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ID: 87

TSG 28 - Affect, beliefs and identity in mathematics education
invited long paper submission (8 pages)

MATHEMATICS-RELATED BELIEFS AND AFFECT - WITH SPECIAL EMPHASIS ON GENDER: AN OVERVIEW

Gilah Leder

Monash University, Australia

Influential approaches to the definition and operationalization of beliefs and other affective dimensions are described in this paper. Snapshots of research findings are presented, commonly used measures are listed, and some technologically enhanced approaches to the measurement of beliefs and affect are discussed. Contributions, both theoretical and practical, to research on the affective domain by those concerned with gender issues are also referenced.



[Leder-MATHEMATICS-RELATED BELIEFS AND AFFECT-87_a.pdf](#)

ID: 1235

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

PERCEIVED SOCIAL SUPPORT AND ACHIEVEMENT: THE MEDIATIONAL ROLE OF MOTIVATIONAL BELIEFS

Emmanuel Adu-tutu Bofah, Markku S Hannula

University of Helsinki, Finland

The literature has shown that perceived social support (PSS) influences academic achievement. However, the mechanisms through which this effect operates have received little empirical attention. The present study, drawing on TIMSS 2011 data for Ghana, examines the multiple mediational effects of motivational beliefs (i.e., intrinsic motivation: students' like learning math, and extrinsic motivation: task value or students' value for math including importance)—which may account for the empirical link between PSS (from parents and teachers) and math achievement. A bootstrap analysis revealed that the motivational beliefs jointly mediated the effect of PSS on math achievement. The findings indicates that motivational beliefs serves a unique function by bolstering the relationship between social support pathways and achievement.



[Bofah-PERCEIVED SOCIAL SUPPORT AND ACHIEVEMENT-1235_a.pdf](#)

ID: 1046

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

A CORRELATION STUDY ON EPISTEMOLOGICAL BELIEFS, THEORETICAL KNOWLEDGE AND TEACHING BEHAVIOR OF MATHEMATICS TEACHERS

Ping YU, Haiyue JIN

Nanjing Normal University, People's Republic of China

This study investigates the correlations between epistemological beliefs, theoretical knowledge, and teaching behavior. A theoretical framework was constructed first to indicate the correlations between teachers' epistemological beliefs, theoretical knowledge and teaching behavior. It proposed that contextual knowledge is an intermediate variable on the causal pathway from epistemological beliefs and theoretical knowledge to teaching behavior. The theoretical framework was then verified using structural equation model. This study has verified that: mathematics teachers' epistemological beliefs and theoretical knowledge impact on teaching behavior via the intermediate variable contextual knowledge and there are differences in contextual knowledge of teachers with different levels of theoretical knowledge and epistemological beliefs, which suggests that contextual knowledge generates mainly through theoretical knowledge and epistemological beliefs.



[YU-A CORRELATION STUDY ON EPISTEMOLOGICAL BELIEFS, THEORETICAL KNOWLEDGE AND TEACHING BEHAVIOR-1046_a.pdf](#)

ID: 80

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

EXPLAINING DIFFERENCES IN MATH-ANXIETY PROFILES BETWEEN GERMAN STUDENTS AND MEXICAN STUDENTS

Antonio Lara-Barragán¹, Cristina Eccius-Wellmann¹, Stefan Freitag², Bastian Martschink²

¹Universidad Panamericana, Mexico; ²Hochschule Bonn-Rhein-Sieg

Math Anxiety has become an important research topic since it represents one of the many difficulties for succeeding at all educational levels. Math Anxiety is discussed in terms of beliefs, attitudes and emotions and some topics related to cultural characteristics for German and Mexican students. The study showed that German students are more anxious than Mexican students are. This report summarizes Math Anxiety indexes for German and Mexican College students and gives an explanation for differences based on academic and cultural differences between them.



[Lara-Barragán-EXPLAINING DIFFERENCES IN MATH-ANXIETY PROFILES BETWEEN GERMAN STUDENTS AND MEXICAN STUDENTS-80_a.pdf](#)

ID: 2887

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

HONG KONG PRIMARY MATHEMATICS TEACHERS' BELIEFS ABOUT THE INTEGRATION OF CHILDREN'S LITERATURE IN MATHEMATICS TEACHING

Qiao-Ping Zhang¹, Natthapoj Vincent Trakulphadetkrai²

¹The Chinese University of Hong Kong, Hong Kong S.A.R. (China); ²University of Reading

Many studies have focused on how children's literature can be integrated into mathematics instructions. This study explored 18 Hong Kong primary mathematics teachers' beliefs about this integration. Results found that teachers' thoughts of this integration were categorized into five themes were found: Pedagogical benefits, barriers and difficulties, ways of integration, associated mathematical topics and associated literacy genre. The pedagogical benefits were most mentioned. Children's literature should be related with stories or books.



Zhang-HONG KONG PRIMARY MATHEMATICS TEACHERS' BELIEFS-2887_a.pdf

ID: 719

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

HOW TO REDUCE MATHEMATICS ANXIETY IN THE CLASSROOM

Marilyn Curtain-Phillips

Fairfield County Schools, United States of America

I will share my strategies of how to reduce mathematics anxiety in the classroom. As a classroom teacher of over 25 years, I have seen anxiety that has turned into disengagement. The presentation will include a look at what mathematics anxiety is and the impact it has on society. I will also demonstrate the use of inexpensive, easy-to-find, everyday items as manipulatives when introducing various mathematics concepts. I will examine the impact use of manipulatives and technology affect on the various learning styles.



Curtain-Phillips-HOW TO REDUCE MATHEMATICS ANXIETY IN THE CLASSROOM-719_a.pdf

ID: 744

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

INVESTIGATION AND ANALYSIS ABOUT STUDENT MATHEMATICS LEARNING ATTITUDE IN CHINESE RURAL AREAS

He Wei, Jia Xujie, Zhao jie

Minzu University of China, China, People's Republic of

The paper is about students' math learning attitude in Chinese rural areas by analyzing the questionnaires in eight provinces. We get the conclusion that the Chinese countryside student's mathematics learning attitude is not only affected by the impact of rural economic and social development, but more with the nature of children, teaching material, teaching methods and the school environment. In the end, some advices are given to the students' math learning in Chinese rural areas.



Wei-INVESTIGATION AND ANALYSIS ABOUT STUDENT MATHEMATICS LEARNING ATTITUDE-744_a.pdf

ID: 1518

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

MATHEMATICS ANXIETY IN SCHOOL: IMPLICATIONS OF GENDER DIFFERENCES

Julie-Ann Edwards¹, Lotta Viika²

¹University of Southampton, United Kingdom; ²Aldworth School, Hampshire, United Kingdom

This study examines the relationships between mathematics anxiety in school-aged students and their mathematical progress and attainment, with a specific focus on gender differences. Outcomes indicate that girls and boys exhibit different correlations between mathematics anxiety and mathematical attainment and that lower and higher attaining groups within each of these gender samples provide a unique challenge for mathematics teachers.



Edwards-MATHEMATICS ANXIETY IN SCHOOL-1518_a.pdf

ID: 1802

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

PARENTS' AND THEIR CHILDREN'S BELIEFS TOWARDS MATHEMATICS AND ITS TEACHING

Theresa Krassnigg

Alpen-Adria-University Klagenfurt, Austria

While students' and teachers' beliefs have been in the focus of beliefs' research in mathematics didactics for quite a while now, parents' beliefs have not been researched as thoroughly. Reasons for this might be, e.g., a lack of influence on or the limited access to parents. Still, due to the large influence parents have on their children in various ways, it is both natural and potentially highly rewarding to investigate beliefs on, views of, and attitudes towards mathematics that currently exist with parents and their children. I will present an Ansatz to choose a suitable target age and group of children – together with their parents – for interviews on questions that are intended to obtain a foothold on the territory of their beliefs towards mathematics and its teaching.



Krassnigg-PARENTS AND THEIR CHILDRENS BELIEFS TOWARDS MATHEMATICS AND ITS TEACHING-1802_a.pdf

ID: 1549

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

SRI LANKA'S PRE-SERVICE TEACHERS' PROFESSED BELIEFS ABOUT NATURE OF MATHEMATICS, AND LEARNING AND TEACHING MATHEMATICS

Gayanthi Malika Wadanambi¹, Frederick K.S. Leung²

¹Ruhuna National College of Education, Sri Lanka; ²The University of Hong Kong, Hong Kong

Research on professed beliefs of mathematics teachers has been recognized as one of the important aspects in the discipline of mathematics education (Thompson, 1992). This study reports the professed beliefs of pre-service secondary mathematics teachers in Sri Lanka. The results reveal that the participants' professed beliefs of learning and teaching mathematics appeared to be more flexible view oriented. Their beliefs about the nature of mathematics and the correlations between the sets of propositions stated under the nature of mathematics and teaching and learning mathematics are also presented.



Wadanambi-SRI LANKA'S PRE-SERVICE TEACHERS' PROFESSED BELIEFS-1549_a.pdf

ID: 874

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

STUDENTS' CONFIDENCE IN LEARNING MATHEMATICS: A STUDY OF STUDENTS FROM SHANGHAI

Fangchun Zhu

China, China, People's Republic of

Confidence is one of the most important factors which will influence students' mathematics learning behavior. In order to help cultivate students' confidence, teachers need to pay more attention to some fields like students' former learning experience. In this study, we try to found the factors which influence students' confidence. The result shows that students' former experience and their belief towards themselves would influence their confidence in learning and solving mathematics problems.



Zhu-STUDENTS' CONFIDENCE IN LEARNING MATHEMATICS-874_a.pdf

ID: 1534

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

A STUDY OF ACHIEVEMENT EMOTION IN MATHEMATICS IN THE CHINESE PRIMARY STUDENTS

Xiaoqing Li

Shenzhen University, China, People's Republic of

This study investigated the features of achievement emotion in mathematics of the Chinese primary students. Nine hundred and ninety-three students of four primary schools in a city of South China participated in the study. The results indicated that the Chinese students scored high on enjoyment and pride when learning mathematics. Their scores on anger and shame were relatively low. Moreover, it was found that the students' emotion varied across the academic settings. Additionally, students' emotional experience in the domain of mathematics had difference by their sex, grade, school type, as well as achievement level. The finding of the current study contributed to an understanding of students' emotional features of Chinese mathematics classes. And the results had some implications for mathematics education.



