ABSTRACTS FOR THE TRACK HANDS-ON WORKSHOPS

ABSTRACT FOR 21148

SPREADSHEETS AND QR CODES WITH CASIO CLASSWIZ

AUTHOR: Wei Ching Quek

AFFILIATIONS: Singapore Polytechnic

The Casio Classwiz is the new classroom standard.

It has a new iconic display. In addition to usual functions in Advanced Scientific Calculators, it is also loaded with useful spreadsheets, tables, statistics functions. It also can generate QR codes for students to retrieve relevant graphical information. This workshop is consists of two activities:

1. Getting Started

Begin with introduction to new features in ClassWiz, this includes tables, statistics, followed by exploring essential features of the spreadsheet function, and generation of QR codes. Participants will use their mobile devices to retrieve additional resources from the QR codes generated.

2. Problems Solving/Discussion

Examine some applications of spreadsheet to solve Riemann Sums and numerical modelling of population growth. Participants will explore the solution to gain further insights to the problem.

ABSTRACT FOR 21155

Introducing MATLAB into High School Mathematics

AUTHOR: Ian Allan Thomson

AFFILIATIONS: Ormiston College, Australia

MATLAB (Matrix Laboratory) is the language of technical computing that is used by millions of engineers and scientists. It is widely used in STEM-related courses across the world. In this workshop, participants will find out how MATLAB can be

introduced into high school mathematics. Participants will receive a collection of ten modelling and problem solving tasks suitable for use with MATLAB or other forms of technology.

ABSTRACT FOR 21156

Mathematical Problem Solving with a Graphing Calculator

AUTHORS: Wee Leng Ng

AFFILIATIONS: National Institute of Education, Nanyang Technological University

Enabling students to acquire and apply the necessary mathematical concepts and skills to solve problems in a wide range of situations is one of the primary aims of mathematics education. On the other hand, empowering students to make effective use of a variety of mathematical tools, including technological tools, in the learning and application of mathematics is identified as an important objective of many school mathematics curricula. Problem solving activities involving the use of technological tools have the potential to contribute to meeting the two aforementioned goals of mathematics education.

In this workshop, participants will engage in activities which explore effective uses of the TI-84 Plus graphing calculator, at different stages of the problem-solving process, in solving a collection of mathematical problems suitable for upper secondary students.

ABSTRACT FOR 21157

Enhancing the Teaching and Learning of Mathematics Through Handheld Technology

AUTHORS: Wee Leng Ng

AFFILIATIONS: National Institute of Education, Nanyang Technological University

Handheld graphing technology, if used appropriately in the mathematics classroom, has the potential to enhance the teaching and learning of mathematics by empowering students to learn across different visual representations of mathematical concepts. With the aid of such technology, teachers have the means to help students develop a deeper understanding of abstract mathematical concepts and sharpen their critical thinking skills.

In this workshop, participants will explore the use of the TI-Nspire CX handheld in helping students develop relational understanding of concepts in calculus and statistics at upper secondary and pre-university levels.

ABSTRACT FOR 21161

Coding in Mathematics

AUTHOR: LC Mooi

AFFILIATIONS: Ministry of Education, Singapore

This workshop introduces participant to a possible pedagogical approach of increasing mathematical content knowledge through coding. A mathematics topic for primary school pupils will be used to demonstrate how technology (viz computer software application) can play a role in enhancing mathematics content knowledge.

ABSTRACT FOR 21162

Learning about equations with ClassWiz

AUTHORS: Barry Kissane

AFFILIATIONS: Murdoch University, Australia

While scientific calculators have been available since the 1970s, advanced versions have been developed recently to suit the needs of mathematics education. So, these calculators provide powerful learning opportunities for many aspects of mathematics treated these days in secondary school and university curricula, as well as giving students access to efficient calculation. This workshop will focus on a variety of ways in which the CASIO ClassWiz calculator can be used to enhance both teaching and learning related to equations in particular. Previous experience with ClassWiz is not assumed.

