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Handbook of Research on Maximizing Cognitive Learning through Knowledge Visualization

Ursyn, Anna 2015-02-28 The representation of abstract data and ideas can be a difficult and tedious task to handle when learning new concepts; however, the advances of emerging technology have allowed for new methods of representing such conceptual data. The Handbook of Research on Maximizing Cognitive Learning through Knowledge Visualization focuses on the use of visualization technologies to assist in the process of better comprehending scientific concepts, data, and applications. Highlighting the utilization of visual power and the roles of sensory perceptions, computer graphics, animation, and digital storytelling, this book is an essential reference source for instructors, engineers, programmers, and software developers interested in the exchange of information through the visual depiction of data.

Object Recognition M. Bennamoun 2001-12-12 Automatic object recognition is a multidisciplinary research area using concepts and tools from mathematics, computing, optics, psychology, pattern recognition, artificial intelligence and various other disciplines. The purpose of this research is to provide a set of coherent paradigms and algorithms for the purpose of designing systems that will ultimately emulate the functions performed by the Human Visual System (HVS). Hence, such systems should have the ability to recognise objects in two or three dimensions

independently of their positions, orientations or scales in the image. The HVS is employed for tens of thousands of recognition events each day, ranging from navigation (through the recognition of landmarks or signs), right through to communication (through the recognition of characters or people themselves). Hence, the motivations behind the construction of recognition systems, which have the ability to function in the real world, is unquestionable and would serve industrial (e.g. quality control), military (e.g. automatic target recognition) and community needs (e.g. aiding the visually impaired). Scope, Content and Organisation of this Book This book provides a comprehensive, yet readable foundation to the field of object recognition from which research may be initiated or guided. It represents the culmination of research topics that I have either covered personally or in conjunction with my PhD students. These areas include image acquisition, 3-D object reconstruction, object modelling, and the matching of objects, all of which are essential in the construction of an object recognition system.

Sage for Undergraduates Gregory V. Bard 2015-02-16 As the open-source and free competitor to expensive software like Maple™, Mathematica®, Magma, and MATLAB®, Sage offers anyone with access to a web browser the ability to use cutting-edge mathematical software and display his or her results for others, often with stunning graphics. This book is a gentle introduction to Sage for undergraduate students toward the end of Calculus II (single-variable integral calculus) or higher-level course work

such as Multivariate Calculus, Differential Equations, Linear Algebra, or Math Modeling. The book assumes no background in computer science, but the reader who finishes the book will have learned about half of a first semester Computer Science I course, including large parts of the Python programming language. The audience of the book is not only math majors, but also physics, engineering, finance, statistics, chemistry, and computer science majors.

Teaching English to Young Learners Janice Bland 2015-09-24 Aimed at student teachers, educators and practitioners, Teaching English Language to Young Learners outlines and explains the crucial issues, themes and scenarios relating to this area of teaching. Each chapter by a leading international scholar offers a thorough introduction to a central theme of English as a foreign language (EFL) with preteens, with clear presentation of the theoretical background and detailed references for further reading, providing access to the most recent scholarship. Exploring the essential issues critically and in-depth, including the disadvantages as well as advantages of Teaching English as a Foreign Language (TEFL) with young learners, topics include: - task-based learning in the primary school; - storytelling; - drama; - technology; - vocabulary development; - intercultural understanding; - Content and Language Integrated Learning (CLIL) scenarios; - assessment. Innovative and rapidly emerging topics are covered, such as immersion teaching, picturebooks in the EFL classroom and English with pre-primary children.

Creativity, Inc. Ed Catmull 2014-04-08 From a co-founder of Pixar Animation Studios—the Academy Award-winning studio behind Coco, Inside Out, and Toy Story—comes an incisive book about creativity in business and leadership for readers of Daniel Pink, Tom Peters, and Chip and Dan Heath. NEW YORK TIMES BESTSELLER | NAMED ONE OF THE BEST BOOKS OF THE YEAR BY The Huffington Post • Financial Times • Success • Inc. • Library Journal Creativity, Inc. is a manual for anyone who strives for originality and the first-ever, all-access trip into the nerve center of Pixar Animation—into the meetings, postmortems, and “Braintrust” sessions where some of the most successful films in history are made. It is, at heart, a book about creativity—but it is also, as Pixar

co-founder and president Ed Catmull writes, “an expression of the ideas that I believe make the best in us possible.” For nearly twenty years, Pixar has dominated the world of animation, producing such beloved films as the Toy Story trilogy, Monsters, Inc., Finding Nemo, The Incredibles, Up, WALL-E, and Inside Out, which have gone on to set box-office records and garner thirty Academy Awards. The joyousness of the storytelling, the inventive plots, the emotional authenticity: In some ways, Pixar movies are an object lesson in what creativity really is. Here, in this book, Catmull reveals the ideals and techniques that have made Pixar so widely admired—and so profitable. As a young man, Ed Catmull had a dream: to make the first computer-animated movie. He nurtured that dream as a Ph.D. student at the University of Utah, where many computer science pioneers got their start, and then forged a partnership with George Lucas that led, indirectly, to his co-founding Pixar in 1986. Nine years later, Toy Story was released, changing animation forever. The essential ingredient in that movie’s success—and in the thirteen movies that followed—was the unique environment that Catmull and his colleagues built at Pixar, based on leadership and management philosophies that protect the creative process and defy convention, such as: • Give a good idea to a mediocre team, and they will screw it up. But give a mediocre idea to a great team, and they will either fix it or come up with something better. • If you don’t strive to uncover what is unseen and understand its nature, you will be ill prepared to lead. • It’s not the manager’s job to prevent risks. It’s the manager’s job to make it safe for others to take them. • The cost of preventing errors is often far greater than the cost of fixing them. • A company’s communication structure should not mirror its organizational structure. Everybody should be able to talk to anybody. Teaching AP Calculus Lin McMullin 2002

Introduction to Applied Linear Algebra Stephen Boyd 2018-06-07 A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples.

Building on the Past to Prepare for the Future Janina Morska 2022-09-01 Abstract of Book This volume contains the papers presented at the International Conference Building on the Past to Prepare for the

Future held from August 8-13, 2022, in King's College, Cambridge, UK. It was the 16th conference organised by The Mathematics Education for the Future Project - an international educational and philanthropic project founded in 1986 and dedicated to innovation in mathematics, statistics, science and computer education world wide. Contents List of Papers and Workshop Summaries Fouze Abu Qouder & Miriam Amit The Ethnomathematics of the Bedouin - An Innovative Approach of Integrating Socio Cultural Elements into Mathematics Education <https://doi.org/10.37626/GA9783959872188.0.001> First page: 1 Last page: 6 Abstract Our study attempted to address young Bedouin (desert tribes) students' persistent difficulties with mathematics by integrating ethnomathematics into a standard curriculum. First, we conducted extensive interviews w 35 Bedouin elders and women to identify: 1. The mathematical elements of their daily lives- particularly traditional units of length and weight, 2. The geometrical shapes in Bedouin women's traditional dress embroidery. Then we combined these with the standard curriculum to make an integrated 90 hours 7-8th grade teaching units that were implemented in Bedouin schools and in the Kidumatica Math Club for Excellent Students. Comparisons between the experimental groups (186) and the control group (62) showed that studying by the integrated curriculum improved:1.The cognitive aspects of the students 2.The affective aspects. Keywords: Bedouin Cultures, ethnomathematics. =====
===== Nadine Adams & Clinton Hayes Why Everyone should know Statistics! <https://doi.org/10.37626/GA9783959872188.0.002> First page: 7 Last page: 11 Abstract "Decision is the central intellectual activity in our everyday lives" and statistics is central to these activities (Longford, 2021, p. xi). The ability to manipulate and interpret data is an important component in decision making. A misunderstanding or poor grasp of data distributions and statistical methods can lead to assumptions that are not accurate. When these inaccurate assumptions are presented as factual to decision makers also possessing little or no statistical knowledge, poor decisions can be made. This paper investigates how an interpretation of statistics played a role the decision

to remove multiple-choice questions from invigilated examinations at a regional Australian university. The case is further argued that it is important for everyone to have a basic understanding of statistics. =====
===== Anita N. Alexander The Perspectives of Effective Teaching and Learning of Current Undergraduate and Graduate Mathematics Students <https://doi.org/10.37626/GA9783959872188.0.003> First page: 12 Last page: 17 Abstract Some mathematics professors engage their students in discourse and explorations to promote a deep understanding of critical concepts. Still, lecture remains the norm in mathematics courses according to current mathematics students' survey responses (Mostly Lecture 52%; Lecture & Discussions 35%; N = 89). Students were asked the best way for them to learn mathematics, whether their career plans are teaching related (Teaching Related: Yes 22%; Not Sure 36%; No 42%), as well as what they enjoy and want to change about their mathematics courses. Students requested "more discussions, and more questions to solve in class," and described lecture as "an unacceptable way to teach," and that "it is the worst way to learn." Students' perspectives on effective teaching and learning are critical for their continued passion to pursue STEM related fields, rather than stating that "I do not love mathematics anymore." =====
===== Clement Ayarebilla Ali & Ernest Kofi Davis Applications of Basketry to Geometric Tessellations <https://doi.org/10.37626/GA9783959872188.0.004> First page: 18 Last page: 23 Abstract We present applications of basketry to geometric tessellation in the primary school mathematics. Even though there are various forms of tessellations, we present three regular and Archimedean tessellations for conceptual analysis of the geometric concepts. With a case study design of 15 pupils through interviews and observations, the findings show that pupils can apply baskets to learn geometric tessellations. It was there recommended that baskets be used to extend learning as they play, game and fun. =====

