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Repositioning Pedagogical Content Knowledge in Teachers’ Knowledge for Teaching Science-Anne Hume 2019-01-28 This book enhances readers’ understanding of science teachers’ professional knowledge, and illustrates how the Pedagogical Content Knowledge research agenda can make a difference in teachers’ practices and how students learn science. Importantly, it offers an updated international perspective on the evolving nature of Pedagogical Content Knowledge and how it is shaping research and teacher education agendas for science teaching. The first few chapters background and introduce a new model known as the Refined Consensus Model (RCM) of Pedagogical Content Knowledge (PCK) in science education, and clarify and demonstrate its use in research and teacher education and practice. Subsequent chapters show how this new consensus model of PCK in science education is strongly connected with empirical data of varying nature, contains a tailored language to describe the nature of PCK in science education, and can be used as a framework for illuminating past studies and informing the design of future PCK studies in science education. By presenting and discussing the RCM of PCK within a variety of science education contexts, the book makes the model significantly more applicable to teachers’ work.

Understanding and Developing

Science Teachers’ Pedagogical Content Knowledge-John Loughran 2012-07-31 There has been a growing interest in the notion of a scholarship of teaching. Such scholarship is displayed through a teacher’s grasp of, and response to, the relationships between knowledge of content, teaching and learning in ways that attest to practice as being complex and interwoven. Yet attempting to capture teachers’ professional knowledge is difficult because the critical links between practice and knowledge, for many teachers, is tacit. Pedagogical Content Knowledge (PCK) offers one way of capturing, articulating and portraying an aspect of the scholarship of teaching and, in this case, the scholarship of science teaching. The research underpinning the approach developed by Loughran, Berry and Mulhall offers access to the development of the professional knowledge of science teaching in a form that offers new ways of sharing and disseminating this knowledge. Through this Resource Folio approach (comprising CoRe and PaP-eRs) a recognition of the value of the specialist knowledge and skills of science teaching is not only highlighted, but also enhanced. The CoRe and PaP-eRs methodology offers an exciting new way of capturing and portraying science teachers’ pedagogical content knowledge so that it might be better understood and valued within the profession. This book is a concrete example of the nature of scholarship in science teaching that is meaningful, useful and immediately applicable in the work of all science teachers (preservice, in-service and science teacher educators). It is an excellent resource for science teachers as well as a guiding text for
teacher education. Understanding teachers' professional knowledge is critical to our efforts to promote quality classroom practice. While PCK offers such a lens, the construct is abstract. In this book, the authors have found an interesting and engaging way of making science teachers’ PCK concrete, useable, and meaningful for researchers and teachers alike. It offers a new and exciting way of understanding the importance of PCK in shaping and improving science teaching and learning. Professor Julie Gess-Newsome Dean of the Graduate School of Education Williamette University This book contributes to establishing CoRes and PaP-eRs as immensely valuable tools to illuminate and describe PCK. The text provides concrete examples of CoRes and PaP-eRs completed in “real-life” teaching situations that make stimulating reading. The authors show practitioners and researchers alike how this approach can develop high quality science teaching. Dr Vanessa Kind Director Science Learning Centre North East School of Education Durham University

**Elementary Mathematics Pedagogical Content Knowledge**—James E. Schwartz 2008 Schwartz Powerful Ideas in Elementary Mathematics: Pedagogical Content Knowledge for Teachers, 1/e ISBN: 0205493750 "This book would be a great tool for helping [today's future elementary teachers] acquire a 'gut level' understanding of mathematics concepts." - Hester Lewellen, Baldwin-Wallace College, OH "The writing in this text is very clear and would easily be understood by the intended audience. The real-world examples put the various math concepts into a context that is easily understood. The vignettes at the beginning of each chapter are interesting and they get the reader to begin thinking about the math concepts that will follow. Each of the chapters seem to build on one another and the author often refers back to activities and concepts from previous chapters which is meaningful to the reader because it lets the reader know that the information they are learning builds their conceptual understanding of other mathematical concepts. " - Melany L. Rish, University of South Carolina, Aiken Organized around five key concepts or "powerful ideas" in mathematics, this text presents elementary mathematics content in a concise and nonthreatening manner for teachers. Designed to sharpen teachers' mathematics pedagogical content knowledge, the friendly writing style and vignettes relate math concepts to "real life" situations so that they may better present the content to their students. The five "powerful ideas" (composition, decomposition, relationships, representation, and context) provide an organizing framework and highlight the interconnections between mathematics topics. In addition, the text thoroughly integrates discussion of the five NCTM process strands. Features: Icons highlighting the NCTM process standards appear throughout the book to indicate where the text relates to each of these. Practice exercises and activities and their explanations reinforce math concepts presented in the text and provide an opportunity for reflection and practice. Concise, conversational chapters and opening vignettes present math contents simply enough for even the most math-anxious pre-service teachers.

