Department of Computer Science

Introduction to Triennial Review

Mahesan Niranjan
Head of Department
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Overview

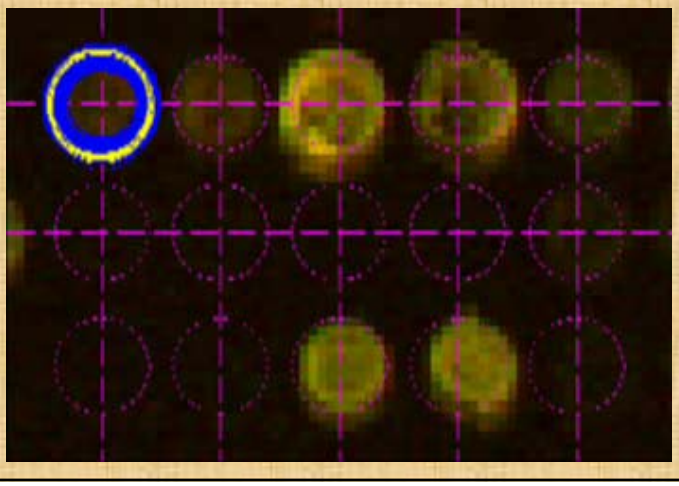
- Selected examples of activities
- Research: Remarks on RAE2001
- Teaching and Learning
  - Failure statistics and recent actions
- Departmental Culture (Personal View)
- Analysis of Academic Planning Budget
  - Adverse effects of under-investment

Trajectory for future

Examples of Activities

- Large research grants: *e.g.* EPSRC Interdisciplinary Research Centre on Advanced Knowledge Technologies
- Interdisciplinary research: *e.g.* Bioinformatics support for Bio-Medical Sciences and Obstetrics
- Innovative teaching: *e.g.* Genesys Solutions Ltd.
- Public understanding of science: e.g. Magna Trust
- Industrial contacts: *e.g.* Games Technology Centre
- Authored Books: *e.g.* Alan Watt's 3D Graphics

Mathematical and Computational Support for Biologists
Mouse eye & ear development



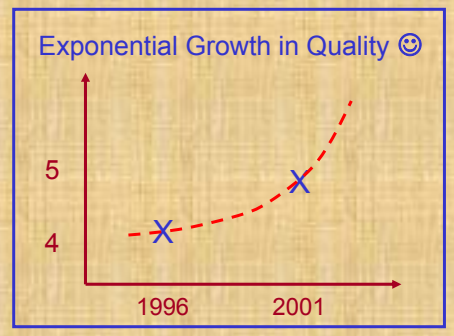
Research Assessment Exercise

- Monotonic Increase in RAE achievement, measured by
  - Publications
  - Research environment
  - Grant Income
  - External Visibility

HEFCE Grant to DCS

620K in 2001/02

1.1M in 2002/03



Lessons from RAE2001

Institution	#Submitted	Grant £000	RA	RS
Cambridge	34	45	0.6	2.4
Southampton	26	62	1.5	2.5
York	39	50	0.9	1.2
Imperial	42	58	0.6	2.0
Edinburgh	87	37	0.4	1.0
Manchester	55	44	0.9	1.6
Average 5* submission	47.8	49.3	0.82	1.78
Sheffield	23	44	1.0	1.5

Big is beautiful?

Notes on External Funding

- More of the money is becoming available in initiative driven large chunks:
  IRC, E-Science, Framework VI
- Only a small number of Faculty bring in research grants
  – But this may be true of other Departments too

University's Mission Statement

to maintain the highest standards of excellence as a research-led institution of international standing, whose staff work at the frontiers of academic enquiry and educate students in a research environment

RAE 5 — Quality […] of international excellence in up to half of the research activity and to national excellence in virtually all of the remainder.

RAE 5* — Quality […] of international excellence in more than half […] national excellence in the remainder.