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Nurten Alpaslan & Emre Alpaslan Mathematics for
Everybody <https://doi.org/10.37626/GA9783959872188.0.005> First page:
24 Last page: 25

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Cynthia Oropesa Anhalt, Ricardo Cortez, Brynja Kohler
& Will Tidwell Interrogation of Social Justice Contexts in Mathematical
Modeling: The Use of Simulations of Practice in the Mathematical
Preparation of Teachers

<https://doi.org/10.37626/GA9783959872188.0.006> First page: 26 Last
page: 31 Abstract Research in prospective teachers' development of
mathematical modeling knowledge for teaching is gaining momentum.
The Mathematics of Doing, Understanding, Learning, and Educating for
Secondary Students [MODULE(S2)]* project developed a curriculum in
modeling for teacher education that includes simulations of practice, in
which prospective teachers reflect on and plan a discussion around
student thinking, their models, and the contextualization of their results.
We present an analysis of prospective teachers' modeling work on the
decreasing area of Indigenous reservation land in the U.S., and a
simulation of practice which explores different methods for finding the
area of land in connection to the injustice deeply rooted in the treatment
of Indigenous people. This problem explores a critical social issue and
calls for explicit attention to pedagogical knowledge in structuring
discussions around the contextualization of the mathematical results.

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Takako Aoki & Shin Watanabe Find out Mathematics on
a Football: Making a football with paper

<https://doi.org/10.37626/GA9783959872188.0.007> First page: 32 Last
page: 34 Abstract We are aiming for a workshop method as a way to
teach mathematics in future school education. It is important to cooperate
with each other and understand mathematics. In this workshop, we aim to
discover the mathematics hidden in the footballs we handle every day. As
an aid to thinking, I would like to make football by paper first and learn
mathematics while looking at concrete things. You need 20 equilateral
triangles. A regular hexagon is made from this equilateral triangle, and a

regular pentagon uses the method of making a hole. In particular, pay
attention to the four-color problem in mathematics, make sure that the
colours of adjacent regular hexagons are different, and use three colours
(red, green, yellow). For example, in a football, how many equilateral
triangles of each colour are used is one of the issues. I am looking forward
to holding a workshop to see what kind of problems there are. Key words:
football Introduction with paper, the truncated icosahedron, the color
coding of the three colors, Euler's polyhedral formula

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Sarah Bansilal Analysing the Demands of an
Assessment in a Geometry Pedagogic Content Knowledge Module
<https://doi.org/10.37626/GA9783959872188.0.008> First page: 35 Last
page: 40 Abstract With the onset of the pandemic, universities were
forced to move to online platforms for teaching and for assessments. In
this paper, I reflect on the use of multiple-choice questions in a geometry
PCK module for pre-service mathematics teachers. The study involves a
secondary analysis of the data generated by the responses of 92 students
to an assessment consisting of 25 items. The aim of the study was to
distinguish between, and if possible, characterise possible levels of
demands of the test items. The results suggested that there are four
distinct groups of items relating to common content knowledge of early
and late high school respectively, PCK related to deductive reasoning
skills and critical thinking in an open book setting.

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Mike Bedwell Three or Four numbers: A Teacher's Tale
<https://doi.org/10.37626/GA9783959872188.0.009> First page: 41 Last
page: 43

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Esther Billings & Lisa Kasmer Learning Experiences
that Support Primary Teacher Candidates' Understanding and Enactment
of Core Mathematics Teaching Practices
<https://doi.org/10.37626/GA9783959872188.0.010> First page: 44 Last
page: 49 Abstract In many teacher preparation programs, instruction
focuses on learning about strategies and practices for teaching rather

themes (Topics). Each theme, furthermore, revealed similarities and differences, providing insight into technology's potential effect.

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===== Ann Dowker, Olivia Cheriton & Rachel Horton Age Differences in Pupils' Attitudes to Mathematics

<https://doi.org/10.37626/GA9783959872188.0.028> First page: 151 Last page: 156 This study investigated children's and adolescents' attitudes to mathematics, with a particular focus on whether and how these are affected by age and gender. 216 pupils from Years 2, 6, 9 and 12 participated in the study. They were given (1) the Mathematics Attitude and Anxiety' questionnaire (Thomas & Dowker, 2000), which assesses levels of maths anxiety; unhappiness at failure in maths; liking for maths, and self-rating in maths; and (2) the British Abilities Scales Number Skills Test to establish actual mathematics performance. Age had a significant effect on both liking for maths and self-rating in maths: older children were lower than younger children in both. Gender had a significant effect on self-rating: boys rated themselves higher than girls, though there was no significant gender difference in mathematical performance. Self-rating, but not anxiety, predicted mathematics performance.

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===== Alden J. Edson & Elizabeth Difanis Phillips The Potential of Digital Collaborative Environments for Problem-Based Mathematics Curriculum

<https://doi.org/10.37626/GA9783959872188.0.029> First page: 157 Last page: 162 Abstract In this paper, we present an overview of the design research used to develop a digital collaborative environment with an embedded problem-based curriculum. We then discuss the student and teacher features of the environment that promote inquiry-based learning and teaching.

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===== Belinda P. Edwards Learning to Teach Mathematics using Virtual Reality Simulations

<https://doi.org/10.37626/GA9783959872188.0.030> First page: 163 Last page: 168 Abstract Researchers (Lampert, et al., 2013; Zeichner, 2010; Grossman, et al., 2009a) recommend the use of rehearsals in teacher

education classrooms to help preservice teachers (PST) bridge theory to practice. Rehearsals enable PSTs to practice teacher moves, such as asking purposeful questioning and engaging students in mathematical discourse during an episode of teaching a lesson (NCTM, 2014). During a rehearsal, the PST's teacher education instructor provides coaching that helps the PST make flexible adjustments to their instruction. Using a phenomenological approach, this research investigates the use of Virtual Reality (VR) simulations to support PSTs learning to teach mathematics through rehearsals. The presentation will include samples of PSTs' mathematics teaching episodes with attention to successes, challenges, and lessons learned from the use of VR simulations in teacher education classrooms.

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===== Allison Elowson, Kristen Fye, Gregory Wickliff, Christopher Gordon, Alisa Wickliff, Paul Hunter & David Pugalee Student Research in a Mathematics Enrichment Program

<https://doi.org/10.37626/GA9783959872188.0.031> First page: 169 Last page: 174 Abstract Increasing emphasis is placed on the development of research skills for students in STEM content areas. As part of a four-week summer enrichment program, 24 high school students participated in a mathematics course highlighting the historical development of mathematics through the lens of history and culture. Each student designed and conducted their own research study under the mentorship of instructors with expertise in mathematics, writing and technical communication, and student research. This paper presents a case study of one project selected on the basis of strong performance in meeting course goals. Data demonstrates the mathematical understanding of the student researcher, their scientific literacy and research skills, and their mathematical communication. The student prepared both a paper and a poster to report their research study.

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===== Antonella Fatai Improving Relational and Disciplinary Competences by Rondine Method

<https://doi.org/10.37626/GA9783959872188.0.032> First page: 175 Last

found matter and its form of expression from the perspective of a new concept. In the process of "looking back" and "re-examine", it was confirmed from the description of the metacognitive part of the students that the use of quasi-variables clarified the object of consideration and made it easier to clarify which numbers contributed to the generalization and expansion in what sense.