[Li-A STUDY OF ACHIEVEMENT EMOTION IN MATHEMATICS IN THE CHINESE PRIMARY STUDENTS-1534_a.pdf](#)

ID: 936

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

BELIEF CHANGES: THE MATHEMATICAL SOCIALISATION OF CALCULUS TEACHERS

Ralf Erens

University of Education Freiburg, Germany

This report focuses on a part of a research project concerning prospective secondary teachers' beliefs towards their teaching of calculus at upper-secondary level. First the theoretical framework and methodology will be briefly outlined. Afterwards the focus lies on studying these teachers' beliefs with a particular concern for how these beliefs might change depending on the stage of their professional development. Results from a qualitative study of preservice teachers and teacher trainees will be discussed centered on whether and how changes in their belief systems occur.



[Erens-BELIEF CHANGES-936_a.pdf](#)

ID: 61

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

EFFECTS OF EMOTIONAL SCAFFOLDS ASSISTED COGNITIVE ADVANCE ORGANIZERS ON ELEMENTARY STUDENTS' MATHEMATICS LEARNING

Hongbiao Yin¹, Wei Lin²

¹The Chinese University of Hong Kong, Hong Kong S.A.R. (China); ²The Chinese University of Hong Kong, Hong Kong S.A.R. (China)

This quasi-experimental study examined the effects of cognitive advance organizers and emotional scaffolds on elementary students' mathematical literacy and affect in the context of China. Students participating in this study were divided into three groups and provided with different treatments: (1) Experimental CO class with the treatment of cognitive advance organizers; (2) Experimental ES+CO class with the treatment of emotional scaffolds assisted cognitive advance organizers; (3) Contrast class without experimental treatment. Tests consisting of mathematical literacy and affect parts were conducted before and after the treatments which lasted five months. The results of analysis of covariance (ANCOVA) showed that student's mathematics literacy in ES+CO class outperformed that of students in CO class and contrast class, while mathematics affect had no significant difference in both CO and ES+CO classes.



[Yin-EFFECTS OF EMOTIONAL SCAFFOLDS ASSISTED COGNITIVE ADVANCE ORGANIZERS-61_a.pdf](#)

ID: 150

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

HOW DID I BECOME SUCH A MATHEMATICS TEACHER?

Okan Arslan, Çiğdem Haser

Middle East Technical University, Turkey

The current study aims to explore how preservice middle grades mathematics teachers develop their mathematics teacher identity through semi-structured interviews with 9 preservice middle grade mathematics teachers. Findings indicated that two main factors influenced their identity: Their experiences as a student before the university and their experiences as a preservice teacher in the mathematics teacher education program. Details of these experiences and how they affected mathematics teacher identities of participants were explored and discussed in this paper.



[Arslan-HOW DID I BECOME SUCH A MATHEMATICS TEACHER-150_a.pdf](#)

ID: 772

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

IDENTITY EMPOWERING MATH – EXPERIENCES WITH A JEWISH-ARABIC MATH SEMINAR

Sabine Stöcker-Segre^{1,2}

¹Achva Academic College, Israel; ²Davidson Institute of Science Education

Seminars during the last year of studies, where student teachers have to prepare and present a math topic of their choice, offer a chance to let students merge their identity with their studies by working on a topic that is tightly connected to their life. Thus motivation can be enhanced and positively influence achievements. We analyze and discuss our experience with a student teacher seminar in the south of Israel, where two thirds of the students were Jewish and one third Arabic. We got quantifiable results from mind maps that students were asked to draw in the beginning and in the end of the annual course, and from feedback at the end of the year. We discuss to which degree our results can contribute to the improvement of math teaching programs through the enhancement of affect and identity.



[Stöcker-Segre-IDENTITY EMPOWERING MATH – EXPERIENCES WITH A JEWISH-ARABIC MATH SEMINAR-772_a.pdf](#)

ID: 636

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

LISTENING FOR THE DIFFERENCE THROUGH TEACHER IDENTITY

Hyun Jung Kang¹, Paula Guerra Lombardi²

¹University of Northern Colorado, United States of America; ²Kennesaw State University, United States of America

This paper focused on how two first year 6th grade teachers develop their identities as mathematics teachers under the context of same school community. It also reports how this community of practice influenced the teachers' identity development and its interaction with their mathematics teaching practice.



[Kang-LISTENING FOR THE DIFFERENCE THROUGH TEACHER IDENTITY-636_a.pdf](#)

ID: 1358

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

MATHEMATICS LEARNING DIFFICULTY AND AFFECTIVITY: AN INVESTIGATION IN THE POSTGRADUATE WORKS IN BRAZIL

Amanda Marina Andrade Medeiros

Universidade de Brasília, Brazil

In this paper we will highlight the mathematics learning difficulty within the school environment, to better understand how this process occurs, mainly when it comes to the emotional aspects of the subjectivity of the subject. It is in this direction that we highlight the importance of this work, which aims to list the postgraduate works (Master and Ph.D.) which has as its central theme the difficulty learning mathematics and/or affection in mathematics learning and develop a concept of mathematics learning difficulty in the theory of subjectivity of González Rey. Most analyzed studies have focused on: the cognitive aspects of the individual, specific disabilities and specific methodologies. From the theoretical analysis we define child with mathematics learning difficulty as one that has difficulty in mastering mathematical concepts within the time and space determined by the school system, but that can be overcome from the movement of its subjectivity.



Medeiros-MATHEMATICS LEARNING DIFFICULTY AND AFFECTIVITY-1358_a.pdf

ID: 310

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

MEASURING STUDENTS' BELIEFS ON TEACHING METHODS AND MATHEMATICAL WORLDVIEWS FOR A LARGE SCALE ASSESSMENT

Boris Gimat

University of Applied Sciences and Arts Northwestern Switzerland School of Teacher Education, Switzerland

This paper presents twelve scales to measure students' beliefs on teaching methods and mathematical worldviews. After discussing their reliability, the results of a pretest concerning gender differences and correlations to marks are used to argue that these scales are useful parts of a context questionnaire to describe the participants and to interpret their performance in large scale assessments.



Gimat-MEASURING STUDENTS BELIEFS ON TEACHING METHODS AND MATHEMATICAL WORLDVIEWS-310_a.pdf

ID: 1442

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

RELATIONSHIPS AMONG STUDENTS' ACADEMIC STRESS AND MATHEMATICS LEARNING MOTIVATION

Bumi Kim

Wonkwang University, Korea, Republic of (South Korea)

This study aimed to investigate the relationships between academic stress and mathematics learning motivation focusing on the mediating effect of academic motivation types, and to test the differential structural relationship among the variables in the high vs. low academic achievement level groups. As a result, academic stress showed negative influence on the mathematics learning motivation via amotivation and autonomous motivation in the all groups. In addition, the results demonstrate that there were significant group differences in the R-squared multiple correlation of relationship patterns of the research variables. In high achievement level group of high school and low achievement level group of middle school, academic stress mediated academic motivation types showed more influence on the mathematics learning motivation.



Kim-RELATIONSHIPS AMONG STUDENTS' ACADEMIC STRESS AND MATHEMATICS LEARNING MOTIVATION-1442_a.pdf

ID: 1859

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

STUDENTS' DISPOSITION TOWARDS MATHEMATICS AT THE HIGH SCHOOL LEVEL

Maria Reyna Cruz, Maria D. Cruz Quiñones, Maria Del Rosario Cruz Quiñones

Universidad Autónoma de Cd. Juárez, Mexico

The purpose of the ongoing study is to explore and understand the students' disposition towards mathematics at the high school level. There were 35 participants in the study. Different data source are implemented to achieve this purpose. Classroom observations were conducted to identify student's behaviors and actions that allow the perception of the disposition. Moreover, a survey was administered to understand students' disposition towards mathematics. After the analysis of these data, focus group interviews will be conducted to identify the students' disposition as well as the teachers influence on the disposition of learning mathematics. The expected findings are a negative and non-productive disposition towards mathematics from these high school students. We expect to highlight the important role that teachers play on the students' disposition to learn mathematics.



Cruz-STUDENTS' DISPOSITION TOWARDS MATHEMATICS AT THE HIGH SCHOOL LEVEL-1859_a.pdf

ID: 771

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

THE RÆMOTIONALITY OF A MATHEMATICS TEACHER EXPLAINING LINEAR EQUATIONS WITH GEOGEBRA

Marina De Simone

École normale supérieure de Lyon, France

In this paper, I will discuss the intertwinement between the rationality and the emotions in a mathematics teacher, who presents linear equations through the use of GeoGebra. This teacher has different expectations from the use of technology for explaining equations and these expectations will be at the basis of her choices in classroom. Her expectations become clearly visible through her emotional involvement during her classroom activity. For this reason, the analysis will be carried out studying both the speech and the non-verbal communication such as, for example, body language and prosody.



De Simone-THE RÆMOTIONALITY OF A MATHEMATICS TEACHER EXPLAINING LINEAR EQUATIONS WITH GEOGEBRA-771_a.pdf

ID: 32

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

THE SURVEY AND ANALYSIS OF JUNIOR SCHOOL STUDENTS' MATHEMATICS ADVERSITY QUOTIENT

CAO Chunyan

Northwest Normal University, China, People's Republic of

Based on dimensions of mathematics test scores and mathematics test anxiety to discuss factors of affecting mathematics adversity quotient will benefit to reveal the internal mechanisms of mathematics leaning and explore large area strategy of improving mathematics. 165 students were conducted by self-edited mathematics adversity quotient questionnaire, mathematics test anxiety questionnaire and mid-term test scores. Result show that: there is a significant positive correlation between mathematics adversity quotient and mathematics test scores ($P < 0.01$), the latter has some influence on the former, there is a significant negative correlation between mathematics adversity quotient and mathematics anxiety ($P < 0.01$), the relief of the latter will help the improvement of the former.