Observations

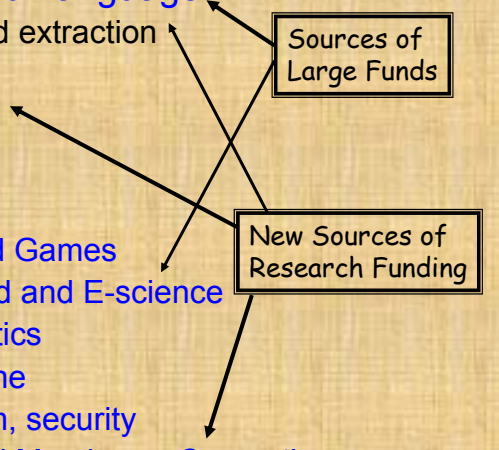
- Our alignment to the University's mission statement has room for improvement…
  - …even if we have reservations about the instruments with which the gap can be measured
- ~40% of the research submitted for assessment was either
  - Not done in Sheffield

  [Niranjan, Mendler, Gheorghe, Luettgen, Wu, Guthrie]
  - Done by full time researchers

  [Cunningham, Bogdanov, Gotoh]

Exploiting Opportunities

- Information, Speech and Language
  - Multi-modal retrieval and extraction
- Computational Biology
  - Systems Biology
  - Data driven modelling
- Visualization, Graphics and Games
- Distributed Computing: Grid and E-science
- Artificial Intelligence, Robotics
- Decision support in Medicine
- Software in crime, terrorism, security
- Nano-technology; DNA and Membrane Computing
- Computational Neuroscience



Teaching & Learning

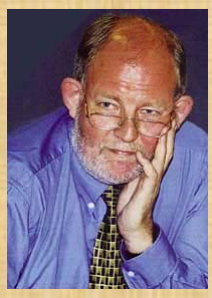
Teaching and Learning

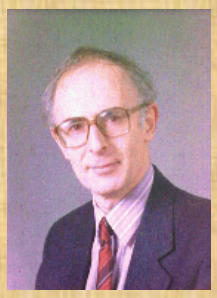
- Commitment to Teaching
- Innovation in Teaching
- Teaching Business
- Teaching Quality Issues

High Commitment to Teaching and Learning

- Equal teaching load carried by all academic staff
- ~220 contact hours per year per academic
- Policy of Professors teaching at L1 and L2
- Effective actions when necessary:
  - *e.g.* COM161 issue with Aerospace degree
- Ability and willingness to teach outside area of speciality
  - *e.g.* E-Commerce module from specialist in Auditory Scene Analysis

Innovative Teaching in DCS





GENESYS SOLUTIONS

Teaching Business £££

- Sharp drop in Home UG - Compensated by expansions elsewhere
- New Courses
  - Dual UG programme (CPE, PHY)
  - Data Communications MSc (with EEE)
    - Intake in 2001/02 20
    - Intake in 2002/03 40
  - Advanced Computer Science PGT 2001/02
  - Functional Genomics possible 2004/05
  - Many other ideas being actively developed

Teaching Business £££

- Lessons from Mobile Communications initiative

"Don't mention Srba"

Ancient Chinese Proverb:

"Build the research base before launching a degree programme"

Failure Statistics

- Re-sit rate presented to Academic Strategy Group in November 2001; DCS identified as problem
- Visit by Faculty Deans (Professors Frisby & Holcombe) to Department in February 2002; tough questions:
  - "What are you going to do about this?"
  - "What is the acceptable failure rate for a module?"
  - "We are here to help you"
- Several causes identified and actions put in place

Causes of High Failure Rates

- Half-Modular Structure
  - Reporting assessment in 10-credit chunks;

  Ancient Chinese Proverb:

  You assess more; they fail more

$$p = 1 - (1 - 0.05)^{12} = 0.46$$

  - Amount of material:

  2 * 10 credit half modules > 20 credit module

Causes of High Failure Rates

- Heavy Curriculum

External examiner comments:

curriculum has more advanced material than at other Universities

MN: "the top end of DCS graduates comparable to Cambridge Engineering graduates"

Causes of High Failure Rates

- Students
  - Large variation in motivation
  - Large variation in abilities

This is more true for Computer Science than for other Engineering disciplines

Causes of High Failure Rates

- Diminished Faculty Motivation
  - Increasing culture of complaint amongst student body
  - Increasing culture of blame from Quality Assurance Process

Causes of High Failure Rates

- Resources
  - Student Staff Ratio at 20:1 (see graphs later)
  - Admin Support (see graphs later)
  - Laboratory: Space and Equipment

Learning to Program is very different from:

- History - How did the wives of Henry VIII die?
- Electronics - Small signal model of transistors?
- Vibrations - Second order differential equations?

