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BOOK REVIEW



Routledge Handbook of Technological Advances in Researching Language Learning, Karim Sadeghi (Ed.). Routledge (2024). 538 pp. ISBN 9781032604312

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Edited by Karim Sadeghi, the *Routledge Handbook of Technological Advances in Researching Language Learning* is a comprehensive guide that explores the intersection of digital technology and second language learning research. The Handbook is comprised of 38 chapters organized into seven sections, each addressing distinct aspects of technology's role in researching language education. The Handbook begins with a Foreword by Dorothy Chun and ends with an extended index. Chapters follow more or less the same structure, tackling relevant theory and/or practical applications of the mentioned technological facility and conclude with benefits and drawbacks, offering suggestions for future research directions.

Chapter one by the editor provides an overview of how technology has been used in researching second language learning. Highlighting the lack of a comprehensive collection on the use of technology for researching L2 education, the chapter makes a case for the current volume.

Section 1 "Technology and data collection in applied linguistics research: Options and considerations" includes 10 chapters. Chapter 2 focuses on practical guidelines for online data collection in applied linguistics. Comparing tools like PsychoPy and Gorilla for implementing online experiments, Toda-Cosi and colleagues discuss the challenges and benefits of online data collection, such as access to diverse populations and the risk of technical issues and provide recommendations for recruitment, participant engagement, and data quality assurance. Chapter 3 explores the use of high-immersion VR (HiVR) in language learning research. Thrasher and colleagues highlight the benefits of VR such as reducing foreign language anxiety and improving engagement, motivation, and language skills as well as challenges such as the cost of VR equipment and the need for longitudinal studies. Case studies are provided to illustrate the L2 education research applications of VR. In chapter 4, Canals and co-researchers examine the use of screencasting tools like ScreenPal to provide corrective feedback (CF) in language learning. Benati discusses the role of online testing methods, such as self-paced reading and eye-tracking, in

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measuring the effects of language instruction in chapter 5. The author reviews studies using these two methods to evaluate the effectiveness of instructional interventions like structured input and textual enhancement. In chapter 6, Shin explores how digital technology can enhance L2 listening assessment and pedagogy research. Digital tools like Praat for acoustic analysis, eye-tracking for cognitive processing, and neuroimaging for brain activation patterns are discussed. Lexile Audio Measure for assessing listening text difficulty is introduced with an emphasis on using authentic audio-visual input in L2 listening tests.

Chapter 7 by Chuang discusses the use of new technologies in Error Analysis (EA) in L2 writing research. She reports how automatic grammatical error correction tools including Grammarly, Ginger, and ChatGPT have developed using generative AI. Mu and Wen discuss the use of Digital Language Portraits (DLP) in chapter 8. DLPs involve creating visual representations of language repertoire of participants using digital tools such as Online Collaborative Whiteboard. DLPs used in connection with biodata questionnaires and follow-up interactions allow researchers to understand multilingual learners' perceptions and identities more holistically. Chapter 9 by Xu and Li provides a methodological review of empirical studies on technology-enhanced oral feedback. Among other findings, they observe that while technological tools are effective to deliver oral feedback, there are several risks such as overreliance on technology and technical issues. In chapter 10, Rahmati and Sadeghi provide a scoping review of studies using technology in language assessment research, focusing on tools like Spoken Dialog Systems (SDS), eye-tracking, Automated Essay Evaluation (AEE) and Automated Scoring of Speaking (ASS). They highlight how these technologies have been used to investigate cognitive processes, interactional competence, and automated scoring. Greenier, in chapter 11, addresses the ethical challenges of using videoconferencing for interviews in applied linguistics research. Participant anonymity, confidentiality, and the limitations of interpreting nonverbal cues in online settings are some of the challenges discussed. The chapter emphasizes the importance of informed consent, transparency, and reflexivity, particularly when working with marginalized populations.

