The Cambridge Handbook of the Learning Sciences



Edited by

R. Keith Sawyer

Washington University



Contents

Preface	page xi
R. Keith Sawyer	
Contributors	xv
Introduction: The New Science of Learning R. Keith Sawyer	1
PART I	
FOUNDATIONS	
2. Foundations and Opportunities for an Interdisciplinary Science of Learning John D. Bransford, Brigid Barron, Roy D. Pea, Andrew Meltzoff, Patricia Kuhl, Philip Bell, Reed Stevens, Daniel L. Schwartz, Nancy Vye, Byron Reeves, Jeremy Roschelle, and Nora H. Sabelli	19
3. Constructionism Yasmin B. Kafai	35
4. Cognitive Apprenticeship Allan Collins	47
5. Cognitive Tutors: Technology Bringing Learning Sciences to the Classroom	61
Kenneth R. Koedinger and Albert Carbett	

viii CONTENTS

6. Learning in Activity James G. Greeno	79
 Knowledge Building: Theory, Pedagogy, and Technology Marlene Scardamalia and Carl Bereiter 	97
PART II METHODOLOGIES	
8. Learner-Centered Design: Reflections on the Past and Directions for the Future Chris Quintana, Namsoo Shin, Cathleen Norris, and Elliot Soloway	119
 The Evolution of Design Studies as Methodology <i>Jere Confrey</i> 	135
10. Design-Based Research: A Methodological Toolkit for the Learning Scientist Sasha Barab	153
 Guiding Inquiry-Based Math Learning Paul Cobb and Kay McClain 	17:
12. Analyzing Collaborative Discourse R. Keith Sawyer	187
13. Assessing for Deep Understanding Sharon M. Carver	205
PART III THE NATURE OF KNOWLEDGE	
14. Case-Based Reasoning Janet L. Kolodner	225
15. The Knowledge Integration Perspective on Learning and Instruction Marcia C. Linn	2.45
16. A History of Conceptual Change Research: Threads and Fault Lines Andrea A, diSessa	26:
17. Spatial Representations and Imagery in Learning Daniel L. Schwartz and Julie Heiser	28:
18. Literacy and the Learning Sciences Annemarie Sullivan Palinesar and Barbara G. Ladowski	290

CONTENTS ix

MAKING KNOWLEDGE VISIBLE	
19. Project-Based Learning Joseph S. Krajcik and Phyllis C. Blumenfeld	317
20. Making Authentic Practices Accessible to Learners: Design Challenges and Strategies Daniel C. Edelson and Brian J. Reiser	335
21. BioKIDS: An Animated Conversation on the Development of Curricular Activity Structures for Inquiry Science Nancy Butler Songer	355
22. Cultivating Model-Based Reasoning in Science Education Richard Lehrer and Leona Schauble	371
23. Exploring Mathematics Through Construction and Collaboration Richard Noss and Celia Hoyles	389
PART V	
LEARNING TOGETHER	
24. Computer-Supported Collaborative Learning Gerry Stahl, Timothy Koschmann, and Daniel D. Suthers	409
25. WILD for Learning: Interacting Through New Computing Devices Anytime, Anywhere Roy D. Pea and Heidy Maldonado	427
26. Arguing to Learn Jerry Andriessen	443
27. Learning in Online Communities Amy Bruckman	461
PART VI LEARNING ENVIRONMENTS	
28. Motivation and Cognitive Engagement in Learning Environments Phyllis C. Blumenfeld, Toni M. Kempler, and Joseph S. Krajcik	475
29. Learning as a Cultural Process: Achieving Equity Through Diversity Na'ilah Suad Nasir, Ann S. Rosebery, Beth Warren, and Carol D. Lee	489
30. Prospects for Transforming Schools with Technology- Supported Assessment Barbara Means	505

X CONTENTS

31. Internet Use in Schools: Promise and Problems Janet Ward Schofield	521
32. Teacher Learning Research and the Learning Sciences Barry J. Fishman and Elizabeth A. Davis	535
33. Scaling Up: Evolving Innovations Beyond Ideal Settings to Challenging Contexts of Practice Chris Dede	551
34. Conclusion: The Schools of the Future R. Keith Sawyer	567
Afterword: After How Comes What Seymour Papert	581
Epilogue: The Fundamental Issue in the Learning Sciences Roger C. Schank	587
Author Index	593
Subject Index	609