Teaching Primary Mathematics

This book offers a theory for the analysis of how children learn and are taught about whole numbers. Two meanings of numbers are distinguished – the analytical meaning, defined by the number system, and the representational meaning, identified by the use of numbers as conventional signs that stand for quantities. This framework makes it possible to compare different approaches to making numbers meaningful in the classroom and contrast the outcomes of these diverse aspects of teaching. The book identifies themes and trends in empirical research on the teaching and learning of whole numbers since the launch of the major journals in mathematics education research in the 1970s. It documents a shift in focus in the teaching of arithmetic from research about teaching written algorithms to teaching arithmetic in ways that result in flexible approaches to calculation. The analysis of studies on quantitative reasoning reveals classifications of problem types that are related to different cognitive demands and rates of success in both additive and multiplicative reasoning. Three different approaches to quantitative reasoning education illustrate current thinking on teaching problem solving: teaching reasoning before arithmetic, schema-based instruction, and the use of pre-designed diagrams. The book also includes a summary of contemporary approaches to the description of the knowledge of numbers and arithmetic that teachers need to be effective teachers of these aspects of mathematics in primary school. The concluding section includes a brief summary of the major themes addressed and the challenges for the future. The new theoretical framework presented offers researchers in mathematics education novel insights into the differences between empirical studies in this domain. At the same time the description of the two meanings of numbers helps teachers distinguish between the different aims of teaching about numbers supported by diverse methods used in primary school. The framework is a valuable tool for comparing the different methods and identifying the various assumptions about teaching and learning.

Teaching and Learning About Whole Numbers in Primary School

This book seeks to address the question of how the task of teaching mathematics to young children might be better understood. But rather than starting out with a conception of mathematics derived from the many histories mathematics might claim as its own we centre the analysis instead within the social practices that surround the teaching of the subject to children aged four to eleven in English primary schools today. That is, we do not commence with an a priori conception of mathematics and see what people are saying about it. Rather, we start...
from what people are saying and see where this points. We probe how the desires of society have manifested
themselves in a societal decision to teach mathematics and how this decision now shapes that which is called
"mathematics". We focus on the operation of the noun "mathematics" and verb "mathematical" and consider how
the meanings of these terms derive from the social domain in which they are being used. This extends and
develops a conception of how language intervenes in the task of mathematics education presented elsewhere
(Brown, 2001). In this present book however, we have a particular focus on trainee and newly qualified teachers,
with a view to pinpointing how this conception of mathematics manifests itself in their evolving practices. We
question how such teachers with many years of experience as a pupil in school might now re-orient themselves
towards the demands of teaching mathematics in schools.

**Issues in Mathematics Teaching**

To help teachers confidently teach mathematics in primary school, this book develops their understanding of
mathematical concepts and processes and how children learn them.

**Understanding and Teaching Primary Mathematics**

This collection of 10 papers aims to provide teachers at all levels with ideas on a number of important aspects of
mathematics education. The Report of the Committee on Inquiry into the Teaching of Mathematics (Cockcroft
Report) has provoked wide discussion in England, and the papers examine some contemporary issues in school
mathematics in light of this and other recent reports. Examined are current issues and problems in mathematics
teaching, teaching mathematics in primary and middle schools and in secondary schools, difficulties in learning
mathematics, organization and methods, the slow learner and the gifted child, calculators in the classroom,
games and recreations, links between mathematics and other subjects, and the assessment and evaluation of
school mathematics. (MNS)

**Mathematics in the Primary School**

This title provides much food for thought and pointers to meet future challenges in mathematics education not
only within Singapore, but also in other countries.

**Mathematical Applications and Modelling**

Suitable for high school students with high mathematics ability and people above high school level. High school
students with higher mathematics ability should learn more in-depth Mathematical Olympiad topics through
independent learning methods to further improve their mathematics level, which is conducive to studying
university subjects in the future.

**Numeracy and Learning Difficulties**

By understanding why children struggle with maths, teachers are better equipped to provide effective support and
nurture confidence in low-achievers. Numeracy and Learning Difficulties includes how to tackle common learning
difficulties by following different teaching practices and principles, identifying gaps in students’ knowledge and
developing curricula that bridges these gaps, improves numerical literacy using problem-solving strategies and
skills, and a handy checklist of benchmarks in achievement.

