



The *Routledge Handbook of Technological Advances in Researching Language Learning* (TARL hereafter) offers an exhaustive examination of how emerging technologies are transforming research methodologies and pedagogical practices in applied linguistics and second language acquisition (SLA). Edited by Karim Sadeghi, this volume builds on previous handbooks and uniquely emphasizes technology's dual role as both a research tool and a means of enhancing language learning. With contributions from 79 scholars, it spans 36 chapters across seven thematic sections: Section One: Technology and Data Collection in Applied Linguistics Research: Options and Considerations; Section Two: Technology and L2 Learning Research: Empirical Studies; Section Three: Technology and Second Language Processing/Psycholinguistics Research; Section Four: Technology and Language Teacher Education Research; Section Five: Technology and L2 Pragmatics Research; Section Six: Technology and Conducting Literature Reviews and Meta-Analyses; Section Seven: Technology and Analyzing L2 Data.

Each section of the TARL handbook addresses a key area of applied linguistics, including data collection, teacher education, psycholinguistics, pragmatics, and meta-analysis. Noteworthy for its focus on the practical application of technological tools, the TARL handbook demonstrates how resources—ranging from discussion boards and videoconferencing to eye-tracking, immersive VR, machine learning, and AI-driven systems such as ChatGPT—are integrated into empirical research. Through its exploration of assessment, feedback, and interaction in digitally mediated contexts, the handbook captures the dynamic evolution of the field.

In the opening chapter, Karim Sadeghi positions the TARL handbook as a pivotal contribution to applied linguistics, emphasizing the often-underappreciated role of technology in language learning research, especially in contrast to its more established use in teaching and assessment. Sadeghi highlights the pandemic-driven acceleration of technology adoption in second language research, stressing the importance for researchers to cultivate technological proficiency in the AI-driven era. The chapter introduces the volume's range of tools, from eye-tracking to AI speech recognition, and explores how these innovations are reshaping research methodologies in

SLA. This introductory chapter effectively sets the stage for the handbook's comprehensive examination of technology's increasing influence in the field.

Section One (Chapters 2-11) presents a comprehensive examination of digital tools and ethical considerations in online L2 research methodologies. It begins with Chapter 2, where Mireia Toda-Cosi, Zhiyi Wu, and Nick B. Pandža provide a practical guide to online data collection, addressing recruitment, implementation, data quality, and ethical considerations. In Chapter 3, Tricia Thrasher, Randall Sadler, and Melinda Dooly explore virtual reality as a platform for language learning and research. Chapter 4, by Laia Canals, Yucel Yilmaz, and Gisela Granena, examines screen-casting as both an instructional tool and a research method for capturing learners' engagement in asynchronous settings, particularly in the context of corrective feedback. In Chapter 5, Alessandro Benati presents a theoretical discussion of online testing for structured input and textual enhancement, exploring the validity of online formats in assessing implicit knowledge. Chapter 6, by Sun-Young Shin, advances the discourse on second language listening assessment by discussing issues of authenticity and task design. In Chapter 7, Fei-Yu Chuang investigates the role of automated grammatical correction tools such as Grammarly, focusing on their use in analyzing learners' written language. The section continues with Chapter 8, in which Siging Mu and Zhisheng (Edward) Wen introduce digital language portraits as a method in multilingualism research, offering a visual-ethnographic approach to understanding language identity. In Chapter 9, Qi Xu and Shaofeng Li provide a methodological review of technology-enhanced oral feedback, presenting a taxonomy of feedback types and associated digital tools. Chapter 10, by Teymour Rahmati and Karim Sadeghi, offers a scoping review of technological innovations in language assessment, highlighting trends such as AI-driven scoring and multimodal evaluation. The section concludes with Chapter 11, in which Vincent Greenier examines ethical considerations in videoconferencing interviews, with particular attention to consent, privacy, and the evolving dynamics between researchers and participants in the context of remote data collection.

Section Two (Chapters 12–16) presents empirically driven studies, exploring the impact of digital technologies on L2 learning and research methodologies. In Chapter 12, Sue Min Park, Sarah Sok, and ZhaoHong Han investigate incidental vocabulary learning through game-mediated tasks, conducting a longitudinal, multiple-case study with the narrative-based mobile game *Choices*. Chapter 13, by Evgeny Chukharev, Wren Bouwman, Nadezhda Dobrynina, Emily Dux Speltz, MacKenzie Novonty and Noëmie Sollier, examines computer-assisted language learning (CALL) tools as both instructional platforms and sites for empirical research through three case studies illustrating the integration of design-based research in the development of CALL tools. In Chapter 14, Lara Ducate and Lara Lomicka analyze L2 learner interaction within asynchronous, multimedia-rich online forums, focusing on the *YellowDig* discussion board. Chapter 15, by Mariko Yuasa and Osamu Takeuchi, explores the use of digital technologies in conducting stimulated recall interviews in L2 research, drawing from case studies and practitioner insights. Finally, Chapter 16, by Nobue Tanaka-Ellis, addresses the challenges of capturing complex learning environments through technology, employing a multimodal and ethnographic approach.

