

The Newsletter
of the
National Association for
Numeracy and Mathematics
in Colleges

An association for all in the Lifelong Learning
Sector

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Contents

Conference reports 2012		Representations	
AGM report	2	Questioning: Viv Brown	8
Keynote Address: Alan Smith	2	Lingfield Report	9
Adults Don't Count? Fiona Allan	3	News	
Applying Mathematical Processes: Anne Fieldhouse	3	CMathTeach	9
Using Digital technologies: Fiona	4	Book Review	9
Interactive Website: Eileen Foster	5		
Dyscalculia: June Massey	5	NANAMIC would like to thank all contributors to this edition of the newsletter. If you would like to contribute to the next newsletter, please contact the Administrator by emailing admin@nanamic.org.uk	
Rational Numbers: Jane Harris	6		
Energising A Level: Bryony Black	7		
Rich tasks/maths games: Joe Murray	7		

Annual Conference 2012

This year's conference was held at St Mary's Conference Centre, Sheffield on Wednesday 4th July 2012. We had over 50 people attending from places as far apart as Bournemouth and Newcastle. Once again the feedback from delegates rated the conference very good. There were three speakers during the morning session and a choice from six workshops during the afternoon. The reports on all these presentations are in the following pages. There have been requests for more, longer sessions covering the same topics and we are bearing this in mind when planning our CPD Programme for next year. Let us know if there are any that are of particular interest to you.

The NANAMIC AGM was also held during the conference and thanks were given to Valerie Simmonds and David Martin who have stepped down from the committee this year after many years' service to NANAMIC as Treasurer and Chair respectively. George Baxter, from Bury College, was voted on to the committee. John Barton, Chair, reported on the activities of NANAMIC over the last year including representation on various organisations and involvement in consultations. Anne Fieldhouse reported on the finances of NANAMIC and explained that we are moving towards more detailed accounting so that we can use every opportunity to make the best use of our income.

Next year's conference will be on Wednesday 3rd July in Derby. Please put the date in your diary. Further information about the conference will be on the website as soon as it becomes available.

Lesley Way, Administrator

Keynote address: Data Visualisation – Alan Smith OBE



Alan gave us many insights into public access to statistics. You might feel like William Farr who said that statistics “should be the driest of all reading” or like William Playfair said “. . . no study is less alluring or more dry and tedious than statistics . . . unless the **mind** and **imagination** are set to work”

In his work at the Office for National Statistics Alan is certainly working hard at bringing in visualisations and in stimulating the imagination. In his hands statistics is displayed in ways far from dry. His aim is to make data not just accessible, but also to share its meaning. He introduced us to baby Kevins in Zurich. Who caused the popularity of the name? Was it Kevin Keegan, Kevin McCallister or Kevin Costner? Did you know that the most popular data set on the ONS website is the baby name one?

Baby name data on the ONS website aims to be presented in an engaging and accessible way, which brought Alan onto the issue of visual presentations from pie charts to word clouds and to ask “what are graphs for?” He shared some good and some bad practice in data presentation. Lots of food for thought and starting points to get our learners using their imagination. See the slides from the presentation on the website.

www.ons.gov.uk/ons/dcp171778_276015.pdf

Sally Barton

Adults don't count? – Fiona Allan

Fiona Allan presented the findings of a large-scale research project which had taken place in the South East of England involving 173 numeracy teachers. The teachers were allocated to one of three groups, but were not told about the other groups. The control group received no input, the second group received CPD on effective delivery of numeracy to adults and the third group received the same CPD, plus training on using neuro-linguistic programming (NLP).

The results are very interesting. All the learners were tested before the beginning of the research and again at the end. The control group showed an improvement of 5.7% while the CPD group's mean score increased by 11.0%. However, the third group saw an increase of 18.4%!

This in itself was fascinating and showed an effective way to increase learner development, but there were other results from this research. Teachers were asked about whether they enjoyed teaching mathematics and whether their learners behaved well. For both these questions there was an increase in enjoyment and behaviour for both the CPD and the NLP groups. In contrast to this the control group teachers said they had less enjoyment at the end of the research period and said that their learners' behaviour was worse than at the beginning.

Fiona then went on to share some of the effective tools which had been used including influencing with words, the double bind, the embedded command and the yes set. A set of cards was produced as a resource for all teachers and these can be downloaded from the web address below.

The importance of body language was also stressed and the need to adopt different

stances to achieve different outcomes when working with learners. A brief example of this was given as part of the session when, working in pairs, the 'teacher' was encouraged to change in the middle of the role play to adopting a similar body position to the 'learner'. It was seen that in some situations it is very helpful to adopt this to create a feeling of empathy.