**Handbook of Technological Pedagogical Content Knowledge (TPCK) for Educators**—Mary C. Herring 2014-06-11 Published by Taylor & Francis Group for the American Association of Colleges for Teacher Education This Handbook addresses the concept and implementation of technological pedagogical content knowledge -- the knowledge and skills that teachers need in order to integrate technology meaningfully into instruction in specific content areas. Recognizing, for example, that effective uses of technology in mathematics are quite different from effective uses of technology in social studies, teachers need specific preparation in using technology in each content area they will be teaching. Offering a series of chapters by scholars in different content areas who apply the technological pedagogical content knowledge framework to their individual content areas, the volume is structured around three themes: What is Technological Pedagogical Content Knowledge? Integrating Technological Pedagogical Content Knowledge into Specific Subject Areas Integrating Technological Pedagogical Content Knowledge into Teacher Education and Professional Development The Handbook of Technological Pedagogical Content Knowledge for Educators is simultaneously a mandate and a manifesto on the engagement of technology in classrooms based on consensus standards and rubrics for effectiveness. As the title of the concluding chapter declares, "It’s about time!" The American Association of Colleges for Teacher Education (AACTE) is a national, voluntary association of higher
Examining Pedagogical Content Knowledge
Julie Gess-Newsome 2006-04-11 This ambitious text is the first of its kind to summarize the theory, research, and practice related to pedagogical content knowledge. The audience is provided with a functional understanding of the basic tenets of the construct as well as its applications to research on science teacher education and the development of science teacher education programs.

Understanding and Developing Science Teachers' Pedagogical Content Knowledge
John Loughran 2006 There has been a growing interest in the notion of a scholarship of teaching. Such scholarship is displayed through a teacher’s grasp of, and response to, the relationships between knowledge of content, teaching and learning in ways that attest to practice as being complex and interwoven. Yet attempting to capture teachers’ professional knowledge is difficult because the critical links between practice and knowledge, for many teachers, is tacit. Pedagogical Content Knowledge (PCK) offers one way of capturing, articulating and portraying an aspect of the scholarship of teaching and, in this case, the scholarship of science teaching. The research underpinning the approach developed by the authors offers access to the development of the professional knowledge of science teaching in a form that offers new ways of sharing and disseminating this knowledge. Through this Resource Folio approach (comprising CoRe and PaP-eRs) a recognition of the value of the specialist knowledge and skills of science teaching is not only highlighted, but also enhanced. The CoRe and PaP-eRs methodology offers a new way of capturing and portraying science teachers’ pedagogical content knowledge so that it might be better understood and valued within the profession. [Publisher, ed].

Re-examining Pedagogical Content Knowledge in Science Education
Amanda Berry 2015-03-24 Pedagogical Content Knowledge (PCK) has been adapted, adopted, and taken up in a diversity of ways in science education since the concept was introduced in the mid-1980s. Now that it is so well embedded within the language of teaching and learning, research and knowledge about the construct needs to be more useable and applicable to the work of science teachers, especially so in these times when standards and other measures are being used to define their knowledge, skills, and abilities. Re-examining Pedagogical Content Knowledge in Science Education is organized around three themes: Re-examining PCK: Issues, ideas and development; Research developments and trajectories; Emerging themes in PCK research. Featuring the most up-to-date work from leading PCK scholars in science education across the globe, this volume maps where PCK has been, where it is going, and how it now informs and enhances knowledge of science teachers’ professional knowledge. It illustrates how the PCK research agenda has developed and can make a difference to teachers’ practice and students’ learning of science.

