

The Shape of Chemistry in 2008

Dr Paul Martin, Dr Karen Moss

*Centre for Effective Learning in Science
Nottingham Trent University*

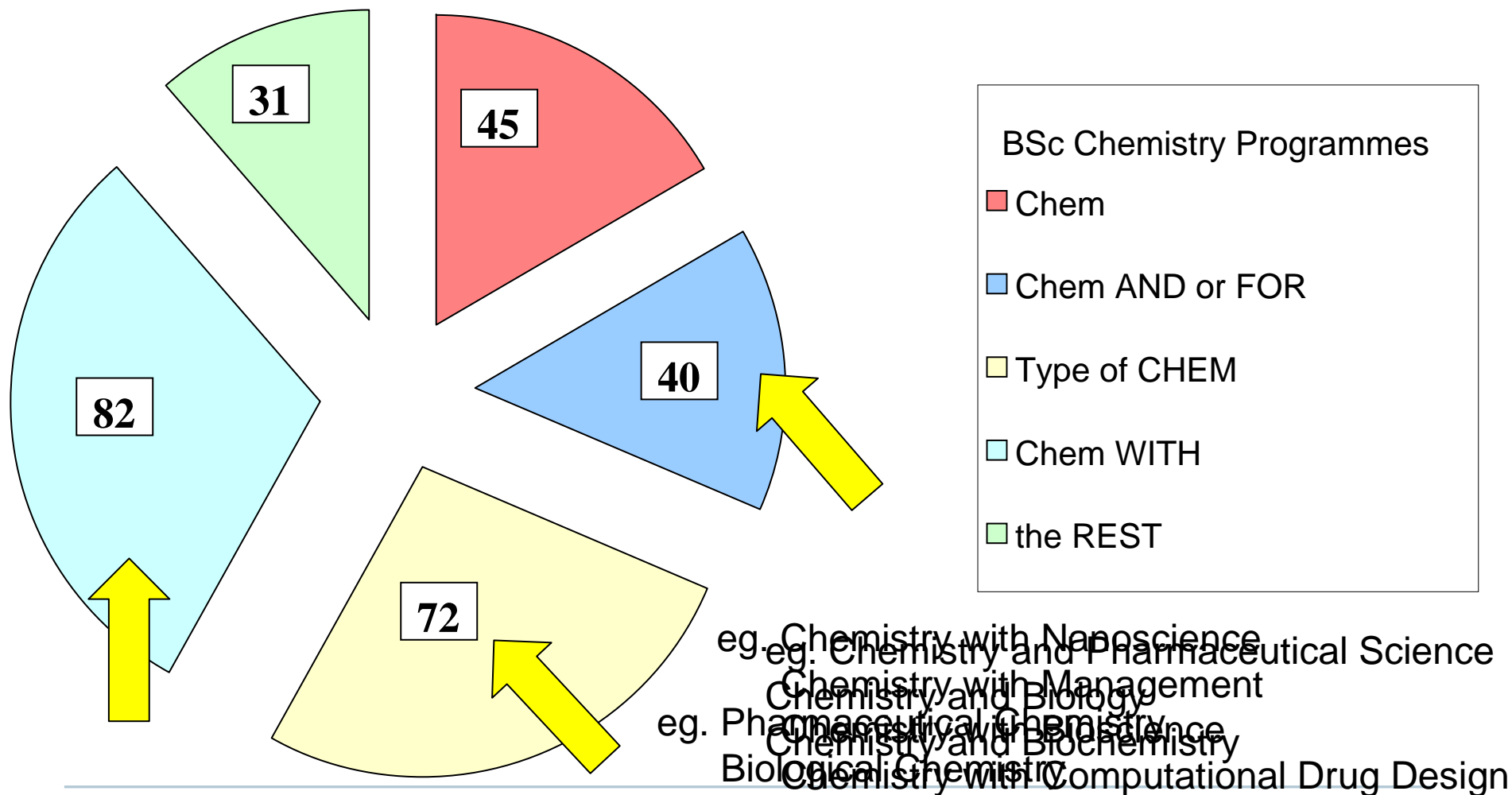
Introduction

- Chemistry for our Future (CFOF): Strand 3.2 –Curriculum Development – Context /Problem – Based Learning [C/PBL]
4 Partners – Leicester(Lead), Hull, Plymouth and NTU
- Research Topic: - Design, Development and Implementation of Context Based and Problem Based Learning Materials ACROSS the Undergraduate Chemistry Curriculum
- P/CBL Track record: Over 80% of medical schools use the problem based learning methodology to teach students about clinical cases, either real or hypothetical (Vernon & Blake, 1993, Bridges & Hallinger, 1991). Started being used for Physical Sciences (ie) our recent survey : **20 chemistry departments have registered specific P/CBL activity**
- Knowledge of shape of chemistry in 2008 can help high-light scope for developing transferable chemistry CBL and PBL resources

