How Students Come to Be, Know, and Do

Studies of learning are too frequently conceptualized only in terms of knowledge development. Yet it is vital to pay close attention to the social and emotional aspects of learning in order to understand why and how it occurs. *How Students Come to Be, Know, and Do* builds a theoretical argument for and a methodological approach to studying learning in a holistic way. The authors provide examples of urban fourth graders from diverse cultural and linguistic backgrounds studying science as a way to illustrate how this model contributes to a more complete and complex understanding of learning in school settings. What makes this book unique is its insistence that to fully understand human learning we have to consider the affective-volitional processes of learning along with the more familiar emphasis on knowledge and skills. Developing interest, persisting in the face of difficulty, actively listening to others' ideas, accepting and responding to feedback, and challenging ideas are crucial dimensions of students' experiences that are often ignored.

Leslie Rupert Herrenkohl, Ph.D., is Associate Professor in the Learning Sciences and Human Development and Cognition Programs in the College of Education at the University of Washington. She also teaches in the Elementary Master's in Teaching Program. Dr. Herrenkohl studies the intellectual, social, and emotional aspects of children's development as science learners in formal and informal settings. She enjoys collaborating with practitioners to apply developmental theory to support the design of learning environments. Her work has been included in the national panel summary of school-based science learning, *Taking Science to School: Learning and Teaching Science in Grades K–8* (2007) and was featured as one of twelve case examples in the volume on applying science research to teaching practice, *Ready, Set, Science! Putting Research to Work in K–8 Science Classrooms* (2008). She served on the oversight panel for the recently released *Surrounded by Science: Learning Science in Informal Environments* (2010). Dr. Herrenkohl has received funding from the National Science Foundation, the Spencer Foundation, and the James S. McDonnell Foundation.

Véronique Mertl is a doctoral candidate in human development and cognition in the College of Education at the University of Washington. Her research explores the social, affective, and contextual elements that influence learning, with a particular focus on collaboration and belongingness in and out of school. She currently studies professional and adolescent musicians. She seeks to understand musicians' interactions, networks, and trajectories, particularly how out-of-school art and music settings engage and empower youth. Mertl works as a researcher for the Learning in Informal and Formal Environments (LIFE) Center, a National Science Foundation Science of Learning Center. She is also a consultant for several music and arts organizations in the United States.

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How Students Come to Be, Know, and Do

A Case for a Broad View of Learning

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To Mrs. Glenda and her students

To Madeline and Isaac

Contents

Series Foreword

This series for Cambridge University Press is widely known as an international forum for studies of situated learning and cognition. Innovative contributions are being made by anthropology; by cognitive, developmental, and cultural psychology; by computer science; by education; and by social theory. These contributions are providing the basis for new ways of understanding the social, historical, and contextual nature of learning, thinking, and practice that emerges from human activity. The empirical settings of these research inquiries range from the classroom to the workplace, to the high-technology office, and to learning in the streets and in other communities of practice. The situated nature of learning and remembering through activity is a central fact. It may appear obvious that human minds develop in social situations and extend their sphere of activity and communicative competencies. But cognitive theories of knowledge representation and learning alone have not provided sufficient insight into these relationships. This series was born of the conviction that new exciting interdisciplinary syntheses are underway as scholars and practitioners from diverse fields seek to develop theory and empirical investigations adequate for characterizing the complex relations of social and mental life, and for understanding successful learning wherever it occurs. The series invites contributions that advance our understanding of these seminal issues.

Roy Pea
Christian Heath
Lucy A. Suchman

Acknowledgments

This book has been in the making for a very long time. It is the result of 15 years of struggle with a nagging feeling that there was something missing from my accounts of science learning. My early attempts to articulate what I thought was missing, what I initially discussed as the role of self in subject matter learning, began while in graduate school. At that time, I was not particularly successful at communicating my ideas. The theoretical language and methodological tools I was trying to use did not do the job very well. So I initially took the safer path of discussing the cognitive and social aspects of how children learn to think like scientists. This work has been generative and provided me with a deep appreciation for how learning is a general as well as domain-specific social endeavor. It has also allowed me to experience firsthand the brilliant capabilities of all children. My work has been conducted in urban settings with diverse groups of students and has opened my eyes to the dangers of deficit models of schooling. I have been convinced that all students are resourceful and eager learners. The task for adults is to entice students to join the discussion and throw themselves wholeheartedly into learning so that they draw on and develop their knowledge, skills, and sense of themselves as science learners. This is risky social and personal business that engages intellectual as well as emotional demands. I've had the pleasure of watching some very capable teachers create these kinds of dynamic classroom environments with their students. However, as I continued to conduct research with different teacher-research partners in different states, the same nagging feeling that something was missing in my written accounts of learning kept coming up. I knew that I was not really capturing the whole story about how students learn science in classrooms with the amazing and dedicated

teachers with whom I have worked. This book is an answer to my own persistent question: What's missing in my account of science learning?