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Ben Galluzzo, Katie Kavanagh, Karen Bliss, Michelle Montgomery & Christopher Musco Math Modelling: Common Pitfalls and Paths for Student Success

<https://doi.org/10.37626/GA9783959872188.0.037> First page: 202 Last page: 207 Abstract Mathematical modelling refers to the process of creating a mathematical representation of a real-world scenario to make a prediction or provide insight. There is a distinction between applying a formula and the actual creation of a mathematical relationship.

Approaching open-ended problems can be challenging for students. In this two part workshop, we first share examples of how students can get off-track while creating models, in particular making choices or assumptions that undermine the solution quality. In the second part, we demonstrate how to facilitate authentic math modelling so that students can be creative and innovative in the modelling process while having ownership over their solution. Participants will assess real student modelling solutions from Mathworks Math Modeling Challenge (M3 Challenge), a program of Society for Industrial and Applied Mathematics (SIAM), and discuss ways that they would advise teams towards improvement.

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Parker Glynn-Adey & Ami Mamolo Modelling Beauty: Hands-on Experiences in Group Theory

<https://doi.org/10.37626/GA9783959872188.0.038> First page: 208 Last page: 213 Abstract In the 19th century, geometric models were valued as tools for exploring complex mathematics. Quartic surfaces and hyperboloids elaborately modelled with plaster gave access to powerful ideas and brought alive wonderful new mathematics. In this workshop, we explore a diverse set of geometric models that capture mathematical

beauty and we showcase how they can be used to bring alive wonderful new-for-students mathematics. We discuss the value of these experiences for fostering mathematical ways of being that can help disrupt preconceived notions about a homely, rote and rigid nature of mathematics, and capture some of the visual richness of older mathematical models.

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Gerald A. Goldin, Lisa B. Warner, Roberta Y. Schorr & Daniel Colaneri Exploring Prospective Mathematics Teachers' Motivating Desires during Group Problem Solving Activity

<https://doi.org/10.37626/GA9783959872188.0.039> First page: 214 Last page: 219 Abstract Earlier research has characterized recurrent patterns of cognition, affect, and behavior during in-the-moment mathematical activity. Each pattern, termed an "engagement structure," is named by a specific motivating desire that evokes it: e.g., Get The Job Done, I'm Really Into This, Value My Culture, etc. This study explores prospective teachers' motivating desires as they engage in small-group problem solving sessions. Participants were enrolled in courses required for teaching certification at two eastern U.S. state universities. Based on survey, individual interview, and focus group data, we identify the most frequently occurring desires, their perceived importance and accompanying emotional feelings. We present and discuss some findings briefly, including the motivating desire to Carry My Weight with a team of peers.

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John Gordon & Kehinde Emmanuel Adenegan Are Abstract Mathematical Thinkers Born or Can They Be Trained?

<https://doi.org/10.37626/GA9783959872188.0.040> First page: 220 Last page: 224 Abstract Abstract mathematical thinkers in the fields of pure Mathematics and theoretical computer science have contributed significantly to the body of knowledge that has fundamentally altered the course of human civilization and technological advances. This paper explores whether these thinkers are naturally gifted or if there are pedagogical strategies that can be implemented that will bring about the

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 ===== Hadas Levi Gamlieli, Alon Pinto & Boris Koichu
 Secondary-Tertiary Transition and Effective Ways of Coping with it: A
 Perspective of Lecturers
<https://doi.org/10.37626/GA9783959872188.0.054> First page: 295 Last
 page: 300 Abstract The secondary-tertiary transition (STT) in mathematics
 education is a longstanding concern. This study explores university
 mathematics lecturers' perspectives on the challenges underlying STT
 and on the effectiveness of university-level coping measures currently
 employed. The analysis of 311 responses to an international survey
 suggests that there is considerable variability regarding the prevalent
 perspectives on STT among university lecturers. While most respondents
 recognized school-related factors, the coping measures they
 recommended were mainly university-related. The findings stress the
 need to improve communication, both between university mathematics
 lecturers and the school mathematics education community, and across
 universities, for promoting comprehensive initiatives to address STT.
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 ===== Sigal Levy & Yelena Stukalin Introducing Main
 Statistical Concepts to Non-statisticians
<https://doi.org/10.37626/GA9783959872188.0.055> First page: 301 Last
 page: 303 Abstract In this paper we present and discuss the results of an
 academic open-end mid-term statistics exam given to high-school
 teachers qualifying to teach Mathematics at a matriculation-exam level.
 The exam focused mainly on defining and understanding key terms and
 concepts in statistical inference. The purpose of this study is to identify
 what questions would be good predictors of the overall score, thus
 indicating a good understanding of statistics. Item analysis showed that
 the ability to properly define a parameter, state research hypotheses and
 interpret the findings were more inclined to do well in the exam.
 Keywords: Statistical concepts, teaching statistics, non-statisticians
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 ===== Nicole Lewis, Ryan Andrew Nivens, Jamie Price, Jennifer
 Price & Anant Godbole Pandemic-Driven Mathematical Initiatives within

the East Tennessee State University Center of STEM Education
<https://doi.org/10.37626/GA9783959872188.0.056> First page: 304 Last
 page: 309 Abstract We describe three Mathematics Education initiatives
 launched as a result of the global pandemic. (i) The Eastman-funded
 MathElites professional development (PD) program for K-8 teachers was
 offered online. Teachers were vastly more involved due to their greater
 autonomy. Old outcomes and those from 2020 will be compared. (ii)
 ETSU's Governor's School, which offers high school students Statistics and
 Biology college courses, went online too, and we used Columbia
 University Virology lessons and Covid19 data sets to make the courses
 more engaging to students. Student projects were assessed to be of a
 higher quality than in years past. (iii)With Niswonger Foundation
 support,we have launched a PD thrust for teachers in 2021, in the new
 areas of Epidemiology, Artificial Intelligence, and Statistics-with-R.
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 ===== Po-Hung Liu Students' Perceptions of Paradoxes of the
 Infinity <https://doi.org/10.37626/GA9783959872188.0.057> First page: 310
 Last page: 315 Abstract Infinity is a significant element for understanding
 calculus, yet studies consistently suggest that its counter-intuitive nature
 confused college students. The purpose of this study was to investigate
 Taiwanese college students' perceptions of paradoxes of the infinity and
 observe how their perspectives shifted back and forth while facing
 contradictory facts. It was found the 1-1 correspondence was the most
 used criterion for comparing the cardinality of infinite sets, which is
 somewhat different from previous studies, and students' reasoning on
 Zeno's paradoxes was feeble. The study suggests future research of this
 line should pay attention to the dialectical process of students' discourse
 to detect their core beliefs about the infinity.
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 ===== Hong Lu & Xin Chen The Relationship between
 Teacher-student Relationship, Interest, Self-efficacy and Mathematics
 Achievement - Does Gender Play a Role in it?
<https://doi.org/10.37626/GA9783959872188.0.058> First page: 316 Last
 page: 321 Abstract This study compared the mechanism by which the

teachers adopting these materials to use within their instruction and strategies used to overcome these challenges will be discussed.

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===== Rafael Alberto Méndez-Romero & María Angélica Suavita-Ramírez The mINNGa Labs: an Initiative of the Universidad del Rosario to Strengthen STEM Skills, Social Sensitivity and Youth Empowerment in Colombia

<https://doi.org/10.37626/GA9783959872188.0.062> First page: 333 Last page: 337 Abstract The challenge of educating the generation of the digital age leads us to resort to pedagogical innovations that are sensitive, empathetic, analytical and multidisciplinary in nature.

Additionally, these new student communities are characterized by appropriating causes, mobilize, manifest and are genuinely curious, which confronts us as educators with a greater and fascinating challenge. On the other hand, the historical moment of Colombia forces us to seek the unity of the country and generate a sum of forces from the specific talents of the people in the regions, to solve, as a body, the emerging needs of the moment. In this article we show a technological pedagogical innovation designed at the Universidad del Rosario, which is based on strengthening STEM skills and youth empowerment through the use of our mINNGa labs, a version of a living laboratory as a social an open innovation.

