

Mathematics Self Efficacy And Mathematical Problem Solving

This book's two primary objectives are to present theory and research on the role of learners' achievement-related perceptions in educational contexts and to discuss the implications of this research for educational practices. Although contributors share the view that students' perceptions exert important effects in achievement settings, they differ in diverse ways including their theoretical orientation, their choice of research methodology, the perceptions they believe are of primary importance, and the antecedents and consequences of these perceptions. They discuss the current status of their ideas and provide a forward look at research and practice.

Abstract: The purpose of this mixed method study was to explore the relationships among the variables of mathematics self-efficacy, mathematics teaching self-efficacy, and procedurally or conceptually-oriented teaching methods. The study included 75 practicing elementary teachers who teach mathematics as well as other subjects. These teachers completed the Mathematics Teaching and Mathematics Self-Efficacy survey, designed as part of the study and based on the Mathematics Self-Efficacy Scale - Revised (MSES-R) and the Mathematics Teaching Efficacy Beliefs Instrument (MTEBI). Sixteen of the teachers also participated in an interview probing teaching methods for two mathematics topics the teachers believed they are most confident or least confident teaching. Interviews were assessed using the Conceptually and Procedurally Oriented Teaching Method Frequency Chart, designed as part of the study. Quantitative data analysis methods include descriptive statistics, Pearsons Product Moment correlation, and chi-square tests. Qualitative

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data analysis includes case study anecdotes for two of the interviewed teachers. Results indicate a strong relationship between mathematics self-efficacy and mathematics teaching self-efficacy and suggest that mathematics self-efficacy may be a precursor to mathematics teaching self-efficacy. Additionally, results indicate that when teaching their most confident mathematics topic teachers are more likely to use conceptually oriented teaching methods and when teaching their least confident mathematics topic teachers are more likely to use procedurally oriented teaching methods. This study offers findings to mathematics teacher educators and elementary mathematics teachers about the importance of developing mathematics self-efficacy and mathematics teaching self-efficacy because of their relationship to teachers choices of instructional methods. Additionally the two instruments developed in the study will help future researchers assess these variables.

Descripción / Resumen (Inglés): The present volume represents a compilation of international teacher education practice and research with a focus on Teacher Education for Contemporary Contexts. It draws upon the diverse educational perspectives, teaching procedures, knowledge, and situated contexts where the discipline takes shape. The sections of this book comprise research papers accepted for presentation during the 18th International Study Association on Teachers and Teaching (ISATT) Biennial Conference that will take place from July 3rd to July 7th in Salamanca, Spain. Around 300 delegates from 57 countries across the globe and a large Scientific Committee of 80 colleagues have contributed academically and professionally to support our ability to share the contents of this volume. The main conference topic is search and research. Searching is the action of looking carefully at people, objects, and situations in order to find something concealed or to discover something beyond the

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ordinary. This is what teachers do in their classrooms and, primarily, 'search' represents their endeavours to construct professional knowledge as a result of developing practice. Researching is systematic inquiry that intends to discover new knowledge and/or to refute educational theories, a process typically rendered by teacher educators and other researchers. The focus of this 18th biennial ISATT conference is to bring together both "search" and "research", connecting practice and theory (or 'praxis'), with the purpose of offering relevant solutions to realistic classroom problems. The editorial process followed three differentiated phases: The first phase required abstract submission with the purpose of being accepted for the conference. A double (or triple) blind review was conducted to evaluate whether the papers submitted were suitable for the conference. A rate of 87% of the papers were accepted for presentation. The second phase encouraged authors to voluntarily submit a full paper of 3,000 words. A total of 111 full papers were then subjected to an open review process with the main purpose of suggesting to authors ways of further improving the presentation of their valuable research. A third phase, not yet completed and therefore beyond the scope of this book, was the review and selection of the outstanding papers, papers that were deemed eligible for the post-proceeding publication (i.e., less than 15% of the total). The central intent of the book is to contribute to fostering scholarly discussions and to inform future teaching trajectories, strengthen lines of research in teacher education and demonstrate the opportunities and constraints in our professional work. Its added value highlights the commonplace in international research that serves to depict how the field of teacher education is moving forward in an increasingly global society. All in all, teachers, teacher educators and researchers learn by effective communication processes, whether in in personal/professional interactions or

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in the use of digital technologies. Positive interactions lead to building strong communities of learners, which in turn, leads to the production of valuable knowledge and better understandings about learning and teaching. With the upcoming commemoration of its 800th anniversary in the year 2018, the University of Salamanca, as the oldest university in operation in Spain, is proud to host the ISATT 18th biennial conference and to support the exceptional work of many researchers in the field of Teacher Education by compiling and editing the work in this volume. Furthermore, the local Organizing Committee and the ISATT Executive Committee hope you will experience a rewarding intellectual experience as a result of your contributions and knowledge, as both academics and practitioners. Thank you very much for providing us this exciting opportunity to work with you. We warmly welcome you to Salamanca – a truly historic and a contemporary context!