Technological Pedagogical Content Knowledge (TPACK) Framework for K-12 Teacher Preparation: Emerging Research and Opportunities
Niess, Margaret L. 2016-10-07 Educational technologies are vastly becoming a common-place entity in classrooms as they provide more options and support for teachers and students. However, many teachers are finding these technologies difficult to use as they were never fully trained on how to utilize it or have received little instruction on how to effectively apply it in the classroom. Technological Pedagogical Content Knowledge (TPACK) Framework for K-12 Teacher Preparation: Emerging Research and Opportunities features contemporary insights into a multi-year research effort that concluded with the design and development of an online TPACK learning trajectory. Highlighting how this development impacts the design of professional development coursework for educators, this publication is a critical work for in-service teachers, researchers, and online course developers.

Re-examining Pedagogical Content Knowledge in Science Education
Amanda Berry 2015-03-24 Pedagogical Content Knowledge (PCK) has been adapted, adopted,
and taken up in a diversity of ways in science education since the concept was introduced in the mid-1980s. Now that it is so well embedded within the language of teaching and learning, research and knowledge about the construct needs to be more useable and applicable to the work of science teachers, especially so in these times when standards and other measures are being used to define their knowledge, skills, and abilities. Re-examining Pedagogical Content Knowledge in Science Education is organized around three themes: Re-examining PCK: Issues, ideas and development; Research developments and trajectories; Emerging themes in PCK research. Featuring the most up-to-date work from leading PCK scholars in science education across the globe, this volume maps where PCK has been, where it is going, and how it now informs and enhances knowledge of science teachers’ professional knowledge. It illustrates how the PCK research agenda has developed and can make a difference to teachers’ practice and students’ learning of science.

The Impact of Physics Teachers' Pedagogical Content Knowledge on Teacher Actions and Student Outcomes-Jennifer Olszewski 2010 Research on teachers' professional knowledge hints at teachers' pedagogical content knowledge being an important criterion for instructional quality and student achievement. This research project investigates the relation between teachers' pedagogical content knowledge, teachers' actions, and students' content knowledge in physics comparing Finland, Germany, and Switzerland.

Technological Pedagogical Content Knowledge-Charoula Angeli 2014-11-13 Technological pedagogical content knowledge (TPCK) reflects a new direction in understanding the complex interactions among content, pedagogy, learners and technology that can result in successful integration of multiple technologies in teaching and learning. The purpose of this edited volume is to introduce TPCK as a conceptual framework for grounding research in the area of teachers’ cognitive understanding of the interactions of technology with content, pedagogy and learner conceptions. Accordingly, the contributions will constitute systematic research efforts that use TPCK to develop lines of educational technology research exemplifying current theoretical conceptions of TPCK and methodological and pedagogical approaches of how to develop and assess TPCK.

Expert Teacher-Darren Mead 2019-06-07 In The Expert Teacher: Using pedagogical content knowledge to plan superb lessons, Darren Mead presents an engaging, research-informed view on which teaching strategies work best to induce long-term learning in students. ‘But what does this look like in the classroom?’ This question generally occurs to educators when they enquire into evidence-based approaches to teaching - and often they will get to the end of a teaching manual only to find that it remains unanswered. In The Expert Teacher, however, Darren Mead provides many of the answers. One of the most universally respected teachers in Britain, Darren has devoted his professional life to attaining pedagogical excellence. In this book he examines in depth what expert teachers do to help students progress their learning and strive for academic success. He lays bare the concept of pedagogical content knowledge and eloquently explains how to utilise it to overcome student misconceptions, create contexts and connections in learning and teach difficult and important content - empowering educators to transform their subject knowledge into multiple means of representing it in teachable ways. The intention of The Expert Teacher is to help teachers to reflect on what and how they plan, how they teach and how to improvise around these plans, and to pave the way for deep professional thinking about best practice. It is split into two parts - entitled How is Your Subject Learned? and Expert Teaching and Learning - and provides educators with a variety of practical tools, illuminating examples and flexible frameworks geared to help them underpin and reinforce the very ampersand in expert teaching & learning. A warning though: this book is not for teachers seeking quick fixes or superficial tricks. The Expert Teacher is for educators who are eager to experience the excitement of knowing and teaching their subject masterfully. Suitable for all teachers in all settings.

