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Mathematics Self-Efficacy and Mathematical Problem Solving: Implications of Using Different Forms of Assessment

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Mathematics Self Efficacy And Mathematical Problem Solving

Laura Golnabi

Mathematics Self Efficacy And Mathematical Problem Solving:

Mathematics Self-Efficacy and Flow in Developmental Mathematics Students Laura Golnabi,2017 This study examined mathematics self efficacy and the characteristics of flow in the context of performing mathematical tasks In particular it explored the 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 **Effects of Teaching Problem Solving Through Cooperative Learning Methods on Student Mathematics Achievement, Attitudes Toward Mathematics, Mathematics Self-efficacy, and Metacognition** Edna Leticia Hernández Garduño,1997 Learning Mathematics Successfully Clark J. Hickman,Helene J. Sherman,2019-09-19 This book combines self efficacy theory with practical strategies for teachers and parents to boost students math competence It explores self efficacy s role in learning math offering methods to enhance confidence and skills Suitable for classroom and home use it aims to support persistent confident math learning **Problem Solving in Mathematics Instruction and Teacher Professional Development** Patricio Felmer,Peter Liljedahl,Boris Koichu,2019-11-22 Recent research in problem solving has shifted its focus to actual classroom implementation and what is really going on during problem solving when it is used regularly in classroom This book seeks to stay on top of that trend by approaching diverse aspects of current problem solving research covering three broad themes Firstly it explores the role of teachers in problem solving classrooms and their professional development moving onto secondly the role of students when solving problems with particular consideration of factors like group work discussion role of students in discussions and the effect of students engagement on their self perception and their view of mathematics Finally the book considers the question of problem solving in mathematics instruction as it overlaps with problem design problem solving situations and actual classroom implementation The volume brings together diverse contributors from a variety of countries and with wide and varied experiences combining the voices of leading and developing researchers The book will be of interest to any reader keeping on the frontiers of research in problem solving more specifically researchers and graduate students in mathematics education researchers in problem solving as well as teachers and practitioners *Advances in the Contributions of Mathematics in the Field of Education and Psychology* Inmaculada Méndez,Juan Pedro Martínez-Ramón,Nelly Lagos San Martín,Belen Garcia-Manrubia,José Manuel García-Fernández,Francisco Manuel Morales Rodríguez,Cecilia María Ruiz Esteban,2024-03-07 *A Case Study Analysis of a Mathematical Problem-solving Program* Jill Noelle Choate,2012 Students must be good problem solvers in order to compete in today s global economy However many students including students with

disabilities do not have adequate problem solving skills thus eliminating potential job opportunities In order to increase opportunities for problem solving success schools must find strategies that are effective and efficient for students to use and simulate real world scenarios Therefore the purpose of this study was to investigate whether a direct cognitive strategy problem solving program Solve It which is designed to enhance student skills in word problem solving could increase the accuracy with which students with and without disabilities correctly solved word problems and whether it affected students beliefs about problem solving The research questions developed for this study were a does the Solve It method affect the math problem solving achievement of Grade 6 students and b what are teacher and student perceptions of the efficacy of the Solve It method of teaching word problem solving A quantitative case study was used for this study to determine the efficacy of a specific cognitive instructional strategy with Grade 6 students Participants in this study included 54 Grade 6 students 7 with disabilities from a middle school in Southwestern Colorado Data were gathered from students through the use of pre and posttests containing 10 word math problems Students were also given short weekly quizzes to monitor progress and check for proper usage of the strategy Finally data were gathered from the Northwest Evaluation Association NWEA instrument winter and spring testing periods to investigate changes on the problem solving strand of the mathematics test Teacher interviews and student surveys were also used to gain deeper insight into the effectiveness of the strategy From this analysis conclusions were drawn to answer the research questions Comparison of means showed that although the Solve It strategy did not statistically significantly improve students mathematical problem solving abilities on the standardized NWEA test it did improve their scores in word problem solving on the 10 item word problem test In addition the students perceived self efficacy to solve word problems increased *Psychological Studies in the Teaching, Learning and Assessment of Mathematics* Yiming Cao,Zsolt Lavicza ,Shuhua An,Lianchun Dong,2024-05-31 There is no doubt that the onset of a new decade has brought high expectations of academic progress for scholars especially for researchers in mathematics education The International Group for the Psychology of Mathematics Education was born in 1976 which focused on the international exchange of knowledge in the psychology of mathematics education the promotion of interdisciplinary research with psychologists mathematicians and mathematics teachers and the development of the psychological aspects of teaching and learning mathematics and its implications **Productive Failure Problem Solving to Improve the Mathematical Affect of Teachers** Angela Schanke,2022 Mathematics is traditionally taught using direct instruction which has been found to engender negative affective responses towards the subject including anxiety and low self efficacy Borko et al 1992 Mischo Schukajlow et al 2019 Productive Failure PF in contrast teaches students how to develop their own approach to solving problems and thus improves conceptual understanding and transfer Kapur 2008 Kapur Loibl Rummel 2014 The purpose of this study was to expose in service mathematics teachers to the PF problem solving process and to examine how their self efficacy and mathematical affect were influenced During problem solving participants self efficacy was negatively impacted

