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SECTION I
Introduction

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**PARTICIPATORY DESIGN
FOR LEARNING**

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and Carl DiSalvo*

The goal of the learning sciences is to not only understand the phenomena of learning, but also to impact educational practices and enable more effective learning. To meet these goals, learning scientists use iterative and participatory design methods as they design curriculum approaches, learning technologies, and technology-rich learning environments. Participatory design (PD) is a field of research and design that examines how stakeholders are able to participate with designers on the development of tools, artifacts, and activities that are important to the user group. Design-based research methods allow them to, in parallel, iterate toward better designs and add to foundational understanding of learning processes and how to support learning. Taking a learner-centered approach to design focuses them on the diverse and changing needs of learners (as opposed to sophisticated users) who may be working toward learning disciplinary content and practices at the same time they are getting used to using new software tools. Taking a community-based design approach helps them make sure they are addressing the needs of learners in ways that learners can identify with, that teachers or facilitators find useful, and that are consistent with the culture of the community. Using a combination of these methods, learning sciences researchers design curriculum and activities, technologies, policies, teacher professional development experiences, and other artifacts and systems in support of learning. They and their teams conceive new designs, develop them, put them to work in the world, test them, refine them, and iterate. The best products tend to come from teams that include not only researchers but also students, teachers, parents, community members, and other stakeholders.

Until now, however, the learning sciences community has not focused on design of artifacts for supporting learning as a formal practice, discipline, and

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field of research. Nowhere is this oversight more evident than with regard to engaging stakeholders actively in the design process. While some research teams have included learners, their families and communities, teachers, and administrators in the design of new learning environments and technologies, to date, there has been little discussion about how to include *direct input* from these multiple participant stakeholders while designing.

We aim, in this volume, to articulate a design practice that is inclusive of those who will use the designed artifacts we are creating and, with that, to begin the process of developing guidelines for such practice. The authors of chapters in this book have been informed by the practice that the Human-Centered Computing community calls PD. In PD, users and other stakeholders in the life of artifacts that are being designed participate directly in design processes. Our goal is to develop and draw attention to design practices that are relevant to participatory design of learning environments and learning technologies and that directly involve learners, teachers, and other community members in all the different steps of designing. Such designing, if done well, will insure that decisions about how to foster learning rely not only on expertise in how people learn, but also on the context in which the designs will be used and the people who will use them. PD at its best offers a way of gathering together and engaging a pluralistic community to collectively imagine and create designs for new technologies, environments, and types of experiences. Practitioners of PD focus, like learning scientists do, on designs for contexts of use. Learner-centered and design-based approaches in the learning sciences are, like PD, founded on the principle that target populations are best served when designs address the needs of community members. PD focuses on giving such stakeholders a high degree of agency throughout the design process, emphasizing the cultivation of knowledge communities in which content and expertise are *co-created* by experts and other participants working in concert. In particular, PD offers methods and practices for discovering, navigating, and *co-creating* goals in direct partnership with participants, while simultaneously revealing the constraints and opportunities that these participants face in complex contexts. But despite what would seem to be a productive fit between the learning sciences and PD, there is little discussion of how to adapt PD into design of learning technologies and environments. Our claim is that PD is a mostly untapped resource that, if used well, can advance the development, implementation, and sustainability of learning innovations.

We claim, conversely, that systematic use of PD practices and outcomes as we design learning technologies and environments will enrich understanding of how people learn in ways that will ultimately contribute to improved PD practices and outcomes. Learning is increasingly important to designers of user experiences and technology that supports learners' interactions and experiences with knowledge, information, and data. Learning is both an implicit and explicit desired outcome of many designed systems and experiences. But within user design practice and research, there is limited engagement with theories of learning. As a result, claims

about learning and the role of design are often weak, such as what learning theories can inform how successful PD is and if PD can also inform the development of learning theories. This does not need to be so. We believe it is possible to bring together PD and the learning sciences to create a vibrant and robust space of inquiry. We expect this book to help create that space and provide the intellectual infrastructure for its growth.

As a first step in crafting a foundation to increase the interaction between PD and learning sciences, our book benefits from a diverse group of contributors across the fields of the learning sciences and design. We have divided our chapters into five sections. The first and last sections serve as bookends to our core collection: Section I provides an introduction to PD and its history with the learning sciences, and Section V offers closing reflections and a call to action for moving forward. The sections in between provide a wide range of working examples and perspectives that cover design practices, audiences, and challenges that designers, education practitioners, and researchers alike will be able to apply in their work.