Descripción / Resumen (Español / Castellano): El presente volumen está integrado por una recopilación de prácticas e investigaciones internacionales de formación docente centradas en la formación de profesores en la sociedad actual. Se basa en las diversas perspectivas educativas, los procedimientos de enseñanza, conocimiento y contextos sociales. Las secciones de este libro comprenden trabajos de investigación aceptados para su exposición en las XVIII Conferencia Bienal Internacional de Estudios de Profesores y Enseñanza (ISATT) que tendrá lugar del 3 al 7 de julio en Salamanca, España. Alrededor de 300 delegados de 57 países de todo el mundo y un gran Comité Científico de 80 colegas han contribuido académica y profesionalmente en favor de este evento. El tema principal de la conferencia es la búsqueda y la investigación. «Buscar» es la acción de mirar cuidadosamente a las personas, objetos y situaciones para encontrar algo escondido o descubrir algo más allá de lo ordinario. Esto es lo que los maestros hacen en sus clases y,

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sobre todo, la búsqueda representa sus esfuerzos para construir conocimiento profesional como resultado del desarrollo de la práctica cotidiana. La «investigación» es una investigación sistemática que pretende descubrir nuevos conocimientos y/o refutar teorías educativas, un proceso que suelen dar los educadores de profesores y de otros investigadores. El objetivo de esta 18ª conferencia ISATT es reunir tanto la «búsqueda» como la «investigación», conectando la práctica y la teoría (o praxis) con el propósito de ofrecer soluciones relevantes a los problemas reales de la clase. El proceso editorial siguió tres fases diferenciadas: 1. Requirió el envío de resúmenes con el propósito de que fuesen aceptados para la ser expuestos en la conferencia. Se realizó una revisión doble ciego (o triple) para evaluar si los artículos presentados eran adecuados. Se aceptó una tasa de 87% de los trabajos para su presentación. 2. La segunda fase requirió de los autores en envío en período voluntario de un trabajo completo de 3.000 palabras. Un total de 111 trabajos fueron sometidos a un proceso de revisión abierta con el propósito principal de sugerir a los autores formas de mejora. 3. Una tercera fase, aún inconclusa, y por lo tanto fuera del alcance de este libro, fue la revisión y selección de los documentos pendientes, los documentos que se consideraron electos para la publicación posterior al procedimiento (es decir, menos del 15% del total). La intención central de esta obra es contribuir a fomentar el debate académico e informar sobre futuras trayectorias de enseñanza, fortalecer las líneas de investigación en la formación del profesorado y demostrar las oportunidades y limitaciones en nuestro ámbito. Su valor es el de destacar el lugar común en la investigación internacional que sirve para describir cómo el campo de la formación de maestros avanza en una sociedad cada vez más global. En general, los maestros, los educadores de educadores y los investigadores aprendan mediante procesos

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de comunicación eficaces, ya sea en interacciones personales/profesionales o en el uso de tecnologías digitales. Las interacciones conducen a la construcción de comunidades fuertes de estudiantes, que a su vez, conduce a la producción de conocimientos valiosos y mejores sobre el aprendizaje y la enseñanza. Con la próxima conmemoración de su 800 aniversario en el año 2018, la Universidad de Salamanca, como la decana de las españolas, se enorgullece en acoger la XVIII Conferencia Bienal de ISATT y apoyar el trabajo excepcional de muchos investigadores en el campo del Profesor Educación Investigador, editando la obra. Además, el Comité Organizador Local y el Comité Ejecutivo de ISATT esperan que experimente una lectura gratificante como resultado de sus contribuciones y conocimientos, tanto académicos como profesionales. Muchas gracias por brindarnos esta emocionante oportunidad de trabajar con usted. ¡Les damos la bienvenida a Salamanca un contexto verdaderamente histórico y a su vez contemporáneo!

"Nothing in life is to be feared, it is only to be understood." Marie Curie: Nobel Physicist This book written by a classroom teacher of mathematics brings a fresh, practical and relevant approach and a less-common perspective to the topic. The primary objective is to improve the self-efficacy of students when studying mathematics and by so doing improve the environment in which they learn and hopefully improve their cognition of the subject. All students need to be numerate citizens in the 21st century. Prior research linking self-efficacy and mathematics enrolment has largely focussed on undergraduates. This study sought input from Year 10 and Year 8 students. The research design is mixed methods with a quantitative survey followed by qualitative interviews. Self-Efficacy was measured using two variables - Self-Rating and Self-Efficacy Score. Mathematical Achievement was measured by students' Numeracy Scores from national

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government testing. When students are considered by their Self-Rating category there are similarities across year levels. Self-Rating categories displayed gender differences but the Self-Efficacy sources were gender neutral.

The Relationship Between Elementary Teachers' Self-efficacy for Teaching Mathematics and Their Mathematical Knowledge for Teaching

Cognitive and Non-cognitive Competencies of Chinese Students in Mathematics

A Dissertation

The Causes, Consequences, and Solutions for Academic Anxieties

Mathematics Self-Efficacy and Flow in Developmental Mathematics Students

Teaching and Learning in Maths Classrooms

The increasing impact of performance based judgments on schools and teachers in the classroom has its critics and supporters. Some oppose the trend and seek to deny the importance of quantitative measures. Others have sought to find ways of implementing educational measurement constructively and with understanding of the concerns. Classrooms are where the operational business of learning takes place and it is on the quality of life within the classroom that the broader process of learning, concerns for the wider community and others, is nurtured. The climate of the classroom has a large

impact on the final outcome measure to which so much interest is directed. To help our understanding of the dynamics involved much work has been done in the development and refinement of quantitative studies to this area by studying essential information about how teachers and students perceive the environments in which the work. Research on classroom climates has reached a practical and theoretical maturity and this volume offers an account of the developments that have taken place and the potential for understanding the classroom as a vital component of the curriculum. This book will also be an essential resource tool for anyone engaged in classroom research. This volume is put together by the National Association of Mathematicians to commemorate its 50th anniversary. The articles in the book are based on lectures presented at several events at the Joint Mathematics Meeting held from January 16-19, 2019, in Baltimore, Maryland, including the Claytor-Woodard Lecture as well as the NAM David Harold Blackwell Lecture, which was held on August 2, 2019, in Cincinnati, Ohio.

