

1. Record Nr.	UNISA996466844703316
Autore	Mari Luca
Titolo	Measurement across the sciences : developing a shared concept system for measurement / / Luca Mari, Mark Wilson, Andrew Maul
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-65558-X
Descrizione fisica	1 online resource (xxxv, 287 pages) : illustrations
Collana	Springer series in measurement science and technology
Disciplina	501
Soggetti	Science - Methodology Metrology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and indexes.
Nota di contenuto	Intro -- Foreword -- Foreword -- Educational Assessment and Educational Measurement -- Opening the Black Box in Educational Measurement -- Conclusion -- Preface -- For whom did we write this book -- The structure of the chapters in this book -- Acknowledgments -- Contents -- List of Figures -- List of Tables -- Chapter 1: Introduction -- 1.1 Why we wrote this book -- 1.1.1 Is measurement necessarily physical? -- 1.2 Some familiar and not-so-familiar contexts for measurement -- 1.2.1 A brief introduction to temperature and its measurement -- 1.2.2 A brief introduction to reading comprehension ability and its measurement -- 1.2.3 An initial view of psychosocial measurement from a physical science perspective -- 1.3 The path we will travel in this book -- References -- Chapter 2: Fundamental concepts in measurement -- 2.1 Introduction -- 2.2 The abstract structure of measurement -- 2.2.1 Measurement as an empirical process -- 2.2.2 Measurement as a designed process -- 2.2.3 Measurement as a process whose input is a property of an object -- 2.2.4 Measurement as a property evaluation -- 2.3 Between the empirical world and the information world -- References -- Chapter 3: Technical and cultural contexts for measurement systems -- 3.1 Introduction -- 3.2 The quality of measurement and its results -- 3.2.1 A sketch of the framework -- 3.2.2 The Error Approach (or True Value Approach) -- 3.2.3 The Uncertainty Approach -- 3.2.4 Basic

components of measurement uncertainty -- 3.2.5 Measurement uncertainty and measurement results -- 3.3 The operational context -- 3.3.1 The metrological system -- 3.3.2 The measurement environment -- 3.4 The conceptual context -- 3.4.1 Measurement and property identification -- 3.4.2 Measurement and measure -- References -- Chapter 4: Philosophical perspectives on measurement -- 4.1 Introduction. 4.1.1 Measurement between objectivity and subjectivity -- 4.2 Characterizing measurement -- 4.2.1 Naive realist perspectives on measurement -- 4.2.2 Operationalist perspectives on measurement -- 4.2.3 Representationalist perspectives on measurement -- 4.3 The concept of validity in psychosocial measurement -- 4.3.1 Early perspectives on validity -- 4.3.2 Construct validity -- 4.3.3 An argument-based approach to validity -- 4.3.4 Causal perspectives on validity -- 4.4 An interpretive framework -- 4.4.1 Exploring perspectives on measurement -- 4.4.2 Towards a different perspective? -- 4.5 A preliminary synthesis: model-dependent realism -- References -- Chapter 5: What is measured? -- 5.1 Introduction -- 5.1.1 The meaning of the Basic Evaluation Equation -- 5.1.2 A pragmatic introduction to the problem -- 5.1.3 Anticipating the main outcomes -- 5.2 Some clarifications about properties -- 5.2.1 Properties of objects as entities of the world -- 5.2.2 Properties and predicates -- 5.2.3 Properties and relations -- 5.2.4 From properties of formal logic to properties of measurement science -- 5.2.5 Context dependence of properties -- 5.2.6 Indistinguishability of properties of objects -- 5.3 A philosophical interlude -- 5.3.1 Do individual properties exist? -- 5.3.2 Individual properties as universals: an explanation -- 5.3.3 Do we really need properties? -- References -- Chapter 6: Values, scales, and the existence of properties -- 6.1 Introduction -- 6.2 Towards values of properties -- 6.2.1 Values of properties: what they are not -- 6.2.2 Values of properties cannot be discarded in contemporary measurement -- 6.3 Constructing values of quantities -- 6.3.1 Operating on (additive) quantities of objects -- 6.3.2 On reference objects and reference quantities -- 6.3.3 Alternative reference quantities and their relations, i.e., scale transformations. 6.3.4 Generalizing the definition of reference quantities -- 6.3.5 Values of quantities: what they are -- 6.3.6 Beyond additivity: the example of temperature -- 6.3.7 Beyond additivity: the example of reading comprehension ability -- 6.4 The epistemic role of Basic Evaluation Equations -- 6.5 Generalizing the framework to nonquantitative properties -- 6.5.1 The scope of the quantitative/nonquantitative distinction -- 6.5.2 From values of quantities to values of properties -- 6.5.3 Property Evaluation Types -- 6.6 About the existence of general properties -- 6.6.1 Properties and variables -- 6.6.2 Justifications for the existence of properties -- References -- Chapter 7: Modeling measurement and its quality -- 7.1 Introduction -- 7.2 Direct and indirect measurement -- 7.2.1 Recovering a meaningful distinction between direct and indirect measurement -- 7.2.2 Refining the distinction between direct and indirect measurement: first step -- 7.2.3 Refining the distinction between direct and indirect measurement: second step -- 7.3 A structural model of direct measurement -- 7.3.1 The design and construction of a measuring instrument -- 7.3.2 The stages of direct measurement -- 7.3.2.1 Transduction -- 7.3.2.2 Matching -- 7.3.2.3 Local scale application -- 7.3.2.4 Public scale construction -- 7.3.2.5 Calibration -- 7.3.3 An alternative implementation -- 7.3.4 The Hexagon Framework -- 7.3.5 An example application of the model in the human sciences -- 7.3.5.1 Transduction -- 7.3.5.2 Matching -- 7.3.5.3 Local scale construction and application

-- 7.3.5.4 Interlude: reality check -- 7.3.5.5 Public scale construction and application, and calibration -- 7.4 Measurement quality according to the model -- 7.4.1 Measurement that involves feedback -- 7.4.2 Uncertainties in the stages of direct measurement -- 7.4.2.1 Regarding the definition of the measurand.
7.4.2.2 Regarding the definition and dissemination of the public scale and calibration -- 7.4.2.3 Regarding transduction and matching -- 7.4.3 Quality of measurement as objectivity and intersubjectivity -- 7.4.4 Can measurement be "bad"? -- References -- Chapter 8: Conclusion -- 8.1 Introduction -- 8.1.1 Syntactic, semantic, and pragmatic information -- 8.1.2 A semiotic perspective on measurement -- 8.2 The path we have walked so far -- 8.3 Can there be one meaning of "measurement" across the sciences? -- 8.3.1 Different subject matters, different processes ... -- 8.3.2 ... with some structural commonalities ... -- 8.3.3 ... and a common emphasis on trustworthiness ... -- 8.3.4 ... and a focus on producing explicitly justifiable information -- 8.3.5 Consequences for the theory and the practice of measurement -- References -- Appendix A: A basic concept system of measurement -- Introduction -- Alphabetical list of the entries -- References -- Index of concepts and authors' names -- Index.