Chunyan-THE SURVEY AND ANALYSIS OF JUNIOR SCHOOL STUDENTS' MATHEMATICS ADVERSITY QUOTIENT-32_a.pdf

ID: 1256

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

VISUALIZATION DEBUNKS MEANING AND POWER-A BELIEF

Shashidhar Belbase

Zayed University, United Arab Emirates

This paper discusses findings from a study of preservice secondary mathematics teachers' beliefs about teaching geometric transformations (GTs) using Geometer's Sketchpad (GSP). The study method comprised of series of task-based interviews with two research participants who were senior undergraduate preservice teachers at a medium-sized public university in the Rocky Mountain Region of the US. I used radical constructivist grounded theory (RCGT) as a theoretical frame to collect, analyze, and interpret the data. From the analysis of the data, I constructed six major categories of their beliefs associated with action, affect, attitude, cognition, environment, and object about teaching GTs with GSP. I discussed only one major category – beliefs about an object and its two sub-categories with some implications.





Belbase-VISUALIZATION DEBUNKS MEANING AND POWER- A BELIEF-1256_a.pdf

ID: 975
TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

WHAT DOES IT MEAN TO BELONG? HIGH SCHOOL STUDENTS' SENSE OF BELONGING IN MATHEMATICS CLASSROOMS

Forster D Ntow⁰¹, Lesa M Covington Clarkson⁰²

¹University of Cape Coast, Ghana.; ²University of Minnesota, U.S.A.

A pedagogy of instruction is like waves which carry things along with it in the right direction, tosses others up and down, and washes others ashore. As such, whether a student "swims" along with the wave, gets tossed up and down or is simply washed ashore depends on the extent to which s/he can swim along a particular pedagogical tidal wave. This study examined the normative identities high school students' have to identify with so as to become doers of mathematics in their respective mathematics classrooms. Findings from this study reveal that a less participatory pedagogy leads to most students developing identities of uncertainty or exclusion and various modes of identification.



Ntow-WHAT DOES IT MEAN TO BELONG HIGH SCHOOL STUDENTS' SENSE-975_a.pdf

ID: 1110
TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

"WHY AM I HERE?": CHANGES IN STUDENTS' SELF-ASSESSMENT AND MATHEMATICAL BELIEFS DURING A DEVELOPMENTAL MATHEMATICS COURSE

Anne Margaret Cawley, Max Altman

University of Michigan, United States of America

Student experiences in developmental math courses are impacted by their understanding of "success" in mathematics, their level of mathematical confidence, and their attitudes toward mathematics as a discipline, and these traits are highly related to their classroom status. Teacher interventions and positive classroom experiences can be highly beneficial in increasing students' sense of status and nuancing their sense of mathematics. In this paper, we analyze a set of writings from students in a developmental mathematics course in which the teacher worked to combat status problems in order to analyze changes in their mathematical views over the duration of the course.



Cawley-"WHY AM I HERE"-1110_a.pdf

ID: 2907
TSG 28 - Affect, beliefs and identity in mathematics education
Poster submission (4th - 18th April)

"MATHS INSIDE" - A PROJECT TO ENHANCE MATHEMATICS IDENTITY

Mary Coupland, Anne Prescott, Marco Angelini

University of Technology Sydney, Australia

"Maths Inside" is funded by the Australian Government under the Australian Maths and Science Partnership Program. It is a three year project aiming to increase the participation of secondary school students in mathematics by enhancing the classroom experiences of students and teachers and broadening their knowledge of where maths is used in science and industry. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is a major partner and the project has produced videos of scientists talking about their work and the role that maths plays in it. Writers from the Australian Association of Mathematics Teachers (AAMT) have prepared classroom materials that link to the Australian Curriculum and use ideas and topics from the videos to provide opportunities for students to explore mathematical concepts and use their maths in interesting ways. We are researching the impact of this program on the attitudes, beliefs and mathematical identity of secondary school students.



Coupland-MATHS INSIDE-2907_a.pdf

ID: 2297
TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

A COMPARATIVE STUDY OF MATHEMATICS CURRICULA OF SECONDARY SCHOOL

Safrudianur Safrudiannur^{1,2}, Benjamin Rott¹

¹Universität Duisburg-Essen, Germany; ²Mulawarman University, Indonesia

This study is part of the comparative study of teachers' beliefs and practices with a focus on problem solving. The aims of the study at hand are to investigate the differences of the mathematics curricula from three countries with very different PISA results: The Curriculum 2006 (C06) and 2013 (C13) of Indonesia are compared with the curricula of Singapore (CS) and Germany (CG). The method is document analysis. The preliminary results show that – regarding the topic of Equations and Inequalities – CS and C13 cover all the contents, CG does not cover linear inequalities and C06 does not cover quadratic equations.



Safrudianur-A COMPARATIVE STUDY OF MATHEMATICS CURRICULA OF SECONDARY SCHOOL-2297_a.pdf

ID: 2268
TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

A DATA MINING APPROACH TO INVESTIGATING MATHEMATICS DISPOSITIONS

Florence Gabriel, Jason Signolet, Martin Westwell

Flinders University, Adelaide, Australia

Large scale assessments such as PISA contain a huge amount of information and high-dimensional structure. Much of this wealth of information is, unfortunately, under-exploited. Here we use random forests and Bayesian statistics to investigate dispositions towards mathematics from the 2012 PISA results in order to demonstrate how modern analysis techniques are well suited to interrogate these types of data.



Gabriel-A DATA MINING APPROACH TO INVESTIGATING MATHEMATICS DISPOSITIONS-2268_a.pdf

ID: 2280
TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

A LONGITUDINAL ANALYSIS ON KOREAN STUDENTS' NON-COGNITIVE CHARACTERISTICS IN MATHEMATICS

Hyunju Kim, InAh Hwang, Won Kyung Kim

Korea National University of Education, Korea, Republic of (South Korea)

In this paper, we investigate individual trends of the non-cognitive characteristics for 5 school years and find causes of their level change by a data mining analysis. Study findings reveal that many students in any level had kept their level over time. It implies that students' non-cognitive characteristics do not alter easily. However, for those who went up and down in their level, the most changing factors are shown to be the mathematical self-efficacy, the intrinsic motivation, effort and endurance, and time management.



Kim-A LONGITUDINAL ANALYSIS ON KOREAN STUDENTS NON-COGNITIVE CHARACTERISTICS-2280_a.pdf

ID: 2275

TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

A MODEL OF STUDENT LEARNING

Priscilla E.L. Murphy^{1,2}, Leigh N. Wood¹

¹Macquarie University, Australia; ²Manukau Institute of Technology

Based on John Biggs' framework of student learning, this quantitative study examines the relationships between tertiary mathematics results, mathematics self-efficacy, student approaches to learning and conceptions in a New Zealand institution. An astounding finding was mathematics self-efficacy was the best predictor of strong performance. Other pertinent factors were a deep approach to learning and cohesive conception. These findings imply a model of learning mathematics in higher education.



[Murphy-A MODEL OF STUDENT LEARNING-2275_a.pdf](#)

ID: 2362

TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

ANALYSIS OF THE ATTITUDES TOWARD MATHEMATICS OF FUTURE PRIMARY EDUCATION TEACHERS

Carmen León Mantero, Alexander Maz Machado, María José Madrid, Noelia Jiménez Fanjul

Universidad de Córdoba, Spain

Attitudes towards mathematics of teachers in training are considered one of the factors that may influence their future job as teachers. As part of a research which aims to study the attitudes towards mathematics in college students, we present advances in the results obtained by students who are in their first year of the Primary Education degree from the University of Córdoba (Spain). These results show that although students value mathematics positively and they also consider them useful and necessary for their training, they do not want to use them in their future professional practice.



[León Mantero-ANALYSIS OF THE ATTITUDES TOWARD MATHEMATICS OF FUTURE PRIMARY EDUCATION TEACHERS-2362_a.pdf](#)

ID: 2298

TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

CHANGES OF PRESERVICE TEACHERS' MATHEMATICS EPISTEMOLOGICAL BELIEFS

Dong-Hoon Shin, Na Young Kwon

Inha University, Korea, Republic of (South Korea)

This study explores the epistemological beliefs in mathematics of Korean preservice teachers using the Discipline-focused Epistemological Beliefs Questionnaire (DEBQ) (Hofer, 2000) and examines the changes in the beliefs of Korean preservice teachers. For the purpose of this study, data were collected for preservice teachers of all grades in the department of mathematics education at a university in a metropolitan area of South Korea for three years, 2010 to 2012. The questionnaire, DEBQ, developed by Hofer (2000) was translated by Korean and used for this study, in particular, in mathematics. To capture the changes of preservice mathematics teachers, we focused on the difference between the ratings of the freshmen's and the senior's beliefs by each year. As the results, we could observe the changes of the Korean preservice mathematics teachers during their teacher education program periods.



[Shin-CHANGES OF PRESERVICE TEACHERS' MATHEMATICS EPISTEMOLOGICAL BELIEFS-2298_a.pdf](#)

ID: 820

TSG 28 - Affect, beliefs and identity in mathematics education
poster submission (1 page)

CHANGES OF STUDENTS' ATTITUDES IN MATHEMATICS WITH ASSISTANT TEACHERS

Kwon Na Young, Kim Sang Hun

SEJONG SCIENCE HIGH SCHOOL, Korea, Republic of (South Korea)

This study aims to examine the effects of assistant teachers on students' attitudes in mathematics. For the purpose of this study, a program, titled '*Understanding Practices in Secondary School Mathematics (UPSSM)*' was developed by one of the authors. During a 2015 spring semester, the participants worked as assistant teachers in regular mathematics classrooms in a middle school. To examine the effects of the program on students, pre- and post-surveys were conducted for the students who had been studied with the assistant teachers in their classrooms. The survey items were about emotions and motivation toward mathematics, in particular, interest, confidence, and anxiety, which was developed by Korea Institute for Curriculum and Evaluation. Data were collected for 8th grades students (pre: 170, post: 174) during the 2015 spring semester. The present study investigates middle school students' shifts in interest, confidence, and anxiety in mathematics with the participants in UCSSM.



