



Review of *Language-learner computer interactions: Theory, methodology, and CALL applications*

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Language-learner computer interactions: Theory, methodology, and CALL applications

Caws, C., Hamel, M.-J. (Eds.)

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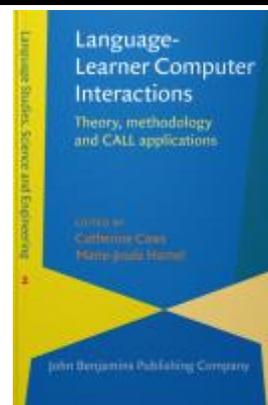
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Interdisciplinarity has become a buzzword in academia (Callard & Fitzgerald; Dzeng, 2013), and it is highly valued for helping to advance scientific research, approach and solve problems in innovative ways, as well as generate crucial research ideas (National Science Foundation, n.d.). Given that computer-assisted language learning (CALL), a field spanning two different disciplines (language learning and teaching and computer technology), is a relatively young field usually housed in applied linguistics and lacking in its own research methods, collaboration with other disciplines dealing with the development and use of technology is more than welcome to compensate for methodological shortcomings. In this sense, the edited volume, *Language-learner computer interactions: Theory, methodology, and CALL applications*, is a timely publication, as it is intended to bring together research methodologies and questions in the fields of applied linguistics, science, technology, and engineering. Due to the extraordinarily integrated nature of this volume, readers may realize that the relationship among these fields is closer than presumed and may notice that such interdisciplinary efforts make it possible to answer previously unanswered questions on the nature of learner–computer interactions.

While the first chapter serves as an overview of the entire volume, Chapters 2–5 form Part I, which introduces theoretical perspectives (e.g., ergonomics, affordances, and complex adaptive systems) popular in science and engineering, but only recently making an appearance in CALL. In Part II, Chapters 6–10 present empirical studies where researchers have employed innovative tools and techniques used in cognitive science and software engineering to better collect and analyze learner–computer interaction data (e.g., eye-tracking, video screen capture, and building personas).

As an introduction, Chapter 1 provides summaries of each chapter and discusses the target audience and the edited volume’s purpose: linking cutting-edge theories and research methods in the fields of science and engineering and CALL research methods, thus ultimately improving language learning environments where learners interact with computers to learn a second language. Chapter 2 focuses on an ergonomic approach to research, one commonly used in the fields of human–computer interaction (HCI), software design, and human-centered design. The authors, Caws and Hamel, define ergonomic research, discuss it within the context of CALL (i.e., studies about what learners actually do when they interact with technology), and justify why such research is needed—to evaluate the use of technologies for language

learning and teaching purposes and improve system design. In addition, the authors provide detailed explanations for how to conduct such studies (i.e., research methods).

Chapter 3 is about the theory of affordances, a concept that was imported from ecological psychology via HCI. Blin introduces the concept, discusses its potential applications within CALL, and explains the merits and challenges of applying affordance theory to CALL studies. Two major sections in this chapter cover affordances in HCI and affordances in CALL. The former is rather long and may be perceived as elusive, unless readers are already familiar with this theory; nonetheless, it lays a strong foundation for those who want to learn more about the theory. The latter is relatively short, leaving the reader wishing for a section that was a bit longer. Those involved in CALL research would be granted a better understanding of this theory if it were explained in a particular research context of greater interest and familiarity.

Chapter 4 discusses complex adaptive systems (CASs) in CALL research. Schulze and Scholz argue that learning a language through interaction with a computer is a very dynamic, complex process involving numerous variables, and recommend non-reductionist research that considers all variables involved in a learning context. After illustrating the characteristics of CAS research, the authors detail research methods suitable for managing multiple variables and point out the persistent lack of popularity of CAS research in CALL, despite many scholars' agreement with its appropriateness and significance. This makes readers wonder why this line of research is not gaining popularity in the field, though one could simply assume that conducting research involving so many variables presents incredible challenges. This question, as well as how to solve the issue, however, are not well addressed in the chapter, which I believe might be necessary if the use of this approach is deemed essential to the field's advancement.

Chapter 5 explores two views in designing and researching CALL: a macro view that takes into account a range of contextual factors external to a particular CALL activity (e.g., systems, integration, normalization) and a micro view that centers on the nature of technology-mediated interactions. In the introduction of the chapter, Levy and Caws state that their rationale for exploring these two areas is to provide links between the first part of the book, describing theoretical frameworks, and the second part, incorporating empirical studies. It remains unclear, however, how the inclusion of these two views really helps to achieve that aim. More explicit explanations of why we need these two views in CALL research would help readers realize the significance of the author's suggested approach.

