Azim Premji University

Talk: Technology and Mathematics Education: Issues and Challenges

Speaker:
Jonaki Ghosh, Dept. of Elementary Education, Lady Sri Ram College, University of Delhi

Date / Time:
September 21, 2012 - 3:30pm - 5:00pm

Venue:
10th Floor, Auditorium, Pixel A, APU

Abstract:
Mathematics has for years been the common language for classification, representation and analysis. Learning mathematics forms an integral part of a child's education. Yet, it is also the subject, which has traditionally been perceived as difficult. The primary reason for this state of mathematics learning today is the significant gap between content and pedagogy. However Mathematics education all over the world has witnessed a shift of paradigm because of the advent of powerful technological tools such as computer algebra systems (CAS), dynamic geometry software (DGS) and handheld technology in the form of scientific as well as graphic calculators.

The talk will focus on the pedagogical affordances of these tools in the teaching and learning of mathematics specifically at the secondary and senior secondary school level. The goals of school mathematics education as envisaged by the National Curriculum Framework 2005, the prominent learning theories such as the constructivist approach and the challenges of school mathematics education will form the backdrop for the talk. It will highlight how the use of appropriate technology can bring about a shift from content of mathematics to the processes of learning mathematics such as estimation, approximation, visualization, reasoning and problem solving. Examples from studies conducted by the speaker will demonstrate how technology enabled explorations and the inclusion mathematical modeling activities can help to deemphasize rote memorization of procedures, computational algorithms and paper-pencil-drills which dominate the traditional approach of mathematics teaching in most schools today. The talk will further elaborate, through these examples, on how technology can provide students access to higher level mathematics, reduce cognitive load, serve as a scaffolding tool, encourage multi-representational understanding of concepts and help students to form and test conjectures. In some of the studies described by the speaker, CAS (Mathematica), DGS (Geogebra), spreadsheets (Ms Excel) or graphics calculators were used as the primary vehicles

for explorations by students either in the classroom or in a mathematics laboratory. In most cases, the use of technology led to deeper insight into concepts and provided a rich and motivating environment for exploring mathematics.

The talk ends with a discussion on some of the challenges related to the integration of these technology tools in the school curriculum in terms of assessment and large scale teacher preparation. The speaker concludes by suggesting that the considered use of appropriate technology can help to restore the balance between the need for computational skills and the need for experiencing processes such as exploration and conjecture.

A Note on the Speaker:

Jonaki Ghosh is an Assistant Professor in the Dept. of Elementary Education, Lady Sri Ram College, University of Delhi where she teaches courses related to mathematics education. She obtained her Ph. D. in Applied Mathematics from Jamia Milia Islamia University, New Delhi and Masters in Mathematics from Indian Institute of Technology, Kanpur. She has also taught mathematics at the Delhi Public School R K Puram for 13 years, where she was instrumental in setting up the *Mathematics Laboratory & Technology Centre.* Her primary area of research interest is in use of technology in mathematics instruction. She is a member of the Indo Swedish Working Group on Mathematics Education. She regularly participates in national and international conferences. She has published articles in proceedings as well as journals and has also authored books for school students. Recently she was a part of the Indian delegation which made a National Presentation at the International Congress on Mathematics Education (ICME 12) which was held at Seoul from 8th to 15th July 2012. She also delivered a regular lecture at the congress.

She has also set up the **Ramanujan Foundation for Initiatives in Mathematics Education** which caters to professional development programmes and training for mathematics teachers at all levels of school education. Workshops conducted by her cater to teachers from elementary school to senior secondary school. Her workshops focus on innovative practices in teaching mathematics through hands – on activities and technology and emphasize on enhancing the content knowledge of teachers.