**Key Concepts in Teaching Primary Mathematics**

Now in its third edition, Mathematics in the Primary School has been updated to reflect recent mathematics
curriculum documentation and revised standards for QTS. Key areas include: The role of talk in learning maths
Teacher questioning Development of children’s reasoning Creative engagement with maths Assessment for
learning and self assessment Suggested resources for teachers including ICT Providing a coherent set of
principles for teaching primary mathematics across the main topics in the curriculum, the authors explore
children’s understanding of key areas of mathematics, at reception, infant and junior levels. Important principles
and teaching approaches are identified, including the use of calculators and computers, and there is an emphasis on mental mathematics and problem solving supporting key issues raised by the Williams review (2008). Case studies are used throughout to illustrate how different teaching approaches are put into practice and how children respond to them, and there is advice on planning, organisation and assessment of mathematical learning in the classroom. Emphasising the importance of teachers' own mathematical knowledge and offering clear guidance and practical advice, this book is essential reading for students, NQTs and practising teachers with a focus on primary mathematics.

**Teaching Mathematics**

Covering the key principles and concepts in the teaching and learning of mathematics in primary schools, this text provides trainee and practising teachers with a quick and easy reference to what they need to know for their course, and in the classroom. The entries are arranged alphabetically, and each contains a brief definition, followed by an explanation and discussion, practical examples and annotated suggestions for further reading. Examples of the wide-ranging material include: Anxiety about mathematics; Assessment for Learning; Cognitive conflict; Concept learning; Creativity in mathematics; Differentiation; Equivalence; Explanation; Investigation; Low attainment; Making connections; Meaningful context; Mental calculation; Numeracy; Play as a context for learning mathematics; Problem-solving; Questioning; Talk.

**Higher Goals in Mathematics Education**

A study of gender issues in mathematics teaching at primary level. It reviews the literature, presents a framework for the gender analysis of primary school mathematics textbooks, and applies this framework to the analysis of the textbooks currently in use in India.

**Reflective Primary Mathematics**

Contemporary concerns in mathematics education recognize that in the increasingly technological and globalized world, with concomitant change in population demographics (e.g. immigration, urbanization) and a change in the status of languages (e.g. English as a dominant language of science and technology) multilingualism in classrooms is a norm rather than an exception. Shifts in perspective also view language not simply as an instrument for cognition with all learners equipped with this instrument in service of learning, although clearly in the classroom that remains of importance. Rather, it is now also being acknowledged that language use is inherently political, so that the language that gets official recognition in the classroom is invariably the language of the powerful elite, or the dominant societal language, or in the case of post-colonial contexts the language of the colonisers. From this socio-political role of language in learning quite different issues arise for teaching, learning and curriculum for linguistically marginalized learners than that of cognition (e.g. immigrants, second language learners, other). Policies on language in education are being considered and re-considered with specific reference to mathematics teaching and learning. Given the policy environment, globally the proposed publication is timely. This edited collection draws on recent, emerging insights and understandings about the approaches to improving policy and practice in mathematics education and mathematics teacher education in multilingual settings. It presents, and discusses critically, examples of work from a range of contexts and uses these examples to draw out key issues for research in education in language diverse settings including teaching, learning, curriculum and fit these with appropriate policy and equity approaches. With contributions from all over the world, especially novice researchers in low income countries, this book is a valuable resource for courses in Mathematics Education and related social sciences both at the graduate and undergraduate levels, as well as for students of international development.

**Teaching Mathematics in Primary Schools**

This up to date book is essential reading for all those teaching or training to teach primary mathematics. Problem solving is a key aspect of teaching and learning mathematics, but also an area where teachers and pupils often struggle. Set within the context of the new primary curriculum and drawing on research and practice, the book identifies the key knowledge and skills required in teaching and learning problem solving in mathematics, and
examines how these and can be applied in the classroom. It explores the issues in depth while remaining straightforward and relevant, emphasises the enrichment of maths through problem-solving, and provides opportunities for teachers to reflect on and further develop their classroom practice.

**Mathematics Education**

Numerous examples from early years and primary classrooms are included as well as checklists and helpful advice. There are also suggestions for further reading to assist trainee and newly qualified teachers in meeting the Standards for Initial Teacher Training and Induction.