Section 2 contains five chapters and is entitled "Technology and L2 learning research: Empirical studies". Chapter 12 explores the potential of digital games in researching incidental vocabulary learning (IVL) in second language (L2) acquisition. Park and colleagues highlight the growing use of digital language learning (DLL) platforms, which offer interactive and immersive experiences. Through a longitudinal case study involving Korean EFL learners, the authors demonstrate that digital games can promote IVL, with participants showing varying levels of vocabulary retention. In chapter 13, Chukharev and his co-authors present three case studies that illustrate how computer-assisted language learning (CALL) tools can be designed and refined using design-based research (DBR) principles. The case studies highlight the benefits of integrating CALL tools for efficient data collection and analysis and emphasize the importance of collaborative research for both research and practical language learning purposes. Chapter 14 examines an online discussion board platform as a research tool for second language (L2) learning. Ducate and Lomicka explain how YellowDig's gamification features foster engagement, autonomy and motivation beyond traditional discussion boards. Chapter 15 by Yuasa and Takeuchi explores the use of stimulated recall interviews in second language (L2) research, particularly through digital technology such as Zoom. Applications of stimulated recall in studying language learning processes, cognitive strategies, and teacher cognition are discussed. A case study on Japanese university students' use of machine translation for L2 writing illustrates how Zoom facilitates remote research. Tanaka-Ellis discusses the role of eye-tracking technology in second language (L2) research, especially within digital environments, in chapter 16. The chapter outlines methodological considerations, including equipment selection, data collection techniques, and ethical concerns as well as challenges such as high costs and complex data analysis.

Section 3 of this volume bears the title "Technology and second language processing/psycholinguistics research" and includes six chapters. Chapter 17 explores the

application of corpus linguistics in second language (L2) research, highlighting how digital tools enable large-scale linguistic analysis to examine patterns in learner language. Lambert discusses key digital tools such as corpus analysis software, online databases, and AI that aid in language learning and assessment. In chapter 18, Fang and Juffs explore the use of web-based experiments in L2 psycholinguistic research. They discuss methods such as acceptability judgment tasks (using Qualtrics), self-paced reading (via PCIbex), and webcam-based eye-tracking (using Gorilla) with practical guidelines. Accessibility, inclusivity, and efficiency are noted as affordances whereas limitations such as technological constraints and participant control are also discussed. Wagstaffe introduces eye-tracking as a method for investigating reading processes in chapter 19. Providing historical and modern applications of this technology, the chapter outlines the basic assumptions of eye-tracking and discusses the experimental methods used in eye-tracking studies. Chapter 20 compares self-paced reading and eye-tracking as experimental technologies for investigating how Japanese learners of English work with relative clauses. Nakamura and Flynn discuss the advantages of eye-tracking over self-paced reading, particularly in capturing the time-course sensitivity and detailed reading profiles. The chapter also examines how L2 learners process relative clauses in comparison to native speakers. Chapter 21 by Libben and his colleagues explores the use of millisecond timing in typewritten production to understand lexical processing in non-Latin scripts, particularly Persian. The chapter discusses the advantages of using online platforms for conducting psycholinguistic research and presents a study that demonstrates how typing latencies can reveal morphological structuring effects. In chapter 22, Gilquin focuses on the use of keylogging and screencasting technologies in L2 writing. The chapter discusses how these technologies can provide insights into writing fluency, the cognitive processing of multiword units, and the use of external sources like dictionaries. The authors present examples from the Process Corpus of English in Education (PROCEED) to illustrate the use of these technologies.

There are 5 chapters in section 4: “Technology and language teacher education research”. Chapter 23 examines the use of videoconferencing tools for reflective practice and corpus research in teacher education contexts. Farr and Riordan discuss how video-conferencing tools help capture multimodal data for both reflective practice and formal research. The chapter presents an example of a teaching practicum session recorded via MS Teams, analysing the teacher's spoken language and gestures to gain insights into teacher presence and emotional states. In chapter 24, Stockwell explores how digital technology has expanded the scope, quality, and efficiency of well-being research including AI's potential for predictive analytics and personalized interventions. Authored by Meskill and colleagues, chapter 25 examines the role of online interviewing in applied linguistics research. It discusses how digital tools enable multimodal communication which allow for deeper engagement, richer data collection, and greater inclusivity. Advantages of using multimedia elements, such as shared documents and co-viewed videos are also recognised. Pourbahram and Sadeghi explore the transformative role of technology in Language Teacher Education (LTE) research in chapter 26. Key technological tools used in different stages of LTE research are discussed with reference to research studies. Conducting research across geographical boundaries, collecting data more efficiently, and exploring various aspects of language teaching and learning are identified as some affordances of recent technology. Liontas explores the evolving role of digital technologies in teacher education, particularly in second/foreign language learning in chapter 27 recognising the impact of digital tools like augmented reality, mobile apps, and social media platforms on language acquisition and teacher identity research.