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===== Jennifer Missen A Process for Updating Mathematics Teaching for 21st Century Students

<https://doi.org/10.37626/GA9783959872188.0.063> First page: 338 Last page: 343 Abstract It is inevitable and necessary that the curriculum, pedagogy, and school and classroom structures for the teaching of Mathematics will continue to change over the next 30 years. However,

teachers are time poor, there are more and more who are teaching Mathematics when it is not their primary content area, and who may have knowledge of Mathematics but not the current pedagogical knowledge. Early career teachers need support in building a portfolio of tools and resources that work for them and their students. Experienced, traditional teachers are more comfortable with direct teaching and mastery practice

and, understandably, are resistant to change. Inquiry based teaching and collaborative strategies, differentiated and tailored for the class and its individuals, combined with direct teaching and mastery practice, allow for greater equity and increased preparation of students for the ever-changing workforce. This two part workshop has participants work through the process of transitioning existing, traditional or textbook units of work to flexible, differentiated units with enough detail and resources to support any teacher to walk into the classroom knowing that they will serve all the students well.

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===== Shelby Morge & Christopher Gordon Using Squeak Etoys to Model Mathematical Ideas

<https://doi.org/10.37626/GA9783959872188.0.064> First page: 344 Last page: 349 Abstract Effective mathematics instruction involves students in making sense of mathematical ideas and reasoning mathematically (NCTM, 2014). Unfortunately for many US students in grades 6-8 (ages 10-14), mathematics is a repeat of topics learned in elementary school with an emphasis on computation. For this reason, students start to see mathematics as something that is hard to understand and not enjoyable. In this workshop, we share how a technology tool, Squeak Etoys, was used in a lesson to engage grade 6-8 students in discovering the relationship between the number of sides and the angle measure in regular polygons. We describe a lesson implementation and engage participants in the development of a Squeak Etoys computer model. In addition, conclusions related to mathematics instructional practices are shared. Key words: Squeak Etoys, modeling, problem solving, lesson, geometry, polygons

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===== Janina Morska New Methods and Forms of Work during Online Maths Lessons <https://doi.org/10.37626/GA9783959872188.0.065>

First page: 350 Last page: 353 Abstract In more than 38 years as a mathematics teacher, I have always tried to look for interesting methods and new forms of work. I wondered how to explain the new material to students so that they would understand and be able to use the information in the future. The previous school year has been a huge

(PSMTs). At the heart of the repeated debate about the delivery of professional mathematics teacher education curricula has been the reported lack of development of PSMTs knowledge for teaching. However, discussion of what mathematical knowledge for teaching is needed by PSMTs and how it should be developed had been uneven. In South Africa, attention to improving the status quo of learners' poor performances in mathematics has been directed toward improving in-service teachers' mathematical knowledge for teaching. However, research has shown that the problem does not only emerge when teachers become practitioners. The problem of low levels performance and of understanding of school mathematics by pre-service teachers has been identified by many studies but is often not addressed during teacher training. This article explores an under-examined strategy for addressing the repeated concerns about the quality of pre-service mathematics teachers' education. It examines how attention to specialised content knowledge (SCK) within a preservice teacher education curriculum could potentially influence deeper quality mathematical knowledge to pre-service mathematics teachers' professionalism. This is a qualitative study conducted in 2018 and 2019. Data was generated from (n=61) PSMTs that were enrolled for Bachelor of Education majoring in mathematics. Data was conducted using written task, open ended questionnaires and focus group interviews. The findings from this small-scale study showed that error analysis has the potential to influence the development of SMK. Furthermore, findings suggest that attention to SCK has the potential to evoke school mathematics concepts and the evolution of subject matter knowledge. Based on the findings it is recommended that future research should be conducted to determine the veracity of these conclusions and their generalization to other mathematical topics. Considering the suggestions made by in literature that the description of knowledge is only valid at the time of the investigation, there is a need of large scale to ascertain the effect of error analysis toward the development of PSMTs' SMK of other school mathematics topics. Keywords: Error analysis, Pre-service mathematics teachers, Specialised Content Knowledge.

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===== Jenna O'Dell & Todd Frauenholtz Recruiting Mathematics and Mathematics Education Majors to a University <https://doi.org/10.37626/GA9783959872188.0.071> First page: 374 Last page: 377 Abstract This paper will present strategies used to recruit students to a four-year university to complete a double major in mathematics and mathematics education, then enter the teaching field. The recruiters are two professors who work in both the Mathematics and Education departments at a university in the United States. The mathematics department has been especially supportive of the initiative as it will double the number of mathematics majors in their programs for two years from four to nine students. The recruiting included contacting community colleges, professional organizations, word of mouth, the university marketing department, and visits to collegiate mathematics classrooms at the level of calculus and above. This project was supported by The National Science Foundation (NSF) as a Noyce project and will support students financially with full cost of attendance for the final two years of the four-year program.

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===== Elizabeth Oldham & Aibhín Bray Undergraduate Mathematics Students' Reflections on School Mathematics Curricula after a Major Curriculum Change in Ireland <https://doi.org/10.37626/GA9783959872188.0.072> First page: 378 Last page: 383 Abstract After decades in which the Irish post-primary (grades 7-12) mathematics curriculum changed incrementally, a major innovation project was approved in 2008, and a "reform"-type curriculum was phased in over several years. The project was controversial, and some students developed negative attitudes to the change. This paper examines recent students' opinions: in particular, the opinions of mathematics undergraduates who had experienced the transition and who took a Mathematics Education module at one Irish university in 2019-20. They studied old and new curriculum documents and examination papers, and watched videos of reform-type lessons; their reflective comments were posted to a discussion board. Thematic analysis of posts from the 18 (out of 25) students who gave permission for use of their

constructed starting with Primary School, by teaching Arithmetic "algebraically". Here, the problem of the symbolic representation of mathematical objects is tackled. The aim is to allow students to clearly distinguish between the two worlds - the one of signs and the one of meanings - and to use signs of mathematical language with full awareness rather than just manipulating them. We present activities and tools which take into consideration different semiotic fields (gestural, iconic, natural, ...) to achieve the mathematical field.

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===== Shelley B. Poole The "Yes, and..." Approach to Teaching Mathematical Modelling
<https://doi.org/10.37626/GA9783959872188.0.078> First page: 413 Last page: 417 Abstract Mathematical modelling can be a particularly creative tool when students are asked to solve open-ended problems. As instructors, when implementing mathematical modelling in the classroom, we can build on the ideas of our students. Utilizing the concept of "yes, and..." from improvisational theatre, we can foster students' creativity and empower them to take ownership of the mathematics when solving open-ended problems. Using this approach allows us an opportunity to let go of the structure of old and embrace new approaches and ideas in the classroom.

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===== Jordan T. Register & Christian H. Andersson Analysing PSTs Ethical Reasoning in a Data Driven World
<https://doi.org/10.37626/GA9783959872188.0.079> First page: 418 Last page: 423 Abstract The prevalence of Big Data Analytics as a proxy for human decision-making processes in globalized society, has catalyzed a call for the modernization of the mathematics curriculum to promote data literacy and ethical reasoning. To support this initiative, ten preservice mathematics teachers (PSTs) in Sweden (SWE) and the United States (US) were interviewed to identify what ethical considerations preservice teachers (PSTs) make in their mathematical analyses of data science contexts. Preliminary results indicate that teachers make a myriad of ethical considerations in their mathematical work that are tied to their

critical mathematics consciousness (CMC), conceptions of data literacy, and experiences. As a result, it is imperative that educators simultaneously design educational curricula to foster students' CMC and work to transform teacher held definitions of data literacy to reflect changes brought on by globalization.

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===== Sarah A. Roberts, Cameron Dexter Torti & Julie A. Bianchini A Mathematics Specialist Supporting District Shifts in Instruction for Multilingual Learners through Studio Days
<https://doi.org/10.37626/GA9783959872188.0.080> First page: 424 Last page: 428 Abstract Mathematics specialists fill a gap in providing individualized professional learning for classroom teachers, including furnishing much needed professional learning related to multilingual learners. This qualitative study examines the role a secondary district mathematics specialist in the United States played in supporting shifts in instruction for multilingual learners through the enactment of studio days professional learning. Interviews across two years with a mathematics specialist were examined. Using a framework of multilingual learner principles and adaptive reasoning, we share instructional shifts around the adaptive reasoning categories of flexibility, understanding, and deliberate practice, as related to multilingual learners. We conclude with implications for both research and practice related to secondary mathematics specialists, multilingual mathematics instruction, and studio day professional learning.