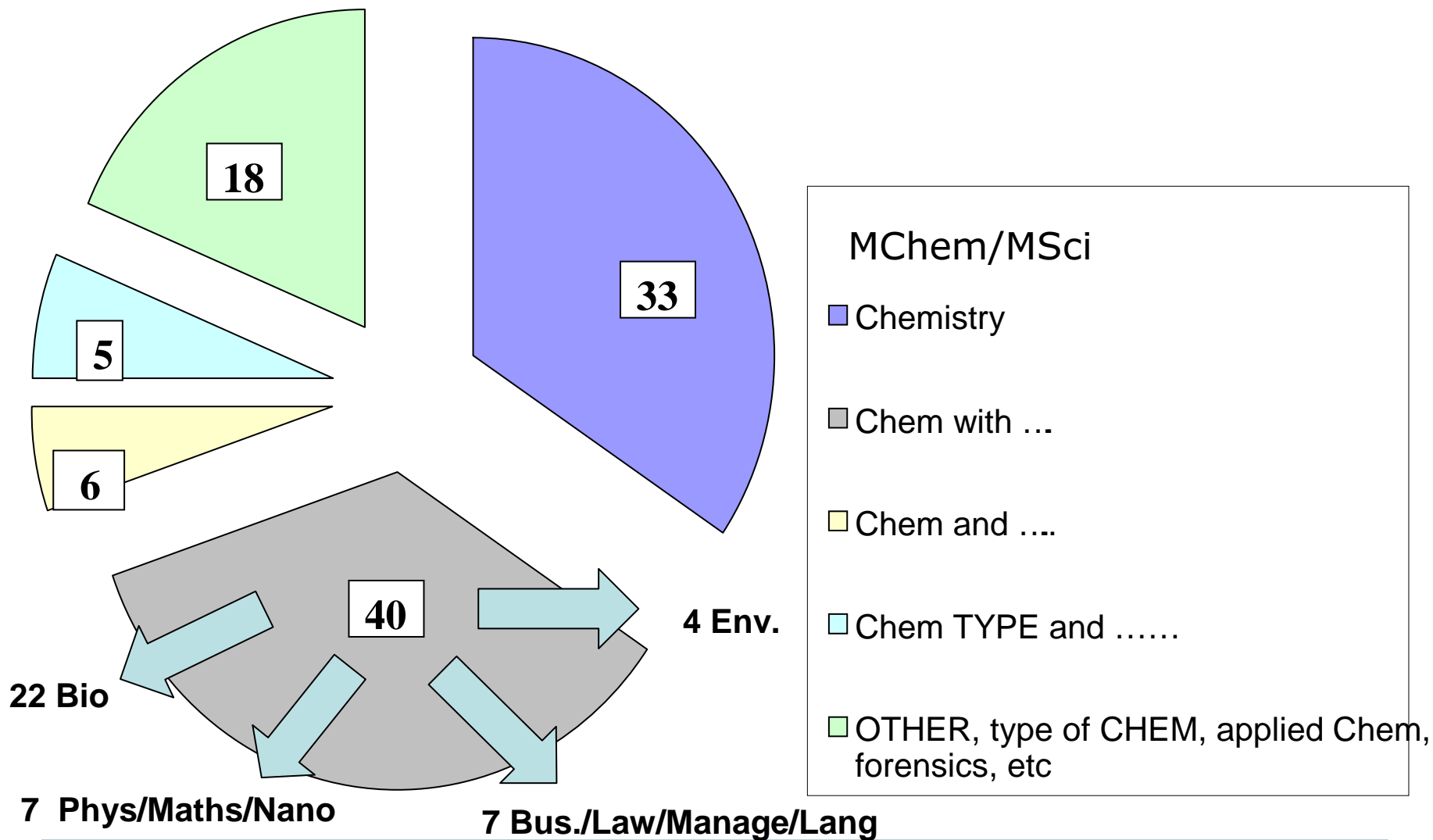
Methodology

- Analysis of breakdown of RSC Accredited/Recognised Courses
- Survey chemistry content at all levels
- Sources of Information:
 - Departmental Websites
 - Heads of Departments and/or Heads of Teaching
- Compare 1st Year UG Chemistry content from 1998 to 2008
- 99% of Websites give more detail than just module titles
- Vast majority give very detailed modular information for all undergraduate levels
- Includes all RSC Accredited/Recognised Courses, ie inclusive South America, Asia, Mainland Europe and Eire

Break down of RSC Recognised Courses



Breakdown of RSC Accredited Courses



Spot the difference.....

Chemistry **and Drug Discovery**

Chemistry **with Drug Discovery**

Chemistry **for Drug Discovery**

MChem v's MChem for Drug Discovery: Level 1 differences

Chemistry Year 1, Semester 1

Mandatory Units

Foundation Chemistry 12 Credits
Analytical chemistry & spectroscopy 6 Credits
Foundation chemistry laboratory 3 Credits

Optional Units

3 credits from the following list:

Inorganic chemistry laboratory 1 3 Credits
Organic chemistry laboratory 1 3 Credits
Physical chemistry laboratory 1 3 Credits

6 credits from the following list:

Foundation mathematics 1 6 Credits
Any other unit(s) up to 6 credits, from around the University, subject to approval by the Director of Studies



Chemistry Year 1, Semester 2

Mandatory Units

Essential Chemistry 12 Credits
Introduction to solid state and main group chemistry 6 Credits

Optional Units

6 credits from the following list:

Inorganic chemistry laboratory 1 3 Credits
Organic chemistry laboratory 1 3 Credits
Physical chemistry laboratory 1 3 Credits

6 credits from the following list:

Foundation mathematics 2 6 Credits
Any other unit(s) up to 6 credits, from around the University, subject to approval by the Director of Studies

Chemistry with Drug Discovery Year 1, Semester 1

Mandatory Units

Foundation Chemistry 12 Credits
Analytical Chemistry and Spectroscopy 6 Credits
Human Physiology 6 Credits
Foundation chemistry laboratory 3 Credits

Optional Units

3 credits from the following list:

Inorganic chemistry laboratory 1 3 Credits
Organic chemistry laboratory 1 3 Credits
Physical chemistry laboratory 1 3 Credits



Chemistry with Drug Discovery Year 1, Semester 2

Mandatory Units

Essential Chemistry 12 Credits
Introduction to solid state and main group chemistry 6 Credits

