

1. Record Nr.	UNINA9910632491503321
Titolo	Mathematics education in Africa : the fourth industrial revolution // Brantina Chirinda, Kakoma Luneta, Alphonse Uworwabayeho, editors
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	3-031-13927-5
Descrizione fisica	1 online resource (342 pages)
Disciplina	510.71
Soggetti	Mathematics - Study and teaching Ensenyament de la matemàtica Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Foreword -- References -- Preface -- Contents -- About the Editors and Contributors -- About the Editors -- About the Contributors -- Chapter 1: Is Africa Ready for the Fourth Industrial Revolution? -- Introduction -- Purpose and Research Questions -- Literature Review -- ICT Integration in Mathematics Education in Some African Countries -- The Benefits Gained for Learners Taught Through Technology-Based Instructions -- Methodology -- Readiness in Teaching and learning STEM Subjects and Other Subjects During the 4IR -- Challenges That Hinder African Countries from Getting Ready for the 4IR in Teaching Mathematics -- The Lack of Training on Professional Development Towards ICT to Embrace the 4IR Era -- Mathematics Curricula That Are Not Designed to Accommodate Changes for the 4IR -- The Potential Solutions for Mathematics Education Ready for the 4IR -- Conclusion -- Appendix: The Reviewed Studies on the Readiness of Education and Mathematics Education in Africa for the 4IR -- References -- Chapter 2: Can the Fourth Industrial Revolution Resolve Why the Teaching of Mathematics in the Current Paradigm Continues to Be Decontextualised and Ineffective -- Introduction -- Historical Implications of the Mathematics Curriculum in Southern Africa -- Decolonising the Mathematics Curriculum Through the Place-Based Mathematics --

Number, Operations and Relationships -- Patterns, Functions and Algebra -- Space and Shape -- Measurement -- Data Handling -- The Influence of Problem-Solving Skills and Competences in Decolonising the Mathematics Curriculum -- Difficulties of Learning Mathematics in the Current Curriculum -- Difficulties of Teaching Mathematics in the Current Curriculum -- Addressing Errors and Misconceptions Through Curriculum Review -- What Is the Fourth Industrial Revolution Mathematics Curriculum? -- Conclusion -- References.

Chapter 3: Alignment and Gaps of the Competency-Based Mathematics Curriculum and the Fourth Industrial Revolution -- Introduction -- The Fourth Industrial Revolution in Africa -- Rationale for Prioritizing Education -- Why Mathematics Education? -- Soft Skill Competencies in Select African Countries -- Zambia -- Rwanda -- Kenya -- Cameroon -- Ghana -- Tanzania -- Opportunities and Challenges -- Conclusion and Way Forward -- References -- Chapter 4: Mathematics Educators' Readiness for Online Education in the Fourth Industrial Revolution: A Case of Two Selected Universities in Ethiopia -- Introduction -- Problem Statement -- Literature Review -- The Stages of Education Versus Industrial Revolution World Views -- Ethiopian Education During the Period of COVID-19 -- Use of e-Learning Platforms in 4IR -- Elements of 4IR -- Theoretical Model -- Methodology -- Research Design -- Participants and Sample Size -- Data Collection Instruments -- Data Analysis -- Results -- Mathematics Teachers' Backgrounds Influence e-Learning/Online Education in Their Classrooms in the 4IR Era -- Mathematics Teachers' e-Readiness to Implement e-Learning -- Psychological Readiness -- Sociological Readiness -- Environmental Readiness -- Human Resource Readiness, Financial and Course Content Items -- Technological Skills -- Conclusion and Future Direction -- Future Direction -- References -- Chapter 5: Mathematics Education and the Fourth Industrial Revolution: Are the High School Mathematics Teachers Ready? -- Introduction -- The Fourth Industrial Revolution and Implication for Mathematics Education -- Teaching Mathematics in the 4IR Era -- Theoretical Framework -- Gender and 4IR Tools Adoption -- Teachers' Age and 4IR Tools Adoption -- Methodology -- Institutional Review Board Statement -- Results -- Discussion -- Conclusions and Recommendations -- References.

Chapter 6: Transforming the Zimbabwean Secondary School Mathematics Curriculum to Align It with the Demands of the Fourth Industrial Revolution -- Introduction -- The Fourth Industrial Revolution -- Features of the Fourth Industrial Revolution -- Artificial Intelligence (AI) -- Robotics -- Three-Dimensional (3D) Printing -- Computational Thinking (CT) -- Augmented Reality (AR) and Virtual Reality (VR) -- The Internet of Things (IoT) -- The Fourth Industrial Revolution and Mathematics Education -- Methodology -- Findings and Discussion -- Content -- Competences -- Teaching-Learning Methods -- Technology -- Infrastructure -- Transforming the Zimbabwean Secondary School Mathematics Curriculum to Align with the Fourth Industrial Revolution Requirements -- Collaboration Activities -- New Literacies -- Mathematics Learning Factories -- Problem-Based Learning -- Infrastructure Relevant to Mathematics Teaching and Learning in the Fourth Industrial Revolution -- Conclusion -- References -- Chapter 7: Mathematics Teachers' Self-Efficacy in Using Problem-Based Learning for the Fourth Industrial Revolution -- Introduction -- Literature Review -- The Fourth Industrial Revolution -- Problem-Based Learning -- Teacher Self-Efficacy -- Theoretical Framework -- Research Methodology -- Research Design

