Editorial: Call for Papers Focused Collection of *Physical Review Physics Education Research* Curriculum Development: Theory into Design

Guest Editors
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Curricular development is an important part of the work done in Physics Education Research (PER), sometimes as part of design-based research projects, sometimes in response to calls for more active-learning curricula. While there are many general descriptions of developed curricula in PER and occasional reports of further improvement/redesign of existing materials, there are few publications on the specific principles (e.g., learning is a social activity) and strategies (e.g., elicit-confront-resolve) that guide PER researchers' design decisions. Even rarer are reports of exactly *how* these principles and strategies influence decisions about the *actual* design of activities and problems, including such seemingly mundane tasks as choosing the right words to introduce activities or phrasing questions in a way that fosters productive thinking and discourse.

This scarcity of literature on theory and design strategies in curriculum development within PER is especially problematic as more and more physics departments have come to value active learning strategies and would like to see new PER colleagues and other faculty in their departments ("PER users") develop or adapt curricula for local needs. Yet, many of the intentional, theory-driven and/or evidence-based design *choices* that curriculum developers make are hidden—not only from faculty using those curricular materials, but also from researchers who may want to evaluate or improve these curricula. With no published resources, researchers and curriculum developers are often forced to "reinvent the wheel" instead of learning from the efforts of experienced curriculum developers/designers.

This Physical Review Focused Collection on theory and design of curriculum is intended to more carefully explore the design decisions that are largely left unstated in existing work. By making decisions about design explicit and theorizing them, we can better hold existing and new curricula up to critique and scrutiny. The goal of this Focused Collection is to publish research articles from across the community of physics education researchers who engage in curriculum development or analysis. We envision that papers in this collection will focus on one or several of the following questions:

- How do learning theories shape curriculum design?
- How does curriculum design that was based on one theory (e.g., difficulties/misconceptions) hold up under other theoretical perspectives (e.g., resources or communities of practice)?
- How are the epistemological commitments of curriculum designers apparent in the materials they design?
- Why are suites of questions phrased and sequenced the way they are? Why are activities and topics structured and ordered in that way? What happens when the order or phrasing changes?
- How have curricular elements changed over time, and for what reasons?
- How and why have materials been adapted for new populations or learning goals?

We particularly welcome papers that compare multiple curricula on similar topics, dive deeply into a single piece of curriculum, or analyze curricula developed by other people. While we expect that some papers may include experimental results of student learning, illustrating learning gains without substantially discussing learning theory and design decisions is inappropriate for this Focused Collection. We welcome papers written by the original researchers of particular curricula as well as papers written by researchers who did not develop the curricula under analysis.

In this volume, we would like authors to focus on how the specific design of curricular materials is guided by and interpretable through theory. We anticipate that this interaction of theory and design will be manifested at the level of, for example, activity prompts, problems,

and experiment descriptions. However, we do not rule out a more broad discussion at longer timescales of instruction, especially to add context to the close analysis of specific activities.

Submission Guidelines

Interested authors should submit 500-word proposals as PDF documents for full papers by September 30, 2018, to the guest editors, Benedikt Harrer, Eleanor Sayre, and Leslie Atkins Elliott at CurDesIssue.PRPER@gmail.com. Proposals for manuscripts of empirical studies, review manuscripts, and theoretical manuscripts are welcome; each proposal must clearly indicate the type of manuscript that is envisioned. Submission requirements are as follows:

- Proposals for manuscripts of empirical studies must describe the theoretical basis of the work, the research question(s), and research methods that will be used, including data analysis.
- Proposals for review and theoretical manuscripts should include the motivation for the review topic and a sampling of references that will be used in the article.

All proposals must include contact information and institutional affiliation of the lead author and be submitted as PDF attachments.

The guest editors will, in consultation with the PRPER editor, Charles Henderson, review proposals and notify authors of the status of their submission by October 31, 2018. Authors of accepted proposals will be asked to prepare manuscripts that will go through the standard PRPER review process. Complete manuscripts will be due by June 30, 2019. Given the short review cycle, we expect the submitted manuscripts to be complete works. Works in progress or incomplete articles will be returned to the author without review. This Focused Collection is expected to be published in early 2020.

This Focused Collection will be supported by an advisory board comprised of Andy Elby (University of Maryland), Fred Goldberg (San Diego State University), Paula Heron (University of Washington), Martin Hopf (University of Vienna), Michael Wittmann (University of Maine), and Dean Zollman (Kansas State University). Volunteers to review articles are welcome; please send a message to the guest editors at CurDesIssue.PRPER@gmail.com.

Charles Henderson
Editor

Published 5 June 2018
DOI: 10.1103/PhysRevPhysEducRes.14.010003