**Teaching and Learning About Whole Numbers in Primary School**

Teaching Statistics in School Mathematics-Challenges for Teaching and Teacher Education results from the Joint ICMI/IASE Study Teaching Statistics in School Mathematics: Challenges for Teaching and Teacher Education. Oriented to analyse the teaching of statistics in school and to recommend improvements in the training of mathematics teachers to encourage success in preparing statistically literate students, the volume provides a picture of the current situation in both the teaching of school statistics and the pre-service education of mathematics teachers. A primary goal of Teaching Statistics in School Mathematics-Challenges for Teaching and Teacher Education is to describe the essential elements of statistics, teacher's professional knowledge and their learning experiences. Moreover, a research agenda that invites new research, while building from current knowledge, is developed. Recommendations about strategies and materials, available to train prospective teachers in university and in-service teachers who have not been adequately prepared, are also accessible to the reader.

**Problems of Teaching Junior Secondary Mathematics in Kenya**

Mathematics teacher education includes the mathematics content teachers need to understand, ways that pedagogical approaches are developed, messages about the nature of mathematics teaching and learning, and interfaces between tertiary preparation and school contexts. Scholars from Sweden, France, Malawi, Singapore, New Zealand, Brazil, the USA, and Canada provide insights for the mathematics education community's understanding of how teacher educators structure, develop, and implement their respective mathematics teacher education programs. Several themes emerged across the chapters, including: varied approaches to developing culturally responsive pedagogies and/or Indigenous perspectives; issues and challenges in fostering partnerships and collaborations; strategies for developing mathematics knowledge for teaching; and preparing flexible and resourceful teachers. Praise for International Perspectives on Mathematics Teacher Education: "International Perspectives on Mathematics Teacher Education explores different facets of mathematics teacher education in eight countries across five continents. The authors and editors answer important questions and open the door to critical conversations about policies and practices related to mathematics teacher recruitment, preparation, and professional development, among other topics. Every reader will develop new perspectives as they learn how one institution is engaging with Indigenous perspectives while other countries struggle with an insufficient supply of certified teachers. This book clearly demonstrates challenges, constraints, nuances and complexities to initiating and maintaining improvement across systems to enhance the work and spaces of mathematics teachers within different historical, cultural, social, and political contexts. This volume also generates ideas and opportunities for leaders, policymakers, and teacher educators to consider and learn from international colleagues about different approaches to mathematics teacher education practice and policy. Undoubtedly, debates about standards, content and experiences in programs, and accountability structures such as accreditation will continue. It is clear from the insights in this volume that strengthening mathematics teacher education will require stronger collaborations, frameworks, policies, infrastructure, and investments on a global scale and it will be critical to collaborate with and learn from colleagues in international settings. These conversations will require reciprocity, interdependence, and resilience as we pursue the ultimate goal of equipping the field of mathematics teacher education." Kathryn Chval Dean, College of Education Professor of Mathematics Education University of Illinois Chicago

**Problem Solving in Mathematics Education**
Help your students to think critically and creatively through team-based problem solving instead of focusing on testing and outcomes. Professionals throughout the education system are recognizing that standardized testing is holding students back. Schools tend to view children as outcomes rather than as individuals who require guidance on thinking critically and creatively. Awesome Math focuses on team-based problem solving to teach discrete mathematics, a subject essential for success in the STEM careers of the future. Built on the increasingly popular growth mindset, this timely book emphasizes a problem-solving approach for developing the skills necessary to think critically, creatively, and collaboratively. In its current form, math education is a series of exercises: straightforward problems with easily-obtained answers. Problem solving, however, involves multiple creative approaches to solving meaningful and interesting problems. The authors, co-founders of the multi-layered educational organization AwesomeMath, have developed an innovative approach to teaching mathematics that will enable educators to: Move their students beyond the calculus trap to study the areas of mathematics most of them will need in the modern world Show students how problem solving will help them achieve their educational and career goals and form lifelong communities of support and collaboration Encourage and reinforce curiosity, critical thinking, and creativity in their students Get students into the growth mindset, coach math teams, and make math fun again Create lesson plans built on problem based learning and identify and develop educational resources in their schools Awesome Math: Teaching Mathematics with Problem Based Learning is a must-have resource for general education teachers and math specialists in grades 6 to 12, and resource specialists, special education teachers, elementary educators, and other primary education professionals.