[Na Young-CHANGES OF STUDENTS' ATTITUDES IN MATHEMATICS WITH ASSISTANT TEACHERS-820_a.pdf](#)

ID: 2859

TSG 28 - Affect, beliefs and identity in mathematics education
Poster submission (4th - 18th April)

DEVELOPMENT OF THE DIAGNOSTIC WORKSHEET FOR KOREAN STUDENTS COUNSELING ON LEARNING MATHEMATICS

Bok Eun Son

Ajou University in Korea, Korea, Republic of (South Korea)

This study was performed in part with the task to find measures to improve the defining characteristics in regards to learning math among Korean elementary and middle school students. For this study, we collected the content of scheduled counseling over 2 years from a math clinic and did the analysis using Grounded Theory analysis. We made diagnostic worksheets for primary school students and it can be used as basic material in consulting students on learning mathematics.



[Son-DEVELOPMENT OF THE DIAGNOSTIC WORKSHEET FOR KOREAN STUDENTS COUNSELING-2859_a.pdf](#)

ID: 2331

TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

FINNISH AND CANADIAN MATHEMATICS TEACHERS' PERCEPTIONS OF THEIR AUTONOMY

Audrey Paradis, Sonja Lutovac, Katri Jokikokko, Raimo Kaasila

University of Oulu, Finland

Autonomy is essential for teachers, but currently it is consistently reduced. In this narrative study, the account of 11 Canadian and 12 Finnish mathematics high school teachers is examined in relation to their perceptions and experiences of autonomy. The findings deepen the understanding of what autonomy means for teachers in different contexts, how they perceive good mathematics teaching, governmental exams and trust among the school actors. Canadian teachers report on more student-centred teaching and while Finnish teachers feel autonomous, pressures for exams/competition restrict their autonomy in a new outlook.



[Paradis-FINNISH AND CANADIAN MATHEMATICS TEACHERS' PERCEPTIONS-2331_a.pdf](#)

ID: 2211

TSG 28 - Affect, beliefs and identity in mathematics education
poster submission (1 page)

MATHEMATICS AS A CAREER AMONG MEXICAN FEMALE STUDENTS

Juan Gabriel Molina Zavaleta¹, Mario Sánchez², Alejandro Rosas³, Avenilde Romo⁴, Apolo Castañeda⁵

¹National Polytechnic Institute, Mexico; ²National Polytechnic Institute, Mexico; ³National Polytechnic Institute, Mexico; ⁴National Polytechnic Institute, Mexico; ⁵National Polytechnic Institute, Mexico

In this poster we present a report of an ongoing research focused on identifying the factors that motivated Mexican female students to choose mathematics as a career. The dataset for research was generated through semi-structured interviews. The interview guide contained a couple of open questions aimed at triggering students' narratives on the activities and experiences that motivated them to study mathematics.

The results show that four are the main factors that motivated women in the sample to choose mathematics as a career: (1) to be aware of the fact that they are good at mathematics, (2) they like mathematics, (3) the influence of their mathematics teachers, and (4) the influence of their relatives. These factors could promote the constitution of a mathematical identity for the choice of their career.



[Molina Zavaleta-MATHEMATICS AS A CAREER AMONG MEXICAN FEMALE STUDENTS-2211_a.pdf](#)

ID: 2322

TSG 28 - Affect, beliefs and identity in mathematics education poster submission(1 page) (by those not applying for the solidarity grant)

MEASURED AFFECTS WHILE USING DIFFERENT TYPES OF WORKED EXAMPLES

Alexandra Schermann

Pädagogische Hochschule Ludwigsburg, Germany

In a study about the effects of different types of worked examples students (n=194) studied some aspects of descriptive statistics in a classroom setting (eleven lessons). Beside data like the increase of knowledge, time spend working on the examples, ... also affective variables were gathered to get a wider picture. Therefore, several affect variables like motivation, interest, and mathematical self-efficacy were measured and matched with data on prior knowledge and the types of worked example. The analysis (MANOVA) showed a statistical dependency between different degrees of 'mathematical self-efficacy' as well as 'interest in mathematics' and the 'prior knowledge in mathematics'. Contrarily to the hypothesis, the 'type of worked example' showed neither any statistical dependency on the 'learning success' nor the affective variables in the pre-post-follow-up inquiry. But a dependency of the 'time on task' and the 'perceived cognitive load' on the 'type of worked example' was found.



[Schermann-MEASURED AFFECTS WHILE USING DIFFERENT TYPES OF WORKED EXAMPLES-2322_a.pdf](#)

ID: 2567

TSG 28 - Affect, beliefs and identity in mathematics education poster submission(1 page) (by those not applying for the solidarity grant)

MEASURING STUDENT VALUES: WHAT SECONDARY STUDENTS IN HAWAII VALUE IN MATHEMATICS LEARNING

Roxanne Moore, Richard Lamb, Kira Carbonneau

Washington State University, United States of America

The purpose of this empirical study is to assess and evaluate the psychometric properties of the WIFI questionnaire, as well as to examine response patterns of secondary students from Hawaii to determine the underlying factor structure. Principal Component Analysis of 363 student responses to the 65-item survey revealed that the instrument measured frequency of engagement as a proxy for values, suggesting that frequency of engagement is a mechanism for valuing.



[Moore-MEASURING STUDENT VALUES-2567_a.pdf](#)

ID: 2411

TSG 28 - Affect, beliefs and identity in mathematics education poster submission(1 page) (by those not applying for the solidarity grant)

PERSONAL MEANING AND MOTIVATION WHEN LEARNING MATHEMATICS

Neruja Suriakumaran, Maik Vollstedt, Christoph Duchhardt

Universität Bremen, Germany

Students are in the need of meaning when dealing with mathematics in a school context. Personal meaning understood as personal relevance of an object or action (Vollstedt, 2011) seems to be closely related to the self-determination theory of motivation (Deci & Ryan, 2002), in particular to the basic psychological needs theory and the organismic integration theory. Yet, the structural relationships between personal meaning and motivation are unexplored. To examine the interplay between them, a self-developed questionnaire (personal meaning) and well-established instruments for motivation are going to be used in lower secondary level. Data will be analyzed with confirmatory factor analysis and structural equation models.



[Suriakumaran-PERSONAL MEANING AND MOTIVATION WHEN LEARNING MATHEMATICS-2411_a.pdf](#)

ID: 2652

TSG 28 - Affect, beliefs and identity in mathematics education poster submission(1 page) (by those not applying for the solidarity grant)

PHOTO ELICITATION INTERVIEWS AS A WAY OF ACCESSING PRIMARY SCHOOL STUDENTS' ATTITUDES

Stine Karen Nissen, Pia Beck Tonnesen, Maria Christina Secher Schmidt

Metropolitan University College, Denmark, Denmark

How can we access primary school students' attitudes towards mathematics? This poster presents the methodological findings and discussions from a study carried out during the fall of 2015 and spring 2016. It is conducted in connection with a study of Early Mathematics Intervention program for Marginal Group in Denmark.



[Nissen-PHOTO ELICITATION INTERVIEWS AS A WAY OF ACCESSING PRIMARY SCHOOL STUDENTS' ATTITUDES-2652_a.pdf](#)

ID: 2548

TSG 28 - Affect, beliefs and identity in mathematics education poster submission(1 page) (by those not applying for the solidarity grant)

STUDENT PARTICIPATION – A WAY TO MOTIVATION?

Monica Nymo Hansen

UIT - The arctic university of Norway, Norway

This poster will present a project focusing on assessment for learning in a Norwegian context. In particular, we are interested in students' expressions about mathematical motivation and identity when interviewed about their experiences from a lesson where assessment for learning in mathematics was used. To get insight in this we will observe Grade 9 students during one lesson in mathematics and follow up by interviewing four of the students, first individually and then as a group. We believe the students' experiences and explanations will contribute with important insight in how to successfully implement assessment for learning.



[Hansen-STUDENT PARTICIPATION – A WAY TO MOTIVATION-2548_a.pdf](#)

ID: 2037

TSG 28 - Affect, beliefs and identity in mathematics education poster submission (1 page)

STUDENTS' ATTITUDES TOWARD MATHEMATICS LEARNING IN CLASSROOM FOCUSING ON SMALL-GROUP MATHEMATICAL COMMUNICATION

Sampan Thinwiangthong, Maitree Inprasitha, Suladda Loipha

Khon Kaen University, Thailand

For the last 15 years, educational reform movement in Thailand focused on students' learning processes and attitudes toward learning. Lesson Study (LS) and Open Approach (OA) were adapted to improve teaching and learning mathematics since 2002 (Inprasitha, 2011). The 2nd phase of OA was separated to 3 sub-phases: learning by individual, peer and group (Kagan, 1994). The objective is to investigate of students' attitudes toward mathematics learning. Mixed methodology was used to collect and analyze the data. Target group were 147 seventh-grade students. Data were collected by questionnaire and classroom video recording and analyzed by basic statistics and Triad Feedback (Thinwiangthong, 2012). The findings revealed that the students have positive attitudes towards mathematics learning rely on high level (Mean=4.17) and negative rely on medium level (Mean=2.98). A great number of emotional experiences had expressed in SMC, it leads to positive attitudes towards mathematics learning.