This study investigated the relationship between the actual mathematical ability and the perceived mathematical ability among preservice elementary teachers with low levels of mathematics self-efficacy. In addition, this study investigated how preservice elementary teachers with low levels of mathematics self-efficacy describe their mathematical ability and how it could affect their teaching effectiveness when they enter the classroom. Participants included 42 elementary preservice elementary teachers in a Great Lakes state during their mathematics methods course. Of the 42 elementary preservice teachers who participated in the study, 14 were self-identified as having low levels of self-efficacy with varying levels of mathematical ability. Six of the 14 agreed to be interviewed to gain a deeper understanding of their mathematical ability and their beliefs on being an effective mathematics teacher. Data sources included the self-revised Mathematics Confidence Scale and clinical interviews. The results concerning actual mathematical ability versus perceived ability were mixed.

Also, the understanding of fractions, proportions, and ratios continue to be viewed as difficult topics. Findings revealed that the preservice elementary teachers with low-levels of mathematics self-efficacy believe they will be effective mathematics teachers when they enter the classroom, but only after time and much effort. In addition, these same preservice elementary teachers stated that they had negative experience during their elementary school years. Therefore, it can be generalized that there are, and potentially will be, novice elementary teachers that will enter the classroom with (a) low levels of self-efficacy, (b) a lack of mathematical content knowledge, and (c) a lack of awareness of what their negative experiences during their elementary years could potentially do to their future students.

Feelings of apprehension and fear brought on by mathematical performance can affect correct mathematical application and can influence the achievement and future paths of individuals affected by it. In recent years, mathematics anxiety has

become a subject of increasing interest both in educational and clinical settings. This ground-breaking collection presents theoretical, educational and psychophysiological perspectives on the widespread phenomenon of mathematics anxiety. Featuring contributions from leading international researchers, Mathematics Anxiety challenges preconceptions and clarifies several crucial areas of research, such as the distinction between mathematics anxiety from other forms of anxiety (i.e., general or test anxiety); the ways in which mathematics anxiety has been assessed (e.g. throughout self-report questionnaires or psychophysiological measures); the need to clarify the direction of the relationship between math anxiety and mathematics achievement (which causes which). Offering a reevaluation of the negative connotations usually associated with mathematics anxiety and prompting avenues for future research, this book will be invaluable to academics and students in the field psychological and educational sciences, as well as teachers working with students who are

**struggling with mathematics anxiety
Student Perceptions in the Classroom
The Effects of Online Homework on
Achievement and Self-efficacy of College
Algebra Students**

Search and research

**The Golden Anniversary Celebration of
the National Association of
Mathematicians**

**Identifying Factors Common Among
Students who Do Not Fit the Typical
Mathematics Self-efficacy and
Achievement Correlation**

**Mathematical and Statistics Anxiety:
Educational, Social, Developmental and
Cognitive Perspectives**

It has been argued by some that boys are inherently better in mathematics than girls (Halpern, 2012; Summers, 2005). However, according to international assessments such as the Trends in Mathematics and Science Study's (TIMSS) and Program for International Student Assessment (PISA), boys do not always outperform girls in mathematics (Mullis, Martin, Foy, & Arora, 2012; OECD, 2014). As such, something other than biology might better explain variations in mathematics performance. One explanation may be self-efficacy, a label used to describe judgments people make about themselves in terms of whether or not they have the capability of doing something (Bandura, 1995; Bandura 1997). Self-efficacy has been found to have a

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significant effect on academic achievement (Bandura, 1995; Bandura 1997); Borman & Overman, 2004; Fast, Lewis, Bryant, Bocian, Cardullo, Rettig, & Hammond, 2010; Pietsch, Walker & Chapman, 2003). This dissertation explored the relationship of gender, self-efficacy, and mathematics achievement on the TIMSS assessment as a way to change biological arguments that boys are inherently better than girls in mathematics. The country of focus is the United States and the students studied were fourth grade participants who took the 2007 TIMSS test ($n = 7,896$) and eighth grade participants who took the TIMSS 2011 ($n = 10, 477$). Self-efficacy was examined through responses to selected TIMSS student background questionnaire statements that represented self-efficacy. Results of this study show that gender on its own is not a significant predictor of mathematics achievement. A positive relationship exists between self-efficacy and mathematics achievement. Further, high self-efficacy is the greatest predictor of mathematics achievement studied in this dissertation. High self-efficacy gave boys a greater advantage in mathematics than girls at both grade levels. This work supports the importance of self-efficacy to mathematics achievement and diminishes the significance of gender to the same end. -- Abstract.