**Becoming a Primary Mathematics Specialist Teacher**

Written by an experienced teacher and teacher educator with widespread experience of teaching mathematics in the UK and internationally, Understanding and Teaching Primary Mathematics combines pedagogy and subject knowledge to build confidence and equip you with all the skills and know-how you need to successfully teach mathematics to children of any age. This 4th edition has been fully updated to reflect the latest research developments and initiatives in the field, including a brand-new chapter on 'Mastery and mathematics' and 'The Singapore approach' which reflects the current international interest in these approaches to learning and teaching mathematics. Extra features also include helpful callouts to the book’s revised and updated companion website, which offers a shared site with a range of resources relevant to both this book and its companion volume, Teaching for Mathematical Understanding. Stimulating, accessible and well-illustrated, with comprehensive coverage of subject knowledge and pedagogy, Understanding and Teaching Primary Mathematics is an essential purchase for trainee and practising teachers alike.

**Enhancing Primary Mathematics Teaching**

**Understanding and Enriching Problem Solving in Primary Mathematics**

**Teaching Statistics in School Mathematics-Challenges for Teaching and Teacher Education**

Tasks in Primary Mathematics Teacher Education is intended to advance relevant research and innovative international practices in the preparation and professional development of mathematics teachers. Emerging from discussion at the ICMI study on teacher professional development, this volume, focused on primary and elementary teachers, culls a richness that can only be found by gathering wisdom from varied experiences around the world. The choice of tasks, and the associated pedagogies, is a key aspect of teaching and learning mathematics. Arguing that what students learn is largely defined by the tasks they are given, several major themes are presented. One such major strand, the form, function and focus of tasks, is discussed throughout several chapters, offering analysis, discussion of implementation, and exemplars of a broader category of illustrative techniques for developing critical understanding.

**Mathematical Problem Solving**

This book is a report on the academic achievement assessment of Grade-6 students in primary school with a
large-scale sample for the first time since the new curriculum reform. This report consists of the general report, reports on the four subjects of Chinese, Mathematics, Science and Morality and Society, the questionnaire survey report and assessment instruments. This report states the complexion of students’ academic achievement including achievements and shortcomings and proposes some targeted suggestions. The methods and assessment instruments have important reference value for future academic achievement assessment.

**Mathematics Explained for Primary Teachers**

'This is an outstanding book: it should be high on the list of any primary school teacher's set of references and a required text for pre-service teachers.' Australian Primary Mathematics Classroom In our technology-rich world, numeracy is just as important as the smartphone in your pocket. Students need to develop mathematical ways of seeing the world and strong problem-solving skills, and those foundations are taught in the primary school classroom. Teaching Mathematics in Primary Schools covers the mathematical content taught in primary and middle years, always emphasising how students can connect what they learn in mathematics with other curriculum areas and with the world beyond the classroom. The authors draw on the latest international research to show how teachers can develop a rich repertoire of classroom teaching techniques, and effective planning, assessment and reporting methods. They outline approaches to creating supportive learning environments for all students, and to building their knowledge and confidence in using mathematics. This third edition has been updated throughout and includes a new chapter on numeracy. Evidence-based uses of digital technologies to support learning and teaching are included in every chapter. With practical strategies that can be implemented in the classroom, this book is an invaluable resource for pre-service and early career primary and middle years mathematics teachers.

**Second Handbook of Research on Mathematics Teaching and Learning**

The mathematics education community continues to contribute research-based ideas for developing and improving problem posing as an inquiry-based instructional strategy for enhancing students’ learning. A large number of studies have been conducted which have covered many research topics and methodological aspects of teaching and learning mathematics through problem posing. The Authors' groundwork has shown that many of these studies predict positive outcomes from implementing problem posing on: student knowledge, problem solving and posing skills, creativity and disposition toward mathematics. This book examines, in-depth, the contribution of a problem posing approach to teaching mathematics and discusses the impact of adopting this approach on the development of theoretical frameworks, teaching practices and research on mathematical problem posing over the last 50 years.

**Teaching and Learning Mathematics in Multilingual Classrooms**

A concise and accessible guide to pedagogy and practice for pre-service teachers.

**Teaching Mathematics in the Primary School**

Containing a range of issues relating to the teaching of mathematics, this text builds on knowledge already gained on ITT and PGCE courses and encourages teachers to consider and reflect on the issues that affect their teaching skills.

