

1. Record Nr.	UNINA9910866587103321
Autore	Pepin Birgit
Titolo	Handbook of Digital Resources in Mathematics Education
Pubbl/distr/stampa	Cham : , : Springer International Publishing AG, , 2024 ©2024
ISBN	3-031-45667-X
Edizione	[1st ed.]
Descrizione fisica	1 online resource (1405 pages)
Collana	Springer International Handbooks of Education Series
Altri autori (Persone)	GueudetGhislaine ChoppinJeffrey
Disciplina	510.285
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Preface -- Contents -- About the Editors -- Section Editors -- Contributors -- Part I: Introduction -- 1 Transformation of Mathematics Education Environments by Digital Resources -- Introduction to the Handbook -- Introduction to the Second Part of this Chapter -- Theoretical Frames -- Activity Theory -- Tensions, Contradictions, and Expansive Transformations -- Digital Resources -- Methodology -- Results -- AS1: Mathematical Activity in Classroom Systems -- Two Types of Contradictions and Tensions Leading to Expansive Transformations in AS1 -- Type 1 Contradiction: DRs and the Interpretations of the Object -- Type 2 Contradiction: DRs, Rules, and Division of Labor -- DRs That Lead to Type 1 and Type 2 Contradictions -- Discussion of AS1 -- AS2: Teacher Professional Learning Systems -- Discussion of AS2 -- AS3: Teacher Design ASs -- ``Design DRs for Teachers as Users`` Versus ``Design DRs for Teachers as Designers`` -- Tensions Between Two Systems and DRs as Boundary Objects -- New Digital Tools and Tensions in the Design System -- Discussion of AS3 -- AS4: Broader Institutional and Political Systems -- Tension: Political Purpose/Intentions Versus DR as Goal -- Tension of Programming Versus Doing Mathematics -- Discussion of AS4 -- Concluding Remarks -- References -- Part II: Methodological and Theoretical Issues for Researching Digital Resources in Mathematics Education -- 2 Advancing Mathematics Education on

Digital Resources: A Reciprocity Between Theory, Methodology, and Design -- Introduction -- Conceptualizing Digital Curricular Resources -- From Digital Artifacts to Digital Resources -- From Digital Resources to Digital Curricular Resources -- Reciprocity of Theory, Methodology, and Design in Research with Digital Resources -- Three Themes Advancing the Field: Drawing on Research with Digital Resources. Digital Resources as New Objects of Study -- Leveraging Digital Resources to Solve Practical Problems at Different Grain Sizes -- Positioning Digital Resources in the Center of Research Programs -- Discussion -- Cross-References -- References -- 3 A Pragmatic Approach to Theorizing Interdisciplinary Design Research on Interactive Math Learning Systems: The Case of a Mul... -- Introduction -- Interdisciplinary Design Research -- Theoretical Framework for the Interdisciplinary Design Research -- Theorizing the Design Process -- The MAL System - A Boundary Object in Interdisciplinary Design Research -- The Interdisciplinary Design Research Cycles -- Framework for the Design Research of the MAL System -- Research on and Development of Tangible User Interfaces -- Research on Algebra Education with Tangibles -- Pragmatic Theory Frame for Learning with the MAL System -- Experiential Learning Related to the MAL System -- The Notion of Algebra Learning Related to the Use of Tiles -- The MAL System - A Flexible Feedback Space for Exploring and Expressing -- The MAL System - Facilitating Abstraction -- The Resulting Guidelines -- Complementary Guidelines for the Design of the MAL System and the Tasks -- Horizontal Design Variations -- Argumentative Grammar for the Local Pragmatic Theory -- Conclusion -- Cross-References -- References -- 4 Networking of Theories: An Approach to the Development and Use of Digital Resources in Mathematics Education -- Introduction -- Evolutions of Theories in Technology-Related Research -- The Networking of Theories -- A Functional Approach to Theories -- The Diversity of Forms of Networking -- Constructions and Studies Referring to the Instrumental Approach -- The General Overview -- Theoretical Combinations and IA: A Step Back in the Story -- A Panorama of Theoretical Connexions in IA-Based Research. The ReMath European Project -- A Project Focused on the Capitalization of Knowledge -- The Networking of Theories and the Design of Digital Tools in ReMath -- The Extension of the Instrumental Approach to the Teacher -- Instrumental Distance and Distance to Practices -- The Concept of Instrumental Orchestration -- Teachers' Instrumental Geneses -- The Development of Documentational Approach to Didactics -- The Foundation of DAD -- Applying and Amplifying DAD: Documentational Experience and Trajectory -- Discussion and Perspectives -- Synthesis of the Contributions Offered by This Chapter -- Research Needs and Perspectives -- Cross-References -- References -- 5 Theorizing a Role of Digital Resources in Promoting Instructional Change in Mathematics Departments -- Introduction -- DiRBOs and Instructional Change -- Designing DiRBOs: Bringing Communities Together -- Implementing DiRBOs: Influencing Views on Instruction -- Continuing Effects of DiRBOs: Impacts on Participants' Practices -- Four Frames for Change in Postsecondary Education: Considerations for Implementing New Digital Resources -- Coordinating Theoretical and Analytic Lenses on DiRBOs -- Theoretical and Analytical Underpinnings -- Analyzing the Design, Implementation, and Continuing Use of DiRBOs -- Techivities as DiRBOs in a College Algebra Intervention -- Employing the Four Frames as an Analytic Lens on DiRBOs in a College Algebra Intervention -- Processes of Change: The Designing Phase -- Processes of Change: The Implementing Phase -- Processes of Change: The Continuing Phase -- The Phases of