This mixed-methods sequential explanatory study was used to determine if teachers' mathematical self-efficacy was impacted as result of a Math Foundations professional development. Over 3 months, this 5-day, 40-hour course utilized various strategies to impact in-service teachers' number sense knowledge. -- The

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review of literature suggested that teacher preparation programs may not be adequately preparing teachers for the classroom. Anxiety and efficacy plague teachers as a result of their inadequacies. To improve teacher capacity, an effective professional development was needed to provide in-service teachers opportunities to increase their number sense knowledge. Research reflected that by improving number sense knowledge, efficacy would be impacted as well. -- To ascertain the impact of this professional development, two quantitative instruments—the Mathematics Teaching Efficacy Beliefs Instrument (measuring general and personal efficacy) and the Teacher Education and Learning to Teach assessment (measuring number sense knowledge)—were analyzed pre and postprofessional development. Additionally, interviews collected qualitative data regarding efficacy and number sense knowledge postprofessional development. -- The conceptual framework for this study suggested that effective professional development would improve teacher content knowledge and improve instruction, which would lead to improving teacher efficacy. The results of the professional development determined that teacher efficacy improved but was not statistically significant, while number sense knowledge improved and was statistically significant as measured by the quantitative instruments. Interviews reflected that teachers improved vocabulary, became more comfortable and confident with the math skills they were previously lacking, gained knowledge behind the “hows” and “whys” of mathematics topics they struggled to teach, and felt that

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they were able to support the students more in their classrooms; thus, participants reflected that the Math Foundations professional development had an impact on their mathematical self-efficacy.

This book seeks to illustrate the research on mathematics competencies and disposition in China according to the conceptual development and empirical investigation perspective. Mathematics education in China has a distinguishing feature a focus of attention to mathematical competency. Paradoxically, there has not been an explicit, refined, and measurable evaluation system in place to assess mathematical competency in China. While academic achievement surveys or evaluations are common, these can only give an overall conclusion about mathematical thinking skills or problem solving abilities. In response to this deficiency, China is beginning to carry out national projects that emphasize defining both a conceptual framework on core competencies in school mathematics and developing a corresponding assessment framework. Thus, the main focus of this volume is the current investigations of different mathematics competencies and mathematical disposition of Chinese students, with the aim of promoting interaction between domestic and international student performance assessment, to provide a more comprehensive understanding of mathematics competencies and disposition in mainland China, and to stimulate innovative new directions in research. The primary audience of this volume is the large group of researchers interested in mathematics competencies, mathematics teaching and learning in

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China, or comparative studies, or the relation of the three. The book will also appeal to teaching trainers or instructors, as well as be an appropriate resource for graduate courses or seminars at either the master's or doctoral level.

The goal of this book is to bring together the concept of self-efficacy theory with practical how-to strategies for both teachers and parents to use in heightening their students' levels of self-efficacy. The book examines how self-efficacy theory relates to the acquisition of mathematical competence. The text also provides specific and practical how-to strategies for both teachers and parents in applying these principles to classroom mathematics instruction and activities. The self-efficacy practices and applications to mathematics are also suitable for families working with learners outside the school environment. Acquiring mathematical skills requires more than knowing arithmetic tables, memorizing rules, and knowing proofs. It requires a basic belief that one is capable of obtaining this information, making sense of it, and applying and generalizing it in mathematical problems. In addition, a student must believe that obtaining these skills leads to a positive outcome, whether it is perceived to be a good or passing grade, comfort-level in tackling mathematical problems, being able to advance to the next mathematics course, being able to score highly on the math section of the SAT and/or be competitive for a desired job. The ability of students to achieve and exceed grade level competence in mathematics is addressed through the lens of Albert Bandura's Self-Efficacy Theory. This

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theoretical position states that one will persist in mastering a behavior (in this case, mastering mathematical principles and skills), in the face of obstacles or failures—to the extent that one believes he or she has the ability to do so, and that there is a desired outcome for doing so. The research literature on the role of self-efficacy in mathematic instruction is examined to demonstrate the validity of using this concept to increase student (and parent/teacher) confidence in learning and applying grade-appropriate math content. Specific teaching methodologies will be provided that infuse self-efficacy strategies for students. Lastly, teachers and parents are provided strategies to increase their own self-efficacy when it comes to conveying mathematics principles to their child or student, as well as strategies to assess their students' level of self-efficacy over time. Teaching and learning mathematics so that students achieve success at their grade level or above can present a variety of challenges. One barrier that affects learners is the belief that one is not capable of learning mathematics or not naturally talented in the field, not a “math person.” As a result, learners may not believe they are capable of a positive outcome for achieving mathematics success. This book is an important resource for pre-service and in-service teachers, as well as families in applying the theory of self-efficacy to support learners in becoming confident and assured in their ability to understand and apply mathematical principles and procedures. Coupled with classroom ready mathematics instructional strategies, the book provides readers with the background, tools and

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strategies needed to carry content success and confidence forward to remain persistent in solving all future mathematical problems.

Investigating the Mathematical Dispositions and Self-efficacy for Teaching Mathematics of Preservice Teachers

PISA 2003 Technical Report

PISA 2012 Results: What Makes Schools Successful (Volume IV) Resources, Policies and Practices

PISA 2009 Technical Report

A Correlational Study

Mathematics Enrolment Intention, STEM and Career Choice

The PISA 2003 Technical Report describes the complex methodology underlying PISA 2003, along with additional features related to the implementation of the project at a level of detail that allows researchers to understand and replicate its analyses.