Section Three (Chapters 17–22) presents a range of methodological innovations, exploring the application of technologies such as electroencephalography (EEG), web-based experiments, eye tracking, and keylogging in SLA and psycholinguistics research, while addressing both their potential and limitations. In Chapter 17, Craig Lambert advocates for the use of EEG in conjunction with the iMotions platform to investigate learners' cognitive and emotional engagement during language tasks. Chapter 18, by Shaohua Fang and Alan Juffs, shifts focus to the practicalities of conducting web-based experimental research in SLA, offering a

comprehensive guide for designing acceptability judgment tasks and self-paced reading studies using platforms like Qualtrics and PCIbex. Chapter 19, by James P. Wagstaffe, provides an indepth overview of eye-tracking in L2 reading research. In Chapter 20, Chie Nakamura and Suzanne Flynn build upon this by examining English relative clause processing in Japanese L2 learners, combining eye-tracking and self-paced reading to uncover evidence of L1 transfer effects and sensitivity to syntactic structure. Chapter 21, by Gary Libben, Bahareh Yousefzadeh, Jordan Gallant, and Sidney Segalowitz, explores lexical processing in non-Latin scripts (e.g., Persian), using millisecond-level keystroke logging to examine Persian typists' production patterns. This study highlights how script-specific properties may influence cognitive load and processing strategies. The final chapter, Chapter 22, by Gaëtanelle Gilquin, integrates keylogging and screencasting to investigate L2 writing processes, focusing on contrasts in planning and revision behaviors among L2 learners.

Section Four (Chapters 23–27) presents insights into the role of technology in language teacher education research, blending theoretical perspectives with practical applications. Chapter 23, by Fiona Farr and Elaine Riordan, examines the transformative potential of videoconferencing tools, particularly Microsoft Teams, in facilitating evidence-based reflective practice and advancing multimodal corpus research in teacher education. In Chapter 24, Glenn Stockwell investigates the evolving role of digital technologies in researching teacher wellbeing, while Chapter 25, by Carla Meskill, Dongni Guo, Fang Wang, and Roberto L. M. Ramos, advocates for technology-supported interviews as dialogic tools in applied linguistics research. Chapter 26, by Roghayeh Pourbahram and Karim Sadeghi, offers a meta-analysis on how technology reshapes the epistemological and methodological dimensions of language teacher education framework for assessing digital technologies in teacher education, critiquing fragmented assessment practices and advocating for comprehensive, context-sensitive evaluations that triangulate qualitative and quantitative data while incorporating stakeholder perspectives.

Section Five (Chapters 28–31) presents a timely exploration of how emerging technologies are reshaping research methodologies in L2 pragmatics. These chapters demonstrate that digital tools both expand methodological options and deepen understanding of L2 learners' development of pragmatic competence within increasingly digital communicative landscapes. Chapter 28, by Naoko Taguchi, surveys technology-enhanced data collection methods in L2 pragmatics research. Chapter 29, by Tetyana Sydorenko, Judith Dombi, Ameeta Agrawal, Steven L. Thorne, Jung In Lee, and Yufei Tao, examines the affordances and limitations of Spoken Dialogue Systems and ChatGPT, presenting a comparative empirical analysis. Chapter 30, by Nuria Ballesteros Soria and Rémi A. van Compernolle, explores Zoom-mediated environments and their influence on L2 pragmatic interactions. Concluding the section, Chapter 31, by Kristi Jauregi-Ondarra, Juul Meijerink, and Maria Christoforou, investigates high-immersion social virtual reality environments for exploring interculturality in L2 pragmatics research.

Section Six (Chapters 32–34) presents a timely discussion on technology's transformative role in systematic reviews and meta-research within applied linguistics. Chapter 32, by Ayca G. Kaymakcioglu and Michael Thomas, explores systematic reviews as a methodological practice, offering a taxonomy of thirteen types of secondary research. In Chapter 33, Yazhuo Quan and Bronson Hui compare three AI-driven platforms: Abstrackr, ASReview, and Rayyan. Chapter 34, by Reka R. Jablonkai, Jaime Kim, and Rui Yan, integrates corpus linguistics into literature review methodology and advocates corpus-based approaches to address challenges of scale, consistency, and replicability.

Section Seven (Chapters 35–38) presents a concluding examination of technology's transformative impact on L2 research, addressing advances in speech recognition, screencast technology, corpus linguistics, and reflections on broader technological trends. Chapter 35, by Kevin Hirschi and Okim Kang, discusses deep neural network-based speech recognition systems for assessing L2 intelligibility. Chapter 36, by Florentina Nicolás-Conesa, Lourdes Cerezo, and Sophie McBride, focuses on screencast technology for analyzing learner engagement with written corrective feedback. Chapter 37, by Thi Ngoc Yen Dang and Thi Thu Hien Hoang, explores corpus linguistics in vocabulary research through learner and reference corpora. In Chapter 38, Karim Sadeghi concludes by reflecting on these studies in the context of broader technological trends, highlighting uneven integration alongside the challenges and opportunities it presents.

As highlighted, each chapter contributes to advancing the field by providing both theoretical discussions and empirical evidence, offering insights into the potential, limitations, and ethical considerations of emerging technologies in language learning and research. This compilation covers a broad spectrum of research topics, methodologies, and technologies, with the goal of providing a comprehensive overview of the evolving landscape of L2 education.

In conclusion, the *Routledge Handbook of Technological Advances in Researching Language Learning* is a seminal work, bridging theoretical depth with methodological innovation in applied linguistics and SLA research. By bringing together leading scholars from diverse subfields, the handbook offers a comprehensive account of technological integration while setting an ambitious agenda for future inquiry. Its broad methodological coverage, paired with practical guidance and theoretical rigor, makes it an indispensable resource for researchers, graduate students, and language education professionals seeking to incorporate emerging technologies into their work. While its primary focus may limit immediate classroom applicability, and the rapid pace of technological change will necessitate ongoing research, this handbook remains an essential reference for advancing empirical inquiry and methodological development in the field. It is highly recommended for academic libraries and research-driven programs engaged in digital language learning studies.

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