ABSTRACT FOR 21163

Modelling with spreadsheets on ClassWiz

AUTHORS: Barry Kissane

AFFILIATIONS: Murdoch University, Australia

Sophisticated spreadsheets are widely used in mathematics and in learning mathematics, but they require students to have individual access to a computer. The CASIO ClassWiz is a hand-held advanced scientific calculator that includes a spreadsheet facility, thus offering learning opportunities only previously available to those with a computer. In this hands-on workshop, we will use some of the activity materials that have been recently developed for the ClassWiz to consider some of the

ways in which a spreadsheet can be used for various kinds of modelling. Previous experience with ClassWiz or with other spreadsheets is not assumed.

ABSTRACT FOR 21164

Investigating mathematics with ClassWiz

AUTHORS: Barry Kissane

AFFILIATIONS: Murdoch University, Australia

Calculators are frequently misunderstood solely as devices to allow students to undertake numerical calculations. The CASIO ClassWiz is an advanced scientific calculator with significant functionality designed for secondary school mathematics. In this workshop, we will focus on ways in which it can be used to provide a more engaging form of learning mathematics than merely undertaking calculations. We will consider some examples of student investigations that are 'low floor, high ceiling' in the sense that it is easy for secondary students to make a start, while there is still significant opportunity for learning afforded by directed use of the calculator. This is a hands-on workshop in which participants will use the ClassWiz to experience this way of learning. Previous experience with ClassWiz will not be assumed.

ABSTRACT FOR 21165

Applying Instructional Technology Creatively In Mathematics Education (to Deliver Content Knowledge and Develop Higher Order Thinking Skills Effectively)

AUTHOR: Poh Yew Teoh

AFFILIATIONS: Creative Wizard Pte Ltd, Malaysia, International Group for Mathematical Creativity and Giftedness MCG

Getting students excited about learning is the teachers' constant challenge. The answer lies in designing creative teaching aids and incorporating creative teaching techniques into our classroom practice. Spicing up our mathematics lessons with some fun and magical, hands-on or animated activities could easily help increase attention, understanding and retention significantly. Appropriate used of instructional technologies will also stimulate intellectual curiosity, develop problem-solving skills, promote discovery and cultivate higher order thinking skills.

In this workshop, participants will learn how to:

- use 5 simple definitions of creativity as a tool to come up with creative ideas to develop effective teaching aids using inexpensive/discarded material.
- begin their lessons with meaningful set induction.

- engage students using ICT-based instructional technologies to learn concepts, solve problems or develop higher order thinking skills
- decipher some interesting mathematical magic and puzzles
- create new magic tricks to help students learn mathematical concepts

Target participants: Upper primary and lower secondary mathematics educators
Sub Theme: Increase Mathematics Content Knowledge through Technology.

ABSTRACT FOR 21167

Harnessing the Power of HP Prime graphing calculator in Teaching Senior High School Mathematics

AUTHOR: Helma Mesa

AFFILIATIONS: Saint Pedro Poveda College, HP Calculators

Saint Pedro Poveda College's Personalized Education Program employs teaching strategies that are learner-centered and most-suited to the students. The graphing calculator technology proved to be useful in attaining a more student-centered learning environment in the classroom.

In this workshop, the participants will explore how the power of HP Prime graphing calculator can be harnessed to reinforce or enhance teaching practices in Senior high school Mathematics. They will explore how Math concepts may be learned by students through investigative/ exploratory approach with the aid of the features/functions of the HP Prime. This will include Math topics in Precalculus, AP Calculus, and Statistics. Examples of modules/worksheets and exploratory activities integrating the use of HP Prime will be presented to show how the teaching-learning process is enhanced and to give the participants the opportunity to integrate HP's technology in teaching Mathematics in the 21st century classroom.

ABSTRACT FOR 21177

Deeper Understanding of Mathematics Through Effective Use of Parameters

AUTHORS: Yew Fook Chan

AFFILIATIONS: School of the Arts

In this workshop, we will discuss how Texas Instruments TI-Nspire CX hand-held technology can be used to facilitate the learning of functions and graphs through the use of parameters. Lesson examples will be shared.

ABSTRACT FOR 21178

Improving Student Engagement Through the Use of Handheld Technology

AUTHOR: Yew Fook Chan

AFFILIATIONS: School of the Arts Singapore

In this workshop, we will learn how to design, construct and use learning activities for students using Texas Instruments TI-Nspire CX hand-held graphing technology that fosters student engagement and understanding in learning mathematical concepts.