by encountering an obstacle having no clear direction and lacking content knowledge Self efficacy was improved as participants developed their own solution strategies and used the real world context as a tool Mathematical affect was improved as participants collaborated on a PF task and as participants felt satisfaction with their work Later interviews corroborated these findings also indicating that negative influences on mathematical affect included having insufficient information and difficulty in collaborating with certain peers The positive influences on affect also included collaboration the context developing one s solution strategy and having opportunities for creativity and satisfaction Though PF has not been previously connected to self efficacy or mathematical affect core components of a PF problem solving session were found to likely improve both of these for the participants Negative aspects were generally overcome by one or more of the positives It is recommended that PF be incorporated into mathematics classrooms intent on improving the mathematical affect of its students *Psychology and Mathematics Education* Gila Hanna,Laura Macchi,Karin Binder,Laura Martignon,Katharina Loibl,2023-09-05 Modern Mathematics is constructed rigorously through proofs based on truths which are either axioms or previously proven theorems Thus it is par excellence a model of rational inquiry Links between Cognitive Psychology and Mathematics Education have been particularly strong during the last decades Indeed the Enlightenment view of the rational human mind that reasons makes decisions and solves problems based on logic and probabilities was shaken during the second half of the twentieth century Cognitive psychologists discovered that humans thoughts and actions often deviate from rules imposed by strict normative theories of inference Yet these deviations should not be called errors as Cognitive Psychologists have demonstrated these deviations may be either valid heuristics that succeed in the environments in which humans have evolved or biases that are caused by a lack of adaptation to abstract information formats Humans as the cognitive psychologist and economist Herbert Simon claimed do not usually optimize but rather satisfice even when solving problem This Research Topic aims at demonstrating that these insights have had a decisive impact on Mathematics Education We want to stress that we are concerned with the view of bounded rationality that is different from the one espoused by the heuristics and biases program In Simon s bounded rationality and its direct descendant ecological rationality rationality is understood in terms of cognitive success in the world correspondence rather than in terms of conformity to content free norms of coherence e g transitivity *Increasing Self Efficacy in Children and Accuracy of Predictions in Mathematically Based Tasks* Barbara A. Fronczkowski,2000 According to the social cognitive theory self efficacy is a determinant of the choices made effort expended and persistence in the face of a task Math self efficacy has been demonstrated to be a predictor of problem solving over divergent kinds of self evaluation including self concept Self efficacy beliefs mediate the effect of other factors of mathematical performance such as prior experience problem solving ability and perceived usefulness High self efficacy leads to greater levels of confidence when faced with similar tasks in the future The current project consists of one completed study The hypothesis states that math exposure through structured play would be

effective in raising math self efficacy beliefs improving accuracy of reported math self efficacy and increasing immediately recorded math skill In an effort to increase reported self efficacy beliefs in children and to increase the accuracy of their reported predictions and skill the research used a pretest posttest control group design The manipulated variable was game exposure The presence or absence of game exposure had a statistically significant effect on how accurately participants predicted their own ability to do math problems It was found that participants had higher reported self efficacy and greater math skill when the hypothesized treatment was present Further investigation of these variables suggest math skill and reported math efficacy have a positive correlational relationship participants reporting with a greater math efficacy in the posttest also demonstrate a greater skill at answering the problems All results supported the hypothesis and the Increasing Math Self Efficacy in Children theory of self efficacy as defined by Bandura 1986 1997 Additionally data on accuracy of predictions add substantial information to a scarce research literature on this topic **Lessons Learned about Boys' and Girls' Mathematical Problem Solving** Patricia D. Hunsader,2005 ABSTRACT The purpose of this non experimental causal comparative study was to examine how gender reading ability and mathematics ability differentially moderated students mathematical problem solving processes linguistic explanations of those solution processes achievement on a mathematical problem solving test self efficacy on a self reported rating scale and self assessment on a self reported rating scale The investigation addressed five research questions First to what extent are students mathematical problem solving processes related to gender Second to what extent is children s performance in mathematical problem solving related to gender reading ability and mathematics ability Third to what extent is the quality of students linguistic explanations of their problem solving processes related to gender reading ability and mathematics ability Fourth to what extent is the relationship between students feelings of self efficacy when commencing work on a mathematical problem and their actual performance related to gender reading ability and mathematics ability Finally to what extent is students ability to assess their own performance on mathematical problem solving tasks related to gender reading ability and mathematics ability After being briefed in the use of the self efficacy and self assessment reporting scales the students from 16 fifth grade classrooms were tested with a 12 item mathematical problem solving test The final sample consisted of 237 students 129 boys and 108 girls All student responses were scored for performance and linguistic explanation using holistic rubrics and were coded according to the solution process employed The results indicate that gender does not play a significant role in students choice of problem solving processes As expected mathematics ability was significantly related to performance as was reading ability Gender was not found to be a significant predictor of performance Reading ability and mathematics ability were both strongly related to the quality of students linguistic explanations of their problem solving processes but gender was not Boys consistently exhibited higher levels of self efficacy but girls were more accurate in their self efficacy feelings Reading ability was also found to be a significant predictor of the accuracy of students self efficacy feelings but mathematics ability was not Reading

ability was found to be the strongest predictor of the accuracy of students self assessment with gender also showing a significant relationship **Journal for Research in Mathematics Education** ,1999 *Correlates of Mathematical Problem-solving* Mary Jane Mathews,2000 **Ed Educational Psych 02/03** McGraw-Hill,2002-04 **Dalumat** ,2010 Current Index to Journals in Education ,1998 *The Effect of Time Constraints on Mathematical Self-efficacy, Performance and Congnitive Problem Solving Strategies* Paul Chandler (M. Sc.),1988 **Differentiation Within Anemone Hepatica L. of Japan** Hiroshi Hara,K. Kurosawa,1958 *Proceedings of the ... International Conference for the Psychology of Mathematics Education* ,1998 **Annual Editions** Kathleen M. Cauley,Fredric Linder,James McMillan,2003-04 This reader of public press articles discusses perspectives on teaching development exceptional and culturally diverse students learning and instruction motivation and classroom management and assessment Adopters have access to Dushkin Online a student website designed to support Annual Editions titles www dushkin com online

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