“Technology and L2 pragmatics research”, section 5, includes 4 chapters. In chapter 28 Taguchi reviews the four different data collection methods in pragmatics research including Multiple Choice Questions, Discourse Completion Tests, role plays and naturalistic data and discusses how these have progressed as far as new technology is concerned. She also makes suggestions for using eye tracking, immersive virtual reality and Large Language Models for pragmatics research. Chapter 29, by Sydorenko and her research team contrasts the use of Spoken Dialogue Systems (SDS) and ChatGPT in L2 pragmatics research. They observe that SDS is predictable and systematic, while

ChatGPT is more creative and variable, resembling human-human interactions more closely. Ballesteros Soria and Van Compernelle discuss the use of Zoom for researching L2 interactional competence in chapter 30. Affordances of Zoom, such as the ability to record interactions and the potential for recruiting diverse participants globally, are highlighted along with challenges such as diminished role of non-verbal behaviours and the need for more explicit linguistic strategies. In chapter 31, Jauregi-Ondarra and colleagues explore the role of high-immersion social virtual reality (HISVR) environments in researching intercultural communication. A multimodal discourse analysis is employed to examine students' strategies in navigating linguistic and cultural differences in virtual exchanges, underscoring that HISVR supports intercultural dialogue through multimodal engagement.

Section 6 is entitled "Technology and conducting literature reviews and meta-analyses" and includes 3 chapters. In chapter 32, Kaymakcioglu and Thomas report on their findings from a systematic review study on gender equality and English language education teaching. They explain their procedure in clear steps and discuss advantages and drawbacks of using an AI platform, Rayyan, during this process. In chapter 33, Quan and Hui briefly explain the features of three AI tools used in systematic reviews and meta-analyses, namely Abstrackr, ASReview and Rayyan, as well as comparing them in terms of functionality, cost, collaboration and workload saving. It is a useful chapter for those looking to choose among existing AI tools for systematic reviews to make more informed decisions based on practical experience. Jablonkai and her team discuss in chapter 34 how a corpus-based approach is increasingly used in systematic reviews and describe their case study, along with the future prospects and areas for improvement for this particular approach.

Section 7 bears the title "Technology and analysing L2 data" and comprises 3 chapters. In chapter 35, Hirschi and Kang discuss two models for automated speech recognition in second language: wav2vec 2.0 and Whisper AI. Comparing these two models with human recognition, they argue for the importance of machine learning for pronunciation development in second language learning and research. Chapter 36 discusses how screen casting technology can be used to provide feedback in correction of writing tasks. Nicolas-Conesa and co-authors discuss how writers' behavioural reactions to various types of feedback were recorded and analysed using screencasting technology. They also suggest further improvements using eye tracking and think aloud protocols to address cognitive and affective levels. In chapter 37, Dang and Hoang provide a useful review of three applications of corpus linguistics into research in second language vocabulary including description, assessment and pedagogy. Challenges include limited availability of corpora, limited resources in languages other than English and insufficient corpus literacy. As solutions the authors suggest collaboration among researchers and practitioners in this field.

The final chapter by the editor, Karim Sadeghi, concludes with a brief summary of various chapters in this volume. The transient nature of the technological developments in the field of second language learning research is highlighted as well as the importance of human agency in the use of any technological tool including AI. Moreover, researchers are encouraged to follow ethical principles in the use of technology for the benefit of all.

There are a number of useful reference books on using technology for language learning and teaching including Chapelle and Sauro (2019), and Stickler (2022). However, a unique quality of the *Routledge Handbook of Technological Advances in Researching Language Learning* is that it demonstrates how technology can be used for conducting research in applied linguistics. As such, the scope of this Handbook is distinct since it shifts the lens from using technology for teaching and learning L2 to researching L2. Additionally, there are several other strengths of this volume including its comprehensive coverage of various areas within L2 research, balanced focus on empirical studies, theoretical insights and practical applications as well as inclusion of ethical considerations throughout the volume. Also, each chapter provides useful suggestions for future research by the chapter authors and the editor. One area for improvement for a possible second edition of this

volume could be reorganising the sections according to various research stages (e.g., data collection or data analysis), disciplines of applied linguistics and teacher education or types of technologies used. To conclude, the *Routledge Handbook of Technological Advances in Researching Language Learning* provides insightful guidance to emerging and experienced researchers working within the field of L2 learning and teaching.

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