[Thinwiangthong-STUDENTS' ATTITUDES TOWARD MATHEMATICS LEARNING-2037_a.pdf](#)

ID: 2267

TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

TEACHER MATHEMATICS-RELATED BELIEFS AND THEIR RELATIONSHIP WITH CLASSROOM PRACTICE: A CASE STUDY

Jose M Diego Mantecon¹, Carmen Graña¹, Teresa Fernandez Blanco², Raquel Vallines Mira³

¹Universidad de Cantabria, Spain; ²Universidad de Santiago de Compostela, Spain; ³University of Texas at San Antonio, United States of America

This study explores the relationship between teachers'



[Diego Mantecon-TEACHER MATHEMATICS-RELATED BELIEFS AND THEIR RELATIONSHIP WITH CLASSROOM PRACTICE-2267_a.pdf](#)

ID: 2506

TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

THE CONSTRUCTION AND CONFIRMATION OF HIGHER-ORDER MATHEMATICS AFFECT MODEL FOR JUNIOR HIGH SCHOOL STUDENTS IN TAIWAN

Hsin-Yi Kung¹, Ching-Yi Lee²

¹National Changhua University of Education, Taiwan, Republic of China; ²Feng Chia University, Taiwan, Republic of China

The study aimed to construct the higher-order mathematics affect model De Corte et al. (2000) proposed. This model suggested that a theory of mathematical learning included five factors of domain specific knowledge, heuristics strategies, metaknowledge, self-regulatory skills and mathematics beliefs. Utilizing structural equation modeling, 1,207 junior high school students in Taiwan participated in the study. The results revealed that the higher-order mathematics affect model was confirmed and the implications were discussed from the perspective of cultivating students' affection in mathematics learning.



[Kung-THE CONSTRUCTION AND CONFIRMATION OF HIGHER-ORDER MATHEMATICS AFFECT MODEL-2506_a.pdf](#)

ID: 2940

TSG 28 - Affect, beliefs and identity in mathematics education
Poster submission (4th - 18th April)

THE IMPACT OF PROPAEDEUTIC SCIENCE COURSES ON STUDENT BELIEFS

Andreas Frank, Stefan Krauss
University of Regensburg, Germany

Student beliefs about mathematics play an important role in how students see, perform, and learn mathematics, and those beliefs are thus of important to the development of mathematical abilities (Schoenfeld, 1992). In our study, we examined the impact of specific courses introduced in the 2009-10 school year for 11th- and 12th-grade students in the Bavarian Gymnasium (the most academic track in the German school system) on the student beliefs.



[Frank-THE IMPACT OF PROPAEDEUTIC SCIENCE COURSES ON STUDENT BELIEFS-2940_a.pdf](#)

ID: 2366

TSG 28 - Affect, beliefs and identity in mathematics education
poster submission(1 page) (by those not applying for the solidarity grant)

UNDERSTANDING SCHOOL LEADERS' DISCOURSE IN REGARD TO MATHEMATICS ACHIEVEMENT

Jhonel Morvan
Brock University, Canada

Over the past 20 years, the notions of equity and discourse in school mathematics have been of considerable interest to the research community. Scholars have looked at equity or discourse and rarely have they studied how one can influence the other. Mathematical discourse is generally associated to classroom practices and scholars tend to overlook the political dimensions of discourse. This poster reports on findings from a research project involving 10 school and systems leaders: five from the Northern part of Haiti and five from the French-language school system in Ontario. It examines school leaders' discourse in terms of students' mathematics achievement. An early analysis leads to 4 themes examined in light of literature that contends that school leaders are central to the shaping of school cultures and that "effective school leadership is needed to support the transformation of teaching practice and school culture" (Vale, Davies, Weaven, Hooley, Davidson, and Loton, 2010, p. 47).



[Morvan-UNDERSTANDING SCHOOL LEADERS' DISCOURSE IN REGARD-2366_a.pdf](#)

ID: 1222

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

FEELINGS OF DIFFICULTY DURING PROBLEM POSING AND SOLVING

Çiğdem Haser
Middle East Technical University, Turkey

Twenty-one junior preservice middle grades mathematics teachers responded to five series of problem posing-solving the posed problem tasks and were also asked how they felt during these tasks throughout two months. The most common reference was to feelings of difficulty (FOD) expressed almost by half of the participants in each task, often with a tone of negative affect. They often described the point in the problem posing/solving process where they experienced FOD and how they were/were not able to manage the process. Participants also described what they needed to know in order to be a better problem poser/solver due to a possible monitoring of their cognitive processes.



[Haser-FEELINGS OF DIFFICULTY DURING PROBLEM POSING AND SOLVING-1222_a.pdf](#)

ID: 1574

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

IDENTITY AS A NEXUS OF AFFECT AND DISCOURSE IN MATHEMATICAL LEARNING

Einat Heyd-Metzuyanin
Technion - Israel Institute of Technology, Israel

The proposed theoretical paper suggests identity as a nexus of concepts tending to affect and concepts tending to discourse in the study of mathematical learning. Pointing to the opportunities that both affect and discourse related studies have to inform each other, the paper puts forward a broadening of Sfard & Prusak (2005) discursive definition of identity which explicitly uses the concept of emotion. It then proceeds to show how such as broadened discursive definition can enable examining processes of interaction between affect and mathematical learning both from the individual-subjective and from a discursive-structural perspective.



Heyd-Metzuyanım-IDENTITY AS A NEXUS OF AFFECT AND DISCOURSE IN MATHEMATICS LEARNING-1574_a.pdf

ID: 949

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

SELF-EFFICACY IN LEARNING MATHEMATICS: THE EFFECT OF VISUALIZATION AND ITS MUTUAL RELATION TO STUDENTS' ACHIEVEMENTS

Zehavit Kohen^{1,2}, Tali Miranda²

¹Bar-Ilan University, Israel; ²Levinsky College of Education

Self-efficacy in learning mathematics has been recognized in the educational literature as important to students' achievements. However, it has been investigated less as a main learning product. The current study explores the impact of learning based visualization, embedded with a tool for promoting self-efficacy, on middle students' achievements and self-efficacy. Participants were 111 9th grade students that were either exposed to learning based visualization (experimental group) or to traditional learning (comparison group) of the content 'analysis of functions'. Students in the experimental group were also divided based on their achievements for high and low achievers. Both groups were exposed to a self-efficacy tool for raising awareness of students' self efficacy in real time. Findings reveal a positive impact of the learning based visualization, specifically on high achievers students' self-efficacy and on low achievers students' mathematics achievements.



Kohen-SELF-EFFICACY IN LEARNING MATHEMATICS-949_a.pdf

ID: 1878

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

SOCIAL REALISM: A FRAMEWORK FOR RESEARCHING THE EMERGENCE OF TEACHERS' IDENTITIES

Lise Westaway

Rhodes University, South Africa

This paper seeks to offer a theoretical and methodological contribution to research on teacher identity within the field of mathematics education. This paper is based on my PhD study, which asks the question 'what practices emerge from the interplay of primary school teachers' identities and teachers' mathematics pedagogical practice?' Although the research is empirically grounded, this paper is theoretical in that it engages with possible limitations of current theorising on teacher identity, which is predominantly based on a social constructionist orientation. It proposes that social realism, particularly Archer's morphogenetic approach, may offer mathematics education researchers opportunities for examining the interplay between teachers' identities and mathematics pedagogical practices. Given the brevity of this paper, the focus will be specifically on teacher identity, although the assumption is that identities emerges as persons engage in social practices.



Westaway-SOCIAL REALISM-1878_a.pdf

ID: 276

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

TEACHERS' PROFESSIONAL IDENTITY

Andreas Karaolis, George Filippou

University of Nicosia, Cyprus

The present study examines teachers' professional identity (PI), focusing on the development of a measurement instrument. The final scale, found through factor analysis of the responses of 315 primary teachers on a trial scale with 73 items, comprised of 48 items in seven dimensions. Hierarchical cluster analysis leads to three groups of teachers with different identity characteristics. In conclusion, we propose confirmation of the scale in different cultures, examination of the characteristics of the three groups of teachers, as a means to enhance pre-and-in service teacher education programs and the development of a PI scale especially for mathematics teachers.



Karaolis-TEACHERS' PROFESSIONAL IDENTITY-276_a.pdf

ID: 1494

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

THE EFFECT OF TEACHER BELIEFS ON STUDENT AFFECT AND ACHIEVEMENT

Markku S. Hannula, Susanna Oksanen

University of Helsinki, Finland

A nationally representative longitudinal data from Finland was used to analyse the effect of grade 9 mathematics teachers' (N = 449) beliefs on the development of their students' (N = 3082) affect and achievement from grade 6 to grade 9. The main conclusion is that the teachers' beliefs have statistically significant, but small effect on the development of student affect and achievement.



Hannula-THE EFFECT OF TEACHER BELIEFS ON STUDENT AFFECT AND ACHIEVEMENT-1494_a.pdf

ID: 277

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

THE IMPACT OF ANXIETY AND PERSONALITY ON STUDENT PERFORMANCE IN DEVELOPMENTAL MATHEMATICS COURSES

Edgar Fuller, Jessica Deshler

West Virginia University, United States of America

Students enrolling in developmental mathematics courses face significant obstacles while pursuing degrees that require even basic levels of mathematics mastery. The gap between their self-perceived abilities and the expectation of most university level mathematics courses creates the potential for anxiety levels surrounding mathematics coursework that can strongly impact their performance. In this work we present the results of two surveys assessing the level of anxiety and personality traits exhibited by students in a large cohort enrolled in a beginning algebra course at a large research university. We attempt to identify underlying relationships with student progress in the course and to analyze the complex way that anxiety associated to different aspects of the study of mathematics interacts with personality traits.



Fuller-THE IMPACT OF ANXIETY AND PERSONALITY ON STUDENT PERFORMANCE-277_a.pdf

ID: 1108

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

THE STRUGGLE FOR RECOGNITION AND THE PROFESSIONAL IDENTITIES OF MATHEMATICS TEACHERS

Clyde Benedict Aurelius Felix

Nelson Mandela Metropolitan University, South Africa

All teachers are perpetually engaged in a struggle for recognition of what they are and what they are worth. This paper reports on a narrative inquiry which shows how the professional identities of three South African mathematics teachers from diverse cultural backgrounds are shaped by their struggles for recognition in a rapidly changing post-apartheid schooling system. Their autobiographical stories were examined through the theoretical lenses provided by combining Axel Honneth's three levels of recognition with Geert Keltchermans' four components of a professional self (or identity). The data show that, in addition to shaping their professional identities, the mathematics teachers' struggle for recognition also affects the quality of teaching and learning mathematics.



