

Editorial: Globalization, History, Technology and Mathematics Education

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Welcome to Vol.2,no.2 of The Montana Mathematics Enthusiast. The Fall 2005 issue is being released a month earlier to coincide with the start of the school year in Montana. As the table of contents will indicate this is the first of (hopefully) many high quality international issues, featuring articles from mathematicians and mathematics educators worldwide. The journal is now indexed in *the Zentralblatt für Didaktik der Mathematik* (ZDM) and articles appearing in the journal are periodically reviewed by ZDM.

The journal is mutating with the changing times, and reveals some of the benefits of globalization and technology. The web-site statistics provided in this issue indicate that TMME is accessed from 30+ countries. This has resulted in a steady flow of high quality manuscripts from across the globe, some which present innovative mathematics content, and others which tackle issues related to classroom pedagogy, such as the use of technology and history to enhance the teaching and learning of mathematics. In this issue, two of the articles provide research based recommendations for the use of Computer Algebra Systems (CAS) in the classroom, whereas one analyzes in depth the use of Dynamic Geometry Software (DGS) for problem solving, posing and facilitating the discovery and generalizations of mathematical results via the use of such software. These three papers also contain non-trivial mathematics relevant for the middle and high school classroom. The other papers of this issue present cross-national curricular comparisons and a glimpse into the genius of John von Neumann.

The first article by Nurit Zehavi and Giora Mann (Israel) builds on a previous study on the use of CAS, and reports on encouraging an awareness of ways in which CAS manipulate symbols algebraically, their corresponding graphical representations and meanings, and its usefulness in fostering connections in analytic geometry. This article makes an interesting comparison of a traditional solution and CAS-based solution of a problem in analytic geometry with recommendations for the teaching and learning of analytic geometry. The use of CAS in the classrooms has engendered criticisms from opponents of the use of such technology in the classroom because it allows students to engage in “button pushing” without understanding the mathematics. Robyn Pierce (Australia) addresses this issue in the third article and argues that CAS can help students develop algebraic insights and facilitate the ability to link different representations. Pierce’s article also outlines a framework useable for planning such activities and monitoring student’s progress on CAS.

International studies such as TIMSS and the recently concluded PISA have shown that the U.S is lagging behind many countries in Europe and Asia. While a positive consequence is more collaboration between mathematics educators in the U.S with researchers in countries like Singapore, Japan and the Netherlands to improve school mathematics curricula and teacher education programs with the aim of positively impacting students in the classroom, a negative consequence of international studies is the general “bashing” of the U.S. educational system and blaming school teachers. One of the arguments commonly heard in the U.S is to increase the mathematics content that prospective mathematics teachers are exposed to in schools and universities. The article by Bettina Dahl (USA) compares secondary mathematics teacher programs in Denmark and Virginia and reports on how much mathematics students get in these countries and the different “values” communicated to them by their respective teacher education systems. The article allows readers to draw their own conclusions about the pros and cons of different educational systems.

Steve Humble (England) contributes an historical article on the legendary human computer John von Neumann and touches on one of his numerous seminal contributions to the science of simulations. The mathematics in this paper is very accessible to high school students interested in probability. This article implicitly reveals the value of technology, in the form of freely available JAVA applets on the world wide web for introducing students to beautiful results in probability theory via the use of simulations.

The final article by Constantinos Christou and colleagues (Cyprus) investigates ways in which students engage in problem solving and problem posing in a dynamic geometry environment. Many of today’s hand held technology (or otherwise) typically include software such as Cabri or Geometer’s Sketch Pad. The question is how do we use this powerful technology to our benefit in the classroom to enhance learning? The interesting avenues of mathematical exploration chosen by six pre-service teachers on two geometry problems provides us with research based insights on the mathematical and pedagogical outcomes of DGS.

It is hoped that MCTM members and all our worldwide readers will enjoy this issue. Readers are encouraged to submit manuscripts that critique or provide commentary on previously published manuscripts. Offers for reviewing manuscripts and book reviews are also welcomed.