within the new CALL developments, this book offers a variety of strategies and suggestions which are beneficial for teacher and researchers in the field of CALL.

Sadeghi, K., Thomas, M., & Ghaderi, F. (Eds.) (2023). *Technology-enhanced language teaching and learning: Lessons from the COVID-19 pandemic*. London: Bloomsbury Academic.

A collection of seventeen chapters exploring how the COVID-19 pandemic influenced the way language teachers and learners used technologies to adapt to the changing landscape of education during emergency online teaching. The book examines up-to-date research on mobile-assisted language learning and social media and their theoretical and practical implications.

Thomas, M., Sykes, J., & Reinders, H., & Peterson, M. (Eds.). (2017). *Digital language learning and teaching: Volume I to IV*. Critical and Primary Series. New York, NY: Bloomsbury Academic.

This four-volume edited volume collects over 100 influential and key articles from the field of CALL, focusing on four main thematic areas: theories and frameworks, focus on the learner, teaching with computer-assisted language learning, and new developments. Each volume explores key areas from sociocultural theory to computer-mediated communication, autonomous learning, creativity, online and blended learning, immersive learning, mobile-assisted language learning, intelligent tutoring and e-research methods.

Thomas, M., & Reinders, H. (Eds.). 2014. *Contemporary computer-assisted language learning*. New York, NY: Bloomsbury Academic.

A comprehensive collection of state-of-the-art papers written by leading experts in the field. The book introduces various key developments in CALL and its subfields: namely, telecollaboration, Distance CALL, language learning in virtual worlds, digital games and language learning, as well as Mobile-Assisted Language Learning (MALL).

Zou, B., Thomas, M., Barr, D., & Jia, W. 2022 (Eds) *Emerging concepts in technology-enhanced language teaching and learning*. IGI Global, USA.

This edited volume captures the interactions between recent developments in new technologies and their pedagogical implications. The book covers topics such as augmented and extended realities, mobile apps, chatbots, corpora, and trends and issues that have been influenced by recent events such as the COVID-19 pandemic.

### **Articles & Chapters**

More recent reviews on the current trends and issues of CALL can be found in the following key articles. For theoretical overviews, Bax (2003), Chun (2016), Gillespie (2020), Hubbard (2009), and Kessler (2018), Warschauer and Healey (1998) provide a general overview as well as introductory perspectives about the history and theoretical foundations of CALL. Chapelle's work in 2009 is the first of its kind in the field that identified the theoretical nexus between CALL and Second Language Acquisition (SLA) theories. Grgurović, Chapelle and Shelley (2013) offer a meta-analysis of studies that provides an empirical understanding of whether or not CALL/technology-supported language learning is effective compared to non-CALL pedagogies.

Bax S. 2003. CALL - past, present and future, *System*, 31, 13-28

This influential article examines the brief history of CALL and proposes a new set of categorizations to redefine the past, present, and the future of CALL research and practice. The aim of the article is to promote normalization of CALL and its integrative implementation to everyday practice in order to better serve the needs of language learners today.

Chapelle, C. 1997. CALL in the year 2000: Still in search of research paradigms? *Language Learning & Technology*, 1(1), 19-43.

This article provides a glimpse of the historical discussion behind the existing CALL paradigms and their associated research design and methodologies.

Chapelle, C. 2009. The relationship between second language acquisition theory and computer-assisted language learning. *The Modern Language Journal*, 93(s1), 741-753.

In this paper, Chapelle highlights a long-lasting theoretical issue in CALL, arguing that there is an apparent theoretical dissonance between CALL and Second Language Acquisition (SLA) theories. By critically examining the intersection of CALL and SLA theories, Chapelle provides a holistic investigation on how to apply SLA theories to aid CALL integration.

Chun, D. 2016. The role of technology in SLA research. *Language Learning & Technology*, 20(2), 98-115.

Published as a review article for the 20<sup>th</sup> anniversary issue of *Language Learning & Technology*, Chun re-examines the status and role of computer technology in SLA research. Building on Bax's notion of normalization of CALL, Chun identifies future research agendas on technology and SLA.

Gillespie, J. 2020. CALL research: where are we now? *ReCALL*, 32(2), 127-144.