There was plenty for us to think about as we came to the end of the conference and exciting possibilities for those who seek to implement the results of this research.

<http://archive.excellencegateway.org.uk/page.aspx?o=333655>

John Barton

Applying mathematical processes - Anne Fieldhouse

The session was run to provide useful practical advice on resources and activities that focus on the problem solving processes involved in mathematics. This is an increasingly important aspect of mathematics given its place in the Functional Skills and GCSE curricula.

Anne introduced her session by using an interesting NRich (<http://nrich.maths.org>) activity as a starter in which the Olympics is used as a context. This was a problem solving matching task in which some information may be known by learners but others would have to be thought through to obtain a solution. For example, do you know how high a basketball hoop is? You could probably work out that, as a US sport, it would be measured in feet, and that out of the choices provided 10 feet is more likely than 100 or 9.76.

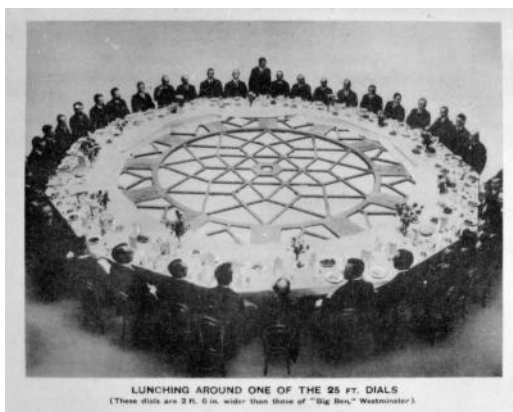
Anne then moved on to the main section which introduced some activities from the Bowland mathematics project (www.bowlandmaths.org.uk/). The project developed contextualised resources that develop discussion and collaborative learning within secondary mathematics. Having noted that the resources were intended for schools there are many resources that are useful in the post compulsory sector. Three activities were shown:

- (a) Estimating the number of people sitting around a table made from the Royal Liver Clock face. This involved making estimates given a photograph of people around part of the table.
- (b) Estimating the number of old / young trees in an area. This involved thinking about appropriate sampling techniques
- (c) Discussion task around the positioning of a security camera in a shop. This involves consideration of geometry and measure.

The session concluded by noting some other useful problem solving resources that the Nuffield Foundation has developed for the Free Standing Mathematics Qualifications. These resources are freely available to download and use whether the qualifications are studied or not.

www.nuffieldfoundation.org/fsmqs

Graham Griffiths



Using Digital Technologies to Enhance Learning - Fiona Allen

The main purpose of this presentation was to demonstrate the wide variety of ICT resources that could be used to enhance teaching and learning within the classroom.

The aim was to develop an understanding for using digital technologies in different contexts for teaching and learning mathematics, moving forwards from the norm, such as PowerPoint.

Within the presentation Fiona demonstrated various spreadsheet activities to identify formulae and introduced the group to Google document resources. These are free online resources that give the user the ability create a range of different documents and even videos to enhance the learning experience. This was an excellent resource that I personally will be using in the classroom.

To finish with, Fiona introduced us to handheld voting devices that could be used in many different contexts for both teaching and learning, which could also be expanded for many other uses within education. The voting devices also included mobile phones, where individuals could text to cast their vote at no extra charge from their mobile network provider.

A brilliant presentation with some excellent ideas and resources to enhance classroom learning with the use of ICT.

Peter Johnstone

<https://sites.google.com/site/gtaresources/tech-tools-rotation-1/google-docs>

Interactive Websites - Eileen Foster

This presentation was to introduce the group to the differing interactive resources available on the Internet. These included such resources as Flash games, multiple choice quizzes, worksheet makers and fun ways to do mathematics.

The presentation started with the very basics of creating these resources, which would have certainly helped any individuals who were unfamiliar with ICT and different software applications for resource creation. This was backed up with very good handouts and resources to simplify the stages from start to finish. This proved invaluable for the spreadsheets multiple choice resource. In addition, we were provided with a host of websites for different resources such as nrich, nctm, Bowland maths and The Nuffield Foundation.

Overall this was a very good presentation with a lot of useful information for resource building, for teaching and learning. Even for an IT layman, the resource building materials are easy to follow and clearly set out using a step by step approach.

Peter Johnstone

Dyscalculia - June Massey

I was looking forward to finding out more about Dyscalculia and I was not disappointed. As far as I am aware I have not had a student with it. However, it is estimated that 5% of the population has dyscalculia. It can co-exist with other disabilities for example dyslexia and dyspraxia.

Dyscalculia has been defined "as measured by a standard test that is given individually, the mathematical ability is substantially less

than would be expected from the person's age, intelligence and education. This deficiency materially impedes academic achievement or daily living." DSM-IV (2000)

To progress in education the necessity to achieve a "C" at GCSE in some cases may be waived.