"This book is an important resource for pre-service and in-service teachers, as well as families in applying the theory of self-efficacy to support learners in becoming confident and assured in their ability to understand and apply mathematical principles and procedures. Coupled with classroom ready mathematics instructional strategies, the book provides readers with the background, tools and strategies needed to carry content success and confidence forward to remain persistent in solving all future mathematical problems"--

This fourth volume of PISA 2012 results examines

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how student performance is associated with various characteristics of individual schools and school systems.

"This study examined the relationship between elementary teachers' mathematical knowledge for teaching (MKT) and their self-efficacy for teaching mathematics. Self-efficacy and MKT are of high importance with implications in regards to quality of instruction and the Common Core State Standards for mathematics. Using the Content Knowledge for Teaching Mathematics (CKT-M) instrument, data for this study were collected from thirty-five elementary school teachers participating in the Improving Teachers' Monitoring of Learning Grant at the time. The data were concerned with these teachers' self-efficacy with the pedagogy and content of mathematics using the Self-Efficacy for Teaching Mathematics Instrument (SETMI). Qualitative data were collected pertaining to teachers' perceptions of the positive influences and challenges of implementing the Common Core State Standards into their classroom. A correlational analysis was run with the data collected from the survey to test for a relationship between the two self-efficacy constructs and the MKT. The results indicated no statistically significant relationship between either of the two self-efficacy constructs and participants' MKT. The qualitative data responses revealed the themes of training and support as positive influences, while

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curriculum and time demands were seen as the major challenges. Further research should be conducted to continue examining the relationship between self-efficacy and MKT using a larger, random sample to help gain a more true representation of the larger population."--Boise State University ScholarWorks.

Beliefs: A Hidden Variable in Mathematics Education?

The Relationship Between Mathematical Mindset and Mathematics Self-efficacy in Developmental Mathematics Students in Higher Education

Teacher Self-efficacy, Instructional Practices, and Student Achievement in Mathematics

An Examination of Elementary Math Anxiety, Self-efficacy, and Academic Achievement

Classroom Environment (RLE Edu O)

Resources, Policies and Practices

The book presents a selection of the most relevant talks given at the 21st MAVI conference, held at the Politecnico di Milano. The first section is dedicated to classroom practices and beliefs regarding those practices, taking a look at prospective or practicing teachers' views of different practices such as decision-making, the roles of explanations, problem-solving, patterning, and the use of play. Of major interest to MAVI participants is the relationship between teachers' professed beliefs and classroom practice, aspects that provide the focus of the second section. Three papers deal with teacher change, which is notoriously difficult, even when the teachers themselves are interested in changing their practice. In turn, the book's third section centers on the undercurrents of teaching and learning mathematics, which can surface in various situations, causing tensions and inconsistencies. The

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last section of this book takes a look at emerging themes in affect-related research, with a particular focus on attitudes towards assessment. The book offers a valuable resource for all teachers and researchers working in this area.

This open access book, inspired by the ICME 13 topic study group "Affect, beliefs and identity in mathematics education", presents the latest trends in research in the area. Following an introduction and a survey chapter providing a concise overview of the state-of-art in the field of mathematics-related affect, the book is divided into three main sections: motivation and values, engagement, and identity in mathematics education. Each section comprises several independent chapters based on original research, as well as a reflective commentary by an expert in the area. Collectively, the chapters present a rich methodological spectrum, from narrative analysis to structural equation modelling. In the final chapter, the editors look ahead to future directions in the area of mathematics-education-related affect. It is a timely resource for all those interested in the interaction between affect and mathematics education.

"This study was to determine if test performance and levels of mathematical self efficacy of 9th grade students with learning disabilities improved after an intervention consisting of organizational strategies, conferencing, and feedback." - Abstract.

The study aims to explore the level of suburban 5th grade students' mathematics self-efficacy, math anxiety, and academic achievement, to discover the possible interconnections between these parameters. The measures used to evaluate each included the Math Anxiety Rating Scale, the Self-Efficacy Questionnaire, and the North Carolina End of Grade Assessment for the 2015-2016 school year. The 5th grade students (N=38) were divided into two clusters: 1) students with positive mathematical self: higher mathematics self-efficacy and self-concept and lower anxiety (n=7) and 2) students with negative mathematical self: lower mathematics self-efficacy and self-concept and higher anxiety (n=5).

Mathematics Self-efficacy, Mathematical Mindset and Their

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Relationship to Study Habits and Perseverance

Determining Elementary Students' Mathematical Self-efficacy and Attitudes Towards Mathematics Through Journal Writing

Gender, Self-efficacy, and Mathematical Achievement : an Analysis of Fourth Grade and Eighth Grade TIMSS Data from the United States

Gender Differences in Mathematics

The Impact of a Math Foundations Course on Teachers' Mathematical Self-efficacy

Self-Efficacy and Mathematics

This book focuses on aspects of mathematical beliefs, from a variety of different perspectives. Current knowledge of the field is synthesized and existing boundaries are extended. The volume is intended for researchers in the field, as well as for mathematics educators teaching the next generation of students.

While there has been much quantitative research done in the area of attitudes and self-efficacy beliefs, this study sought hear the voices of the middle school child.

