Design-Based Research in CALL

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Design-Based Research in CALL
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Edited by

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## Contents

Julio C. Rodríguez
Cristina Pardo-Ballester  
**Chapter 1**
Introduction  

### Theoretical Perspectives

Thomas C. Reeves
Susan McKenney

**Chapter 2**
Computer-Assisted Language Learning and Design-Based Research: Increased Complexity for Sure, Enhanced Impact Perhaps  

Diane Larsen-Freeman

**Chapter 3**
A Promising Combination: Complexity Theory, Design-Based Research, and CALL  

Mike Levy

**Chapter 4**
Design-Based Research and the Quest for Normalization in CALL  

Agnieszka Palalas
Debra Hoven

**Chapter 5**
Implications of Using DBR to Investigate the Iterative Design of a Mobile-Enhanced Language Learning System  

Hsiu-Ting Hung

**Chapter 6**
Capitalizing on the Dual Goals of Design-Based Research in Computer-Assisted Language Learning Contexts  

### Operationalization of Design-Based Research

Michael D. Bush
Meg Sorensen

**Chapter 7**
An Alternate Reality Experience for Language Learning: A Design-Based Evaluation  

E. Marcia Johnson
Elaine Khoo
Lucy Campbell

**Chapter 8**
Cycles of Teacher Reflection: Using Course-Cast Software to Enhance Fully Online Language Teacher Education
<table>
<thead>
<tr>
<th>Authors</th>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patricia Martínez-Álvarez</td>
<td>Chapter 9</td>
<td>Blending Practices: DBR and CALL to Enrich Emergent Bilingual Learners’ Concept and Language Development</td>
<td>127</td>
</tr>
<tr>
<td>Brenda Bannan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seijiro Sumi</td>
<td>Chapter 10</td>
<td>The Cyclic Model of Learning: An Attempt Based on the DBG in an EFL Context</td>
<td>157</td>
</tr>
<tr>
<td>Osamu Takeuchi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cristina Pardo-Ballester</td>
<td>Chapter 11</td>
<td>Design Principles for Language Learning Activities in Synthetic Environments</td>
<td>183</td>
</tr>
<tr>
<td>Julio C. Rodríguez</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tasha N. Lewis</td>
<td>Chapter 12</td>
<td>DBR and Task-Based Learning: The Ongoing Experience of Designing a Task-Based Telecollaboration</td>
<td>211</td>
</tr>
</tbody>
</table>
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Chapter 1

Introduction

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The purpose of this volume is to expand and refine our understanding of the use of design-based research (DBR) in CALL by contributing to the growing body of literature in this area. We have tried our best to strike a balance between theoretical considerations and concrete examples of DBR. The first section of this volume focuses on theoretical perspectives and ideas that can inform the use of DBR in CALL. The second section contains studies that illustrate DBR through concrete instances of its operationalization. We hope this volume will be a useful source of information and inspiration for those considering to further explore DBR in CALL. For updates on DBR in CALL, please visit the companion site to this volume: https://sites.google.com/site/designbasedresearch/

The first chapter in this volume, by Thomas C. Reeves and Susan McKenney, presents a critical view of the current status of DBR in CALL. Their perspective from a sister discipline, educational technology, introduces this discussion by identifying plausible synergies between DBR and CALL based on their vast experience of how DBR has enriched research in educational technology. The authors provide a review of work in DBR and CALL and stress the need to consider professional development as an outcome of DBR.

We believe this piece makes an important contribution to the DBR literature by giving due value to the important role of professional development in any CALL context. Reeves and McKenney go as far as to include professional development as one of the goals of DBR in addition to the dual goals of theory building and improvement of practice. As the authors duly acknowledge, issues related to professional development are extremely difficult to avoid in DBR. Inspired by their contribution, we have given professional development a focal role in the second section of this volume.

Diane Larsen-Freeman’s thoughtful chapter shares her perspectives on how DBR, Complexity Theory, and CALL could make a powerful combination to advance our understanding of how technology can best support second language acquisition (SLA). She examines how the qualities of this triad make up a promising blend that offers the potential to address important aspects of CALL research, such as the need to acknowledge the complexity of natural instructional contexts, the possibility to adopt a reflective, retrodictive perspective to explain the success
or failure of an intervention, and not least, the flexibility to enact the refinement of pedagogical devices, tools, and theory in the same fashion effective practitioners do.

Mike Levy’s contribution presents a unique in-depth reflection on normalization as a possible construct to anchor CALL research and explores some of the difficulties to define this construct as well as scenarios in which its use could be helpful. In order to better define the construct, he suggests decompressing the idea of “computer technology” by considering a number of levels, each of which represents different functions or components. In this way, “normalization” could be explored in relation to those functions or components rather than to the idea of “computers” as a whole. Motivated by the goal to increase the impact of research on CALL practice, Levy suggests ways in which CALL research could more closely inform practice through research approaches that are natively anchored in practice themselves, such as DBR. Drawing from McKenney and Reeves (2012), the author explores the idea of theories evolving from principles of local relevance toward high-level, generalizable ones.