The cognitive demand on the learner is to be creative right from the beginning

Actions taken recently

- Increased lab-based teaching
  - *e.g.* COM161 Java Programming (2002/03)
  - *e.g.* Pattern Processing (2002/03)
- Review of modules with high failures in 2002
  - each module reviewed by two lecturers (Summer 2002)
- Review of Coursework set at Level 3 modules (Summer 2002)
- Inflated credits on L3 dissertations (40 to 60) to reduce workload on students (Session 2002/03)

Actions taken recently

- Link modules at L1 to report marks in 20 credit units (Summer 2003)
- Plan future new modules in 20 credit units for content and assessment (Session 2003/04)
- Assess any 10 credit unit only by exam or by coursework (Session 2003/04)

Department Culture & Desirable Change

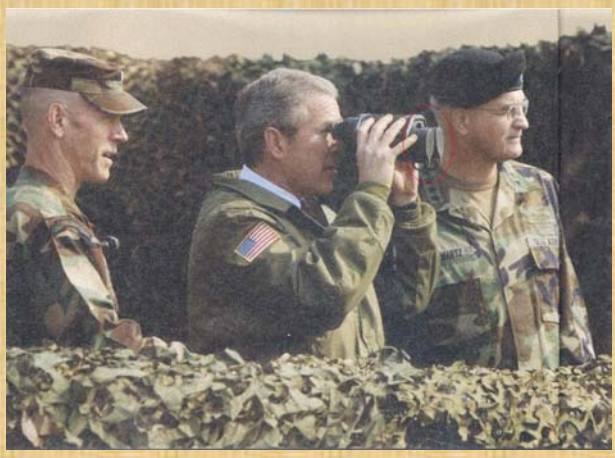
Predominantly teaching-centric culture

- Most teaching committee actions tend to increase teaching load on academics
- Several members of Faculty do not see external funding for research as part of their job

Department Culture & Desirable Change

- Suggestion for change in teaching is usually met with strong opposition; *e.g.*
  - "*large failure rates because new HoD has scaled down the Tutorial system*"
  - "*you are anti-teaching*"
  - "*this is attacking our heritage*"
  - "*this is butchering the teaching programme*"

Head of Department's Vision

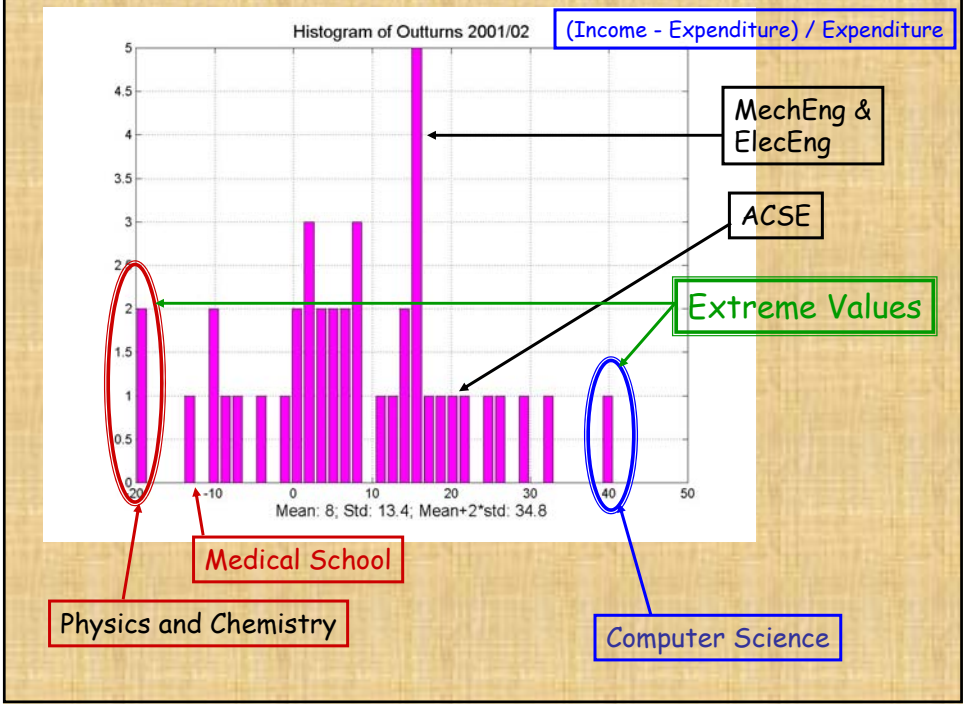


Culture change towards Research centric thinking

What is needed to achieve change?