The most up-to-date synthetic overview of CALL studies that were published in three leading international CALL journals: *ReCALL*, the *CALICO Journal* and *Computer Assisted Language Learning*. Based on the analysis of the past 30 years of publications in the field, Gillespie maps out some of the key areas of research that are considered trending, calling for more studies to broaden perspectives in the limited research avenues.

Goksu, I., Ozkaya, E., & Gunduz, A. 2022. The content analysis and bibliometric mapping of CALL journal. *Computer Assisted Language Learning*, 35(8), 2018-2048.

This article presents a systematic analysis of the methodological trends of articles published in the journal *Computer Assisted Language Learning* between 2014 and 2019. The authors conducted a content analysis and bibliometric mapping to summarize the observed trends in research methodologies, pedagogical findings, keywords, and the countries/authors that have made the most significant contributions to the journal during the given period.

Grgurović, M., Chapelle, C., & Shelley, M.C. 2013. A meta-analysis of effectiveness studies on computer technology-supported language learning. *ReCALL*, 25(2), 165-198.

A critical piece that empirically examines the effectiveness of CALL and non-CALL pedagogies. Based on the meta-analysis investigating language outcomes in two modalities, the result

favors the CALL/technology-supported pedagogy compared to pedagogy not-supported by computer technology.

Hubbard, P. 2009. General Introduction. In P. Hubbard (Ed.). *Computer Assisted Language Learning, Volume 1: Foundations of CALL*. Critical Concepts in Linguistics, pp. 1-20. New York: Routledge.

As a general introduction to the four volumes of the *Computer-Assisted Language Learning: Critical Concepts in Linguistics* series, Hubbard gives a brief summary of the main research areas in CALL, namely, theoretical and research foundations of CALL, CALL and language skills, Computer-Mediated Communication (CMC), and future directions of CALL.

Kessler, G. 2018. CALL (Computer-Assisted Language Learning). In J. I. Lontas, & M. DelliCarpini (Eds.), *The TESOL Encyclopedia of English Language Teaching*. Wiley Blackwell & TESOL International.

This encyclopaedia entry provides an authoritative introductory overview of the field of CALL with a brief history as well as future developments of CALL research.

Lim, M., H. & Aryadoust, V. 2022. A scientometric review of research trends in computer-assisted language learning (1977-2020). *Computer Assisted Language Learning*, 35(9), 2675-2700.

This study uses a retrospective scientometric approach to examine the current research trends in the field of computer-assisted language learning (CALL). A total of 3697 articles published between 1977 and 2020 across 11 journals were analyzed to identify seven major areas of trends: 1) advanced learner (synchronous CMC and negotiated interaction), 2) cell phone (multimedia), 3) other side (telecollaboration or email exchanges), 4) empirical link (blogs), 5) extramural digital context (digital games), 6) interaction pattern (wikis), and 7) mobile-assisted language learning (podcasts).

Shadiev, R., & Tang, M. 2020. Review of studies on technology-enhanced language learning and teaching. *Sustainability*, 12(2), 524-545.

An important study summarizing the trends of research in the area of CALL/Technology-Enhanced Language Learning and Teaching between 2014-2019. Based on the analysis of 398 published articles retrieved from this period, the author highlights some of the shifting trends of research in the area of language types, language skills, and technology used.

Warschauer, M., & Healey, D. 1998. Computers and language learning: An overview. *Language Teaching*, 31(2), 57-71

A state-of-the-art article that has long provided a theoretical foundation to many CALL studies in the 2000's. The article explores the history of CALL, current research and practice, and the future of CALL in a way that is still relevant over two decades later.

## **Areas of Special Interest**

There are several key research studies that provide systematic reviews and meta-analyses of CALL sub-fields. These reviews and analyses provide more concrete perspectives about where we are in the field of CALL today as well as the areas in which more research is needed. In conjunction with the ongoing advancement of technology, there is an increasing number of sub-fields and special interest groups, such as Intelligent CALL (ICALL) involving artificial intelligence (AI) technology, virtual-reality (VR) and language learning, digital game-based language learning, virtual worlds and language learning, computer-mediated communication (CMC), distance and blended learning, massive open online courses (MOOCs), and mobile-assisted language learning (MALL), with even more unique sub-fields such as robot-assisted language learning emerging.