Therefore, this qualitative study investigated the attitudes toward mathematics and mathematics self-efficacy beliefs of middle school students in one middle school in western Kansas. The conceptual framework for this study is supported by the research of Albert Bandura on Social Cognitive Theory. This study used a naturalistic inquiry approach and data were collected from multiple sources, including short-answer questionnaires, classroom observations, and one-on-one interviews. Coded data were examined for patterns, themes, and relationships. Middle school students in this study exhibited positive, negative, and variable attitudes toward mathematics, and both positive and negative mathematics self-efficacy beliefs. Students attribute their high mathematics self-efficacy beliefs to the teacher or

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the high grades they receive on daily assignments, as well as the scores they receive on state and local assessments. Conversely, middle school students have low mathematics self-efficacy beliefs when they feel unsuccessful or distressed, and they attribute those beliefs to the low grades they receive on daily assignments and assessments, as well as the distress of not understanding the mathematics. Middle school students told their mathematical stories of the change in attitudes toward mathematics and mathematics self-efficacy beliefs, and attributed positive changes to the mathematics teacher. Negative changes in attitudes toward mathematics and mathematics self-efficacy beliefs were attributed to the amount of homework expected at the middle school level, as well as the lack of hands-on activities. The influence of the teacher, grades, and hands-on activities impact middle school students' attitudes toward mathematics and mathematics self-efficacy beliefs. There is a relationship between attitudes toward mathematics and mathematics self-efficacy beliefs. Low mathematics self-efficacy beliefs and poor attitudes toward mathematics are related since low mathematics self-efficacy beliefs and poor attitudes toward mathematics are highly connected. Conversely, high mathematics self-efficacy beliefs and good attitudes toward mathematics are highly related. Middle school students' experiences impact both mathematics self-efficacy beliefs and attitudes toward mathematics. Students' mathematics self-efficacy beliefs impact their attitudes toward mathematics.

The United States has now been engaged in war for fourteen years, the longest war in American history. A war like this has created an atmosphere of extended deployments for members of the military resulting in

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separation from their family. Deployments can affect many areas of family life, and the child's academics is one such area. A student's success often depends on his/her confidence, or "self-efficacy", in academics. This can be affected by the inconsistencies of military life, such as constantly moving and transferring schools, which can shake that confidence causing him or her to struggle academically. The purpose of this study was to examine the mathematics self-efficacy of military dependent students and compare the results to the general student population. The Mathematics Self-Efficacy Scale (MSES) was used to quantify the results and a multivariate analysis of variance (MANOVA) was run to determine the areas of significance of the subscales and overall mathematics self-efficacy. The study was a quantitative, causal-comparative design comparing 200 students - 100 military dependent and 100 general population - comparing each population's total mathematics self-efficacy, mathematical task self-efficacy, and math-related school subjects self-efficacy. The results are intended to determine whether, in this population, the military dependent students show a greater amount of self-efficacy than the general population. According to the results of the One-Way MANOVA, military dependent students did show a greater mathematics self-efficacy than general population students. Since the One-Way MANOVA showed a significant difference, one-way ANOVAS were run and the only significance found was that military dependent students were higher than the general population in math task self-efficacy.

Anxiety in Schools presents current theory and research addressing both context- and content-specific contributions to anxieties experienced in schools. The

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concept of «academic anxiety» is a new construct, formed through the content within this book, and is proposed as a unifying representation for various forms of specialized manifestations of anxiety in school settings. With contributions from leaders in their respective fields of academic anxieties, the book provides detailed and thorough explorations of the varied and specific orientations toward anxieties in school settings. Explicit attention is given to the broader construct of academic anxiety and the contextual influences that can be brought to overcome or mitigate the impact of the many academic anxieties encountered by learners.

The Relationship Among Mathematics Anxiety, Mathematical Self-efficacy, Mathematical Teaching Self-efficacy, and the Instructional Practices of Elementary School Teachers

Self-Efficacy Beliefs of Adolescents

A Naturalistic Inquiry Into the Attitudes Toward Mathematics and Mathematics Self-efficacy Beliefs of Middle School Students

A Case Study Exploring the Ways Preservice Elementary Teachers with Low Levels of Mathematics Self-efficacy Believe Their Mathematical Ability Will Affect Their Teaching Effectiveness

An International Perspective

Improving Mathematic Performance and Self Efficacy Through Organization, Conferencing, and Feedback Among High School Students with Learning Disabilities

Previous research has shown that mathematical self-efficacy is positively correlated with mathematical performance level. However, in elementary classroom

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settings, teachers noticed that students with high mathematical self-efficacy had low mathematical performance level. On the other end of the spectrum, there are students who have low mathematical self-efficacy yet excel in mathematics. Discovering what factors are common among these two types of students can aid teachers in helping these students improve their self-efficacy and mathematics performance. This explanatory mixed-methods design was conducted in a K-6 elementary school with the research participants consisting of fourth-, fifth-, and sixth-grade students. The first of two research phases included assessing students' mathematical performance level and mathematical self-efficacy. Utilizing the criteria of high or low performance in correlation to high or low self-efficacy, the students were placed into one of four categories; high performance/high self-efficacy (High P/High SE), low performance/low self-efficacy (Low P/Low SE), high performance/low self-efficacy (High P/Low SE), and low performance/high self-efficacy (Low P/High SE). Phase II of the research included interviewing the top two students from the High P/High SE group and the bottom two from the Low P/Low SE group

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as well as all of the students in the High P/Low SE and the Low P/High SE groups. After the interviews were analyzed, the researcher identified the factors that are common to the High P/Low SE and Low P/High SE groups that were not found in the High P/High SE or Low P/Low SE groups. Some examples of these factors for students with High P/Low SE included feelings of jealousy, not feeling smart even when the math is easy, and not feeling encouraged by teachers and parents. Examples of these factors for students with Low P/High SE included preferring completing assignments in a group and giving up when the mathematics gets difficult. The potential implications of this research may be used in elementary classrooms to help teachers identify outlier students as well as help students better align their self-efficacy with their achievement level. The intended audience of this research was elementary mathematics teachers.