There are many people who have helped me along this path. I owe a huge debt of gratitude to my first two mentors, Jim Wertsch and Annemarie Palincsar. Without them, it is fair to say, I would not be the person or thinker that I am today. I am deeply grateful for their support and the hours they dedicated to my learning and development as a young scholar. They were excellent role models of mentoring that I strive to live up to with my own students.

I am grateful for the support and generosity of time and talent from good friends and colleagues. When I first arrived at the University of Washington, my colleagues Pam Grossman, Deborah McCutchen, and Sam Wineburg were instrumental in encouraging and supporting my desire to understand learning from this broad view. I benefited from their generosity of time and spirit to review and provide feedback on my ideas and my writing. Jim Greeno and his students Melissa Gresalfi, Vicki Hand, and Randi Engle were partners in dialogue during early phases of this work. UW colleagues Elham Kazemi and Elizabeth Dutro and Clark graduate student colleagues Kevin O'Connor and Bill Penuel provided comments on drafts of this work that really helped push my thinking and improve my writing. I also benefited from hours of discussion with Eli Gottlieb when he was a postdoctoral Fellow at UW. UW College of Education Dean Pat Wasley supported my work at a time when I needed to focus solely on writing the manuscript. I am grateful to students who joined in my doctoral seminars over the years to discuss self and subject matter and what I now call a broad view of learning. In particular I'd like to thank Laura Adriance, Lindsay Cornelius, Sue Feldman, Brenda Hood, Sasha Lotas, Sandra Toro Martell, David Spring, Tammy Tasker, Kersti Tyson, Scott Votaw, and Sherry Yeary.

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A special thank you is due to my doctoral student, Véronique Mertl, who joined me in the process of analyzing data and writing the book. I am continually impressed by Véronique's analytic eye and the insight she brings to conversational interaction. Writing the book would have been a lonely experience without her company along the way. I appreciated her effort throughout this process and look forward to a bright and shining future ahead for her!

To Leslie Rupert Herrenkohl, I, Véronique, extend sincere thanks and gratitude for inviting me to collaborate on this book. I appreciate Leslie's thoughtful reflection and our many dynamic dialogues around learning, youth, and research. This exceptional opportunity has profoundly challenged my thinking and understanding about how people develop and learn. As an advisor and a mentor, Leslie has guided me with both knowledge and care. I thank her for inspiring me to pursue my interests and to grow as a scholar and researcher.

This book was originally planned as a series of papers. Véronique and I owe Ellice Forman a thank you for encouraging us to write it up as a book instead. We also owe a huge debt of gratitude to Roy Pea, an editor of the Learning in Doing series. Roy has encouraged this book from the beginning and provided helpful comments and

critique that improved initial drafts. We would also like to recognize Sofian Ouled Amor and thank him for his graphic expertise. Thanks are also due to Simina Calin, our editor at Cambridge, and Jeanie Lee, her editorial assistant, for guidance and expertise in preparing the manuscript for production.

The most abundant thanks are due to Mrs. Glenda and her students, whose work together has inspired me over these past 15 years. It is a privilege and honor to have been present for the unit of study that we describe in this book. We hope that this iteration is taking us closer to more fully representing the power of what Mrs. Glenda accomplished with the students in her classroom. Mrs. Glenda has read versions of this manuscript and provided feedback and consultation throughout the writing process. We want to thank her for this continued conversation about teaching and learning and for providing us with such an outstanding example of teaching.

Finally, Véronique and I wish to thank her brother, Gregory, for his editorial skills and extraordinary support of this work. I would like to thank my husband Todd and children Madeline and Isaac who inspire every aspect of my life and work. Todd has been inordinately patient with my obsession with this project over many years. Maddie and Isaac have provided important diversions from the work as well as very personal motivations for me to see this project through to provide a more complete account of learning.

Leslie Rupert Herrenkohl & Véronique Mertl
Seattle, Washington
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