ABSTRACT FOR 21180

Exploring Graphs using HP Prime

AUTHORS: Betty, Wan Niu Voon

AFFILIATIONS: Universiti Tenaga Nasional

Graphing calculators, are meant to portrait graphs. In this workshop, a few aplets will be explored to plot different types of graphs. Graphs of functions, inequalities, conic sections, parametric equations, polar equations and even sequence and series will be explored. In HP Prime, certain aplets enable integration of commands. Furthermore, commands from aplets can be executed from homepage and the outcome can be imported from homepage into aplets as well. These features can be time saving while avoiding mistakes. Hence, participants will be guided in this hands-on workshop to grasp the skills to play around with these features of this graphing calculator. Handouts will be provided.

ABSTRACT FOR 21185

Assembling 10 Rhombic Hexahedrons into a Rhombic Icosahedron

AUTHORS: Jen-chung Chuan

AFFILIATIONS: National Tsing Hua University, Taiwan

In this workshop with Cabri 3D we are to assemble 10 rhombic hexahedrons to form a rhombic icosahedron. To see more details, you may visit http://atcm.mathandtech.org/EP2016/jc_21185.pdf.

ABSTRACT FOR 21186

An Animation of Six Identical Cylinders Each Touching Exactly Four Others

AUTHORS: Jen-chung Chuan

AFFILIATIONS: National Tsing Hua University, Taiwan

In this workshop with Cabri 3D, we are to construct an animation displaying six identical cylinders each touching exactly four others. For more details, you may visit http://atcm.mathandtech.org/EP2016/jc_21186.pdf.

ABSTRACT FOR 21187

How Jitterbug inspired an Interesting Dancing Routine for Skeletal Rhombic Hexahedrons?

AUTHORS: Jen-chung Chuan

AFFILIATIONS: National Tsing Hua University, Taiwan

In this Cabri 3D workshop we are to construct:

1. An animation of a conformal polyhedral linkage known as the Buckminster Fuller"s Jitterbug.

2. A linkage movement for eight skeletal rhombic hexahedrons each sharing a common edge with three others.

For more details, you may visit http://atcm.mathandtech.org/EP2016/jc_21187.pdf.

ABSTRACT FOR 21190

Technology-Advantaged Mathematics Teaching-Learning Process: CASIO fx-991EX Classwiz

AUTHORS: Rodulfo T. Aunzo, Jr.

AFFILIATION: Faculty, USC Cebu Philippines

Research studies show that students with a non-positive attitude towards Mathematics don’t find learning Mathematics fun. Learning Mathematics to them doesn’t sound interesting. In the context of the K-12 General Mathematics and Statistics and Probability, learning will be made easier and fun upon the integration of calculator in the teaching-learning process. Students display an awe expression upon arriving exactly the same answer when using few manual computations as compared to their calculator-aided computations.

This paper talks about how CASIO fx-991EX CLASSWIZ calculator, together with its emulator, is useful in handling computational learning activities in Business Mathematics, Statistics, and Advanced Algebra. Thus, making mathematics learning to be fun and much easier.

ABSTRACT FOR 21194

Autograph v.4 for pure mathematics

AUTHORS: Douglas Butler

AFFILIATIONS: iCT Training Centre (Oundle, UK), Autograph-Maths

Autograph v.4 for pure mathematics

Douglas will present the exciting new version of the popular software, Autograph. Lesson plans will include complex numbers, transformations or shapes and functions, calculus and vectors (in 2D and 3D) and his favourite topic: 1st and 2nd order differential equations. Delegates will receive a free copy of the software and the chance to sample the pedagogical strength of the Autograph user-interface.

www.tsm-resources.com

ABSTRACT FOR 21195

Autograph v.4 for probability, data handling and statistics

AUTHORS: Douglas Butler

AFFILIATIONS: iCT Training Centre (Oundle, UK), Autograph-Math

Autograph v.4 for probability, data handling and statistics

This session will start by exploring the TSM Resources web site for exciting real data sets that can be downloaded to Excel and analysed there or in the new Autograph v.4. Difficult topics such as histograms and frequency density will be covered, moving on to probability distributions, hypothesis testing and scatter diagrams. Delegates will receive a free copy of the software and the chance to sample the pedagogical strength of the Autograph user-interface f.