This book examines new trends and developments in research related to the mathematical education of pre-service elementary teachers, and explores the implications of these research advances for theory and practice in teacher education. The book is organized around the following four overarching themes: pre-

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service teachers' mathematics content and mathematics-specific pedagogical preparation; professional growth through activities and assessment tools used in mathematics teacher preparation programs; pre-service mathematics teachers' knowledge and beliefs; and perspectives on noticing in the preparation of elementary mathematics teachers. Including contributions from researchers working in 11 different countries, the book offers a forum for discussing and debating the state of the art regarding the mathematical preparation of pre-service elementary teachers. By presenting and discussing the findings of research conducted in different countries, the book offers also opportunities to readers to learn about varying teacher education practices around the world, such as: innovative practices in advancing or assessing teachers' knowledge and beliefs, similarities and differences in the formal mathematics education of teachers, types of and routes in teacher education, and factors that can influence similarities or differences.

This study examined mathematics self-efficacy and the characteristics of flow in the context of performing mathematical tasks. In particular, it explored the

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subjective experiences of 113 undergraduate students enrolled in a developmental mathematics course while they were independently solving certain mathematical problems. This study supplemented the literature on the role of self-efficacy as a mediator of the effect of the challenge/skill ratio on flow by applying it to the context of mathematical problem solving. This study also expanded the discussion on how findings may indicate a direction for further research on mathematics anxiety. Additionally, the relationship between mathematics self-efficacy and flow-like experiences as measured by the Flow Short Scale was considered.

Females consistently score lower than males on standardized tests of mathematics - yet no such differences exist in the classroom. These differences are not trivial, nor are they insignificant. Test scores help determine entrance to college and graduate school and therefore, by extension, a person's job and future success. If females receive lower test scores then they also receive fewer opportunities. Why does this discrepancy exist? This book presents a series of papers that address these issues by integrating the latest research findings

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and theories. Authors such as Diane Halpern, Jacquelynne Eccles, Beth Casey, Ronald Nuttal, James Byrnes, and Frank Pajares tackle these questions from a variety of perspectives. Many different branches of psychology are represented, including cognitive, social, personality/self-oriented, and psychobiological. The editors then present an integrative chapter that discusses the ideas presented and other areas that the field should explore.

Raising Self-Efficacy in Students,
Teachers and Parents

Fresh Perspectives on Motivation,
Engagement, and Identity

Learning Mathematics Successfully

How Elementary School Teachers

Mathematical Self-efficacy and Mathematics

Teaching Self-efficacy Relate to

Conceptually and Procedurally Oriented
Teaching Practices

Anxiety in Schools

Mathematical anxiety is a feeling of tension, apprehension or fear which arises when a person is faced with mathematical content. The negative consequences of mathematical anxiety are well-documented. Students with high levels of mathematical anxiety might underperform in important test situations, they tend to hold

negative attitudes towards mathematics, and they are likely to opt out of elective mathematics courses, which also affects their career opportunities. Although at the university level many students do not continue to study mathematics, social science students are confronted with the fact that their disciplines involve learning about statistics - another potential source of anxiety for students who are uncomfortable with dealing with numerical content. Research on mathematical anxiety is a truly interdisciplinary field with contributions from educational, developmental, cognitive, social and neuroscience researchers. The current collection of papers demonstrates the diversity of the field, offering both new empirical contributions and reviews of existing studies. The contributors also outline future directions for this line of research.

The introduction of the psychological construct of self-efficacy is widely acknowledged as one of the most important developments in the history of psychology. Today, it is simply not possible to explain phenomena such as human motivation, learning, self-regulation, and accomplishment without discussing the role played by self-efficacy beliefs. In this, the fifth volume of our series on adolescence and education, we focus on the self-efficacy beliefs of adolescents. We

are proud and fortunate to be able to bring together the most prominent voices in the study of self-efficacy, including that of the Father of Social Cognitive Theory and of self-efficacy, Professor Albert Bandura. It is our hope, and our expectation, that this volume will become required reading for all students and scholars in the areas of adolescence and of motivation and, of course, for all who play a pivotal role in the education and care of youth.

This mixed-methods research examined teacher self-efficacy in mathematics and the use of specific mathematical instructional practices in Grades 3-5 classrooms. The purpose was to examine the relationships among teacher self-efficacy of teaching mathematics, the use of specific mathematical instructional practices, and student achievement as measured by the North Carolina end-of-grade test. According to the National Mathematics Advisory Panel (2008), differences in students' mathematical achievement are credited to differences in teacher characteristics including their self-efficacy in teaching and use of specific instructional practices. The study sought to add to the research behind that finding. -- Correlational relationships among the variables were studied. The outcome variable was student achievement as measured by the end-of-grade