## **Intelligent Computer-Assisted Language Learning (ICALL) & Artificial Intelligence (AI)**

Intelligent computer-assisted language learning (ICALL) research explores how artificial intelligence (AI), natural language processing (NLP) and computational linguistics can be used to aid language learning, typically by developing more traditional computer-assisted language learning resources and applications (Heift & Schulze, 2007). Although it has been a growing body of research over the last several decades, it is still perceived as a rather difficult and challenging area, requiring more sophisticated digital literacy skills from teachers (Weng & Chiu, 2023). ICALL applications include a wide range of different tools, from speech recognition to spelling and grammar checkers to aid writing and quizzes to support vocabulary retention. Increasingly ICALL is being integrated into the more widely used term Artificial Intelligence (AI) which is having a more significant impact across education and society. The rise of Generative Pre-Trained Transformer or GPT technologies based on more sophisticated language learning models (LLMs) can process vast amounts of big data and has led to a new phase in the popularization of AI (Kohnke, Moorhouse & Zou, 2023). ChatGPT 4, for example, is an advanced AI chatbot based on OpenAI and part of a family of LLMs that can respond to questions posed by humans to generate realistic longer content in the form of high level writing and image-based outputs. While there is significant potential to help language learning, much more research is required on how AI can be harnessed effectively and in line with ethical requirements in teaching, learning and research.

Huang, X., Zou, D., Cheng, G., Chen, X., & Xie, H. (2023). Trends, research issues and applications of artificial intelligence in language education. *Educational Technology & Society*, 26(1), 112-131.  
[https://doi.org/10.30191/ETS.202301\\_26\(1\).0009](https://doi.org/10.30191/ETS.202301_26(1).0009)

This paper considers the potential of artificial intelligence based on a bibliometric analysis of 516 research papers published between 2000 and 2019. Findings reveal that most research in this period took place in the USA and that AI was used to support skills development and intelligent tutoring systems as well as automated writing evaluation.

Kohnke, L., Moorhouse, B., L., & Zou, D. 2023. ChatGPT for language teaching and learning. *RELC Journal*. <https://doi.org/10.1177/00336882231162868>

The paper critically explores the potential and limitations of ChatGPT, a generative artificial intelligence (AI) chatbot in the context of language learning and teaching which has come to prominence in 2023. Significantly, the research focused not just on the potential of the technology, by highlighting the digital and pedagogical literacies that teachers will need to effectively deploy AI technologies in the language classroom and/or to support autonomous learning.

Weng, X., & Chiu, T.K.F. 2023. Instructional design and learning outcomes of intelligent computer assisted language learning: Systematic review in the field. *Computers and Education: Artificial Intelligence*, 4. 1-12. <https://doi.org/10.1016/j.caeai.2022.100117>

This systematic review aims to identify how intelligent computer-assisted language learning (ICALL) environments facilitate learning, considering the perspectives of the First Principles of Instruction (FPI) and the challenges associated with ICALL environments, based on an analysis of 83 empirical studies retrieved from four educational data bases, namely, the Web of Science, ERIC, Scopus, and ProQuest Social Science Database.

### **Mobile-Assisted Language Learning (MALL)**

Mobile-assisted language learning or MALL refers to the use of portable or mobile devices such as smart phones and tablets. MALL enables learners to learn anywhere, anytime, through short-burst learning, typically as a form of self-directed or autonomous language learning. Increasingly sophisticated MALL applications may take advantage of location services on mobile devices to enable research-based tasks such as WebQuests in which learners may also collaborate to complete specific activities in the target language. Ultimately MALL promotes more flexible and personalised approaches to language learning across a range of skills.

Burston, J. 2014. Twenty years of MALL project implementation: A meta-analysis of learning outcomes. *ReCALL*, 27(1), 4-20.

Burston's authoritative meta-analysis of the primary mobile-assisted language learning (MALL) studies published in the past two decades reveals some of the major shortcomings of MALL research designs and interpretations. Burston's critical analysis calls for more methodologically sound and statistically reliable studies that thoroughly examine learning outcomes in the context of MALL research.