ID: 793

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)**A COMPARISON OF MATHEMATICS EDUCATION BELIEFS AMONG MATHEMATICS CURRICULUM LEADERS IN ENGLAND AND NIGERIA CANCELLED****Sylvester Juwe**

University of Cambridge, United Kingdom

Despite the importance of Mathematics Curriculum Leaders (MCLs), their beliefs lack the research attention they deserve. The paper reports findings from a project that compared the Mathematics Education beliefs of MCLs in English and Nigerian schools. It involved the use of inductive analysis, together with agreement rates in the analysis of semi-structured interviews of 18 MCLs. Findings, consistent with earlier studies, revealed that the beliefs of the MCLs according with national cultural expectation. Furthermore, there was evidence that the English MCLs were more pragmatic in adaptation of reforms initiatives, whilst their Nigerian counterparts integrated the reform expectation and their earlier dispositions, which could also be cultural.



Juwe-A COMPARISON OF MATHEMATICS EDUCATION BELIEFS AMONG MATHEMATICS CURRICULUM LEADERS-793_a.pdf

ID: 1978

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)**A NOVICE TEACHER'S POWERFUL MATHEMATICAL AFFECT: A CASE STUDY OF MYKIA'S TEACHLIVE™™ REHEARSALS****Deena Khalil, Ayanna Johnson**

Howard University, United States of America

Ball and Forzani posit that education research that focuses on the instructional dynamic "as teachers and students interpret one another and their environment over time" is perhaps one the most salient research that can be done to improve learning and teaching (p. 531). Such research relies on descriptive constructs. This case study seeks to describe one novice teacher's (NT) "in-the-moment" affective behavioral patterns as she engages in "rehearse teaching" in TeachLivE™™, a mixed-reality simulated classroom. To analyze the powerful mathematical affect observed in these rehearsals, Goldin et al.'s (2011) 'engagement structure' (ES) archetypes are applied, unpacking evidence of each structure with a description of the "simultaneously present and dynamically interacting" strands (p. 549). Findings reveal that ES has *transcendental value* in that it can connect teacher's prior 'in-the-moment' behavior as *math learners* with their 'in-the-moment' behavior as *math teachers*.



Khalil-A NOVICE TEACHER'S POWERFUL MATHEMATICAL AFFECT-1978_a.pdf

ID: 361

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)**EXPLORING STUDENTS' OWN EXPRESSIONS OF THEIR ASPIRATIONS FOR MATHEMATICS LEARNING****Karina Joyce Wilkie**

Monash University, Australia

As an *alternative approach to investigating the affective dimensions of students' learning* in normative surveys with pre-defined constructs and Likert scales, this study used a free-response format that sought students' views in their own words. Data were collected on over 3500 middle-school students' aspirations for their learning. Its intent was to seek insights into what students themselves choose to focus on when describing their hopes, as a way of not only informing teachers of the nature of these more broadly but also to offer teachers an approach they can use with their own students and against which their own students' responses can be compared. This paper discusses the methodological design of the study and uses affect-related examples to illustrate the insights that researchers and teachers can gain from eliciting open responses from students.



Wilkie-EXPLORING STUDENTS' OWN EXPRESSIONS OF THEIR ASPIRATIONS-361_a.pdf

ID: 1318

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)**MATHEMATICS ANXIETY AND MATHEMATICS TEACHING ANXIETY AMONG IN-SERVICE ELEMENTARY SCHOOL TEACHERS****Atinuke Adeyemi**

University of Windsor, Canada

This study examined the relationship between mathematics anxiety and mathematics teaching anxiety among in-service elementary school teachers and how these anxieties differ by gender. Data were collected with Revised Mathematics Anxiety Rating Scale (RMARS), translated Mathematics Teaching Anxiety Scale (MATAS-E), and demographic questionnaire through an online survey completed by participants. The findings revealed a strong positive correlation between mathematics anxiety and mathematics teaching anxiety. Also, female participants had higher mathematics anxiety as well as higher mathematics teaching anxiety due to subject knowledge and self-confidence than their male counterparts. Recommendations are provided on strategies that could be used by teachers and school boards to tackle the problem concerning the two constructs.



Adeyemi-MATHEMATICS ANXIETY AND MATHEMATICS TEACHING ANXIETY AMONG IN-SERVICE ELEMENTARY SCHOOL TEACHERS-1318_a.pdf

ID: 244

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)**STUDENTS' ATTITUDES TOWARD MATHEMATICS: A MODELING STUDY****Ozge Gun¹, Safure Bulut²**¹Bartın University, Turkey; ²Middle East Technical University, Turkey

In this study, students' attitudes toward mathematics were examined in terms of cognitive, affective and behavioral components via structural equation modeling. The model was tested using data from seventh grade elementary school students (N = 1960). Major findings from the model revealed that cognitive, affective and behavioral components of attitude toward mathematics were significantly and positively related to attitude toward mathematics and these three components were significantly and positively correlated with each other.

Keywords: attitude toward mathematics, structural equation modeling, components of attitude



Gun-STUDENTS ATTITUDES TOWARD MATHEMATICS-244_a.pdf

ID: 1888

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)**THE INTERPLAY OF RATIONALITY AND IDENTITY IN A MATHEMATICAL ACTIVITY IN SECONDARY SCHOOL****Francesca Morselli¹, Laura Branchetti²**¹University of Genova, Italy; ²University of Palermo, Italy

This contribution originates from a joint work aimed at networking theoretical tools and employ them to better understand teaching and learning episodes. We adopt a socio-cultural perspective and combine two theoretical lenses: the construct of rational behavior and that of identity. The networked analysis sheds light into group-work and classroom discussion episodes.



Morselli-THE INTERPLAY OF RATIONALITY AND IDENTITY IN A MATHEMATICAL ACTIVITY IN SECONDARY SCHOOL-1888_a.pdf

ID: 173

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

THE MEASUREMENT OF MOTIVES TO BECOME A TEACHER IN TEDS-M - TESTING FOR INVARIANCE ACROSS COUNTRIES AND CULTURES

Christin Laschke¹, Sigrid Blömeke²

¹Humboldt-Universität zu Berlin, Germany; ²University of Oslo, Norway

The paper presents the challenges of cross-cultural research in motivation to teach of mathematics future teachers. Referring to the studies of cross-cultural psychology, the measurement invariance of constructs representing the intrinsic and extrinsic motivation to become a teacher is examined across Chile, Germany, Malaysia, Norway, Oman, Philippines, Poland, Russia, Singapore, Switzerland, Taiwan, Thailand and USA. According to the results, correlational analyses are meaningful since invariance of the factor structure and the factor loadings was established for all countries, except Russia and the USA. Comparing factor means is only reasonable for groups of countries which share a cultural tradition, as it is true for Germany, Switzerland and Norway, for Taiwan and Singapore, and for the Philippines and Malaysia. As the results show, the comparability of measurements in large scale assessments should not be taken for granted. Testing for measurement invariance is illuminating.



[Laschke-THE MEASUREMENT OF MOTIVES TO BECOME A TEACHER IN TEDS-M-173_a.pdf](#)

ID: 611

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

TWO-LEVEL MODEL OF ATTITUDES AND BELIEFS INFLUENCING HIGHER ORDER THINKING (HOT) SKILLS IN MATHEMATICS

Elizar Elizar

The University of Adelaide, Australia

This article focuses on a two-level model analysis of attitudes and beliefs affecting students' higher order thinking (HOT) skills in mathematics in Indonesia. The data used is nested within the hierarchical ordering of both student (level-1) and teacher (level-2). The variables used at level-1 include liking mathematics, valuing mathematics, confidence in mathematics, and individual judgement of mathematics ability, as well as beliefs concerning mathematics related to lower order thinking (LOT) and higher order thinking (HOT). The variables at level-2 involve beliefs concerning mathematics teaching related to LOT and beliefs concerning mathematics teaching related to HOT. The analysis reveals that there are four variables at level-1 and one variable at level-2 contributing to student performance related to HOT in mathematics.



[Elizar-TWO-LEVEL MODEL OF ATTITUDES AND BELIEFS INFLUENCING HIGHER ORDER THINKING-611_a.pdf](#)

ID: 621

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

CAN THE STUDENTS' PERSONAL MEANING OF LEARNING MATHEMATICS BE ASSESSED WITH A PAPER AND PENCIL QUESTIONNAIRE?

Maïke Vollstedt, Christoph Duchhardt

University of Bremen, Germany

Personal meaning understood as personal relevance of an object or action is important for students when learning mathematics. In a former interview study conducted in Germany and Hong Kong with $N = 34$ participants, a typology of personal meaning was reconstructed. This typology forms the basis for the development of a questionnaire to inquire the students' preferred kinds of personal meaning on a bigger data set. This paper presents the process of scaling as well as first results from a cluster analysis based on the data of a pilot study.



[Vollstedt-CAN THE STUDENTS' PERSONAL MEANING OF LEARNING MATHEMATICS BE ASSESSED WITH A PAPER AND PENCIL Q_a.pdf](#)

ID: 1669

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

EMOTIONS IN UNDERGRADUATE MATHEMATICAL MODELLING GROUP WORK

Paul Hernandez-Martinez, Helen Harth

Loughborough University, United Kingdom

Taking a socio-cultural perspective of affect in education, we use observations of two groups of undergraduate engineering students to explore the role of emotions on the students' mathematical thinking and learning while working collaboratively on a mathematical modelling coursework assignment outside the classroom. Our analysis revealed complex interrelations between patterns of emotions and aspects of mathematical learning. We conclude that 'negative' feelings might sometimes lead to positive consequences on the activity of individuals and conversely, that 'positive' feelings do not necessarily lead to positive outcomes. Hence, pedagogical practices should aim to foster a range of emotions that can open possibilities for students' success.