**Gender Sensitivity in Primary School Mathematics in India**

Click on the link below to access this title as an e-book. Please note that you may require an Athens account.

**EBOOK: Issues in Teaching Numeracy in Primary Schools**

This book contributes to the field of mathematical problem solving by exploring current themes, trends and research perspectives. It does so by addressing five broad and related dimensions: problem solving heuristics, problem solving and technology, inquiry and problem posing in mathematics education, assessment of and
through problem solving, and the problem solving environment. Mathematical problem solving has long been recognized as an important aspect of mathematics, teaching mathematics, and learning mathematics. It has influenced mathematics curricula around the world, with calls for the teaching of problem solving as well as the teaching of mathematics through problem solving. And as such, it has been of interest to mathematics education researchers for as long as the field has existed. Research in this area has generally aimed at understanding and relating the processes involved in solving problems to students’ development of mathematical knowledge and problem solving skills. The accumulated knowledge and field developments have included conceptual frameworks for characterizing learners’ success in problem solving activities, cognitive, metacognitive, social and affective analysis, curriculum proposals, and ways to promote problem solving approaches.

**Primary Mathematics: Teaching For Understanding**

"Becoming a Primary Mathematics Specialist Teacher challenges teachers to think about the role and impact of the Mathematics Specialist in changing staff, parents and children's attitudes to the subject in the primary school. It explores what we really mean by deep mathematical subject knowledge, explains key pedagogical approaches to teaching mathematics, and demonstrates how you can effectively mentor less experienced or confident colleagues to improve teaching and learning. Illustrated throughout with classroom-based examples, research findings and theoretical ideas, this book considers a wide range of issues including the use and application of mathematics, the utilisation of practical resources, and the principles of progression. It also considers some common misconceptions in mathematics, and offers scenarios and reflection activities at the end of each chapter. This supportive text is centred around three key themes of deep subject knowledge, pedagogical knowledge and the skills required for mentoring, coaching and supporting colleagues - features which the authors explore first from a theoretical perspective, and secondly through the context of specific mathematical topics taken from the primary curriculum. Becoming a Primary Mathematics Specialist Teacher supports primary mathematics teachers in their development as reflective practitioners, who can confidently challenge practice in their own classroom and move the whole school forward through collaborative professional development"--

**Effective Teaching Strategies for Dyscalculia and Learning Difficulties in Mathematics**

'This original book shows the crucial importance of personal philosophies of mathematics. Using current research it guides us to reflect on our attitudes and beliefs. Essential reading for anybody interested in mathematics and its teaching.' Paul Ernest, Emeritus Professor of Mathematics Education, University of Exeter Teaching mathematics can be challenging, and returning to a mathematics classroom yourself may not inspire you with confidence. This book can help you to become an assured teacher who can give young learners the high quality mathematics education that they deserve, by exploring the philosophy that lies behind good mathematics teaching and its application in the classroom. Throughout the book you are encouraged to put your own thoughts on mathematics learning and teaching under the microscope and examine your perceptions and understanding in order to develop as a critically reflective teacher, aware of potential challenges and what underpins effective mathematics teaching in primary schools. Coverage includes: developing your own philosophy towards mathematics teaching, understanding links between confidence and learning, the importance of subject knowledge, common beliefs and attitudes among mathematics learners, how to develop your relationship with the subject. This is essential reading for all students studying primary mathematics on initial teacher education courses, including undergraduate (BEd, BA with QTS), postgraduate (PGCE, School Direct, SCITT, Teach First) and NQTs. Elizabeth Jackson has over thirty years' experience of mathematics education through primary and secondary school teaching, lecturing in initial teacher education and supervising mathematics Master's dissertations, as well as conducting research into mathematics and writing.

**Mathematics Across the Curriculum**

Effective Teaching Strategies for Dyscalculia and Learning Difficulties in Mathematics provides an essential bridge between scientific research and practical interventions with children. It unpacks what we know about the possible cognitive causation of mathematical difficulties in order to improve teaching and therefore learning. Each chapter considers a specific domain of children's numerical development: counting and the understanding of numbers, understanding of the base-10 system, arithmetic, word problem solving, and understanding rational
numbers. The accessible guidance includes a literature review on each topic, surveying how each process develops in children, the difficulties encountered at that level by some pupils, and the intervention studies that have been published. It guides the reader step-by-step through practical guidelines of how to assess these processes and how to build an intervention to help children master them. Illustrated throughout with examples of materials used in the effective interventions described, this essential guide offers deep understanding and effective strategies for developmental and educational psychologists, special educational needs and/or disabilities coordinators, and teachers working with children experiencing mathematical difficulties.