Chinnery, G. M. 2006. Going to the MALL: Mobile assisted language learning. *Language Learning & Technology*, 10(1), 9-16.

This paper provides a summary of research involving the early developments and applications of MALL. In particular, the author provides a review of previous studies in regard to the use of cell phones, PDAs and iPods and discusses some of the benefits and challenges associated with mobile-assisted language learning.

Kukulska-Hulme, A., & Shield, L. 2008. An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL*, 20(3), 271-289.

This is one of the most cited articles in the field of MALL if not CALL. It provides an overview of MALL, and the theoretical foundations as well as current approaches to MALL research and practice.

Miangah, T. M., & Nezarat, A. 2012. Mobile-assisted language learning. *International Journal of Distributed and Parallel Systems*, 3(1), 309-319.

Miangah and Nezarat provide various examples of mobile-assisted language learning in practice and how it can be implemented to support specific areas of language development. The authors also provide a valuable summary of the advantages and disadvantages of MALL approaches.

Rosell-Aguilar, F. 2017. State of the app: A taxonomy and framework for evaluating language learning mobile applications. *CALICO Journal*, 34(2), 243-258.

This paper provides a comprehensive review of language learning apps in the context of MALL. Based on the systematic evaluation of language learning apps, Rosell-Aguilar outlines both a framework and taxonomy of apps that is beneficial to language learners.

Stockwell, G. 2022. *Mobile assisted language learning: Concepts, contexts and challenges*. New York, NY: Cambridge University Press.

This book provides a comprehensive overview of Mobile Assisted Language Learning (MALL), covering both fundamental principles of MALL research and practice, as well as practical approaches and challenges in integrating mobile technologies for language learning.

Stockwell, G. 2014. Mobile-assisted language learning. In M. Thomas, H. Reinders, & M. Warschauer (Eds.), *Contemporary computer-assisted language learning* (pp. 201-216). New York, NY: Bloomsbury Academic.

This chapter provides an entry point to the field of mobile-assisted language learning, highlighting some of the advantages, challenges, and emerging themes in regard to the use of mobile devices for language learning.

## **Digital Games and Language Learning**

Games have always been popular in language learning, both within and outside the formal classroom. As a result of the significant popularity of digital games on consoles such as Xbox and Play Station, there has been a growth in their use in second language learning. Several key monographs and edited collections as well as growing body of empirical peer reviewed journal articles have explored the potential of commercial off the shelf games (COTS), serious games (those designed not purely for entertainment) and games designed specifically for language learning. It has now become a significant area of research relating to project-based learning and autonomous learning in particular.

Peterson, M. 2013. *Computer games and language learning*. New York: Palgrave Macmillan.

A comprehensive overview of computer games and language learning. The book explores the theoretical foundations of the use of computer games for language learning with a particular emphasis on how computer games can be pedagogically beneficial for language learning.

Peterson, M. 2010. Computerized games and simulations in computer-assisted language learning: A meta analysis of research. *Simulation & Gaming*, 41(1), 72-93

A review of several influential studies examining the use of computerized games and simulations for language learning. Peterson identifies the main theoretical foundations that explain the use of computer games and simulations in CALL, namely, psycholinguistic and sociocultural frameworks. Based on the synthesis of findings retrieved from the original studies, Peterson highlights several potential areas of research that focus on the use of computerized games and simulations for language learning.

Peterson, M., Yamazaki, K., & Thomas, M. 2021. *Digital games and language learning: Theory, development and implementation*. New York: Bloomsbury.

A comprehensive overview of recent research developments in the area of digital games and language learning. Applying theory into practice, this edited volume explores the design, pedagogical approach as well as the impact of digital games when integrated into language learning in and outside the classroom.

Rama, P. S., Black, R. W., van Es, E., & Warschauer, M. 2012. Affordances for second language learning in World of Warcraft. *ReCALL*, 24(3), 322-338.

A qualitative study investigating college-level Spanish learner's experiences with the Spanish language version of the massively-multiplayer online game called World of Warcraft.