[Hernandez-Martinez-EMOTIONS IN UNDERGRADUATE MATHEMATICAL MODELLING GROUP WORK-1669_a.pdf](#)

ID: 483

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

EXAMINING THE ATTITUDES OF PRE-SERVICE ELEMENTARY SCHOOL TEACHERS TOWARD MATHEMATICS

Mark Arvidson, Elizabeth Rivas

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Many factors contribute to a general phobia of learning and teaching mathematics by pre-service teachers, not the least of which are the attitudes they bring to the classroom. This study explored the extent to which pre-service teachers' attitudes toward mathematics changed during the course, Mathematics for Elementary Teachers, and the correlation between pre-service teachers' initial attitudes toward mathematics and their achievement in the course. Utilizing the Attitudes Toward Mathematics Inventory (ATMI), the categories of value, enjoyment, motivation and self-confidence showed no significant change. However, initial attitudes about mathematics were positively correlated with the final exam grade ($p < .05$). While participants valued mathematics, their scores for enjoyment, motivation and self-confidence were neutral to negative. In sum, developing self-confident, motivated students who value and enjoy mathematics cannot be overstated, but the path for doing so is not so clear.



[Arvidson-EXAMINING THE ATTITUDES OF PRE-SERVICE ELEMENTARY SCHOOL TEACHERS TOWARD MATHEMATICS-483_a.pdf](#)

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TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

FOSTERING A MUTUALLY BENEFICIAL RELATIONSHIP BETWEEN FACULTY AND STUDENTS TO PROMOTE A POSITIVE LEARNING ENVIRONMENT

Esther M.H. Billings, Lisa Kasmer

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Pre-service teachers (PSTs) often enter their mathematics courses with anxiety and lack of confidence, both in learning and teaching mathematics to their future students. Research suggests a positive student-faculty relationship and non-threatening class environment contributes to their motivation and success at the university level. In this paper, we explore research-based strategies that promote positive relationships among students and faculty and a safe classroom environment.



[Billings-FOSTERING A MUTUALLY BENEFICIAL RELATIONSHIP BETWEEN FACULTY AND STUDENTS-1673_a.pdf](#)

ID: 96

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

IMPLICATIONS OF GROWTH MINDSET TRAINING ON UNDERGRADUATE STATISTICS STUDENTS BY GENDER

Valorie Lynn Zonnefeld

Dordt College, United States of America

This paper documents the results of a quantitative study to determine the effects of an intervention in growth mindset training on students in introductory statistics courses at a small, liberal arts university in the United States. The research examined differences between genders in mastery of statistics and attitudes toward statistics for students who received training in a growth mindset. A pretest-posttest design utilized the Students' Attitudes Toward Statistics (SATS[®]) instrument and the Comprehensive Assessment of Outcomes in a first Statistics course (CAOS) instrument. Analysis of covariance revealed that females gained more than males on the SATS[®] components of *value* ($F(1, 63) = 9.40, MSE = 3.79, p = .003$) and *effort* ($F(1, 63) = 4.41, MSE = 4.07, p = .040$). Females also gained mastery of statistical concepts at a greater rate ($F(1, 63) = 5.30, MSE = 0.06, p = .025$).



Zonnefeld-IMPLICATIONS OF GROWTH MINDSET TRAINING ON UNDERGRADUATE STATISTICS STUDENTS-96_a.pdf

ID: 1278

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

INTERDEPENDENCE IN MIDDLE SCHOOL STUDENTS' CONCEPTIONS OF USEFULNESS IN MATHEMATICS

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This research takes a sociocultural approach to the study of perceived utility in mathematics. To highlight students' perspectives on usefulness, this work uses interviews, observations, and surveys to examine students' personal values, goals, and conceptions of usefulness. Findings underscore students' emphasis on interdependence. Implications for research and practice are considered.



Dobie-INTERDEPENDENCE IN MIDDLE SCHOOL STUDENTS' CONCEPTIONS-1278_a.pdf

ID: 1663

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

MATHEMATICS FUTURE PRIMARY TEACHERS' AFFECT: BACK TO THE FUTURE

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Future primary teachers' emotions, beliefs and attitudes are a main topic in the research on affect in mathematics education. On the one hand, it is well-documented as many future primary teachers – not always being specialist in math – are insecure about their competences, they hold “instrumental beliefs” about mathematics and its teaching, and they associate negative emotions to mathematics and to the idea of having to teach mathematics in the future. On the other hand, researchers underline as mathematics future teachers' affect can influence their current development and their future classroom practice. Studying future primary teachers' school experiences, i.e. their past, seems crucial to understand the causes for the current relationship with math and consequently to devise teachers development programs.



Pacelli-MATHEMATICS FUTURE PRIMARY TEACHERS' AFFECT-1663_a.pdf

ID: 765

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paper submission (4 pages)

PRE-SERVICE PRIMARY TEACHERS' ATTITUDES TOWARDS MATHEMATICS: AN EMPIRICAL STUDY GROUNDED IN THE SOUTH AFRICAN CONTEXT

Patrick Bamby

University of the Witwatersrand, South Africa

This study utilized a mixed-methods approach to examine pre-service primary teachers' attitudes towards mathematics. International authors have identified a number of possible dimensions of teacher attitudes. A possible criticism of these studies is that there is a lack of justification for these theoretical dimensions, particularly so in an under-researched context. With a mixed-methods approach, this study firstly used open-ended questions to qualitatively identify teachers' components of attitude. These questions were based on the conceptual framework identifying cognitive, affective and behavioral components of attitude. Having qualitatively identified dimensions, teacher statements for these questions were used to develop a quantitative instrument for measuring attitudes. Statistical methods were used to confirm identified dimensions of attitude. We report on the dimensions emerging from this particular South African context, and discuss the advantages of the employed method.



Bamby-PRE-SERVICE PRIMARY TEACHERS' ATTITUDES TOWARDS MATHEMATICS-765_a.pdf

ID: 1954

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

PRIMARY AND SECONDARY STUDENTS' VIEWS OF THEMSELVES IN RELATION WITH MATHEMATICS AND DIFFERENCES BETWEEN GRADES

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In this paper, we present a preliminary analysis of how primary and secondary Chilean students view themselves in relation with their ability, effort, enjoyment and success in mathematics. Research data come from answers of a group of 166 students to 10 items of a questionnaire used in Chile in the context of the national Measurement System of Learning Achievements (SIMCE). Students were in grades 4, 6, 8, 10 and 11 at the same school. We carried out a descriptive analysis of each of the ten items followed by an analysis of differences between grades using ANOVA test. Some remarkable results were obtained, for example, 84% of 166 students agree or strongly agree with “If I study, I do well in math” or that 49% of students enjoy mathematics. About differences between grades, in 7 of the items were observed significant differences and most of them were between grades 4 and 8. Significant differences in effort as learners of mathematics were found between grades 4 and 10.



Perdomo Díaz-PRIMARY AND SECONDARY STUDENTS' VIEWS OF THEMSELVES-1954_a.pdf

ID: 333

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paper submission (4 pages)

PROBLEM SOLVING: MAIN “FLOW” ACTIVITY IN MATHEMATICS TO UNIVERSITY STUDENTS

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When students experience flow (states of deep concentration and enjoyment) within academic tasks, they get higher performance and motivation toward the subject. Flow depends on the person, the task and the environment in which it is carried out. This study intends to know the kind of activities that provide flow in a sample of 121 university students. For this purpose, the researchers use a questionnaire and an interview. The data analysis suggests that having great mathematical skills is not necessary to experience flow with activities; and that the main flow activity in mathematics involves problem solving, regardless of the chosen degree and previous experience with mathematics.



Montoro Medina-PROBLEM SOLVING-333_a.pdf

ID: 697

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paper submission (4 pages)

WHAT GET VALUED SIMILARLY AND DIFFERENTLY IN THE AUSTRALIAN AND CHINESE MATHEMATICS CURRICULA: A COMPARATIVE STUDY

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Pupils are socialized during education process. Therefore, the value is an important perspective in educational research, including mathematics education. Mathematics values potential existed in content standards of Mathematics Curriculum Standard of Compulsory Education (2011 edition) of China[MCS] and the Australian Curriculum Mathematics[ACM] are analyzed. There is a predominant emphasis of the mathematics values of objectism, but rationalism is rising gradually as learning stage rising, which is more obviously in MCS; the value of control is more over progress in MCS, but they are corresponding in ACM; both nations emphasized on openness, but it should be more noted to transmit the value of mystery by mathematical beauty. This study can partly reveal the values of standard makers and relevant educational systems, and people also can benefit from it to understand and design value education under certain mathematics educational context. However, there are several problems should be deepened.



[Tang-WHAT GET VALUED SIMILARLY AND DIFFERENTLY IN THE AUSTRALIAN AND CHINESE MATHEMATICS CURRICULA-697_a.pdf](#)

ID: 1417

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paper submission (4 pages)

WHAT MACAO STUDENTS VALUE IN MATHEMATICS LEARNING

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Effective teaching and learning is one of the goals in mathematics education. What students and their teachers value in mathematics learning and teaching, affect to a large extent their decisions and actions in the pedagogical process. The 'What I Find Important (in mathematics learning)' study [WIFI] was designed to identify what students value in their mathematics learning processes. Macao is one of the 18 participating economies. Questionnaire data collected from 664 eighth grade Macao students were analyzed using Principal Components Analysis. The resulting rotated matrix consisted of the following six components: achievement, relevance, practice, technology, communication, and mathematical development. In this article, we will interpret these valuing in the local cultural context, and discuss observed differences between what Macao students and their peers from the greater China regions value in mathematics education.



[Jiang-WHAT MACAO STUDENTS VALUE IN MATHEMATICS LEARNING-1417_a.pdf](#)

ID: 37

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

A MOTIVATIONAL THEORY FOR HOMEWORK

Graham Rankin

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Academic performance is not just dependent on cognitive skills but on having the motivation to perform a given task as homework. Given the complexity and diversity of homework it should therefore not be surprising that several different theory based frameworks of analysis are possible. In this paper a motivation theory which provides a framework to describe and analyze motivation in the context of student's engagement in doing mathematics homework is posited.

This theory grew out of a cluster of models and theories developed in the health science field and which Rogers (1975) and Rogers & Maddux (1983) further developed into a "protection motivation" theory of how people assess and respond to health threatening conditions. The foundation of this theory presented herein incorporates both the foregoing protection motivation theory and the social cognitive theory as set forth by Bandura (2001).