- Tight control of the teaching programme **Done**
  - 2001/02: 62 half modules taught by Faculty
  - 2002/03: 48 taught by Faculty + 5 buy-in
    [Allocation managed by MN]
  - 2003/04: 51 taught by Faculty + 3 buy-in
    [Managed by Teaching Committee]
- Reduction in Faculty teaching load (2.5 modules to 2.0 modules) - has limitations
- Investment compatible with goals of the University
  - purpose of this meeting

Next: Analysis of ADC Figures

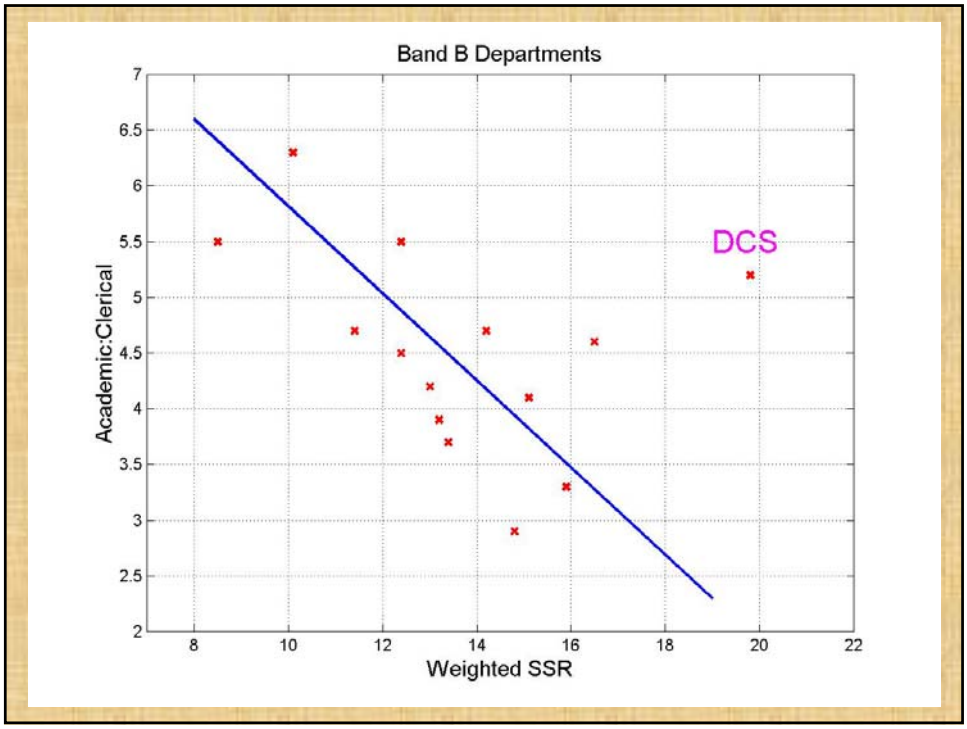


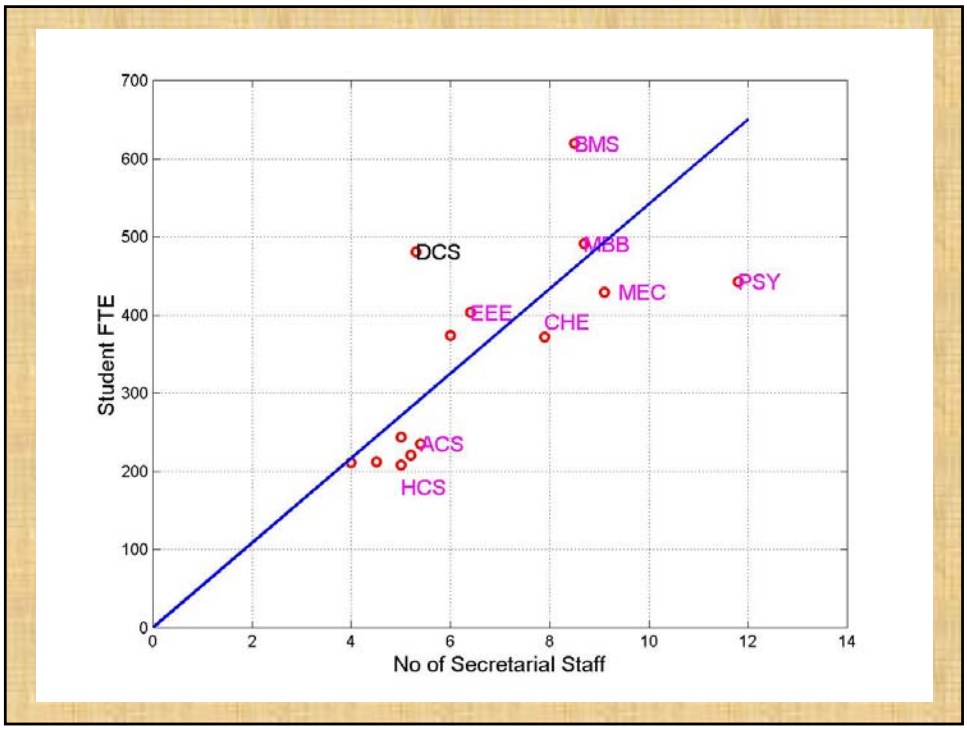
2000/01	Income	3676 K
	Expenditure	3002 K
2001/02	Income	4292 K
	Expenditure	3052 K

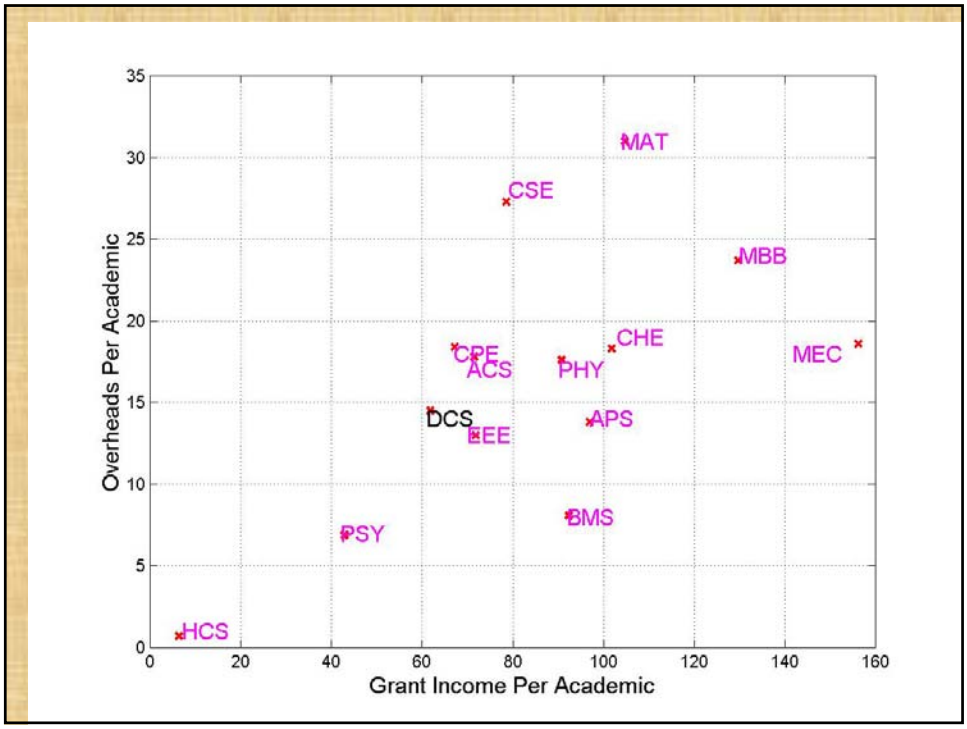
Increase in Income: 674 K
Increase in Expenditure: 50 K