Ranalli, J. 2008. Learning English with the Sims: Exploiting authentic computer simulation games for L2 learning. *Computer Assisted Language Learning*, 21(5), 551-455.

This is one of the most influential studies that examines whether the simulation game *The Sims* designed for mass audience is pedagogically beneficial for language learning. The study provides

evidence that commercial computer simulation games can be a valuable learning tool for vocabulary development if implemented appropriately, creating a positive learning environment for language learners.

Reinders, H. (Ed.) 2012. *Digital games in language learning and teaching*. New York: Palgrave Macmillan.

This edited volume provides a collection of research concerning game-based language learning. The book is divided into two parts - from theory to practice and from practice theory - and demonstrates the important role of a research-informed approach to CALL.

### **Virtual Reality (VR), Augmented Reality (AR), Virtual World (VW) and Language Learning**

Arising from the interest in digital games, virtual worlds have attracted an increasing amount of interest from language educators since around 2005. Virtual worlds such as Second Life and Open Simulator (OpenSim) offer a 3-dimensional space in which teachers and learners can build and create complex objects and landscapes to simulate real-world environments. Drawing on constructivist approaches in which learners solve problems and complete tasks, virtual environments offer an immersive experience in which learners can manipulate an avatar or lifelike character in a realistic setting, such as learning French in virtual Paris. While there are numerous advantages, to date virtual worlds have proven to be a specialist interest given the relatively high barriers to use such as technology skills and equipment required by teachers and schools. Recent scholarship has also considered the potential of augmented reality (AR) in which the real world is overlaid by digital content resulting in mixed reality or hybridised learning environments.

Huang, X., Zou, D., Cheng, G., & Xie, H. 2021. A systematic review of AR and VR enhanced language learning. *Sustainability*, 13(9), 4639: <https://doi.org/10.3390/su13094639>

This is a systematic review of studies involving AR and VR language learning published between 2011 and 2020. Based on the analysis of 88 retrieved articles, Huang et al. found a generally positive outlook on the use of AR and VR in language learning, particularly in regard to learning outcomes, enhanced motivation, immersive learning experience, increased interaction and reduced learning anxiety.

Lin, T. J., & Lan, Y. J. 2015. Language learning in virtual reality environments: Past, present, and future. *Journal of Educational Technology & Society*, 18(4), 486-497.

A review of published articles regarding virtual reality language learning from 2004 to 2013 in four top ranked CALL journals. Based on the content analysis of the identified studies, Lin and Lan highlight the trends and issues as well as future possibilities of virtual reality language learning research.

Parmaxi, A. 2020. Virtual reality in language learning: a systematic review and implications for research and practice. *Interactive Learning Environments*,

A systematic review of published studies involving virtual reality (VR) and language learning retrieved from 2015-2018. Based on the analysis of 26 articles looking at the use of technology, learning environment, benefits and limitations, and future research directions, Parmaxi provides an outlook in favor of VR language learning, however also identifying issues, challenges, and areas for future research and implementation. Available

\*online[<https://doi.org/10.1080/10494820.2020.1765392>]\* by subscription.

Sadler, R. 2012. *Virtual worlds, telecollaboration, and language learning: From theory to practice*. Bern: Peter Lang.

An in-depth overview of the theory and practice concerning the use of virtual worlds for language learning. The book provides a review of popular virtual worlds that are available, sharing discussions of both advantages and challenges to implementing virtual worlds for language learning.

Sadler, R., & Dooly, M. 2014. Language learning in virtual worlds: Research and practice. In M. Thomas, H. Reinders, & M. Warschauer (Eds.), *Contemporary computer-assisted language learning* (pp. 159-182). New York, NY: Bloomsbury Academic.

This chapter serves as entry point to the field of virtual world language learning, providing a brief overview of the history of virtual world research as well as a case study on the use of a virtual world (Second Life) among young language learners.

### **CALL Teacher Training**

In such a fast-moving area as CALL, teacher education is an essential area of research focusing on the connection between learning technologies and foreign language learning and how they combine to shape curricula and professional development. CALL teacher education examines both pre-service and in-service teacher education, incorporating how language teachers learn and maintain the currency of their knowledge through mentoring and continuous programmes of development. Reacting against the constant change in technologies, teacher education programmes have developed to support train and support teachers with the technological, pedagogical and content knowledge required to adapt to new pedagogical trends.

