



Building the future by looking to the past: the evolution of research strands in influential CALL papers

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Abstract. To trace the evolution of research strands in published Computer Assisted Language Learning (CALL) papers over time, a corpus of 426 highly-cited papers in four major CALL journals (*ReCALL*, *CALL*, *LL&T*, and *CALICO Journal*) was compiled and coded using NVivo 12. All identified aspects of technology-mediated language learning and teaching were collected to produce a comprehensive list of 690 recurring research strands and then, by adopting a constant comparison method, were merged to form 119 unique research strands. The top 10 alone represent almost half of all research strands: Computer-Mediated Communication (CMC), writing, vocabulary, feedback, evaluation, learning environment, telecollaboration, design, speaking, and grammar. This paper provides the rationale for the study along with the methodology for data collection and analysis, with a particular focus on the dominant and intermediary strands to inform future CALL publications.

Keywords: CALL research, CALL evolution, research strands, corpus analysis.

1. Introduction

Since its inception, CALL has been widely adopted to support learning, assess learners' knowledge of language skills, and assist with data collection/analysis for both classroom-related and beyond-the-class inquiry. With the rapid development of CALL over the years, CALL-oriented journals have emerged and expanded to invite their readers to keep up with the pace of technological advances through

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academic Research Articles (RAs), attesting to the influence of CALL research (Gillespie, 2020).

These CALL papers, combined with other academic genres such as books and book chapters, master's theses, and doctoral dissertations, as well as conference proceedings, have had a substantial role in shaping the history of CALL research. To trace part of that history, this narrative review charts the evolution of research strands in highly-cited CALL RAs. The main objective of the study is to concentrate on the past and present of CALL research strands, build on their diversity, and accordingly propose avenues for the future of researching CALL.

2. Method

The pool of data consists of all 2,397 RAs published in English in four major CALL journals: *CALL*, *ReCALL*, *LL&T*, and *CALICO Journal*, from their first appearance up to and including 2019. A novel approach pinpointed the top 15% of highly-cited RAs based on Google Scholar (for more details see Choubsaz, Boulton, & Jalilifar, 2020; Choubsaz, Jalilifar, & Boulton, 2021), providing greater focus in the final corpus of representative high-impact CALL papers. A coding scheme was then developed for recording the existing research strands. As extracting, coding, and merging research strands involves a degree of interpretation, we followed Riazi, Shi, and Haggerty (2018) in opting for a data-driven thematic approach, coding the data by drawing on the actual words of the authors as much as possible. To add objectivity and consistency, 10% of the RAs were coded in two separate rounds by two independent coders for an inter-rater r of 89.8. The analysis was also complemented by substantial use of computer-assisted corpus analysis tools (i.e. NVivo 12 and AntConc) to facilitate the coding of the research strands.

3. Results and discussion

The diverse aspects of CALL and the multiple research strands in each study posed major challenges. Therefore, to attain a high level of granularity, an exhaustive list of research strands was compiled, including all identified aspects of language teaching and learning (initial coding); 690 recurrent research strands were collected and fed into NVivo 12 and AntConc for a detailed analysis. The strands were later manually merged by adopting a constant comparison method (focused coding). By taking account of the technologies adopted as a separate

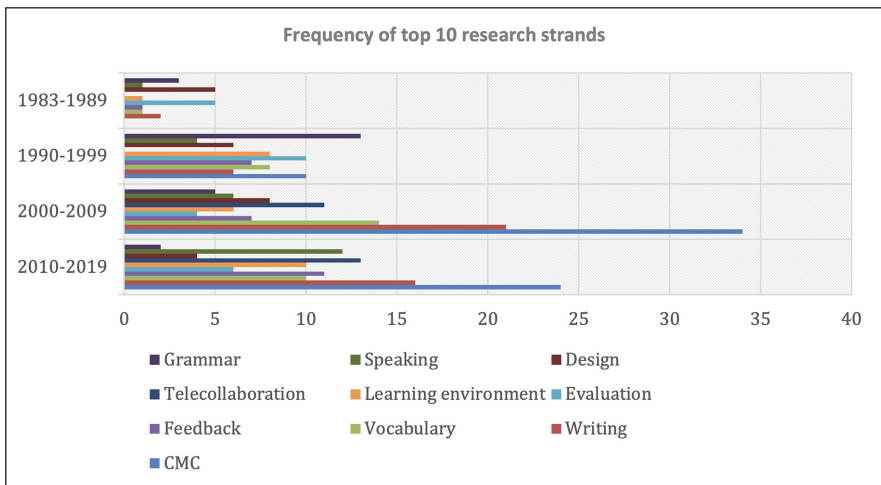
context-related sub-theme, the strands identified in our study truly reflect the primary research areas in high-impact CALL RAs and are not overrepresented by technology-related themes; 119 unique research strands were thus identified. Due to space constraints, only the top ten and the 27 intermediary strands are discussed here as they have appeared in at least seven studies over almost four decades of researching CALL.