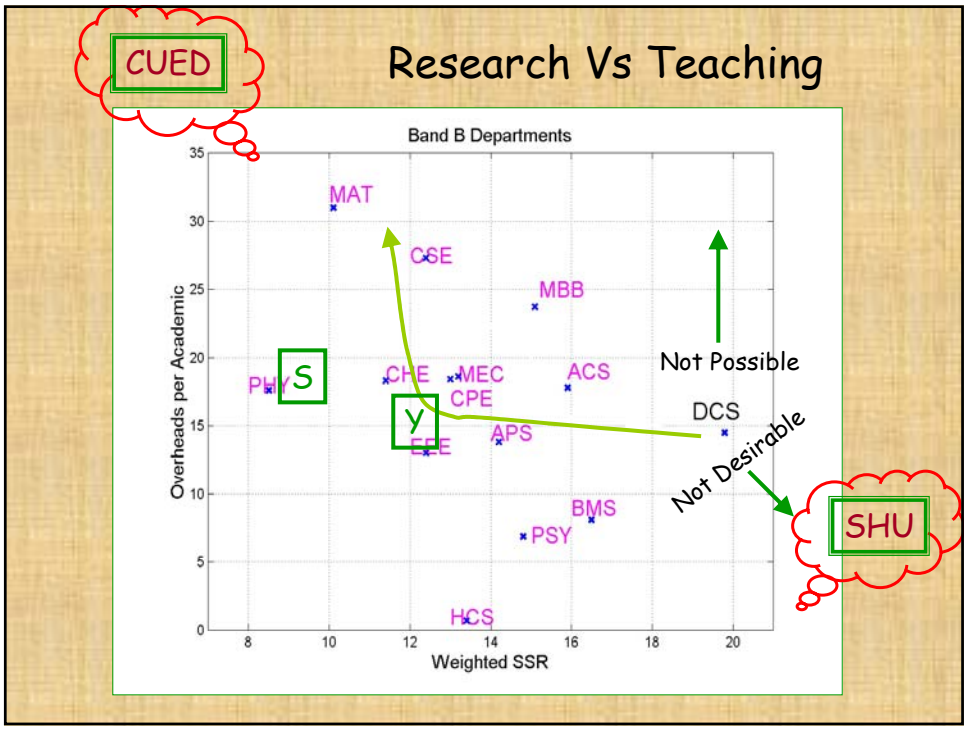
What contributed to the 674 K increase ?

157 K from Re-banding 1.8 to 2
142 K from increased research
333 K from fees and increased overseas


Band B Departments
Academic:Clerical
Weighted SSR
DCS
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
8
10
12
14
16
18
20
22


Student FTE
No of Secretarial Staff
BMS
DCS
MBB
MEC
PSY
EEE
CHE
ACS
HCS
700
600
500
400
300
200
100
0
0
2
4
6
8
10
12
14


Overheads Per Academic
Grant Income Per Academic
MAT
CSE
MBB
CHE
MEC
CPE
ACS
PHY
DCS
APS
EEE
BMS
PSY
HCS
0
5
10
15
20
25
30
35
0
20
40
60
80
100
120
140
160


CUED
Research Vs Teaching
Band B Departments
Overheads per Academic
Weighted SSR
MAT
CSE
MBB
PHY
S
CHE
MEC
ACS
CPE
Y
DCS
APS
EEE
BMS
PSY
HCS
Not Possible
Not Desirable
SHU
0
5
10
15
20
25
30
35
8
10
12
14
16
18
20

Adverse Effects of Under-Investment

1. Hurts Teaching Quality
   - criticisms from external examiners
2. Hurts Recruitment
3. Frustrates & de-motivates Faculty:
   - hurts career advancement
   - Mendler, Luettgen, Wu resignations
4. Reduces research output

There is clear evidence for (1), (3) & (4)
(2) is not impossible

How can the problems be solved?

- Teaching laboratory:
  investment in space and computers
- Secretarial support:
  transfer two secretaries
- Student- staff ratio:
  invest to reduce SSR to sensible levels
- Better NSB to support innovative teaching ideas:
  e.g. Robotics lab

How can the (teaching) problems NOT be solved?