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===== Keith Robins Applying Mathematical Thinking Principles to Real Life Situations to Create an Objective Thinking Strategy
<https://doi.org/10.37626/GA9783959872188.0.081> First page: 429 Last page: 433 Abstract Teaching set thinking can make a great difference in teaching and learning mathematics as it demonstrates its relevance to real life. The following examples include how socialising is a mathematical process and how one can create a mathematical model for any experience or system rather than creating perceptions.

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Christine Robinson & Karen Singer-Freeman Digital Enhancements for Common, Online Mathematics Courses
<https://doi.org/10.37626/GA9783959872188.0.082> First page: 434 Last page: 438 Abstract The University of North Carolina System Office (UNC System) established the Digital Enhancement Project to rapidly develop high-quality, online course materials to support faculty and student success in online courses. Content was created for Calculus I, a course that is critical to student progress, is in high demand, and has large enrollments. To evaluate the usefulness and impact of the materials, project evaluators developed assessment instruments that included a survey for students enrolled in classes being taught by early adopters. Overall, students rated the quality of classes using project materials to be high. However, underrepresented ethnic minority students were somewhat less positive than other students and all students were less positive about the alignment of course content with course assessments than they were about other aspects of the course design.

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Ann-Sofi Røj-Lindberg Trends in Mathematics Education in Finland <https://doi.org/10.37626/GA9783959872188.0.083> First page: 439 Last page: 444 Abstract Since PISA 2000 there has been a huge international interest towards education in Finland. Are there particular explanations to the PISA-success, a philosophers' stone, to be found? Is it possible to export innovative components found in Finnish schools to other countries and what exactly are these components? Is it about accessibility? Can the successful components be noticed and described? And why has the Finnish PISA-results in mathematics dropped lately? Questions like these have been asked over the years. In the paper I discuss trends in the Finnish public schooling that I find to be of particular importance and highlight changes in the curriculum and trends in mathematics education generally. I connect my arguments to research findings as well as to anecdotal stories.

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Sheena Rughubar-Reddy & Emma Engers Video Tutorials and Quick Response Codes to Assist Mathematical Literacy

Students in a Non-classroom Environment
<https://doi.org/10.37626/GA9783959872188.0.084> First page: 445 Last page: 450 Abstract This paper discusses effectiveness of video tutorials, accessed via Quick Response codes, on Grade 10 mathematical literacy students' ability to complete their homework. To assist them outside of the classroom, an intervention involving video tutorials explaining specific sections of work and how to go about solving problems, was devised. Students could access the relevant tutorials on a mobile device via the scanning of barcodes provided on the worksheets. The effectiveness of the intervention was assessed both quantitatively and qualitatively, through analysis of the participating students' homework submissions and interviews with the students after the intervention had ended. Feedback from students via focus group interviews and questionnaires revealed that they found the tutorials helpful. This would indicate that the intervention was potentially beneficial. Keywords: Quick Response codes, video tutorials, homework.

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Sheryl J. Rushton, Melina Alexander & Shirley Dawson Mathematics to Teacher Education Persistence
<https://doi.org/10.37626/GA9783959872188.0.085> First page: 451 Last page: 456 Abstract In 2017, a university in Northern Utah's Teacher Education and Mathematics Departments moved from a two-course mathematics requirement to incorporate a three-course mathematics requirement for Elementary and Special Education Teacher Education majors to satisfy university and Utah State Board of Education Quantitative Literacy graduation requirements. The proposed research seeks to determine how persistence rates differ from the original two-course math series to the new three-course destination series.

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Robyn Ruttenberg-Rozen In-the-Moment Narratives: Interventions with Learners Experiencing Mathematics Difficulties
<https://doi.org/10.37626/GA9783959872188.0.086> First page: 457 Last page: 462 Abstract Despite a significant amount of planning, so much of what occurs in mathematics teaching and learning intervention

interactions, for both teacher and learner, are based on fleeting in-the-moment decisions and responses. At the root of these in-the-moment interactions are narratives that position the learner, teacher, and mathematics. In this paper I explore the interplay between in-the-moment decisions and responses, narratives, and positioning within a mathematical intervention for a learner experiencing mathematics difficulties. I use data from a mathematics intervention study of learners experiencing mathematics difficulties to show that interventions in mathematics can be a reciprocal and partnered activity. Importantly, since these narratives emerge in the reciprocal space of an intervention, narratives also evolve through the interaction.

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===== Tanishq Kumar Sah Extension of Theories

<https://doi.org/10.37626/GA9783959872188.0.087> First page: 463 Last page: 465 Abstract From an atom to this universe, from a bowl of water to the cosmic ocean this constant is present everywhere. This constant is π (periodicity of the tangent function). For tangent function we know that $\tan(\tan^{-1}(x))=x$, but the expression $\tan(\tan^{-1}(x))$ looks very complicated but is actually an expression of the type polynomial divided by another polynomial. The sine function is very important not only for graphs but for geometry too. There are some inputs whose behavior is very strange from the usual ones. Geometrical shapes and their relations are very important for many things such as for vectors and many more but the triangle is very special because it is the least sided polygon. Riemann zeta function is very crucial for prime numbers. Infinite series related to them may be a game changer for it. Wallis's integral formula is a boon but its domain is very constrained and needs another solution to it.

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===== Ishola A. Salami & Temitope O. Ajani Mathematics Songs to Hip-hop Music: Power to Engage Pupils and Improve Learning Outcomes in Primary Mathematics

<https://doi.org/10.37626/GA9783959872188.0.088> First page: 466 Last page: 471 Abstract Song-based strategy has been one of the most effective approaches of making learners remembering rule-governed

educational contents like that of Mathematics. But the extent to which learners enjoy Mathematics songs and get engaged in it within and outside the school system is limited. Besides, many of the available Mathematics songs are for preschool while research studies have shown that learners' scores in Mathematics started to decline from Primary IV class. One of the music types children love most is hip-hop and they easily memorize the lyrics. This led to the production of Mathematics hip-hop music with its lyrics being Mathematics principles, ideas, formulae and procedures for upper primary classes. This study determines the effectiveness of Mathematics Hip-hop music on improved Mathematics learning outcomes. Keywords: Hip-hop music, MATMUSIC, Upper primary Mathematics.

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===== S R Santhanam Teaching Mathematics using Storytelling and Technology

<https://doi.org/10.37626/GA9783959872188.0.089> First page: 472 Last page: 475 Abstract Storytelling coupled with technology is an attractive method to teach geometry. The following story was told to a set of students of the age group 14 - 16 years, who are familiar with the GeoGebra software. A pirate hid his treasures in an island and left a note for the treasure hunt to his son. The instructions are as follows. "Find two palm trees in the island with markings of a heart (\heartsuit) on them. There will be a very small pond near them. From the pond go to one palm tree and turn 90 degrees and proceed equal distance to mark a point P on the ground. Do the same for the second palm tree to get another point Q. The treasure is hidden at the midpoint of PQ". When his son went there, he could find the two palm trees but there was no pond nearby. But with his geometric knowledge, he could find the treasure. How? The students tried and some found the solution. In this short paper, this is discussed.

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===== Ipek Saralar-Aras & Betul Esen Designing Lessons for the 5th Graders through a Design Study on Teaching Polygons

<https://doi.org/10.37626/GA9783959872188.0.090> First page: 476 Last page: 481 Abstract It has been argued by researchers that learning about

stories from the Bible to introduce some concepts in probability. We believe that this approach will make learning probability and statistics more understandable to the Ultra-Orthodox students and increase their motivation to engage in their studies. Keywords: cultural diversity, biblical examples, non-statisticians

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===== Emily K. Suh, Lisa Hoffman & Alan Zollman STEM SMART: Five Essential Life Skills Students Need for their Future <https://doi.org/10.37626/GA9783959872188.0.099> First page: 526 Last page: 530 Abstract To be successful in a future STEM-focused world, students need to know more than content: students need to be STEM SMART. A STEM SMART student has the mindset of an intellectual risk taker, the tenacity to tackle tough problems while learning from mistakes, and the critical thinking skills to separate scientific information from opinions and beliefs. We use the SMART acronym (Struggle, Mistakes, All, Risk, Think) to introduce five essential life skills not obviously related to STEM (Science, Technology, Engineering, and Mathematics) disciplines but necessary for success in STEM. For each of our five essential skills, we provide an explanation of its importance, connections to relevant educational research, and real-world applications.