Hubbard, P., & Levy, M. (Eds.). 2006. *Teacher education in CALL*. Amsterdam: John Benjamins.

This edited volume consisting of 20 chapters explores a wide array of CALL teacher education programmes around the world, examining how they have developed. The book's five sections analyse the foundations of CALL teacher education, degree programmes, pre-service courses, in-

service courses, and discusses alternatives to the different types of formal CALL training that is available.

Schmid, E. C. 2017. *Teacher education in computer-assisted language learning: A sociocultural and linguistic perspective*. London, UK: Bloomsbury.

This book provides an essential sociolinguistic perspective on CALL and teacher education.

Based on an extensive review of research on CALL teacher education. Schmid argues that there needs to be more situated, localized, collaborative learning opportunities for teacher training and developments in CALL.

Thomas, M., & Schneider, C. 2020. *Language teaching with video-based technologies: Creativity and CALL teacher education*. New York, NY: Routledge.

In this book, Thomas and Schneider explore the affordance of machinima, or screencast animated videos capturing the experiences within a virtual world. Drawing upon the existing literature on project-based language learning, Thomas and Schneider report on the process of implementing and evaluating machinima in the context of language teaching and learning.

### **CALL Pedagogical Approaches**

While CALL has often been driven by the emergence of new technologies in the shape of hardware and software, a frequent lesson learned to date has been the importance of appropriate pedagogical approaches to guide the use of technology. Sound pedagogical approaches help teachers to design appropriate lessons, exercises and tasks and to identify how and when learners need different types of support. Research on CALL pedagogical approaches considers the types of approach required to teach the four language skills, as explored in Blake (2016), as well as the appropriate blend of approaches required in and outside the classroom. Emerging from the communicative language teaching approach, task-based language teaching has been a significant pedagogical development over the last three decades and more research has been done strengthening the link between CALL and TBLT, as discussed in Gonzalez-Lloret and Ortega (2014) and developments from this approach, such as project-based language teaching, as seen in Thomas and Yamazaki (2021).

Blake, R. 2016. Technology and the four skills. *Language Learning & Technology*, 20(2), 129-147.

The article identifies the areas in which CALL research can contribute to the four main skills of language learning, namely, speaking, listening, reading and writing.

Gonzalez-Lloret, M., & Ortega, L. 2014. *Technology mediated TBLT: Researching technology and tasks*. Amsterdam: John Benjamins Publishing Company.

This edited volume includes a collection of papers exploring the intersection of technology and task-based language teaching (TBLT). With reference to the wide range of theoretical frameworks deriving from educational, cognitive and sociocultural backgrounds, the authors propose a new framework called technology-mediated TBLT.

Thomas, M., & Yamazaki, K. (Eds.) 2021. *Project-based language learning and CALL: From virtual exchange to social justice*. San Marcos, TX: Computer Assisted Language Instruction Consortium.

The first substantial scholarly contribution in the area of project-based language learning and CALL. The edited volume provides a collection of both conceptual, pedagogical, and empirical research developments in various digitally-mediated learning modalities, exploring new approaches for teaching, learning and researching project-based language learning with CALL.

### **CALL Journals**

A steady stream of academic journals has appeared over the last three decades. These include *Language Learning & Technology*, one of the first open access journals, which is now a leading international journal among Education as well as Linguistics journals. Several journals are linked to language learning associations, either nationally or internationally, such as the *JALTCALL Journal* in Japan, *ReCALL* representing the European context or *CALICO* in the United States.

#### [AsiaCALL Online Journal](#)

An open-access, peer reviewed international journal belonging to the Asia Association of Computer-Assisted Language Learning (AsiaCALL). It is interdisciplinary and publishes research across the Humanities and Social Sciences two times per year.

#### [CALICO Journal](#)

This is an online, peer reviewed international journal aligned with The Computer Assisted Language Instruction Consortium in the United States. Founded in 1983 it publishes editions three times per year.