- Increased TQA type red-tape; Inventing more forms to fill
- Blaming it on individual academic staff
- Blaming it on students
  - student abilities (when they come in)
  - motivation (when they are here)

Space and Environment

- Inadequate teaching laboratories has direct impact on quality of teaching
- Research space is sufficient for current volume; can only accommodate growth in
  - » HSL site
  - » ICoSS

We are involved in both these

Serious space difficulties

More Research Assistants in Open Plan Offices

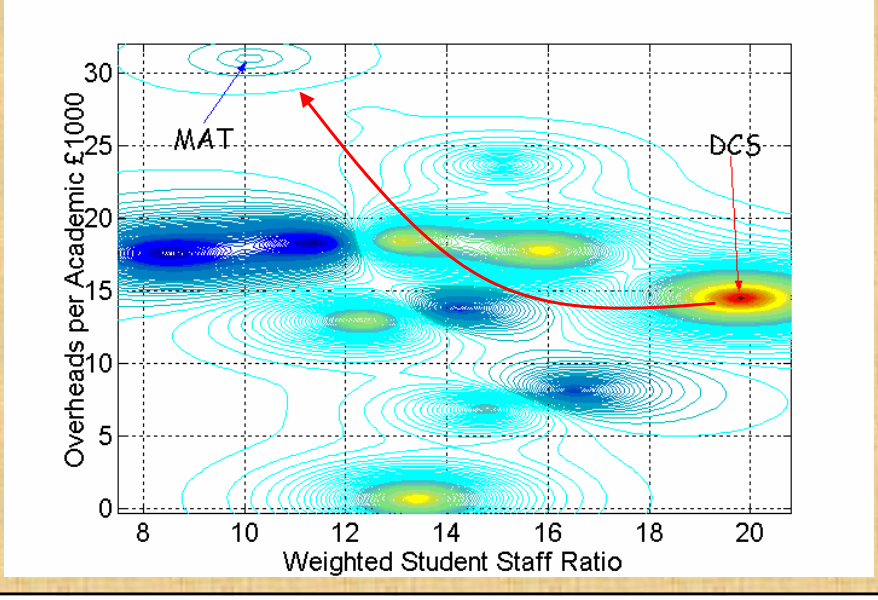
Investment: Laboratory

- URGENT need for Additional Teaching Laboratory
  - Space 250 sq m
  - Equipment 80 good computers, Software & regular upgrades
- Ideas:
  - Commercial activity in Regent Court
  - Build a Dome/Tent over Courtyard
  - Genesis in Innovation Center

Investment: Staffing

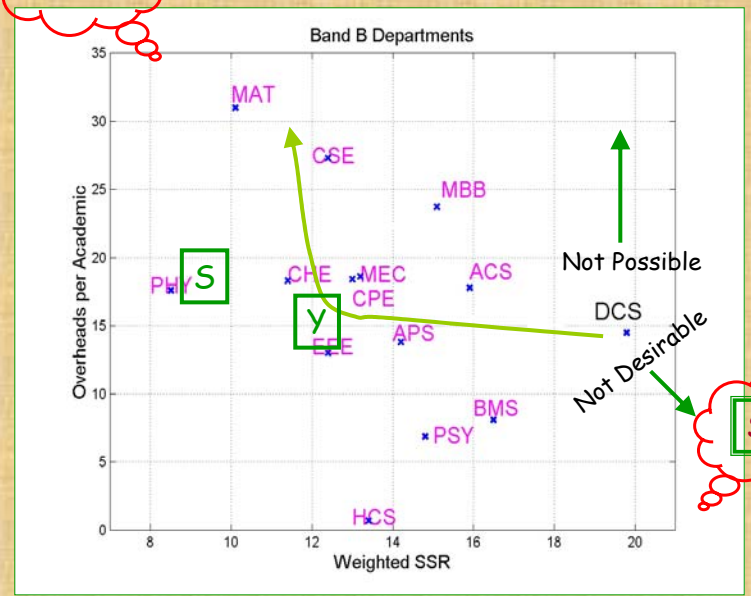
- Permanent Contracts
  - Graham Bates, Stephanie Portier
- Two secretarial posts
- Senior Level
  - Lyn Walker from AT & T Laboratories, New Jersey Done
  - Transfer 80% Rod Smallwood from Medical Physics Done
  - Fabio Ciravegna following Information Studies Chair Interview
- New Blood posts
  - Kalina Bontcheva, Barry Norton, Marta Milo
- Lectureships
  - Distributed Computing, Speech Sciences
- Teaching Assistantships * 3
- Software Engineer in Genesys; Junior technician

How do we come into alignment with University's Mission Statement?



Research Vs Teaching

CUED



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