Pedagogical Content Knowledge in STEM-Stephen Miles Uzzo 2018-10-25 This volume represents both recent research in pedagogical content knowledge (PCK) in science, technology, engineering and math (STEM), as well as emerging innovations in how PCK is applied in practice. The notion of “research to practice” is
critical to validating how effectively PCK works within the clinic and how it can be used to improve STEM learning. As the need for more effective educational approaches in STEM grows, the importance of developing, identifying, and validating effective practices and practitioner competencies are needed. This book covers a wide range of topics in PCK in different school levels (middle school, college teacher training, teacher professional development), and different environments (museums, rural). The contributors believe that vital to successful STEM education practice is recognition that STEM domains require both specialized domain knowledge as well as specialized pedagogical approaches. The authors of this work were chosen because of their extensive fieldwork in PCK research and practice, making this volume valuable to furthering how PCK is used to enlighten the understanding of learning, as well as providing practical instruction. This text helps STEM practitioners, researchers, and decision-makers further their interest in more effective STEM education practice, and raises new questions about STEM learning.

Benchmarks for Science Literacy—American Association for the Advancement of Science 1994-01-06 Published to glowing praise in 1990, Science for All Americans defined the science-literate American—describing the knowledge, skills, and attitudes all students should retain from their learning experience—and offered a series of recommendations for reforming our system of education in science, mathematics, and technology. Benchmarks for Science Literacy takes this one step further. Created in close consultation with a cross-section of American teachers, administrators, and scientists, Benchmarks elaborates on the recommendations to provide guidelines for what all students should know and be able to do in science, mathematics, and technology by the end of grades 2, 5, 8, and 12. These grade levels offer reasonable checkpoints for student progress toward science literacy, but do not suggest a rigid formula for teaching. Benchmarks is not a proposed curriculum, nor is it a plan for one: it is a tool educators can use as they design curricula that fit their student’s needs and meet the goals first outlined in Science for All Americans. Far from pressing for a single educational program, Project 2061 advocates a reform strategy that will lead to more curriculum diversity than is common today. IBenchmarks emerged from the work of six diverse school-district teams who were asked to rethink the K-12 curriculum and outline alternative ways of achieving science literacy for all students. These teams based their work on published research and the continuing advice of prominent educators, as well as their own teaching experience. Focusing on the understanding and interconnection of key concepts rather than rote memorization of terms and isolated facts, Benchmarks advocates building a lasting understanding of science and related fields. In a culture increasingly pervaded by science, mathematics, and technology, science literacy require habits of mind that will enable citizens to understand the world around them, make some sense of new technologies as they emerge and grow, and deal sensibly with problems that involve evidence, numbers, patterns, logical arguments, and technology—as well as the relationship of these disciplines to the arts, humanities, and vocational sciences—making science literacy relevant to all students, regardless of their career paths. If Americans are to participate in a world shaped by modern science and mathematics, a world where technological know-how will offer the keys to economic and political stability in the twenty-first century, education in these areas must become one of the nation’s highest priorities. Together with Science for All Americans, Benchmarks for Science Literacy offers a bold new agenda for the future of science education in this country, one that is certain to prepare our children for life in the twenty-first century.

International Handbook of Teacher Education—John Loughran 2016-05-04 The International Handbooks of Teacher Education cover major issues in the field through chapters that offer detailed literature reviews designed to help readers to understand the history, issues and research developments across those topics most relevant to the field of teacher education from an international perspective. This volume is divided into two sections: The organisation and structure of teacher education; and, knowledge and practice of teacher education. The first section explores the complexities of teacher education, including the critical components of preparing teachers for teaching, and various aspects of teaching and teacher education that create tensions and strains. The second examines the knowledge and practice of teacher education, including the critical components of teachers’ professional knowledge, the pedagogy of teacher
education, and their interrelationships, and delves into what we know and why it matters in teacher education.

**Handbook of Technological Pedagogical Content Knowledge (TPACK) for Educators**
Mary C. Herring 2016-01-29 The 2nd edition of the Handbook of Technological Pedagogical Content Knowledge (TPACK) for Educators addresses the concept and implementation of technological pedagogical content knowledge—the knowledge and skills that teachers need in order to integrate technology meaningfully into instruction in specific content areas. Driven by the growing influence of TPACK on research and practice in both K-12 and higher education, the 2nd edition updates current thinking about theory, research, and practice. Offering a series of chapters by scholars in different content areas who apply the technological pedagogical content knowledge framework to their individual content areas, the volume is structured around three themes: Current thoughts on TPACK Theory Research on Technological Pedagogical Content Knowledge in Specific Subject Areas Integrating Technological Pedagogical Content Knowledge into Teacher Education and Professional Development The Handbook of Technological Pedagogical Content Knowledge (TPACK) for Educators is simultaneously a mandate and a manifesto on the engagement of technology in classrooms.