mathematics test. The two outcomes variables were teacher self-efficacy of teaching mathematics as measured by the Self-Efficacy for Teaching Mathematics Instrument and the use of mathematical instructional practices as measured by the Teachers' Instructional Practices Survey. Descriptive analysis, Pearson correlations, and multiple regression analysis were used to analyze the quantitative data. Qualitative data were gathered through teacher interviews. The notes from these interviews were reviewed for themes and then compared to the quantitative data. -- This study yielded strong to moderate correlations between teacher self-efficacy and the six measured mathematical instructional practices. Upon further analysis, the study found strong correlations between teacher self-efficacy for pedagogy in mathematics and each of the following mathematical instructional practices: cooperative learning; communication and study skills; problem-based learning; and manipulatives, models, and multiple representations. However, correlations between the frequency of the measured mathematical instructional practices and study achievement were not established. Weak correlations were found between student achievement and teacher self-efficacy in mathematics. Additionally, the

study found that teacher self-efficacy was statistically significant to the prediction of student achievement as defined by student scale scores on the end-of-grade mathematics assessment.

The purpose of this study was to explore the relationship between mathematical self-efficacy and mindset of developmental mathematics students. It also looked to concur with previous research findings showing students' mindsets can change through intervention.

Domain Knowledge, Attitudes, Self-efficacy Beliefs, and Attributions for Achievement

Working Together in the Community College Remedial Mathematics Classroom

Emerging Themes in Affect-related Research: Teachers' Beliefs, Students' Engagement and Social Interaction

Effects of Mathematical Anxiety and Self-efficacy on Mathematics Achievement

teacher education for contemporary

Beyond Shanghai and PISA

Research Advances in the Mathematical

Education of Pre-service Elementary Teachers

This study compared the effectiveness, in terms of mathematical achievement and mathematics self-efficacy, of online homework to textbook homework over an entire semester for 145 students enrolled in multiple sections of college algebra at a large community college. A quasi-

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experimental, posttest design was used to analyze the effect on mathematical achievement, as measured by a final exam. A pretest-posttest design was used to analyze the effect on mathematics self-efficacy, as measured by the Mathematics Self-efficacy Scale. The control group completed their homework using the textbook and the treatment group completed similar homework using an online homework system developed by the textbook publisher. All class sections followed a common syllabus, schedule, and homework list and completed a common, departmental final exam. Classroom observations were also used as a way to establish the similarity between groups. The results of the study found that while the treatment group generally scored higher on the final exam, no significant difference existed between the mathematical achievement of the control and treatment groups. Both the control and treatment group did experience significant improvements in their mathematics self-efficacy but neither group demonstrated more improvement than the other. When students were divided based on incoming mathematics skill level, analysis showed that low-skilled students who used online homework exhibited significantly higher mathematical achievement than low-skilled students who used textbook homework. Exploratory analysis also showed that more students with low incoming skill levels and more repeating students received a passing grade when using online homework than did their higher-skilled, first-time counterparts, although the differences were not significant. Based on this study it appears as if online homework is just as effective as textbook homework in helping students learn college algebra and in improving students' mathematics self-efficacy. Online homework may be even more effective for

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helping the large population of college algebra students who enroll in the course with inadequate prerequisite math skills. Instructors and researchers should consider the possibility that online homework can successfully help certain populations of students develop understanding better than traditional approaches. This study has implications for mathematics instructors and for online homework system developers.

Elementary students' self-efficacy and attitudes towards mathematics can be challenging to measure. Bandura (1997) describes perceived self-efficacy as "not a measure of the skills one has but a belief about what one can do under different sets of conditions with whatever skills one possesses" (p. 37). Attitudes in the educational setting represent a desired outcome relative to a specific target (McCoach, Gable, & Madura, 2013). Efficacy and attitudes continue to influence educational attainments (Bandura, 1997). This sequential mixed-methods study explored grade 5 students' mathematical self-efficacy and enjoyment, after implementing a 10-week journal writing treatment. The research questions were: 1. Is there a difference between students exposed to journal writing and not exposed, after controlling for initial differences on the pre-test, with respect to: mathematical self-efficacy and enjoyment? 2. Is there a difference between male and female students, after controlling for initial differences on the pre-test, with respect to: mathematical self-efficacy and enjoyment? 3. Is there an interaction between gender and treatment group, after controlling for initial differences on the pre-test, with respect to: mathematical self-efficacy and enjoyment? 4. How do grade 5 students in the treatment group respond to journal writing?

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writing prompts regarding affective/attitudinal and dispositions in the content of mathematics? 5. In what ways are gender perspectives revealed through the journal writing responses? The instrument was administered to grade 5 participants in the journal writing treatment group (N=79) from one elementary school and the comparison group (N=51) from a comparable elementary school in the same district who were not exposed to the treatment. Two 2-way ANCOVAs revealed no significant differences ($p > .05$) in mathematics self-efficacy beliefs, attributions for achievement, and mathematics anxiety. The findings of this study showed that attitudes toward mathematics, self-efficacy beliefs, and attributions for achievement influenced mathematical domain knowledge acquisition among four students.

What Is Known, and What is Still Missing
Affect and Mathematics Education
Raising Self-efficacy in Students, Teachers and Parents
An Integrative Psychological Approach
Mathematics Anxiety

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The Differences in Mathematics Self-efficacy Scores Between Military Dependent Students and General Population Students

The PISA 2009 Technical Report describes the methodology underlying the PISA 2009 survey. It examines additional features related to the implementation of the project at a level of detail that allows researchers to understand and replicate its analysis.