However, a person with dyscalculia may have no real understanding of what a number is.

Dyscalculia presents everyday difficulties with:

- Computation of addition, subtraction, multiplication and division.
- Measuring and weighing.
- Time.
- Money.
- Using a calculator, without double checking.
- Estimation.

Some of these difficulties *can* be worked around. If a measure of milk is required for a specific recipe, a mark can be put on the jug and a written label put near it. Every time a purchase is made a banknote or a pound coin can be used. Then all the change can be taken to the bank and exchanged back to notes and pound coins.

A skill can be learned, but then daily use and much practice of the skill is required to maintain it. It is a lifestyle choice as to how much it is worth keeping the skill. For example, one student could only keep the skill of change with money if she played "shops", every day, with her daughter.

June gave a good insight into dyscalculia. The best resources for students with dyscalculia are multi-sensory ones. A few examples are Dienes Apparatus, Cuisenaire Rods, money, counters and fingers.

Penny Wright

Rational Numbers: Investigating compulsion for mathematics study to 18 - Jane Harris, Policy Research Manager at The Pearson Think Tank

Jane gave a brief overview of research she had led at Pearson investigating the compulsory study of mathematics to the age of 18. The research involved a literature review and conversations with the STEM community, mathematics education academics, subject associations and organisations including NANAMIC. Engagement with year 11 and 12 students took place through focus groups. Teachers of mathematics, and of a range of other subjects, took also part in online surveys.

Key findings of the project included:

1. The academic research evidence base for the benefits of compulsory mathematics to 18 within our current free-choice qualification system is limited
2. The current focus on GCSE grade C is leading to this being seen as an end-point, which is affecting post-16 participation
3. Due to the difficulty of mathematics at A level, there are barriers preventing large numbers of learners with grade C (or even B) at GCSE from accessing level 3 mathematics provision
4. Learners are very concerned about the introduction of compulsory mathematics for a range of reasons.
5. Learners and FE tutors believe that mathematics must be relevant if we are to increase engagement.

This led to the following report recommendations:

1. The government should not seek to implement compulsory mathematics

- learning for all post-16 learners unless part of a Baccalaureate model
2. The government should continue its move against early entry to GCSE mathematics
3. The government and mathematics community should consider the AS in mathematics. We believe the AS should be redesigned to be fully accessible for learners with a C at GCSE (or the mathematics community will have to accept that the subject will remain the preserve of a 'clever core')
4. That new ways of reporting mathematical progress through GCSE and AS level are introduced. Learners should take on-going low-stakes interim assessments throughout their GCSE course which log the competencies demonstrated.
5. HE departments and employers in the STEM sector demand more mathematics from their entrants (whether this is a full A level or results from smaller level 3 qualifications would be a decision for HE and employers).
6. That where mathematics content features in other subject areas at levels 2 and 3, this learning should both be emphasised *within* that qualification and should also be recognised *outside* of it. This type of embedded mathematics learning should count towards the government's 10-year target
7. More is done by the STEM sector to identify why the number of people with STEM degrees choose not to work in the subject. Once the reasons are uncovered, we advise that moves are taken to reverse the trend.

The presentation offered us useful insights into this important area of current debate and much material for further discussion. As part of a full and engaging day, time was not available for discussion at the conference,

but we were given contact details to engage with this further and invited to book a place at the report launch later in the month.

David Martin

Energising Advanced Level Maths - Bryony Black

Bryony challenged us to look at how we think about our learners – what are our favourite or least favourite student types? We then considered our maths lessons from their point of view. What do our classrooms look and sound like? What behaviour do we reward?

We then discussed producing independent, engaged learners and looked at the resources available – including the Standards Unit box, RISPS (rich starting points), UK Maths challenge and a problem solving journal run by Birmingham University. We were also given some recommended reading to help us in our A level teaching.

We shared our own experiences and set short term and longer term goals for ourselves and our students.

Sally Barton

Rich tasks and maths games - Joe Murray

A rich task is a fresh approach to stale learning. It involves rich mathematical learning. It starts off as a task that can be generalised to all levels, which makes it accessible to all. It can then be extended up to higher levels. It involves a “What if” element. The most important aspect of a rich task is that it is enjoyable.

Joe gave examples of rich tasks and maths games. He got us to try them out and gave examples of how they had worked with students.