ABSTRACT FOR 21199

Creating and designing furniture with Cabri 3D

AUTHORS: Jean-Jacques Dahan, Jean-Marie Laborde

AFFILIATIONS: IRES of Toulouse, Cabrilog Grenoble France

We will use the creations and the transformations tools of Cabri 3D to create in 3D

tables, chairs, beds, chests of drawers, bedside lamps … This workshop will stimulate your creativity and give you some tools and techniques in order to create and design the fruits of your own imagination.

ABSTRACT FOR 21200

Riemann sums with Cabri 2 Plus and the new Cabri

AUTHORS: Jean-Jacques Dahan, Jean-Marie Laborde

AFFILIATIONS: IRES of Toulouse, Cabrilog Grenoble France

We will discover a simple trick to represent easily the Riemann sums with Cabri 2 Plus and the new Cabri. We will also show how to represent the dynamic generation of solids of revolution and the approximations of their volumes with cylinders got by the rotation of the Riemann sums around the axis of the axes of these solids.

ABSTRACT FOR 21231

Mathematical Modelling Using Handheld Technology

AUTHOR: Thomas Yeo

AFFILIATIONS: Texas Instruments

Very often, it is more effective for students to learn Math in an authentic context to make meaning of what they are learning in the lesson. In this workshop, participants will learn how to design and implement a mathematical modelling activity/task, which will allow students to apply concepts learnt in real life. Handheld technology will be used in this workshop in a 1-to-1 classroom concept/setting.

ABSTRACT FOR 21232

Mathematics Modelling in Real Life

AUTHORS: Katrina Ng

AFFILIATIONS: School of Arts Singapore

Often in a mathematics classroom, students are unable to relate Mathematical concepts to real life. In this workshop, participants will learn how to conduct an activity using temperature sensor to collect data and model the function. This activity consists of using the concept of Newton Law of Cooling and Exponent

ABSTRACT FOR 32001

The Pedagogical Usability of GSP in Designing and Creating Mathematics Instructional Materials

AUTHORS: Ronnachai Panapoi,Ph.D.; Danita Chunarom; Pilaluck Thongtip; Siriwan Jantrkool; Woranart Yoosook; Jannapa Uttama

AFFILIATIONS: Thailand

ABSTRACT FOR 32002

Fun Math with GeoGebra

AUTHORS: Pinyada Klubkaew; Amarisa Chantanasiri; Nuanchan Ritkham; Pathamaporn Awachai; Puttoei Talawat, Ph.D.; Sasiwan Maluangnont, Ph.D.; Sutharot Nilrod, Ph.D.; Pattanachai Rawiwan

AFFILIATIONS: Thailand

ABSTRACT FOR 32003

Instructional Materials for Primary Mathematics

AUTHORS: Bhimmawajna Thammachai; Benjamas Laokwansathit; Ausanee Wongarmart

AFFILIATIONS: Thailand

ABSTRACT FOR 32004

Math Circle demo: Catalan counting

AUTHOR: Matthias Kawski

AFFILIATIONS: Arizona State University, USA

MathCircles have a long tradition in Bulgaria and Russia, and since the late 1990s have been taking over the US and other countries. MathCircles typically are complementary to formal school education, and provide after school settings in which students in grades K-12 explore advanced mathematical scenarios. MathCircles successfully compete with piano lessons, chess clubs, and organized sports – get kids excited about math, and MathCircles provide them with a place where they can flourish while being mentored by professional mathematicians. The emphasis is on fun and students' self-directed inquiry into ever more advanced mathematics.

Having observed the changes in attitude by students participating in such inquiry based learning environment, which is not driven by standardized tests and curricular benchmarks, many teachers have formed their own TeachersMathCircles to rejuvenate their own scholarly explorations of mathematics beyond the routine classroom drudgery.

In this workshop participants will experience an active learning experience that is typical for the exploratory environment in MathCircles. This particular workshop will focus on counting problems, and Catalan numbers, and is an example of a MathCircle for advanced high school students, just as it is

an excellent example for a TeachersMathCircle for teachers from middle school grades to college levels.