**Teaching Statistics in School Mathematics-Challenges for Teaching and Teacher Education**

This book addresses the particular areas of mathematics within the primary curriculum that teachers find difficult to teach and in which children struggle to achieve... It begins with introductory sections on how children learn mathematics and is then organised on a subject area basis, dealing with the teaching of particular maths topics. Key topics addressed include rounding and measuring, means and medians, fractions, negative numbers, commutative and associative laws in number operations, and shape and space. Within each chapter, the authors examine the themes of representing, reasoning and communicating, drawing out both the subject knowledge and ways of teaching each topic. A reference section for studies drawn upon is provided at the end of each chapter.

**Assessment Report on Chinese Primary School Students’ Academic Achievement**

Issues in Teaching Numeracy in Primary Schools is a bestselling guide for all trainee and practising primary school teachers, classroom assistants and mathematics specialist teachers. It provides an accessible guide to a wide range of research evidence about teaching and learning mathematics. Major changes in the primary mathematics curriculum in recent years - such as those recommended in the National Numeracy Strategy, the Primary National Strategy, the Early Years Foundation Stage, the Williams, Rose and Alexander Reviews - are reflected throughout the book. The new edition comprises fourteen new chapters, including a section devoted to post-Williams issues and four popular chapters that have been retained and updated in light of the vast changes in the field. Key topics include: Using resources, ICT, AfL and problem solving approaches effectively Learning from errors and misconceptions Developing mental and written calculation The ‘gifted and talented’ Transition from EYFS into Key Stage 1 Intervention and the Every Child Counts programme This popular book is essential reading for all trainee and practising primary school teachers, classroom assistants and mathematics specialist teachers. The chapters can be read in a standalone fashion and many are cross-referenced to other parts of the book where specific ideas are dealt with in a different manner. Contributors: Mike Askew, Patrick Barmby, Meindert Beishuizen, Margaret Brown, Kev Delaney, Nick Dowrick, Sylvia Dunn, Richard English, Sue Gifford, Tony Harries, Steve Higgins, Jeremy Hodgen, Louise Matthews, Frank Monaghan, Mike Ollerton, Julie Ryan, Ian Thompson, John Threlfall, Julian Williams, Jan Winter

**The Perceptions of Teachers of the Problems They Encounter in Teaching Primary School Mathematics**

**Mathematics Olympiad Masterpiece Series: High School Level**

Teaching Statistics in School Mathematics-Challenges for Teaching and Teacher Education results from the Joint ICMI/IASE Study Teaching Statistics in School Mathematics: Challenges for Teaching and Teacher Education. Oriented to analyse the teaching of statistics in school and to recommend improvements in the training of mathematics teachers to encourage success in preparing statistically literate students, the volume provides a picture of the current situation in both the teaching of school statistics and the pre-service education of mathematics teachers. A primary goal of Teaching Statistics in School Mathematics-Challenges for Teaching and Teacher Education is to describe the essential elements of statistics, teacher’s professional knowledge and their learning experiences. Moreover, a research agenda that invites new research, while building from current knowledge, is developed. Recommendations about strategies and materials, available to train prospective teachers in university and in-service teachers who have not been adequately prepared, are also accessible to the reader.
Teaching Mathematics in Primary Schools

The fifth edition of Teaching Primary Mathematics has been significantly revised and updated for the current educational environment. The organisation of the book has been redesigned to reflect feedback from readers and the approach taken by the Australian Curriculum: Mathematics. Teaching Primary Mathematics provides teachers and students with a sound framework for the successful teaching of mathematics to primary students. It is suitable both as a core text for primary student teachers and as an indispensable reference for practicing primary teachers seeking to update their knowledge.