Physiology, pathology, pharmacology 2 6 Credits

Optional Units

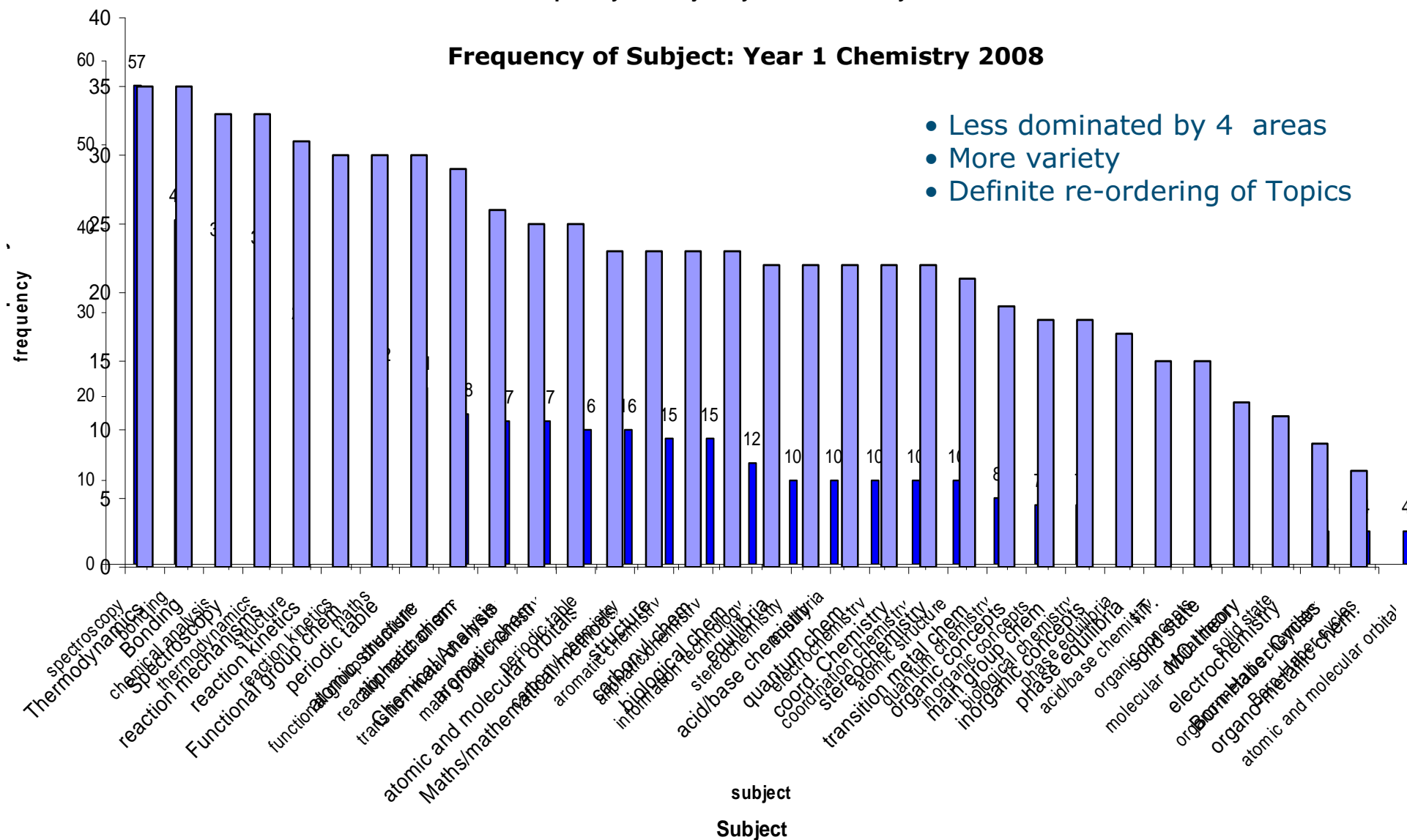
6 credits from the following list:

Inorganic chemistry laboratory 1 3 Credits
Organic chemistry laboratory 1 3 Credits
Physical chemistry laboratory 1 3 Credits

Direct comparison of Topics: 1998 – 2008 MChem

Frequency of subject: year 1 chemistry

Frequency of Subject: Year 1 Chemistry 2008



Conclusions changes to Year 1 1998-2008

A substantially more varied student experience in year 1 through changes to syllabus and increased option choices

- Diversity in course title does not always change level 1 chemistry content, but Maths ?
- Some topics, like electrochemistry, are less prevalent
- New topics have been introduced to Year 1- typically 'buzz areas' - nanotechnology, modelling & simulation
- Different departmental strengths/specialism are introduced earlier
- Since 1998:
 - some topics are introduced to a greater depth than others
 - some are at less depth
 - Some are disappearing from the 1st year syllabus, or have moved to later years
- Drive for variety. Diverse courses and chem content. But at what price ?
- P/CBL Activities could be a way of introducing variety, provide engagement, practise problem-solving and improve mathematics content/skills without losing subject depth and content.
- Highlight Scope: A single P/CBL project to cover broad areas of syllabus: 'Unlocking the OSC of Ceria' (i) Nanotechnology: Nonoparticles/nanotubes (ii) Solid State/ Defect Chemistry/Surface Science Techniques/ Catalysis (iv) Thermodynamics & Kinetics
- Other possibilities: Forensic Science \Rightarrow Drugs \Rightarrow Biological Chemistry \Rightarrow Organic Concepts

Further Work

- Content of higher levels
- Problem/Context Based Activity
- Breakdown of Courses with industrial, commercial, international placements
- Deeper Understanding of differences (subtle or otherwise) between content and delivery of Chemistry at all undergrad. levels, within ever more diverse courses.

The Shape of Chemistry in 2008

Acknowledgements:

Dr Karen Moss and David Moss (1998 survey)

Funding: HEFCE and CFOF

Interested in sharing/trialling your P/CBL Material ?

Contact: paul.martin@ntu.ac.uk