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===== Janet (Hagemeyer) Tassell, Jessica Hussung, Kylie Bray, Darby Tassell & Haley (Clayton) Carbone Elementary Pre-Service Teachers' Beliefs about Mathematics Fluency: Transforming Through Readings & Discussions <https://doi.org/10.37626/GA9783959872188.0.100> First page: 531 Last page: 536 Abstract Teacher candidates continue to enter Elementary Math Methods with the belief that mathematics fluency is synonymous to speed and rote memorization -assessed best by timed tests. In the Elementary Math Methods 2018-2021 school years, fall and spring semesters, qualitative data were gathered from pre-service elementary mathematics teachers' pre/post-assessments of reading mathematics fluency journal articles, viewing video samples, and participating in full-class discussions. The pre- to post-assessment themes show that reading

research articles may be a possible intervention to add to their clinical school observations in the K-6 setting.

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===== Eleni Tsami, Dimitra Kouloumpou & Andreas Rokopanos The Gender Gap in Statistics Courses: A Contemporary View on a Statistics Department <https://doi.org/10.37626/GA9783959872188.0.101> First page: 537 Last page: 541 Abstract Gender equality remains a strategic objective of the EU educational system. The present paper provides a contemporary view of the gender balance in the Department of Statistics and Insurance Science at the University of Piraeus. Our results indicate that a gender gap is prevalent in this specific department, although this gap is only marginal in terms of the statistics on students. On the other hand, statistics for the academic staff reveal that the department is clearly male dominated, thus stirring the discussion of gender preferences and systemic gender bias. Our findings support the notion that the institutional change currently taking place across departments and academic communities worldwide is yet to come to fruition and considerable effort is needed in order to bridge the gender gap in science, technology, engineering and mathematics (STEM) courses.

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===== Ching-Yu Tseng, Paul Foster, Jake Klinkert, Elizabeth Adams, Corey Clark, Eric C. Larson & Leanne Ketterlin-Geller Using Cognitive Walkthroughs to Evaluate the Students' Computational Thinking during Gameplay <https://doi.org/10.37626/GA9783959872188.0.102> First page: 542 Last page: 547 Abstract In this paper, we describe how a team of multidisciplinary researchers, including game designers, computer scientists, and learning scientists, created a learning environment focused on computational thinking using a commercial video game Minecraft. The learning environment includes a Minecraft mod, a custom companion application, and a learning management system integration. The team designed the learning environment for students in Grades 6-8. Working with a group of educators, the researchers identified eleven high-priority Computer Science Teacher Association (CSTA) standards to guide game

Working to Deepen and Grow Number Sense Knowledge
<https://doi.org/10.37626/GA9783959872188.0.107> First page: 569 Last page: 573 Abstract Deep, flexible number understandings are foundational for mathematics learning. This workshop is based on two mathematics teacher educators' journey to better understand how to facilitate future teachers' development and use of number sense. Engaging preservice teachers in Number Talks enabled the educators to identify and to examine the strategies preservice teachers used during number talks while also providing a context for improving and expanding their own professional knowledge about number sense. Participant engagement includes experiencing Number Talks, examining preservice teachers' work samples, and responding to the educators' observations about number sense language (decomposition of numbers, fluency and flexibility with numbers, and mathematical properties).

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===== Ryan G. Zonnefeld & Valorie L. Zonnefeld Rural STEM Teachers: An Oasis in the Desert
<https://doi.org/10.37626/GA9783959872188.0.108> First page: 574 Last page: 579 Abstract Teacher preparation programs for STEM education should prepare teachers for all settings, including rural schools. Students across geographic locales show equal interest in STEM fields, but rural students often lack access to highly qualified STEM teachers. UNESCO (2014) notes that the disparity in education between rural and urban schools is a concern of many countries. In the United States, the National Center for Educational Statistics confirms that twenty percent of students are educated in rural schools and the STEM teachers in these schools are often the only STEM expert. These teachers become backbone teachers that set the foundation and direction of STEM education in the entire school. This paper reviews the landscape of STEM education in rural schools, explores strategies for ensuring high-quality STEM education in rural schools, and outlines early successes of a university teacher preparation program in meeting these needs.

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===== Valorie L. Zonnefeld Pedagogies that Foster a Growth

Mindset Towards Mathematics
<https://doi.org/10.37626/GA9783959872188.0.109> First page: 580 Last page: 584 Abstract Research demonstrates that a student's mindset plays an important role in achievement and that mindsets are domain specific. Carol Dweck claimed that mathematics needs a mindset makeover and has shown that teachers can foster a growth mindset through their pedagogical choices. This paper shares how one university trains preservice teachers in mathematics pedagogies that are key to fostering a growth mindset. These practices include educating students on brain function, equitable access, metacognition strategies, feedback practices, the importance of productive struggle, and learning from mistakes.

On Your Mark Thomas R. Guskey 2014-08-05 Create and sustain a learning environment where students thrive and stakeholders are accurately informed of student progress. Clarify the purpose of grades, craft a vision statement aligned with this purpose, and discover research-based strategies to implement effective grading and reporting practices. Identify policies and practices that render grading inaccurate, and understand the role grades play in students' future success and opportunities.

Proceedings of the Eighth International Conference on Soft Computing and Pattern Recognition (SoCPaR 2016) Ajith Abraham 2017-08-17 This volume presents 70 carefully selected papers from a major joint event: the 8th International Conference on Soft Computing and Pattern Recognition (SoCPaR 2016) and the 8th International Conference on Computational Aspects of Social Networks (CASoN 2016). SoCPaR-CASoN 2016, which was organized by the Machine Intelligence Research Labs (MIR Labs), USA and Vellore Institute of Technology (VIT), India and held at the VIT on December 19–21, 2016. It brings together researchers and practitioners from academia and industry to share their experiences and exchange new ideas on all interdisciplinary areas of soft computing and pattern recognition, as well as intelligent methods applied to social networks. This book is a valuable resource for practicing engineers/scientists and researchers working in the field of soft computing, pattern recognition and social networks.

By the Light of Burning Dreams David Talbot 2021-06-15 New York Times bestselling author David Talbot and New Yorker journalist Margaret Talbot illuminate “America’s second revolutionary generation” in this gripping history of one of the most dynamic eras of the twentieth century—brought to life through seven defining radical moments that offer vibrant parallels and lessons for today. The political landscape of the 1960s and 1970s was perhaps one of the most tumultuous in this country's history, shaped by the fight for civil rights, women’s liberation, Black power, and the end to the Vietnam War. In many ways, this second American revolution was a belated fulfillment of the betrayed promises of the first, striving to extend the full protections of the Bill of Rights to non-white, non-male, non-elite Americans excluded by the nation’s founders. Based on exclusive interviews, original documents, and archival research, *By the Light of Burning Dreams* explores critical moments in the lives of a diverse cast of iconoclastic leaders of the twentieth century radical movement: Bobby Seale of the Black Panthers; Heather Booth and the Jane Collective, the first underground feminist abortion clinic; Vietnam War peace activists Tom Hayden and Jane Fonda; Cesar Chavez, Dolores Huerta and the United Farm Workers; Craig Rodwell and the Gay Pride movement; Dennis Banks, Madonna Thunder Hawk, Russell Means and the warriors of Wounded Knee; and John Lennon and Yoko Ono’s politics of stardom. Margaret and David Talbot reveal the epiphanies that galvanized these modern revolutionaries and created unexpected connections and alliances between individual movements and across race, class, and gender divides. America is still absorbing—and reacting against—the revolutionary forces of this tumultuous period. The change these leaders enacted demanded much of American society and the human imagination. *By the Light of Burning Dreams* is an immersive and compelling chronicle of seven lighting rods of change and the generation that engraved itself in American narrative—and set the stage for those today, fighting to bend forward the arc of history. *By the Light of Burning Dreams* includes a 16-page black-and-white photo insert.

Artificial intelligence and the future of warfare James Johnson 2021-09-14 This volume offers an innovative and counter-intuitive study of how and

why artificial intelligence-infused weapon systems will affect the strategic stability between nuclear-armed states. Johnson demystifies the hype surrounding artificial intelligence (AI) in the context of nuclear weapons and, more broadly, future warfare. The book highlights the potential, multifaceted intersections of this and other disruptive technology – robotics and autonomy, cyber, drone swarming, big data analytics, and quantum communications – with nuclear stability. Anticipating and preparing for the consequences of the AI-empowered weapon systems are fast becoming a critical task for national security and statecraft. Johnson considers the impact of these trends on deterrence, military escalation, and strategic stability between nuclear-armed states – especially China and the United States. The book draws on a wealth of political and cognitive science, strategic studies, and technical analysis to shed light on the coalescence of developments in AI and other disruptive emerging technologies. Artificial intelligence and the future of warfare sketches a clear picture of the potential impact of AI on the digitized battlefield and broadens our understanding of critical questions for international affairs. AI will profoundly change how wars are fought, and how decision-makers think about nuclear deterrence, escalation management, and strategic stability – but not for the reasons you might think.

