

Using An Interactive Whiteboard In The Mathematics Classroom A workshop for practitioners and educators

Dave Miller and Doug Averis
eda19@educ.keele.ac.uk and edc05@educ.keele.ac.uk
Keele University, UK <http://www.keele.ac.uk/depts/ed/iaw/>

Rationale

The use of the Interactive Whiteboard (IAW) in the mathematics classroom continues to grow at a significant rate. The type and range of software available to the mathematics teacher in the classroom is also increasing. For these resources to be used appropriately, we propose that there needs to be a framework by which teachers can assess the effectiveness of both the content of the material being used and the process of classroom practice.

Our work to date suggests that to be most effective in the use of the IAW in the classroom teachers need to be operating at an *enhanced interactive* level. Furthermore, that there are functions of the use of IAWs (or *manipulations*) which can be used in a structured and coherent way to ensure best practice in exploring and developing mathematics in the classroom.

Purpose

The aim of this workshop is to demonstrate what is meant by *enhanced interactive* teaching by considering various approaches to the teaching of particular topics and to identify *manipulations* and reflect on how their use supports both teaching and learning.

Target audience

The workshop will be of interest to those whose work includes consideration of the teaching and learning of the secondary mathematics curriculum.

Some experience of working with ICT in the mathematics classroom will be assumed and there will be a focus on how the material is used rather than how the material is written and developed.

Resources

Much of our material has been developed using a Promethean IAW and ActivBoard Professional 2 . In addition we shall consider work based on:

Geometer's SketchPad/Cabri-géomètre,
Omnigraph/Autograph
Word and Excel
EXP maths 7, 8 and 9 (from Nelson Thornes)

Those attending the workshop are invited to bring laptops. A CD-Rom of appropriate files will be available during the session.

The workshop will focus on pedagogy with reference to pupil-pupil and pupil-teacher interaction and the nature of effective questioning techniques.

Being Mathematical: New Questions for Old

Yudariah Mohd. Yusof and Roselainy Abdul Rahman
Department of Mathematics, Faculty of Science, Universiti Teknologi Malaysia
81310 UTM Skudai, Johor Darul Ta'zim yudariah@mel.fs.utm.my

Abstract:

Students are learning mathematics so they need to know what it is, thus the mathematics in any task has to be explicit. Even though teachers would like their students to get the best examination results, they should also ensure that their students understand the mathematics. In this paper, we will put forward ideas how we can enhance students' learning and appreciation of mathematics. Generally, textbooks are one of the major resources in the mathematics classroom. In this presentation, we will illustrate how we can diversify mathematical tasks and activities found in current mathematics textbooks to make the mathematical processes explicit and provide students with a richer mathematical experience. If students are to be able to think mathematically then they must be given the opportunities to exercise their mathematical powers and be supported in developing these powers in the classroom. By using examples drawn from school and tertiary mathematics textbooks, we will show how we can adapt and extend existing questions and tasks to develop and challenge students to use their thinking powers. We will also highlight certain techniques that we can use to analyse the mathematics within a particular topic and how to devise alternative ways of asking mathematics questions mathematically.

Invoking Students' Use of their Own Powers of Mathematical Thinking Workshop

PM Dr. Yudariah Mohd. Yusof, Pn. Roselainy Abdul Rahman.

Department of Mathematics, Faculty of Science, UTM.

Synopsis: The workshop aims to offer a fresh perspective on the teaching of mathematics which engages students in thinking mathematically, making use of their natural powers. The only way to appreciate suggestions for teaching is to gain experience for oneself. It is important that participants work on the mathematical tasks themselves so that they will be able to make sense of the underlying concepts and structures which can then be used to inform how they make use of mathematical tasks in the classroom. We will share some classroom strategies to invoke students' use of their own powers of mathematical thinking .

Proposed programme:

	View of Mathematics	of	Task 1: Imagining & Expressing	Invoking students' use of their own powers	Task 6: Adapting & Extending
	Mathematical Powers & Themes		Task 2: Specialising	Task 4: Same and Different	Task 7: Sorting
			Task 3: Generalising	Task 5: Doing and Undoing	

Equipment: OHP, LCD Projector, Flip-charts, OHP pens, Markers, OHP Transparencies

An Introduction to Dynamic Programming - The Two Hour Challenge

Dr Mehryar Nooriafshar

Summary - This workshop presents a practical method of teaching basic Dynamic Programming (DP). This method of teaching DP has been tested with several hundred students in recent years. By adopting this approach, all students would understand and learn DP concepts and applications in a two hour session. The development of this methodology was prompted by the author's observation of Business students' experience in learning DP and its applications. The method utilizes a generic recursive formula and an easy to use tabular approach based on a general purpose table. The concepts such as breaking up the problem into smaller sub-problems, linking the solutions of the sub-problems through a generic recursive relationship are explained by the use analogies and anecdotes. As a result of learning Dynamic Programming this way, a very large proportion of students usually achieve B+ grades in the formal assessments

The workshop will simulate a typical session with hands-on opportunities for the candidates. On completion of this workshop, candidates should be able to adopt this practically oriented teaching method of Dynamic Programming for their teaching and learning introductory Dynamic Programming.

For information on this approach, you may refer to:

Nooriafshar M. (2002), "Use of Web-Based Multimedia Technology in Teaching and Learning Mathematical Programming", *Journal of Computers in Mathematics and Science Teaching* 21(4), 331-349. [Online]. Available: <http://www.aace.org/dl/index.cfm/fuseaction/View/paperID/10628>

Nooriafshar M. (2004), "The Use of Innovative Teaching Methods for 'Maximising' the Enjoyment from Learning Mathematical Concepts ", *Series of International Monographs on Mathematics Teaching Worldwide*, Muzaki, Budapest (A Kluwer Company).

This paper was selected for inclusion in the first of the international monographs, entitled "INTERNATIONAL RESEARCH: Selected Articles from the International Journal for Mathematics Teaching and Learning".