and Paradigm -- Participants and Sampling Techniques -- Research Instruments -- Procedures of Data Collection -- Data Analysis -- Results and Discussions -- Teachers' Knowledge -- Teaching Practices -- Difficulties While Implementing PBL -- Conclusion and Recommendation -- References -- Chapter 8: Computer Adaptive-Based Learning and Assessment for Enhancing STEM Education in Africa: A Fourth Industrial Revolution Possibility -- Introduction -- Literature Review -- The Problem -- Methodology -- Theoretical and Conceptual Frameworks.

Assessment as Learning with Computer Adaptive Learning as a 4IR Application in Education -- Conclusion and Recommendations -- References -- Chapter 9: Exploring the Challenges of Teaching Mathematics During the Fourth Industrial Revolution in Selected Rwandan Secondary Schools -- Introduction -- Literature Review -- Philosophy of Mathematics Education -- An Overview of Mathematics Education and the Fourth Industrial Revolution -- Method of Teaching Mathematics in Rwanda in 4IR -- Challenges Encountered by Teachers During Teaching Mathematics in 4IR -- Research Questions -- Methodology -- Findings and Discussion -- Challenges of Teaching Mathematics in 4IR -- Potential Solutions to the Challenges of Teaching and Learning Mathematics -- Mathematics Challenging Topics Difficult to Teach -- Conclusion and Implication -- References -- Chapter 10: Emerging Realities from COVID-19 and the Fourth Industrial Revolution: Mathematics Education Lecturers' Collaborative Autoethnographic Experiences -- Introduction -- Literature Review: Understanding Remote Learning in Higher Education -- Mathematics Education in 4IR -- Community of Inquiry and Online Learning -- Methodology -- Data Collection and Analysis in Collaborative Autoethnography -- Ethics on Collaborative Autoethnography -- Findings and Discussion: Emerging Realities -- Remote Student Support Through e-Tutoring in a Community of Inquiry -- Students' Response to an Online Support System -- Assessing Students Online -- Collaboration: Multiple Streams of Cheating -- Conclusion -- Recommendations -- Limitations -- References -- Chapter 11: Fault Lines in Designing Learning Activities for Practising Mathematics Teachers: An Autoethnographic Account -- Opening -- A Brief Note on the Fourth Industrial Revolution and Mathematics Education -- A Perspective on the Research Canon-The Approach.

My Experience with Story-Telling -- The Spark -- Fault Lines of My CPD Facilitation Regarding Getting Teachers to Design an Activity -- Towards an Activity -- A Mere Activity is Not Enough for Teacher Learning -- The Teacher Learning Goal -- Thinking and Learning in Which Teachers Might Engage (Anticipations) and the Types of Questions to Be Asked to Spur Teachers' Thinking -- Guidelines for Implementing the Teacher Learning Activity -- A Light Shock -- Conclusions -- References -- Chapter 12: Teaching Mathematics in the Fourth Industrial Revolution: Instances of Instrumental Orchestration When a Teacher Integrates GeoGebra in Solving Linear Inequalities -- Introduction -- Problem Statement and Research Question -- Theoretical Underpinnings -- Data Collection and Analysis -- Results and Discussion -- Guiding Teachers in Making Technology Integration Decisions -- A New Learning Ecology -- Teacher Concerns -- Recommendations -- Conclusion -- References -- Chapter 13: Integration of GeoGebra in Teaching and Learning of Mathematics in the Niger Republic Classrooms -- Introduction -- Literature Review -- Theoretical Framework -- Methodology -- The Field of Our Research -- The Participants -- The Observation Tools -- Analysis of Higher Secondary School Mathematics Curriculum -- Learning Approach

of the Concept of Functions in Higher Secondary School -- Presentation
of the Problems on the Mathematical Functions and a Priori Analysis --
Findings and Discussion -- The Cognitive Gains Scores for Students
in Learning Mathematical Functions -- Conclusion -- Appendix --
Problème 1 -- Problème 2 -- References -- Chapter 14: Factors
Influencing Preservice Teachers' Adoption of WhatsApp as an Interactive
Social Media Platform in Mathematics Teacher Education in Malawi --
Introduction -- Norms in Preservice Mathematics Teacher Education
in Malawi.
Disruption of Norms in Teacher Preparation Due to the Abrupt Onset
of COVID-19.