Graphics Interface 2014 Paul G. Kry 2020-11-26 This book is the proceedings of the 40th annual Graphics Interface conference—the oldest continuously scheduled conference in the field. The book includes high-quality papers on recent advances in interactive systems, human computer interaction, and graphics from around the world. It covers the following topics: shading and rendering, geometric modeling and meshing, image-based rendering, image synthesis and realism, computer animation, real-time rendering, non-photorealistic rendering, interaction techniques, human interface devices, augmented reality, data and information visualization, mobile computing, haptic and tangible interfaces, and perception.

GCSE Mathematics for OCR Higher Homework Book Nick Asker 2015-06-18 A new series of bespoke, full-coverage resources developed for the 2015 GCSE Mathematics qualifications. Endorsed for the OCR J560

GCSE Mathematics Higher tier specification for first teaching from 2015, our Homework Book is an ideal companion to the OCR Higher tier Student Book and can be used as a standalone resource. With exercises that correspond to each section of the Student Book, it offers a wealth of additional questions for practice and consolidation. Our Homework Books contain a breadth and depth of questions covering a variety of skills, including problem-solving and mathematical reasoning, as well as extensive drill questions. Answers to all questions are available free on the Cambridge University Press UK Schools website.

Conference Proceeding. New Perspectives in Scienze Education Pixel
2016-03-04

Advances in Neural Networks – ISNN 2014 Zhigang Zeng 2014-11-28 The volume LNCS 8866 constitutes the refereed proceedings of the 11th International Symposium on Neural Networks, ISNN 2014, held in Hong Kong and Macao, China on November/ December 2014. The 71 revised full papers presented were carefully reviewed and selected from 119 submissions. These papers cover all major topics of the theoretical research, empirical study and applications of neural networks research as follows. The focus is on following topics such as analysis, modeling, and applications.

COLT '91 COLT 2014-05-23 COLT

Women Winemakers Lucia Albino Gilbert 2020-01-27 The passion, courage, and talent of women making their way in a male-dominated field are captured through conversations with women winemakers from throughout California and wine regions of France, Italy, New Zealand, Portugal, and Spain. Their stories are told through the lens of four career pathways and the cultural histories of each wine region.

Mathematics for Machine Learning Marc Peter Deisenroth 2020-04-23 The fundamental mathematical tools needed to understand machine learning include linear algebra, analytic geometry, matrix decompositions, vector calculus, optimization, probability and statistics. These topics are traditionally taught in disparate courses, making it hard for data science or computer science students, or professionals, to efficiently learn the mathematics. This self-contained textbook bridges the gap between

mathematical and machine learning texts, introducing the mathematical concepts with a minimum of prerequisites. It uses these concepts to derive four central machine learning methods: linear regression, principal component analysis, Gaussian mixture models and support vector machines. For students and others with a mathematical background, these derivations provide a starting point to machine learning texts. For those learning the mathematics for the first time, the methods help build intuition and practical experience with applying mathematical concepts. Every chapter includes worked examples and exercises to test understanding. Programming tutorials are offered on the book's web site. *Handbook of Computer Animation* John Vince 2003 Written by specialists in teaching computer animation, this text addresses key international topics of computer animation, such as: mathematics, modelling, rendering, and compositing. Each chapter discusses a particular topic and how it is applied, including state-of-the-art techniques that are used in computer animation. The handbook provides a complete and up-to-date picture of computer animation and will be a valuable reference source for programmers, technical directors and animators in computer animation, computer games and special effects and also undergraduate and postgraduate students. The editor, John Vince, has written and edited over 20 books on computer graphics, computer animation and virtual reality.

Breast Imaging Hiroshi Fujita 2014-06-23 This book constitutes the refereed proceedings of the 12th International Workshop on Breast Imaging, IWDM 2014, held in Gifu City, Japan, in June/July 2014. The 24 revised full papers and 73 revised poster papers presented together with 6 invited talks were carefully reviewed and selected from 122 submissions. The papers are organized in topical sections on screening outcomes, ultrasound, breast density, imaging physics, CAD, tomosynthesis and ICT and image processing.

Geometric Theory of Information Frank Nielsen 2014-05-08 This book brings together geometric tools and their applications for Information analysis. It collects current and many uses of in the interdisciplinary fields of Information Geometry Manifolds in Advanced Signal, Image & Video Processing, Complex Data Modeling and Analysis, Information Ranking

and Retrieval, Coding, Cognitive Systems, Optimal Control, Statistics on Manifolds, Machine Learning, Speech/sound recognition and natural language treatment which are also substantially relevant for the industry. *The Pixel Eye* Paul Levinson 2003-08-02 NYPD forensic detective Dr. Phil D'Amato's latest futuristic adventure pits personal loyalties against public responsibilities, safety against freedom, and the right to know against animal rights, all against a backdrop of a post 9/11 New York City.

3D Computer Graphics Sam Buss 2003-05-19 Table of contents

Conference Proceedings. The Future of Education Pixel 2015-07-01
Interpretable Machine Learning Christoph Molnar 2020 This book is about making machine learning models and their decisions interpretable. After exploring the concepts of interpretability, you will learn about simple, interpretable models such as decision trees, decision rules and linear regression. Later chapters focus on general model-agnostic methods for interpreting black box models like feature importance and accumulated local effects and explaining individual predictions with Shapley values and LIME. All interpretation methods are explained in depth and discussed critically. How do they work under the hood? What are their strengths and weaknesses? How can their outputs be interpreted? This book will enable you to select and correctly apply the interpretation method that is most suitable for your machine learning project.

Optical Superresolution Zeev Zalevsky 2004 The authors explore the ways to improve the classical resolution limits of an imaging system, and provide novel approaches for achieving better results than would otherwise be possible with current imaging technology. The book begins by presenting the theoretical foundations, background information, and terminology of super resolution, and then discusses methods and systems used to achieve the super resolution effect. Various approaches to dealing with and exceeding the limitations of the lens aperture, the pixel size of the camera, and the noise generated at the detector are presented and analyzed. The last chapter illustrates several industry-related examples and potential applications to real industrial electro-optical systems. This book is intended for graduate students or researchers in academia or industry, and anyone else looking to improve the performance of their

electro-optical system design.

Pixel Detectors Leonardo Rossi 2006-01-18 Pixel detectors are a particularly important class of particle and radiation detection devices. They have an extremely broad spectrum of applications, ranging from high-energy physics to the photo cameras of everyday life. This book is a general purpose introduction into the fundamental principles of pixel detector technology and semiconductor-based hybrid pixel devices. Although these devices were developed for high-energy ionizing particles and radiation beyond visible light, they are finding new applications in many other areas. This book will therefore benefit all scientists and engineers working in any laboratory involved in developing or using particle detection.

Artificial Intelligence in Real-Time Control 1992 M.G. Rodd 2014-06-28 The symposium had two main aims, to investigate the state-of-the-art in the application of artificial intelligence techniques in real-time control, and to bring together control system specialists, artificial intelligence specialists and end-users. Many professional engineers working in industry feel that the gap between theory and practice in applying control and systems theory is widening, despite efforts to develop control algorithms. Papers presented at the meeting ranged from the theoretical aspects to the practical applications of artificial intelligence in real-time control. Themes were: the methodology of artificial intelligence techniques in control engineering; the application of artificial intelligence techniques in different areas of control; and hardware and software requirements. This symposium showed that there exist alternative possibilities for control based on artificial intelligence techniques.