Dominant research strands. As illustrated in Table 1, the top ten characterize nearly half of all the research strands over the four time periods under investigation.

Table 1. Top 10 CALL research strands across four time periods

(≥3%)	1983-1989	1990-1999	2000-2009	2010-2019	Total
CMC	-	10	34	24	68 (9.8%)
Writing	2	6	21	16	45 (6.5%)
Vocabulary	1	8	14	10	33 (4.7%)
Feedback	1	7	7	11	26 (3.7%)
Evaluation	5	10	4	6	25 (3.6%)
Learning environment	1	8	6	10	25 (3.6%)
Telecollaboration	-	-	11	13	24 (3.4%)
Design	5	6	8	4	23 (3.3%)
Speaking	1	4	6	12	23 (3.3%)
Grammar	3	13	5	2	23 (3.3%)
Total	19	72	116	108	315 (45.6%)

Figure 1. The evolution of top research strands across four time periods



The most dominant research strands are CMC (9.8%), writing (6.5%), and vocabulary (4.7%). One of the main findings is that although the top ten strands have been the focus of CALL research over time, some of them seem to have lost popularity in the last decade, a fact that is noticeable with the decline in entries from 116 to 108 RAs during 2010-2019 (see Table 1 and Figure 1 above). The other findings can be the arrival and increased popularity of telecollaboration in the last two decades and the constant rise of speaking.

Intermediary research strands. The 17 mid-frequency strands (Table 2) constitute almost one third of the total (213, 30.8%); together with the top ten, they represent 76.4% of the overall data set. However, there is a major difference: with the exception of reading, teacher education, and studies focused on error analysis/correction/diagnosis, which see an increase from the second to third time period and then a decline in the fourth, most of the research strands in this category have remained popular or increased over time.

Table 2. Intermediary CALL research strands across four time periods

(1% – 2.9%)	1983-1989	1990-1999	2000-2009	2010-2019	Total
Task	1	1	10	9	21 (3%)
Technology effectiveness	2	5	2	9	18 (2.6%)
Listening	2	3	6	4	15 (2.1%)
Proficiency	1	1	5	8	15 (2.1%)
Learner variables1	-	1	4	10	15 (2.1%)
Teacher education	-	1	8	5	14 (2%)
Reading	2	3	7	2	14 (2%)
Perception	-	1	4	9	14 (2%)
Learner autonomy	-	1	1	11	13 (1.8%)
Error2	1	8	2	2	13 (1.8%)
Technology affordances	-	-	3	8	11 (1.5%)
Culture	-	3	1	5	9 (1.3%)
Pronunciation	-	4	2	3	9 (1.3%)
CALL program	4	4	-	1	9 (1.3%)
Glosses	-	1	5	2	8 (1.1%)
Learning strategies	1	2	2	3	8 (1.1%)
CALL research	-	2	3	2	7 (1%)
Total	14	41	65	93	213 (30.8%)

Note. 1. Behavior, attitudes, engagement, self-efficacy, performance, socialization.

Note. 2. Analysis, correction, diagnosis.

Identifying 119 research strands (out of 690 recurrent strands in our collection) complements similar syntheses like that of [Lim and Aryadoust \(2021\)](#) who established seven major research clusters in 11 CALL journals. However, our synthesis is distinctive in offering a bird's-eye view of the research strands reflecting all identified aspects of language teaching/learning.

4. Conclusions

To conclude, this study charts the evolution of research strands in highly-cited CALL papers over time. Similar to the findings of [Gillespie \(2020\)](#), the most central strands over four decades of researching CALL have been CMC (9.8%), the four language skills, along with the essentials of first/second language learning such as vocabulary (4.7%), feedback (3.7%), evaluation (3.6%), telecollaboration (3.4%), design (3.3%), and grammar (3.3%); in other words, classroom-related research areas plus physical and virtual learning environments still inform the research strands after four decades.

Additionally, the increasing breadth of research strands informing the field can be observed in the most recent time periods, when new strands such as collocations, learning outcomes, and identity practices have emerged and been addressed in special issues of CALL journals in the form of position and review papers. In the light of narrative review, we found that under-researched strategic research strands such as CALL and ethics and cultural CALL ([Gillespie, 2020](#)) need further investigation.

Moreover, CALL researchers have recently tended to move toward sophisticated strands and interdisciplinary projects in the field of computer sciences, including eye-tracking technology and robot-assisted language learning. The shift toward such sophisticated strands necessitates the adoption of integrated methodologies, complex designs, and well-established theories so that CALL research can reflect its current interdisciplinary state ([Hubbard & Colpaert, 2019](#)).

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