The first section of papers, beyond this introduction, includes the inspiring reflections of Pelle Ehn (Chapter 2), one of the founders of the participatory design movement in Scandinavia, on the history of participatory design and its shared foundations and commitments with the learning sciences. Chapter 4 is the transcript of a conversation mediated by Jason Yip, between Christopher Hoadley, an expert in the history of design in the learning sciences, and Carl DiSalvo, an expert in the field of design. This conversation provides a unique opportunity to see the ways that the field of learning sciences and design approach participatory design and where some of the fundamental differences and similarities lie.

The second section of the book brings together diverse perspectives on the types of participants that can be included in participatory design and ways of working with them. This includes Chapter 5, by Judith Uchidiuno et al., that speaks to the unique ways that families can contribute to participatory design as a research method to better understand how learning happens between generations in a family. In contrast, Chapter 6, by Joseph Polman et al., demonstrates how the unique power dynamic between learning researchers and teachers produces a very different type of participatory design that takes place over semesters and even years. In Chapter 7, Helene Gelderblom looks at students as participants in designing their own course and how that relationship can shape the learning experience. These three chapters taken together offer an opportunity to reflect on the diversity of methods and approaches to integrating participation in design and how they are interdependent upon the relationships between designers and participants, and among participants.

The chapters in third section of the book are case studies on specific projects or practices of participatory design. Chapter 8, by Marti Louw, Nina Barbuto, and Kevin Crowley, provides a case study of collaboration between researchers trained in design and the learning sciences and their interdisciplinary approach to designing learning pathways with families. Chapter 9 is a case study by Juan Pablo

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Hourcade on the unique challenges in designing with children in the autism spectrum. Chapter 10, by Michelle Hoda Wilkerson, is the post analysis that reflects on the participation of after-school professionals in the development of digital tools. In Chapter 11, Lisa Maurer and Elizabeth Bonsignore reflect on the development of Pearson Kids CoLab and how participatory design principles placed the learner as the central player in the design process.

The fourth section of the book looks at emerging perspectives on participatory design. Ann Light and Jos Boys (Chapter 12), who are designers and researchers of design practices, present a number of cutting-edge approaches to participatory design and reflect on the learning outcomes and applications for learning that can be gleaned from them. In Chapter 13, Betsy DiSalvo and Kayla DesPortes explore how applying participatory design approaches, in the form of formative and meta-design, can help to shape learning that is driven by the values of the learners. Chapter 14 is a conversation facilitated by Elizabeth Bonsignore between a human–computer interaction researcher, Allison Druin, and a practicing designer and design educator, Jon Kolko. This conversation reflects many of the differences between the goals of academic researchers and those of design professionals in their respective use of participatory design. Brenna McNally and Mona Leigh Guha in Chapter 15 share perspectives on creating and sustaining co-design teams that allow participants to develop expertise.

In the concluding section of the book, Liz Sanders (Chapter 16) provides an autobiographical account of participatory design in her work as a design educator and insights into frameworks for radical ways to move forward with participatory design and the efforts to design for conviviality. Chapter 17 is our final conversation. This conversation, facilitated by Elizabeth Bonsignore, highlights three researchers (Chris Frauenberger, Chris Quintana, and Yvonne Rogers) and provides a personal narrative of how they each came to use PD and its relationship to learning, which highlight conflicts between PD and the learning sciences and what needs to be addressed to move forward. Finally, Chapter 18 is the editors' critical reflection on design for learning and educational environments and their call to action for learning scientists and design researchers alike to seize opportunities for increased cross-pollination and coordinated, interdisciplinary collaboration between their complementary – but currently parallel – research tracks.

For some readers, this will be the first time they have considered their work in learning with a PD lens; for others, PD practices and methods came first, and learning sciences' expertise adds a new dimension to the negotiation of goals and design outcomes among participants. Taken together, our compendium offers a resource that will support researchers who aim to incorporate PD principles into their learning frameworks, as well as PD practitioners who aspire to incorporate learning constructs and theories into their designs.

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Author Queries

- AU:1 Chapter 4 is the referenced transcript; Chapter 3 is an essay by Christopher Hoadley alone: “How Participatory Design Has Influenced the Learning Sciences.” Please either supply missing text or delete the current Ch. 3 from the mss.
- AU:2 Change to present tense OK?
- AU:3 Chapter numbers changed to reflect current mss. (and may need further renumbering if the current Chapter 3—per above comment—remains in the mss.)

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