Putting the "Why" Back into Bone "Archytecture" Phil Salmon 2017-07-27 A large literature exists on trabecular and cortical bone morphology. The engineering performance of bone, implied from its 3d architecture, is often the endpoint of bone biology experiments, being clinically relevant to bone fracture. How and why does bone travel along its complex spatio-temporal trajectory to acquire its architecture? The question "why" can have two meanings. The first, "teleological - why is an architecture advantageous?" - is the domain of substantial biomechanical

research to date. The second, "etiological – how did an architecture come about?" – has received far less attention. This Frontiers Bone Research Topic invited contributions addressing this "etiological why" – what mechanisms can coordinate the activity of bone forming and resorbing cells to produce the observed complex and efficient bone architectures? One mechanism is proposed – chaotic nonlinear pattern formation (NPF) which underlies – in a unifying way – natural structures as disparate as trabecular bone, swarms of birds flying or shoaling fish, island formation, fluid turbulence and others. At the heart of NPF is the fact that simple rules operating between interacting elements multiplied and repeated many times, lead to complex and structured patterns. This paradigm of growth and form leads to a profound link between bone regulation and its architecture: in bone "the architecture is the regulation". The former is the emergent consequence of the latter. Whatever mechanism does determine bone's developing architecture has to operate at the level of individual sites of formation and resorption and coupling between the two. This has implications as to how we understand the effect on bone of agents such as gene products or drugs. It may be for instance that the "tuning" of coupling between formation and resorption might be as important as the achievement of enhanced bone volume. The ten articles that were contributed to this Topic were just what we hoped for – a snapshot of leading edge bone biology research which addresses the question of how bone gets its shape. We hope that you find these papers thought-provoking, and that they might stimulate new ideas in the research into bone architecture, growth and adaptation, and how to preserve healthy bone from gestation and childhood until old age.

Foundations of Education Allan C. Ornstein 2016-01-01 Highly respected for its substantive coverage and analysis of all foundational areas -- social, philosophical, historical, political, economic, curricular, and legal -- FOUNDATIONS OF EDUCATION, Thirteenth Edition, describes and analyzes the key educational issues and policies affecting American education. The authors relate the book's wide-ranging topics to an array of applied features to help prepare students for their future careers as educators. The chapters on the history and philosophy of education

encourage students to construct their own personal philosophy of education, building a strong foundation for a professional career. Completely up-to-date throughout, this edition also provides the latest information on the common core curriculum, accountability, technology in education, school reform, diversity, legal rulings, recent trends in school funding and teacher compensation, new instructional practices, teaching licensure, the outlook for careers, and many other important topics. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Tensor Voting Philippos Mordohai 2006-12-01 This lecture presents research on a general framework for perceptual organization that was conducted mainly at the Institute for Robotics and Intelligent Systems of the University of Southern California. It is not written as a historical recount of the work, since the sequence of the presentation is not in chronological order. It aims at presenting an approach to a wide range of problems in computer vision and machine learning that is data-driven, local and requires a minimal number of assumptions. The tensor voting framework combines these properties and provides a unified perceptual organization methodology applicable in situations that may seem heterogeneous initially. We show how several problems can be posed as the organization of the inputs into salient perceptual structures, which are inferred via tensor voting. The work presented here extends the original tensor voting framework with the addition of boundary inference capabilities; a novel re-formulation of the framework applicable to high-dimensional spaces and the development of algorithms for computer vision and machine learning problems. We show complete analysis for some problems, while we briefly outline our approach for other applications and provide pointers to relevant sources.

1001 Math Problems LearningExpress LLC 2013 1001 math problems will teach you how to: master core concepts to prepare for important exams, learn math rules and how to apply them to problems, learn math skills you can apply when solving problems at all levels, and overcome math anxiety through skills reinforcement and focused practice.

Geo-Spatial Knowledge and Intelligence Hanning Yuan 2017-03-02

The two volume proceedings of CCIS 698 and 699 constitutes revised selected papers from the 4th International Conference on Geo-Informatics in Resource Management and Sustainable Ecosystem, GRMSE 2016, held in Hong Kong, China, in November 2016. The total of 118 papers presented in these proceedings were carefully reviewed and selected from 311 submissions. The contributions were organized in topical sections named: smart city in resource management and sustainable ecosystem; spatial data acquisition through RS and GIS in resource management and sustainable ecosystem; ecological and environmental data processing and management; advanced geospatial model and analysis for understanding ecological and environmental processes; applications of geo-informatics in resource management and sustainable ecosystem.

Pattern Recognition and Artificial Intelligence Mounîm El Yacoubi

2022-06-01 This two-volume set constitutes the proceedings of the Third International Conference on Pattern Recognition and Artificial Intelligence, ICPRAI 2022, which took place in Paris, France, in June 2022. The 98 full papers presented were carefully reviewed and selected from 192 submissions. The papers present new advances in the field of pattern recognition and artificial intelligence. They are organized in topical sections as follows: pattern recognition; computer vision; artificial intelligence; big data.

Image Processing for Computer Graphics Jonas Gomes 1997 Image processing is a central theme in computer graphics. This book provides a modern introduction to both the underlying mathematics and the main concepts and techniques of the subject. It covers important modern techniques such as morphing and warping images as well as dithering, compositing, and other operations on images.

Computer Vision - ACCV 2014 Workshops C.V. Jawahar 2015-04-10 The three-volume set, consisting of LNCS 9008, 9009, and 9010, contains carefully reviewed and selected papers presented at 15 workshops held in conjunction with the 12th Asian Conference on Computer Vision, ACCV 2014, in Singapore, in November 2014. The 153 full papers presented were selected from numerous submissions. LNCS 9008 contains the

papers selected for the Workshop on Human Gait and Action Analysis in the Wild, the Second International Workshop on Big Data in 3D Computer Vision, the Workshop on Deep Learning on Visual Data, the Workshop on Scene Understanding for Autonomous Systems, and the Workshop on Robust Local Descriptors for Computer Vision. LNCS 9009 contains the papers selected for the Workshop on Emerging Topics on Image Restoration and Enhancement, the First International Workshop on Robust Reading, the Second Workshop on User-Centred Computer Vision, the International Workshop on Video Segmentation in Computer Vision, the Workshop: My Car Has Eyes: Intelligent Vehicle with Vision Technology, the Third Workshop on E-Heritage, and the Workshop on Computer Vision for Affective Computing. LNCS 9010 contains the papers selected for the Workshop on Feature and Similarity for Computer Vision, the Third International Workshop on Intelligent Mobile and Egocentric Vision, and the Workshop on Human Identification for Surveillance.

The Economics of Discrimination Gary S. Becker 2010-08-15 This second edition of Gary S. Becker's *The Economics of Discrimination* has been expanded to include three further discussions of the problem and an entirely new introduction which considers the contributions made by others in recent years and some of the more important problems remaining. Mr. Becker's work confronts the economic effects of discrimination in the market place because of race, religion, sex, color, social class, personality, or other non-pecuniary considerations. He demonstrates that discrimination in the market place by any group reduces their own real incomes as well as those of the minority. The original edition of *The Economics of Discrimination* was warmly received by economists, sociologists, and psychologists alike for focusing the discerning eye of economic analysis upon a vital social problem—discrimination in the market place. "This is an unusual book; not only is it filled with ingenious theorizing but the implications of the theory are boldly confronted with facts. . . . The intimate relation of the theory and observation has resulted in a book of great vitality on a subject whose interest and importance are obvious."—M.W. Reder, *American Economic Review* "The author's solution to the problem of measuring the motive

behind actual discrimination is something of a tour de force. . . . Sociologists in the field of race relations will wish to read this book."—Karl Schuessler, *American Sociological Review*

Technology in Education. Innovations for Online Teaching and Learning
Lap-Kei Lee 2020-12-16 This book constitutes extended papers from the 5th International Conference on Technology in Education, ICTE 2020, held in August 2020. Due to the COVID-19 pandemic the conference was held online. The 30 papers presented in this volume were carefully reviewed and selected from 79 submissions. They are organized in topical sections on instructional technology; learning analysis and assessment; learning environment; open and collaborative learning; technology and education.

Indigenous Pathways, Transitions and Participation in Higher Education Jack Frawley 2017-05-31 This book is open access under a CC BY 4.0 license. This book brings together contributions by researchers, scholars, policy-makers, practitioners, professionals and citizens who have

an interest in or experience of Indigenous pathways and transitions into higher education. University is not for everyone, but a university should be for everyone. To a certain extent, the choice not to participate in higher education should be respected given that there are other avenues and reasons to participate in education and employment that are culturally, socially and/or economically important for society. Those who choose to pursue higher education should do so knowing that there are multiple pathways into higher education and, once there, appropriate support is provided for a successful transition. The book outlines the issues of social inclusion and equity in higher education, and the contributions draw on real-world experiences to reflect the different approaches and strategies currently being adopted. Focusing on research, program design, program evaluation, policy initiatives and experiential narrative accounts, the book critically discusses issues concerning widening participation.