**Creating Effective Teaching and Learning Environments: First Results from TALIS**
OECD 2009-06-18 This survey aims to help countries review and develop policies to make the teaching profession more attractive and more effective.

**New Directions in Technological Pedagogical Content Knowledge Research**
Dr. Myint Swe Khine 2015-05-01 In the past decades wide-ranging research on effective integration of technology in instruction have been conducted by various educators and researchers with the hope that the affordances of technology might be leveraged to improve the teaching and learning process. However, in order to put the technology in optimum use, knowledge about how and in what way technology can enhance the instruction is also essential. A number of theories and models have been proposed in harnessing the technology in everyday lessons. Among these attempts Technological and Pedagogical Content Knowledge (TPACK) framework introduced by Mishra and Koehler has emerged as a representation of the complex relationships between technology, pedagogy and content knowledge. The TPACK framework extends the concept of Shulman's pedagogical content knowledge (PCK) which defines the need for knowledge about the content and pedagogical skills in teaching activities. Since then the framework has been embraced by the educational technology practitioners, instructional designers, and educators. TPACK research received increasing attention from education and training community covering diverse range of subjects and academic disciplines and significant progress has been made in recent years. This book attempts to bring the practitioners and researchers to present current directions, trends and approaches, convey experience and findings, and share reflection and vision to improve science teaching and learning with the use of TPACK framework. A wide array of topics will be covered...
in this book including applications in teacher training, designing courses, professional development and impact on learning, intervention strategies and other complex educational issues. Information contained in this book will provide knowledge growth and insights into effective educational strategies in integration of technology with the use of TPACK as a theoretical and developmental tool. The book will be of special interest to international readers including educators, teacher trainers, school administrators, curriculum designers, policy makers, and researchers and complement the existing literature and published works.

**The Making of a Teacher** - Pamela Lynn Grossman 1990
The training of teachers has increasingly been the focus of critical inquiry in the field of education: What qualifications should be demanded of those entering the teaching profession? This book examines this crucial issue with an in-depth comparison of the classroom approaches and effectiveness of two groups of secondary school English teachers.

**Science Education** - Keith S. Taber 2016-12-27
"This book comprises a wide range of scholarly essays introducing readers to key topics and issues in science education. Science education has become a well established field in its own right, with a vast literature, and many active areas of scholarship. Science Education: An International Course Companion offers an entry point for students seeking a sound but introductory understanding of the key perspectives and areas of thinking in science education. Each account is self-contained and offers a scholarly and research-informed introduction to a particular topic, theme, or perspective, with both citations to key literature and recommendations for more advanced reading. Science Education: An International Course Companion allows readers (such as those preparing for school science teaching, or seeking more advanced specialist qualifications) to obtain a broad familiarity with key issues across the field as well as guiding wider reading about particular topics of interest. The book therefore acts as a reader to support learning across courses in science education internationally. The broad coverage of topics is such that that the book will support students following a diverse range of courses and qualifications. The comprehensive nature of the book will allow course leaders and departments to nominate the book as the key reader to support students - their core ‘course companion’ in science education."

**Handbook of Research on TPACK in the Digital Age** - Niess, Margaret L. 2018-11-02
The impact of digital technologies in education has called for teachers to be prepared to facilitate their students’ learning through communication, collaboration, critical thinking, and creativity. In order to create ideal learning environments for their students, teachers must develop a more integrated knowledge for infusing digital technologies as learning tools, a knowledge referred to as TPACK. The Handbook of Research on TPACK in the Digital Age provides innovative insights into teacher preparation for the effective integration of digital technologies into the classroom. The content within this publication represents the work of online learning, digital technologies, and pedagogical strategies. It is designed for teachers, educational designers, instructional technology faculty, administrators, academicians, and education graduate students, and covers topics centered on classroom technology integration and teacher knowledge and support.