Mathematical Problem Posing

The audience remains much the same as for the 1992 Handbook, namely, mathematics education researchers and other scholars conducting work in mathematics education. This group includes college and university faculty, graduate students, investigators in research and development centers, and staff members at federal, state, and local agencies that conduct and use research within the discipline of mathematics. The intent of the authors of this volume is to provide useful perspectives as well as pertinent information for conducting investigations that are informed by previous work. The Handbook should also be a useful textbook for graduate research seminars. In addition to the audience mentioned above, the present Handbook contains chapters that should be relevant to four other groups: teacher educators, curriculum developers, state and national policy makers, and test developers and others involved with assessment. Taken as a whole, the chapters reflects the mathematics education research community’s willingness to accept the challenge of helping the public understand what mathematics education research is all about and what the relevance of their research findings might be for those outside their immediate community.

Tasks in Primary Mathematics Teacher Education

This book offers a theory for the analysis of how children learn and are taught about whole numbers. Two meanings of numbers are distinguished – the analytical meaning, defined by the number system, and the representational meaning, identified by the use of numbers as conventional signs that stand for quantities. This framework makes it possible to compare different approaches to making numbers meaningful in the classroom and contrast the outcomes of these diverse aspects of teaching. The book identifies themes and trends in empirical research on the teaching and learning of whole numbers since the launch of the major journals in mathematics education research in the 1970s. It documents a shift in focus in the teaching of arithmetic from research about teaching written algorithms to teaching arithmetic in ways that result in flexible approaches to calculation. The analysis of studies on quantitative reasoning reveals classifications of problem types that are related to different cognitive demands and rates of success in both additive and multiplicative reasoning. Three different approaches to quantitative reasoning education illustrate current thinking on teaching problem solving: teaching reasoning before arithmetic, schema-based instruction, and the use of pre-designed diagrams. The book also includes a summary of contemporary approaches to the description of the knowledge of numbers and arithmetic that teachers need to be effective teachers of these aspects of mathematics in primary school. The concluding section includes a brief summary of the major themes addressed and the challenges for the future. The new theoretical framework presented offers researchers in mathematics education novel insights into the differences between empirical studies in this domain. At the same time the description of the two meanings of numbers helps teachers distinguish between the different aims of teaching about numbers supported by diverse methods used in primary school. The framework is a valuable tool for comparing the different methods and identifying the various assumptions about teaching and learning.

New Teacher Identity and Regulative Government

This survey book reviews four interrelated areas: (i) the relevance of heuristics in problem-solving approaches – why they are important and what research tells us about their use; (ii) the need to characterize and foster creative problem-solving approaches – what type of heuristics helps learners devise and practice creative solutions; (iii) the importance that learners formulate and pursue their own problems; and iv) the role played by the use of both multiple-purpose and ad hoc mathematical action types of technologies in problem-solving contexts – what ways
of reasoning learners construct when they rely on the use of digital technologies, and how technology and technology approaches can be reconciled.

**Awesome Math**

Mathematics is a core subject and using and applying mathematics in problem solving activities is crucial in enabling children to use their knowledge and skills in a range of situations. Mathematics Across the Curriculum shows how to teach mathematical concepts through different subjects and discussing the reasoning and research behind using problem solving and investigation teaching techniques. Best practice for planning and assessment, classroom organisation and practice, and use of resources are all discussed, with clear links to recent research and government standards and initiatives. Case studies from practicing teachers enable readers to easily relate the theoretical information to their classroom and teaching. Mathematics Across the Curriculum is essential reading for all trainee and newly qualified teachers seeking to teach engaging, inspiring and challenging mathematics lessons. It will also be a useful resource for established teachers embarking on their Masters in Teaching and Learning (MTL).

**International Perspectives on Mathematics Teacher Education**

Mathematical Applications and Modelling is the second in the series of the yearbooks of the Association of Mathematics Educators in Singapore. The book is unique as it addresses a focused theme on mathematics education. The objective is to illustrate the diversity within the theme and present research that translates into classroom pedagogies. The book, comprising of 17 chapters, illuminates how application and modelling tasks may help develop the capacity of students to use mathematics in their present and future lives. Several renowned international researchers in the field of mathematical modelling have published their work in the book. The chapters are comprehensive and laden with evidence-based examples for both mathematics educators and classroom teachers. The book is an invaluable contribution towards the emerging field of research in mathematical applications and modelling. It is a must-read for graduate research students and mathematics educators.

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