#### [CALL-EJ On-line](#)

This is an online, peer reviewed journal that has been publishing research in the area of CALL since 1999 and was founded when CALLEJ in Japan and On-CALL in Australia were merged.

#### [Computer Assisted Language Learning: An International Journal](#)

An online, peer reviewed international journal published by Taylor & Francis 8 times per year.

#### [IJCALLT](#) (International Journal of Computer-Assisted Language Learning and Teaching)

This is an international peer reviewed journal that publishes CALL research focusing on a diverse range of theoretical and practical areas and was founded in 2011 by IGI Global.

*JALTCALL Journal* (Japan Association of Language Teaching - Computer-Assisted Language Learning Special Interest Group)

This is an international refereed journal that has been published by the Japan Association for Language Teaching Computer Assisted Language Learning Special Interest Group (JALT CALL SIG) since April, 2005. Three editions are typically published per year.

*Journal of Computer Assisted Learning*

First published in 1985, this journal is an international peer reviewed publication which explores a wide range of areas related to using digital technologies to support learning, teaching, instructional design and development, and knowledge dissemination and exchange.

*Language Learning and Technology*

Published as an open access peer reviewed journal since 1997, this journal is aligned with the National Foreign Language Resource Center in the United States and publishes articles on a rolling basis.

[ReCALL](#)

This is a peer reviewed journal published by Cambridge University Press on behalf of the European Association for Computer Assisted Language Learning (EUROCALL) three times per year.

*Teaching English with Technology*

A free, open access peer reviewed journal that is published online by the University of Nicosia in Cyprus and the Maria Curie-Skłodowska University in Poland.

### **CALL Associations**

As CALL has developed its national and international profile over the last three to four decades, it has been supported by the emergence of teacher associations around the world. Developing initially from special interest groups in larger language teacher associations such as TESOL (Teachers of English as a Second Overseas Language) or the IATEFL (International Association of Teachers of English as a Foreign Language, CALL groups have rapidly grown to become independent groups in their own right. These associations now often produce their own peer reviewed academic journals, book series and/or national and international annual conferences. There are CALL associations in Asia (AsiaCALL, JALTCALL, KAMALL, PacCALL), the United States (CALICO, IALLT, TESOL CALL-

IS) and Europe and the UK (EUROCALL, LTSIG), as well as the World Association of Computer-Assisted Language Learning (WORLDCALL), which has an annual conference every five years.

#### [AsiaCALL](#)

The Asia Association of Computer-Assisted Language Learning based in Korea and registered with the Korea Research Foundation.

#### [CALICO](#)

The Computer Assisted Language Instruction Consortium is based in the United States and publishes the CALICO research journal.

#### [EUROCALL](#)

The European Association for Computer Assisted Language Learning is a not-for-profit organisation established in 1986 which also publishes the ReCALL journal and EUROCALL Review.

#### [IALLT](#)

The International Association For Language Learning Technology is a professional organisation based in the United States which can trace its history back to 1965.

#### [IndiaCALL](#)

The India Association of Computer Assisted Language Learning runs events and professional development activities in India on technology-enhanced language learning.

#### [JALTCALL](#)

JALTCALL is a special interest group of the Japan Association of Language Teachers. It holds an annual conference each year on CALL and publishes the JALTCALL Journal.

#### [KAMALL](#)

The Korea Association of Multimedia-Assisted Language Learning which runs events and professional activities in Korea and can trace its history to 1996.

#### [LTSIG](#)

The Learning Technologies Special Interest Group is part of the International Association of Teachers of English as a Foreign Language (IATEFL) and is based in the UK.

#### [PacCALL](#)

The Pacific Computer-Assisted Language Learning Association is an international association for CALL which runs webinars, conferences and professional activities for members in the wide Asian region.

#### [TESOL CALL-IS](#)

The Teachers of English to Speakers of Other Languages (TESOL) Computer Assisted Language Learning Interest Section is based in the United States and runs events and supports foreign language educators through a range of professional development activities.

#### [WORLDCALL](#)

The world professional association for teachers and educators interested in Computer Assisted Language Learning is based in Spain and runs an international conference every five years.