**Exploring Teachers’ Thinking** - James Calderhead 1987-01-01

**The Wisdom of Practice** - Lee S. Shulman 2004-04
What do teachers need to know in order to teach well? How important is the depth and quality of teachers' content knowledge as a critical aspect of their ability to teach? How can teachers best be educated, and how can we assess their accomplishments as teachers? In what ways is the professional preparation of teachers comparable to the preparation of physicians and other members of learned professions? What kinds of educational research can provide deeper understanding of teaching, learning, and the reform of education? These are just some of the many questions answered in this landmark collection of Lee Shulman's best work. A pioneer in the field of teaching and teacher research, Shulman's work and thinking have long influenced teachers and researchers. But while Shulman is one of the most widely cited scholars in education, his writings have been scattered among a variety of books and journals—until
now. The Wisdom of Practice at last makes Shulman’s major works on K-12 education and teacher education available in one volume. His interests in teaching of all sorts—in K-12 schools, in teacher education, in graduate programs for educational researchers, in liberal education—have been diverse. The essays included touch on such wide-ranging topics as the psychology of school subjects, medical problem solving, teacher knowledge, performance assessment, teaching in higher education, the scholarship of teaching and learning, the characteristics and pedagogies of the professions, the role of cases in professional education and research, and the character of relevant and rigorous educational research.

**Nature of Science in Science Instruction** - William McComas 2020-08-24

This book offers a comprehensive introduction to Nature of Science (NOS), one of the most important aspects of science teaching and learning, and includes tested strategies for teaching aspects of the NOS in a variety of instructional settings. In line with the recommendations in the field to include NOS in all plans for science instruction, the book provides an accessible resource of background information on NOS, rationales for teaching these targeted NOS aspects, and – most importantly – how to teach about the nature of science in specific instructional contexts. The first section examines the why and what of NOS, its nature, and what research says about how to teach NOS in science settings. The second section focuses on extending knowledge about NOS to question of scientific method, theory-laden observation, the role of experiments and observations and distinctions between science, engineering and technology. The dominant theme of the remainder of the book is a focus on teaching aspects of NOS applicable to a wide variety of instructional environments.

**Teacher Education in Globalised Times** - Jillian Fox 2020-05-12

This book provides commentary on the influence of multi-layered political contexts that surround the work of teacher educators worldwide. It addresses the drawbacks of the massification, standards-based movements and marketisation of universal business that threaten authenticity, innovation and entrepreneurship within teacher education on a global scale. The chapters celebrate the richly described local stories that explore the often tacit political activity that underpins teacher educators’ work. The book highlights the commitment of both teachers and teacher educators to social justice, and human rights and critical consciousness as central to the process of teacher development. Teacher formation, teacher education policies and curriculum development in an era of globalisation, super-diversity and the positioning of Indigenous populations, and national regulation and localisation are topics that are explored in this book.

**Powerful Teacher Education** - Linda Darling-Hammond 2012-06-28

Powerful Teacher Education describes the strategies, goals, content, and processes of seven highly successful and long-standing teacher education programs - Alverno College, Bank Street College, Trinity University, University of California, Berkeley, University of Southern Maine, University of Virginia, and Wheelock College. All these colleges and universities have succeeded in preparing teachers to teach diverse learners to achieve high levels of performance and understanding. In discussing the common features of these programs, Linda Darling-
Hammond shows what outstanding teacher education models do and how they do it, and what their graduates accomplish as a result. Powerful Teacher Education also examines the policies, organizational features, resources, and relationships that have enabled these programs to succeed.

The Handbook of Mathematics Teacher Education: Volume 1 - 2008-01-01 Knowledge and Beliefs in Mathematics Teaching and Teaching Development addresses the “what” of mathematics teacher education, meaning knowledge for mathematics teaching and teaching development and consideration of associated beliefs.

Understanding by Design - Grant P. Wiggins 2005-01-01 Presents a multifaceted model of understanding, which is based on the premise that people can demonstrate understanding in a variety of ways.