He gave us $4U + T$

- Choose any number **below 40**
- Multiply the **units digit** by 4 and add the **tens digit**
- Repeat this with the new number and continue thus!!!

so 16 → 25 → 22
 → 10 → 1 → 4
 → 16

- Investigate other start numbers **below 40**.
- What about starting with a number **above 40**
- What about **$2U + T$** , **$3U + T$** , etc

It was a fun session that gave an insight into all the free resources that can be used. Many can be found on the nrich website. If you register with them they will send you a monthly newsletter with lots of other activities.

nrich.maths.org

Penny Wright

Questioning – Viv Brown

Viv, representing **NANAMIC**, presented two workshops on **questioning** at the MA Conference for Secondary Mathematics Teachers in Stirling.

Recent research shows that changing or improving a teacher's questioning style, makes an impact in the classroom. The sessions explored closed and open questions and different ways of asking questions, and included activities such as picking a number out of a bag and creating as many calculations as possible with that number as the answer, following a treasure trail around the room, working in pairs to classify questions as either open or closed, creating open questions for learners and using photographs to promote discussion in mathematics.



What questions could you ask about this photograph to promote mathematical discussion?

Participants were provided with a range of links to activities and research relating to questioning including:

- NCETM Departmental Workshop on Questioning – www.ncetm.org.uk/resources/24355
- Fractions/Percentages Treasure Hunt + blank template to make your own www.ncetm.org.uk/Default.aspx?page=14&module=com&mode=102&comcid=1265&comf=76405&comfb=1&comu=0

- What makes a good resource? If I know this I also know www.ncetm.org.uk/resources/20331
- Standards Unit Improving learning in mathematics: challenges and strategies www.ncetm.org.uk/public/files/224/improving_learning_in_mathematics.pdf
- Fractions (Maths4Life) Rachel McLeod & Barbara Newmarch Assessment by questioning. Page 22. Possible questions. Page 23. Analysing errors and misconceptions. Page 24. Suggestions for resources. Page 26. Some do's and don'ts. www.ncetm.org.uk/public/files/257666/fractions_booklet.pdf
- Thinking Through Mathematics – Developing questioning www.ncetm.org.uk/online-cpd-modules/ttm/strategies-for-teaching-mathematics/developing-questioning
- Nrich – Using Questioning to Stimulate Mathematical Thinking <http://nrich.maths.org/2473>
- Association of Teachers of Mathematics (ATM) Anne Watson & John Mason Questions and Prompts for Mathematical Thinking www.atm.org.uk/shop/products/dis002.html

And if you'd like to read more about questioning, why not explore some of the articles on the NCETM Research Gateway where you can search reports, articles and research papers from the British Education Index specifically selected for the NCETM. www.ncetm.org.uk/research-gateway Just type questioning into the search box and click go.

Lingfield Report

Many will have heard the headline recommendations of the Lingfield Report: Membership of the IfL is to be voluntary and teachers in FE no longer need a teaching qualification, but few seem to understand what is happening.

The recommendations regarding IfL are being implemented, but the recommendation on teacher qualifications is currently out for consultation. There are meetings, organised by LSIS, taking place in: Birmingham (18 October), London (8 & 20 November), Taunton (13 November) and Leeds (15 November).

I will be attending the one in Leeds to recommend that compulsory teaching qualifications are maintained, especially for those teaching mathematics. I would also like to see it extended to functional maths.

Professionalization of the workforce has taken some time to achieve. Parity between QTS and QTLS has only just been achieved. It is not the time for a backwards step, especially when the government wants all learners to study mathematics until the age of 18.

The results of the consultation will be released in the Spring, when a final decision will be made. Watch this space, but get involved!

To book on a consultation near you, go to <https://events.lsis.org.uk/>, choose the events tab and search for FE Teacher/Trainer.

To read a summary of the recommendations, read the TES article at this link: www.tes.co.uk/article.aspx?storycode=6202944

John Barton - Chair

CMathTeach

Congratulations!

We are pleased to announce that we have had a further member who has received the Chartered Mathematics Teacher designation. Priya Suresh was awarded the designation at the November Regulatory Body Meeting. Are you interested in finding out more about this designation which is available for those in the post 16 sector, as well as the other sectors? If so, feel free to contact the association and we will happily give you more details about how to apply and the requirements you need to fulfil.

<http://www.cmathteach.org.uk/>

Book Review

The Great Mathematicians by Raymond Flood and Robin Wilson (2011) published by Arcturus at £9.99

This book shows the human face of mathematics. It presents over 200 pages in two A4 page spreads brief sketches of mathematicians and their achievements in mathematics. The coverage is from ancient mathematics, through early European up to the modern age of mathematics. Ideas for further reading are included.

This book combines the authority of Presidents of the British Society for the History of Mathematics with an easy, well-illustrated, reading style. This could prove a good starting point for both lecturers and students as they try and fill in the details of the on-going mathematical journey that can so enrich our teaching and learning.

David Martin