In their reflective piece, Agnieszka Palalas and Debra Hoven build a strong case for how DBR could fit in the context of design, development, implementation, and research of instructional interventions for mobile-assisted language learning. Their chapter takes us behind the scenes of DBR and describes how a sophisticated DBR undertaking made a contribution to an emerging theory, Ecological Constructivism (Hoven, 2006), thereby materializing an essential aspect of DBR, such as is the requirement for theory creation or refinement as part of an iterative research process (Design-Based Research Collective, 2003). This chapter highlights the intrinsic need for collaboration present in most DBR projects, discusses some of the challenges presented by DBR, and offers practical recommendations for successful implementation.

The last chapter in this first section helps us imagine the possibilities of a synergistic approach to research in CALL that builds on foundational research on SLA and on research in applied linguistics. Drawing from Orrill, Hannafin, and Glazer’s (2003) distinction, Hsiu-Ting Hung situates DBR at the confluence of foundational and applied research. Conceptualizing research from this perspective, the aim is not to necessarily subordinate applied linguistics research to SLA research or to rely solely on SLA research to provide the theoretical frameworks to gauge the success of an instructional intervention, but rather to take advantage of the convergence of SLA and applied linguistics research to further develop or refine both theory and practice through a principled approach that does justice to both.

Hung’s piece reflects on and makes a case for the centrality of design as a mediational artifact in the research process, a concept that will most probably resonate with many CALL researchers. She takes a look at the iterative process of design, showing us concrete examples of how the iterative nature of the process and the dual goals of DRB can be documented.

The second section of this volume capitalizes on the theoretical and reflective accounts presented in the first section by focusing on the operationalization of
DBR. Synergies between theory (e.g., applied linguistics, SLA, sociocultural theory, etc.), pedagogy (e.g., language teaching methodologies), and design artifacts (e.g., CALL tools, environments, etc.) create exceptional opportunities to advance theory and expand our understanding of how these three components can improve language learning and teaching through technology. The iterative nature of DBR makes it possible for each of these three components to also take advantage of refinement through iteration (see Figure 1).

Many of the chapters in this second section clearly manifest how professional development issues play a role in the operationalization of DBR, thereby supporting Reeves and McKenney’s assertion in the first chapter that professional development should constitute a DBR goal and should therefore be addressed in DBR interventions. Because of the saliency of professional development issues in all chapters in the second section, we would like our readers to consider a construct that can organize some of the most important aspects of knowledge construction in world language teacher development contexts.

Technological Pedagogical Content Knowledge (TPACK) is a construct that has emerged in the field of technology and language teacher development in the last decade (Hofer, Harris, Blanchard, Grandgenett, Schmidt, van Olphen, & Young, 2009; Rodríguez, 2006). The TPACK construct can be a useful advance organizer to help us understand the nuanced complexities in world language teacher development that emerge in most DBR implementations in this volume. The TPACK construct evolved from Lee L. Shulman’s (1986) original construct: pedagogical-content knowledge (PCK). In his early work, Shulman (1986) defined PCK as “the ways of representing and formulating the subject that make it comprehensible to others” (p. 9). In other words, PCK is a particular type of knowledge that teachers construct through the dialogic interaction between pedagogy and discipline-specific content.
Koehler and Mishra (2005) later expanded Shulman’s original construct by proposing the addition of technological knowledge, which in its basic form includes knowledge of how technology operates (e.g., knowledge of typing, knowledge of operating a piece of software, etc.). Following Shulman’s model, they also used the concept of knowledge amalgamation, that is, the interaction between each of the three “core” bodies of knowledge with one another gives rise to blended types of knowledge, namely technology pedagogy knowledge (TPK), pedagogy content knowledge (PCK), and technology content knowledge (TCK) (for examples of these types of knowledge in world language teacher education contexts, see Rodríguez, 2006). The combination of these three blended types of knowledge results in a unique, highly contextualized type of knowledge: TPACK (see Figure 2). The assumption is that for effective technology integration to take place, instructors need to develop TPACK (Koehler & Mishra, 2005; Koehler et al., 2004).

Figure 2
Technological Pedagogical Content Knowledge construct (www.tpack.org)

We open the second section with a contribution by Michael Bush and Meg Sorensen, who vividly describe the implementation of a complex instructional change. They recount the ESL learners’ experiences with a customized social networking tool and the slow adoption process of the instructors. The authors delve into the complexity of the change by taking a closer look at learner perceptions and the role of the teacher in the intervention. This chapter highlights interesting nuances in the adoption of an innovation (see also Mike Levy’s contribution in this volume) as well as in the slow and steady process of teacher development that leads to successful implementation. The authors’ insights into the instructors’ role remind us of the complexity of technology and teacher development, or, as Johnson, Khoo and Campbell describe it in their contribution to this volume: “the messiness of complex teaching environments” (pp. 109). Although not
used explicitly in this chapter, the authors’ description of the different factors influencing the teachers’ decisions can often be related to the TPACK construct presented above. ByIteration 4, a TPACK-type of knowledge appears to have emerged prompting teachers to re-evaluate their initial stance and to see the potential for successful integration of the innovation and envision the possibilities beyond scripted practice.