An Investigation of Primary Teachers' Mathematical Pedagogical Content Knowledge - Wayne Hawkins 2012 Abstract: "In an era of educational reform, investigating teachers’ pedagogical content knowledge has implications for many involved in education, from policy makers and curriculum designers to those in teacher education. This thesis proposed a model, designed by the researcher, used to examine Shulman's (1986) theory of pedagogical content knowledge. In particular, it addressed primary teachers’ pedagogical content knowledge required for teaching measurement. By examining teachers’ mathematics pedagogical content knowledge a greater understanding of teachers’ professional knowledge was gained enabling improvement of teacher quality, by being able to identify more clearly individual teacher’s needs for professional development. This study addressed four specific research questions. How evident is the teacher’s depth of mathematical knowledge of measurement within their teaching? How do teachers show that they understand and address the needs of students when teaching? How to teachers demonstrate their general pedagogical knowledge when teaching? How is a teacher’s knowledge and practice impacted by other factors when teaching and what are these major factors? A qualitative research model was used in which four teachers of Years Three and Four participated, providing four individual case studies. Each teacher was interviewed at the commencement of the study, was observed and recorded throughout their teaching of a sequence of measurement lessons, interviewed prior to and following each lesson, and finally responded to a reflective questionnaire two weeks after the sequence of lessons had concluded. Due to the extensive nature of the data, a series of vignettes was written, based upon MATHEMATICAL PEDAGOGICAL CONTENT KNOWLEDGE viii identified teaching episodes, significant to addressing the research questions. These vignettes contributed to the cross case analysis (Yin, 2010), along with the other data. The study found that the teachers’ knowledge varied considerably in each of the areas of knowledge of teaching, knowledge of students and knowledge of mathematics. Consequently, the teachers were rated differently in relation to their pedagogical content knowledge, ranging from very weak to strong. These differences were examined in terms of the model, providing evidence that the model effectively explained variations in teachers’ pedagogical content knowledge. Factors such as self-efficacy, teacher beliefs and the culture of the school were also shown to influence each teacher’s pedagogical content knowledge. The model was shown to be dynamic and it clearly identified how and why pedagogical content knowledge varied from one teacher to another. This study has shown that the model used to represent pedagogical content knowledge demonstrated theoretical, methodological and diagnostic value. This study concludes with a discussion of implications for policy and practice at system level and for teacher education courses for preservice teachers. The findings of this study provide further understanding of teacher pedagogical content knowledge, which is an essential step towards improving teacher quality and teaching practice. The evidence suggests that this model could be used for further research into pedagogical content knowledge beyond the teaching of measurement."


TPACK: Breakthroughs in Research and
Practice - Management Association, Information Resources 2019-02-01 Educational technologies are becoming commonplace entities in classrooms as they provide more options and support for teachers and students. However, many teachers are finding these technologies difficult to use due to a lack of training and instruction on how to effectively apply them to the classroom. TPACK: Breakthroughs in Research and Practice is an authoritative reference source for the latest research on the integration of technological knowledge, pedagogical knowledge, and content knowledge in the contexts of K-12 education. Highlighting a range of pertinent topics such as pedagogical strategies, blended learning, and technology integration, this publication is an ideal resource for educators, instructional designers, administrators, academicians, and teacher education programs seeking current findings on the implementation of technology in instructional design.

Pre-Service Teachers' Pedagogical Content Knowledge - Margaret Marshman 2013 Effective teachers have good pedagogical content knowledge (PCK). Pedagogical content knowledge is the intersection of discipline specific content knowledge and pedagogical knowledge. How effectively are pre-service teachers helped to develop good PCK? In this project we asked our pre-service teachers how they would respond to a particular student misconception before and after teaching three topics, to determine if there had been any growth in their PCK. Although the pre-service teachers had deepened their knowledge on teaching specific mathematics content, few changed their answer to the question or showed a deeper understanding of what the student had understood. This then has implications for our teaching—we need to make our thinking explicit so that pre-service teachers can see the complexity of these issues.

Recent Developments in Technology-Enhanced and Computer-Assisted Language Learning - Zou, Bin 2019-12-06 The pace at which technology changes has created unique challenges in the integration of such technologies into language teaching and learning. Innovative pedagogies and strategies must be developed that adapt to these changes and accommodate future technological changes. Recent developments in Technology-Enhanced and Computer-Assisted Language Learning is an essential research publication that focuses on technological influences on language education and applications of technology in language learning courses including foreign and second language learning. Featuring an array of topics such as artificial intelligence, teacher preparation, and distance learning, this book is ideal for teachers, language instructors, IT specialists, instructional designers, curriculum developers, researchers, education professionals, academicians, administrators, practitioners, and students.

Handbook of Research on Mathematics Teaching and Learning - Douglas Grouws 2006-11-01 Sponsored by the National Council of Teachers of Mathematics and written by leading experts in the field of mathematics education, the Handbook is specifically designed to make important, vital scholarship accessible to mathematics education professors, graduate students, educational researchers, staff development directors, curriculum supervisors, and teachers. The Handbook provides a framework for understanding the evolution of the mathematics education research field against the backdrop of well-established conceptual, historical, theoretical, and methodological perspectives. It is an indispensable working tool for everyone interested in pursuing research in mathematics education as the references for each of the Handbook's twenty-nine chapters are complete resources for both current and past work in that particular area.