Chapter 6 presents an empirical study based on the technique of identifying learner personas, the usefulness of which has been advocated in the field of software design. In her study, Heift classified study participants into distinctive personas according to the frequency of their access to help options and investigated its effect on their working behavior and linguistic performance. Heift's study suggests that the technique of identifying personas could contribute to enhanced individualization of instruction, as well as improved modelling of learning process.

In Chapter 7, authors Hamel and S ror introduce three empirical studies that show the affordances of video screen capture technology in documenting and scaffolding L2 writing processes: a tracking tool to collect real-time data, a retrospection tool to allow learners to reflect on their writing process, and a scaffolding tool to provide feedback to learners. Readers who are new to this research tool and who desire to use it in their own study would highly benefit from this chapter, as it offers a great deal of practical advice, including where to access the tool to document learner-computer interaction, how to analyze data collected with this technology, and which software programs to use to facilitate the analysis of such data.

Chapter 8 reports on two studies that used eye-tracking technology to explore how learners interact with computers. Based on the eye-mind hypothesis, which claims that eye focus is an indication of mental focus, Smith, Stickler, and Shi investigated whether learners were actually concentrating on their tasks at hand or were absent-minded during the task. The authors enthusiastically advocate the technology, yet, at the same time, are critical and transparent about the technology's costs and challenges. Also, they provide pragmatic tips (e.g., considerations for renting a system instead of purchasing one right away and selecting areas of interest that are tracked by the system instead of letting it work on the whole screen) and mention the

problems one might encounter when trying out this new technology as a research tool (e.g., the influence of participants' physical features like pupil size on eye-tracking data or the effects of scrolling up and down over data).

Chapter 9 presents three studies examining the affordances of webcams and discusses how to analyze multimodal data collected using a webcam. In all three studies, Cohen and Guichon analyzed the same set of pedagogical synchronous interaction data employing different methods (quantitative, qualitative, and mixed). Similar to the preceding two chapters, this chapter offers practical advice on implementation of a study, including possible ethical considerations in the creation of a participation consent form, tips for annotating multimodal data, and the importance of finding balance when presenting results between providing rich data and considering readers' capacity to process data. Given that all three of the studies presented in the chapter used webcams to collect data and given that this is mirrored in the title of a table overviewing the chapter, *Overview of Studies on Affordances of the Webcam*, the title of the chapter itself might have integrated the term webcam as well. In that way, the title would not only have been more self-explanatory, but also more consistent with the other chapters in Part II, which include the names of key tools or techniques in their titles.

In Chapter 10, using the example of the Learning and Teaching Corpora research project, Chanier and Wigham demonstrate how to build sharable corpora using data collected from online learning situations. They highlight the importance of making transcriptions and analyses more systematic in this process in order to make corpora re-analyzable, more sharable through open-access repositories, and comparable to other studies within the research community. Although creating such corpora is time-consuming, the authors underscore that such actions will eventually contribute to more valid, reliable, and efficient research practices because of cross-referencing.

As this edited volume introduces readers to theories, research tools, and techniques popular in science and engineering, yet relatively new in CALL, the work is expected to be a useful resource to many CALL researchers who recognize the lack of scientifically rigorous research methods in the field and are looking for fresher, more innovative perspectives. Because the book series preface states that it "was intended to allow applied linguists and STEM professionals to interact around research methodologies and questions" (p. ix), I expected to see some chapters written by those outside the field of applied linguistics; however, all authors are affiliated with language-related departments. Inviting authors from STEM fields could have enabled evaluation of CALL research paradigms from the perspective of outside authorities who have more experience with the theories introduced in this volume, perhaps establishing a more suitable accordance with the editors' interdisciplinary intention.

Some readers may feel challenged or discouraged while reading the first part of the book, which introduces technical concepts mostly from the context of science or engineering studies. I would encourage those readers to bear with the first part and continue, because concepts such as ergonomics and affordance are recycled and reviewed again in the context of CALL research, with which they may be more familiar, in the studies appearing in Part II. Authors of these chapters refer to other chapters in the book a great deal, creating commonality and shared topical threads throughout. For example, Chapter 7 does an excellent job of discussing video screen capture technology in terms of ergonomics and affordances. The cross-referencing among chapters also fosters a sense of interconnectedness and consistency throughout the edited volume.

After reading this book, readers will realize an acute and relevant interarticulation between the applied linguistics and STEM fields. Hopefully, the text will encourage readers to establish sustained interest in neighboring fields, so they may have access to new perspectives and conduct scientifically sound research, potentially enabling them to answer difficult questions. Given these possibilities, this book is surely a worthwhile contribution to the field.

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