E. Marcia Johnson, Elaine Khoo, and Lucy Campbell’s case study is an excellent example of the enactment of DBR in an online teacher development context. The authors zoom in on an online CALL course offered to preservice and inservice language teachers to take a closer look at how a tool designed for lecture-capture (Panopto) is integrated into a CALL course. They provide useful insights into designs for online learning in general and online teacher development in particular.

Paraphrasing Reeves, McKenney, and Herrington (2011), Johnson et al. state that a “deeper understanding of pedagogy, technology, and their interactions should lead to more robust instructional practice and deeper theoretical insights” (pp. 111). This not only summarizes the potential synergies between DBR and technology integration into teacher education contexts but also succinctly expresses the need to better understand how technological-pedagogical content knowledge (TPACK) is constructed in teacher education contexts.

Instructional contexts that blend the teaching of academic content with language instruction can be quite complex and thus challenging to explore. Patricia Martínez-Alvarez and Brenda Bannan take up this challenge by using a DBR approach to shed light on the integration of science, SLA, and literacy in instructional contexts designed for emerging bilinguals. As the authors state, these areas fall within the confines of different disciplines and are typically not explored in combination.

Martínez-Alvarez and Bannan highlight the issue of overlapping content areas, as it is common in language teacher education settings and explain how in their context of inquiry, the dual content of teacher development (i.e. language proficiency and linguistic awareness) is compounded by the need for teachers to also “demonstrate the necessary practical and theoretical expertise to provoke conceptual change in science while simultaneously enhancing SLA” (pp. 129). Drawing from Bannan-Ritland’s (2003) Integrative Learning Design Framework (ILDF), the authors provide a rich description of the process of development of a tool that promotes both inquiry-based learning and SLA and simultaneously supports content learning in the sciences (geomorphologic processes in this case). The TPACK construct is useful to ponder the complexity of the knowledge the teachers need to acquire in order to successfully integrate technology.

The next chapter, by Seijiro Sumi and Osamu Takeushi, constitutes a fine example of how DBR can help build and operationalize theory through the development of an instructional method. They apply an adaptation of the DBR phases outlined by Amiel and Reeves (2008) to look into factors that prevent instructors from effectively using technology in language learning contexts. Based on the results of their research, they implement and further analyze a flipped model of
language instruction in which technology is used to extend the classroom. As
the researchers show, making technologies and resources available online and
repurposing spaces to facilitate social interaction and collaboration can result in
a powerful combination to support language instruction. Their observations have
implications for language resource centers in higher education.

Again, the TPACK construct is helpful to establish connections between some
of the factors identified by Sumi and Takeushi which prevented instructors from
using technology effectively. For example, two aspects that are identified by the
researchers and that need to be overcome for the construction of TPACK to crys-
tallize are (a) the mismatch between instructor expectations and the actual af-
fordances of the system and (b) the complexity of operation of the technology
system. Arguably, both of these technology factors need to be overcome before
any meaningful integration of technology takes place. Aligning expectations with
affordances and having adequate familiarity with the system’s operation are pre-
cursors to meaningful integration.

The notion of developing instructors’ TPACK as a means to improve tech-
nology integration is compatible with the ecological perspective that Sumi and
Takeushi so well illustrate since the TPACK construct natively allows for content,
pedagogical, and technological affordances to be taken into consideration. From
this view, effective integration of technology depends on how well the teacher is
able to use their TPACK knowledge in a given environment. It is assumed that the
ability to identify affordances of the content, pedagogy, and technology is neces-
sary for the operationalization of TPACK.

Cristina Pardo-Ballestero and Julio C Rodríguez use a DBR approach to explore
how Spanish language learners’ experience and explore a synthetic environment
used to teach a hybrid language course. Learners’ experiences and perceptions are
used to inform changes in task design and to extract a set of design principles for
learning language and culture in multiuser virtual worlds. Sociocultural theory
is used to analyze linguistic interactions between novice (language learner) and
expert (native speaker) and to illustrate instances of interaction that may aid L2
development. Design principles for language learning task design in synthetic im-
mersive environments are derived from the analysis of the data.

In the following chapter, Tasha Lewis describes a task-based, telecollaborative
language exchange that was improved by using a DBR approach. The telecollabo-
ration tasks, implemented in first- and second-year college Spanish, were sup-
ported by a synchronous, multimodal videoconferencing tool (Skype). Question-
naires answered by student participants guide the redesign of the original tasks.
The analysis of the students’ interaction with native speakers reveals the presence
of language features that aid acquisition. Lewis identifies opportunities and chal-
lenges in the implementation of similar telecollaboration programs and provides
advice for their expansion.

In closing this introduction, we would like to express how fortunate we have
been to assemble such a diverse range of voices and perspectives on issues and
topics related to DBR. This volume goes beyond what we could have ever imag-
ined when we embarked on this journey a couple of years ago. We hope our read-
ers will enjoy interacting with and thereby learning from this modest contribution to our field just as much as we have enjoyed interacting and thereby learning from such a distinguished group of professionals.

References