Activity Theory in Education - Dilani S. P. Gedera 2015-12-22 Activity Theory in Education: Research and Practice brings together cutting-edge scholars from a number of continents. Through in-depth case studies the authors highlight how Activity Theory is used in education and discuss the theoretical as well as pragmatic use of Activity Theory frameworks in a range of contemporary learning contexts. The first section of the book focuses on empirical research on using Activity Theory in analysing students’ and teachers’ experiences of learning and teaching in face-to-face and online learning contexts. The second section contains insights in identifying historical and systemic tensions in educational contexts using Activity Theory. The third section discusses conceptual and contextual
aspects of educational contexts through Activity Theory, and Section four discusses the application of Activity Theory in understanding teachers’ Pedagogical Content Knowledge and curriculum development. In spite of the widespread and rapidly increasing use of Activity Theory in educational research, few collections of this work are available. Activity Theory in Education: Research and Practice is such a much needed collection of practical experiences, theoretical insights and empirical research findings on the use of Activity Theory in educational settings.” – Yrjö Engeström, Centre for Research on Activity, Development and Learning (CRADLE), The University of Helsinki.

**Cognitive Load Theory**-John Sweller 2011-04-07 Over the last 25 years, cognitive load theory has become one of the world’s leading theories of instructional design. It is heavily researched by many educational and psychological researchers and is familiar to most practicing instructional designers, especially designers using computer and related technologies. The theory can be divided into two aspects that closely inter-relate and influence each other: human cognitive architecture and the instructional designs and prescriptions that flow from that architecture. The cognitive architecture is based on biological evolution. The resulting description of human cognitive architecture is novel and accordingly, the instructional designs that flow from the architecture also are novel. All instructional procedures are routinely tested using randomized, controlled experiments. Roughly 1/3 of the book will be devoted to cognitive architecture and its evolutionary base with 2/3 devoted to the instructional implications that follow, including technology-based instruction. Researchers, teachers and instructional designers need the book because of the explosion of interest in cognitive load theory over the last few years. The theory is represented in countless journal articles but a detailed, modern overview presenting the theory and its implications in one location is not available.

**Education/Technology/Power**-Hank Bromley 1998-01-01 With a focus on educational computing, this book examines how technological practices align with or subvert existing forms of dominance. Examines the important question: Is the enormous financial investment school districts are making in computing technology a good idea?

**Revisiting "The Culture of the School and the Problem of Change"**-Seymour B. Sarason 1996 Revisiting “The Culture of the School and the Problem of Change” provocatively and seamlessly joins Seymour Sarason’s classic, landmark text on school change with his own insightful reflections on those same issues in the face of today’s crisis in public schools. This is an extensive, monograph-length revisiting. Part I of this book reproduces the second edition of Sarason’s ground-breaking work, The Culture of the School and the Problem of Change, in which he detailed how change can affect a school’s culturally diverse environment—either through the implementation of new programs or as a result of federally imposed regulations. Throughout, many of the major assumptions about change in institutions are challenged. Specific events and examples demonstrate that any attempt to implement change involves some existing regularity within the school. Dr. Sarason also takes a close look at government involvement in change efforts in schooling—and includes a detailed examination of current efforts to implement PL 94–142 into public schools. He presents compelling evidence that the federal effort to change and improve schools has largely been a failure. Also included are investigations into the purposes of schooling and how these purposes can be affected by change, and the process by which educators and administrators formulate intended outcomes of change efforts. In Part II, Dr. Sarason “revisits” the text and the issues 25 years after the original publication. As he explains in his preface, to him the word crisis means “a point in time when a dangerous situation contains conflicting forces of an intensity or seriousness that in the near term will be dramatically altered depending on which forces win out. When I wrote the book a quarter century ago, I did not regard our schools as in crisis...[though] my intuition . . . was that a crisis would come sooner or later. It has, in my opinion, come.” Believing that “what happens in our cities and our schools will determine the fate of our society,” Dr. Sarason is deeply concerned that the reform arena is being manipulated by forces that are at best untroubled by and at worst intent on the dismantling of the public school system. That, coupled with his fear that even the system’s defenders are not focusing on the real issues, has infused Dr. Sarason’s return to the topic of
educational change with a great sense of urgency. The important things he has to say will be welcomed by all who truly care about the state of the public schools that America’s children attend.