Designing, Implementing, and Continuing -- Discussion -- Summary of the Chapter -- Conceptualizing DiRBOs: Potential for Collaborations -- Implications from Our Theorizing -- Concluding Remarks -- Cross-References -- References.

6 How Digital Storyboards Support the Transaction of Practice: The Semiotic Infrastructure of Representations of Practice -- Introduction -- Transactions of Practice and Representations of Practice -- A Systemic Functional Account of Storyboards of Practice -- Metafunction: A Storyboard Represents Practice While Relating People to Each Other Through Cohesively Evolving Messages -- The Interpersonal Metafunction in Storyboards: How Producer and Viewer Relate -- Orientation: Storyboards Tell Viewers Where to Focus -- Visibility: Storyboards Display What Is Important for the Viewer to See -- The Ideational Metafunction in Storyboards: Representing Classroom Instruction -- Simultaneity: Storyboards Represent Many Happenings at the Same Time -- Temporality: Storyboards Convey a Sense of Time as Sequence and Duration -- Individuality: Storyboards Represent Individual People, Artifacts, and Settings -- Final Comments on the Ideational Metafunction -- The Textual/Compositional Metafunction -- Register and Genre: The Uses of Storyboards in Different Transactions of Practice -- Register and Genre in Mathematics Classroom Discourse -- Transactions of Practice as Genres and the Transactive Registers: Our Windows onto Practice Shape the Practice We See -- Representations of Practice Are Pedagogical Artifacts -- Toward a Semiotic Infrastructure of Practice: Beyond Storyboards and Beyond Instruction -- References -- 7 Humans-with-Media: Twenty-Five Years of a Theoretical Construct in Mathematics Education -- Introduction -- The Humans-with-Media Construct -- Digital Technology Phases and the Humans-with-Media Construct -- The Roots and Epistemological View of the Humans-with-Media Construct -- Theoretical Contributions and Dialogues -- Humans-with-Media and Research in Mathematics Education -- Humans-with-Software-Internet -- Humans-with-Digital-Videos.

Agency on Humans-with-Internet-SARS-CoV-2 -- Final Remarks -- References -- 8 Embodied Design of Digital Resources for Mathematics Education: Theory, Methodology, and Framework of a Pedagogical Research... -- Preamble and Structure -- Embodiment and Embodied Design: An Overview -- Theory: A Paradigm Shift Toward Embodiment -- Technology: Innovation in Embodied Interaction Interfaces -- Methods: Sensory Measures and Learning Analytics -- The ED Learning Process -- Interlude: A Brief Participatory Demonstration of Embodied Design, with a First Explicit Experience of Attentional Anchors -- Overarching Rationale and Principles of the Embodied Design Research Program -- Multimodal Learning Analytics of Embodied Design: Recurrence Quantification Analyses of Motor and Eye Behaviors in Solving Mat... -- SpEED - Special Education Embodied Design: Rationale and Research -- On Teachers' Multimodal Dialogic Work with Embodied Design -- Practicing Embodied Design in the Classroom: A Teacher's Perspective -- Moving Forward -- References -- 9 Intertwined Use of Physical and Digital Tools in Mathematics Teaching and Learning -- Introduction -- Three Aspects of Theoretical Models -- Research on the Use of Technology at Domain-Specific and Local Levels -- Task-Technique-Theory Framework -- Overview of the Model -- Classroom Episode -- Commentary -- Duo of Artifacts -- Overview of the Model -- Example of Design of Duo and Its Implementation -- Commentary -- Interplay Between Physical and Digital Activities -- Overview of the Model -- Classroom Episode -- Commentary -- Discussion -- Conclusion -- Cross-References -- References -- 10

From the Web to the Mathematics Classroom: Investigating Internet
Phenomena as Educational Resources in Mathematics -- Introduction
-- Research Approach and Literature Review.
Theoretical Framing: Acquiring a Theoretical Understanding of the Web
2.0 Culture.