[Rankin-A MOTIVATIONAL THEORY FOR HOMEWORK-37_a.pdf](#)

ID: 1030

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

FACTORS INFLUENCING TEACHERS' BELIEF CHANGE IN THE CONTEXT OF CHINA'S RECENT MATHEMATICS CURRICULUM REFORM

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This study investigated the factors influencing teachers' belief change in the context of China's recent mathematics curriculum reform. Three junior secondary mathematics teachers from Chongqing were involved in the semi-structured interviews. The identified factors included in-service training programs, innovative curriculum materials, school culture, students, time and schedule, examination system, national reform climate, teachers' past learning experience, and reflection. Most of the factors seemed unable to contribute to the realization of the conditions for belief change, thus they seemed to help maintain teachers' traditional mathematics beliefs. Furthermore, the role of culture in effecting teachers' belief change was highlighted.



[Chen-FACTORS INFLUENCING TEACHERS' BELIEF CHANGE IN THE CONTEXT-1030_a.pdf](#)

ID: 1919

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

IMPACT OF TIME SPENT ON HOMEWORK, MOTIVATION, AND PARENTAL INVOLVEMENT ON LOW-ACHIEVING STUDENTS' SUCCESS

Giang-Nguyen Thi Nguyen¹, Barbara Otto², Byron Havard¹, Carla Thompson¹

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Students drop out from school due to various reasons. There is an increase in the negative effects that accompany dropping out of high school. This paper provides the results of a longitudinal research on three different potential key factors which are expected to contribute to whether or not low-achieving students graduate from high-school: their time they spent on doing homework, their motivation, and their parents' involvement in school. In order to investigate the impact of these potential risk factors MANOVAs were conducted. The results revealed a significant difference between those students who drop out of school compared to those who graduate regarding their motivation and their parents' involvement, but not concerning their time spent on homework.



[Nguyen-IMPACT OF TIME SPENT ON HOMEWORK, MOTIVATION, AND PARENTAL INVOLVEMENT ON LOW-ACHIEVING STUDENTS_a.pdf](#)

ID: 1388

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INVESTIGATING SHANGHAI BEGINNING MATHEMATICS TEACHERS' BELIEFS IN THEIR FIRST TWO TEACHING YEARS

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This paper presents findings of a study that investigate Shanghai beginning mathematics teachers' beliefs in their first two teaching years. Two common features in professed beliefs (what teacher state) of four teachers are inferred from the interview data collected at the beginning and the end of two years. Firstly, most of the beginning teachers consistently held the mixed, teacher-centered and content-focused but with the emphases of understanding beliefs. Secondly, all of the teachers became to distinguish school mathematics from the subject of mathematics at the end of the two years. They emphasized that they had to teach the school mathematics, although they thought the subject of mathematics should be taught to the students. Based on these, discussions are on the dilemma the beginning teachers face in the initial stage of teaching and the essential factors influencing their beliefs.



[Lu-INVESTIGATING SHANGHAI BEGINNING MATHEMATICS TEACHERS' BELIEFS-1388_a.pdf](#)

ID: 2090

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

MATHEMATICAL EXPERIMENTS AND THEIR IMPACT ON STUDENTS BASIC NEEDS

Sarah Beumann

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Mathematical student experiments enable activity-based learning in mathematics. As one part of this intervention study it will be analyzed, how far a learning setting based on student experiments supports the experience of basic needs. The basic needs theory is part of the self-determination theory from Deci & Ryan and explains the relationship between the three basic psychological needs of people (autonomy, competence and relatedness) and their well-being. 179 students took part of this intervention study and were asked to answer a post questionnaire subsequent to their experimental session. The experimental courses took place between Mai and June 2015 in an extracurricular learning location at the University of Bochum and were designed for students in classes 6 to 9.



[Beumann-MATHEMATICAL EXPERIMENTS AND THEIR IMPACT ON STUDENTS BASIC NEEDS-2090_a.pdf](#)

ID: 1007

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

THE EFFECT OF TEACHING EXPERIENCE ON TURKISH MATHEMATICS TEACHERS' MATHEMATICAL BELIEFS

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This study examines the Turkish mathematics teachers' beliefs concerning the teaching, learning and nature of mathematics. The main focus is about the teaching experience of the mathematics teachers, involved in the study were ten middle and high schools. Their teaching experiences vary between 3-34 years. A questionnaire with open-ended questions was used as the data collection instrument. The data was analyzed by categorizing the views presented in terms of four mathematics-related orientations. According to the results, teachers often regarded mathematics mainly as a static system, however their beliefs about teaching / learning mathematics consisted of features deriving from application and process orientations. The results also showed that there are similarities and differences of teachers' beliefs according to their teaching experiences. Comparing with inexperienced ones' beliefs, experienced teachers show more dynamics aspects of mathematics.



[Uysal-THE EFFECT OF TEACHING EXPERIENCE ON TURKISH MATHEMATICS TEACHERS' MATHEMATICAL BELIEFS-1007_a.pdf](#)

ID: 1641

TSG 28 - Affect, beliefs and identity in mathematics education
paper submission (4 pages)

THE "LAST MAN" AND MATHEMATIC EDUCATION

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UNESP Rio Claro, Brazil

The present study refers to an experiment, conducted by a Mathematics professor of upper-middle, 12 year old students, about their perception towards a municipal decision of reducing the maximum speed on expressway avenues. While figures appeared to, in an absolute and isolated manner, portray authorities' incompetence, the teacher questioned the origin of the Mathematical investigation in this case. Based on a figure of Nietzsche, "the last man", this research seeks to identify the relationship between "comfortable truths" taught through Mathematics, and the construction of the postmodern western type - settled and peaceful of our time. And proposes that inquires of the use of numbers, as stamped instruments of perceived and assumed reality can represent an advantage in the fight against the construction of this "last man of our time."



[Muzinatti-THE "LAST MAN" AND MATHEMATIC EDUCATION-1641_a.pdf](#)

ID: 1588

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paper submission (4 pages)

WHAT STUDENTS THINK ABOUT MATHEMATICS TEACHERS' DRAWINGS OF A CLASSROOM TEACHING

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This study used the "Draw a Mathematics Teacher" method to collect 32 pre-service elementary mathematics teachers' perceptions about mathematics classroom teaching and 6 distinctive teachers' drawings were then used to create a student questionnaire. 53 Grade 5 students were recruited to answer their preferences and feelings about these 6 drawings. Results showed that although more students preferred student-centered teaching approach, they also have high preferences and positive feelings for a traditional teaching approach with student-teacher interactions and small group discussions.



[Lin-WHAT STUDENTS THINK ABOUT MATHEMATICS TEACHERS' DRAWINGS-1588_a.pdf](#)

ID: 918

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A LONGITUDINAL STUDY OF MATHEMATICS AND SCIENCE MOTIVATION PATTERNS FOR STEM-INTENDING HIGH SCHOOLERS IN THE US

James A Middleton, Daniel Mangu, Andrew Lee

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The research studied motivational factors that influence US high school students' intended careers in STEM. This study utilized data from the High School Longitudinal Study of 2009 which surveyed over 24,000 students in 9th grade and again in 11th grade. We classified students into four categories of intentions: 1) Not STEM Intending, those who did not select a STEM field as an intended occupation in either the 2009 or 2011 administrations; 2) Leavers, students who selected a STEM occupation in 2009 but not in 2011; 3) Newcomers, those who did not originally specify a STEM career in 2009, but who did in 2011; and 4) Stayers, those who chose STEM careers in both 2009 and 2011. Results show that occupational intentions change dramatically between 9th and 11th grades, and that the relationship between STEM intention and motivation is highly time-sensitive: Of the 6,788 STEM intending students in 2009 (29% of the total sample), only 3,560 remained STEM intending in 2011 (48% attrition).



[Middleton-A LONGITUDINAL STUDY OF MATHEMATICS AND SCIENCE MOTIVATION PATTERNS-918_a.pdf](#)

ID: 961

TSG 28 - Affect, beliefs and identity in mathematics education
invited for extended paper submission (8 pages)

AFFECTIVE TRANSGRESSION AND META-AFFECT: AN EXPLORATION OF PROCESSES FOR BELIEF CHANGE IN MATHEMATICS EDUCATION

Barbara Pieronkiewicz¹, Gerald Goldin²

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In underachieving students, well-established beliefs about mathematics or about their own ability may underlie response patterns of fear and/or aversion, sometimes termed "math anxiety." Here we consider some possible processes of belief awareness and change in students who choose to address counterproductive beliefs voluntarily. We bring to bear two theoretical ideas: the concept of affective transgression (consciously crossing emotional boundaries established by prior beliefs); and the concept of meta-affect (affect about affect, affect about cognition about affect, and the monitoring and regulation of affect). In this paper, we focus on processes of "getting over" affective obstacles, where students confront their prior beliefs and accompanying emotions directly through new experiences that include changes in their meta-affect. We suggest that teachers embrace the value of addressing affect explicitly within an emotionally safe teaching environment, and suggest some ways to do so.



[Pieronkiewicz-AFFECTIVE TRANSGRESSION AND META-AFFECT-961_a.pdf](#)

ID: 239

TSG 28 - Affect, beliefs and identity in mathematics education
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MULTIPLE SOLUTIONS, THE EXPERIENCE OF COMPETENCE, AND INTEREST

Kay Achmetli, Stanislaw Schukajlow

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In the project MultiMa, we have been investigating how students' learning is affected when they construct multiple solutions while solving real-world problems by applying multiple mathematical procedures. Three hundred seven ninth graders from twelve middle-track classes took part in this study involving four lessons. We tested students' experience of competence during the teaching unit as well as students' interest before and after the teaching unit. The results indicate that constructing multiple solutions has a positive influence on students' experience of competence but no effect on their interest in mathematics.



[Achmetli-MULTIPLE SOLUTIONS, THE EXPERIENCE OF COMPETENCE, AND INTEREST-239_a.pdf](#)

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