

MAT 388 2008-09

Creativity, Innovation, Enterprise & Ethics

⇒	W1 - Introduction to the module (Teaching & Learning)	PK	✓
⇒	W1 - The role of the Engineer (Social & Ethical Responsibilities)	PK	✓
⇒	W2 - Creativity, Innovation and Enterprise: (What are they?)	PK	✓
⇒	W2 - Developing New Products	PK	✓
⇒	W3 - Systems thinking and practice (Introduction to)	PK	✓
⇒	W3 - Problem Solving (Methodologies & examples)	PK	✓
⇒	W4 - The Innovation Process	JA	✓
⇒	W4 - Economic explanations of technical change (Case study)	JA	✓
⇒	W5 - Enterprise (Introduction)	PK	✓
⇒	W5 - Business Plan (Develop your own)/ Marketing	PK+DS	✓
⇒	W6 - Business Finance (Introduction & Accounting Basics)	VK	
⇒	W6 - Investment Appraisal (Techniques)	VK	
⇒	W7 - Leadership/Motivation	PK	
⇒	W7 - Conflict and Negotiation	PK	
⇒	W8 - Organizational behaviour (A practitioner's view point)	FD	
⇒	W8 - OB – (Practical example)	FD	
⇒	W9 - Intellectual Property Rights (The facts)	ML	
⇒	W9 - Entrepreneurship, (the real deal)	Roo?	
⇒	W10 - Ethics in Research (Things going wrong)	RH	
⇒	W10 - Ethics in Research (Ethics and Science)	RH	
⇒	W11 - Decision Making (How decisions are made & examples)	PK	
⇒	W11 - Introducing TQM (Philosophy & Methodology)	PK	
⇒	W12 – Innovation & industry (The Corus perspective)	AH	
⇒	W12 - Engineering – a Creative Integrated Profession	PK	
⇒	Case Study Presentations	PK	

The lecturers

PK	Dr. Plato Kapranos – Director of Short Courses (Staff)
JA	Mr. Jonathan Aylen – Head of TIEMPO - Technology, Innovation, Entrepreneurship, Management and Policy, University of Manchester
FD	Dr. Fred Dobson – Business Liaison Consultant (Staff)
RH	Dr. Russell J. Hand – Senior Lecturer (Staff)
AH	Prof. Andy Howe – Visiting Prof. (Corus/Staff)
RG	Prof Bob Gibbs - Executive Director – Research Works Group
ML	Mark Lunt - Harrison Goddard Foote
VK	Vina Khan - Financial Planning and Budgeting Accountant (Staff)
DS	Dan Shore - Business Manager, Royal Bank of Scotland

All lectures 10.00-12.00 Fridays

Module Outcomes:

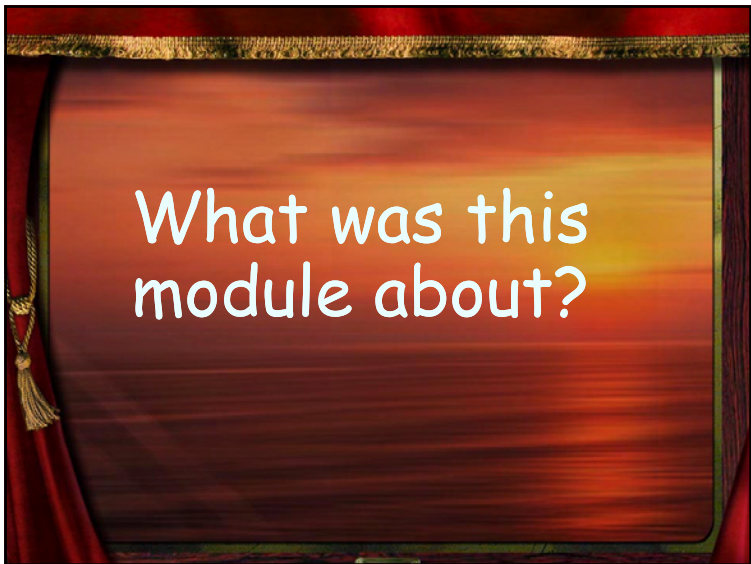
- The module introduces the student to the professions: rights and responsibilities of engineers and scientists, engineers and design, managing risk, the search for optimal balance.
- Introduces the concept of Creativity (theories), the barriers to it and ways to overcome them.
- It sets the foundations of understanding the process of Innovation and discusses how to manage technical innovation.
- This is followed by a general introduction to enterprise; looking at how businesses function, what is entrepreneurship, the start up business team, what is IPR, leadership, business culture (getting it right) and the innovative enterprise: the route from creative ideas to the market place.
- What is a business plan and how to write one?
- Introduction to the marketing management process.
- Introduction to business finance; accounting principles (understanding small business accounts), basics of costing (Different forms of costing, look at absorption and marginal costing methods, understanding and using break-even analysis) and investment appraisal techniques.
- This is followed by an introduction to the economic explanations of technical change, consolidated by examples and a case study.
- A further example of innovation in practice is established by considering in some detail the Corus experience.
- This is followed with further views from practitioners on Organisational behaviour, Leadership and Culture.
- The basics of Total Quality Manufacture (the evolution of quality, what is quality, what is TQM and the costs of quality), Statistical Process Control (SPC) and Six Sigma (what is it, methodology, challenges and pitfalls, examples).
- Project Management.
- Principles and applications of decision making (how decisions are made, insight to managerial decision making, quantitative decision making techniques). Risk.
- Routines for creative problem solving.
- Ethics in research and engineering.
- Examples of ethical conflicts.
- Group case study presentations (Preparing a business plan for a new UK based company).

Module 388

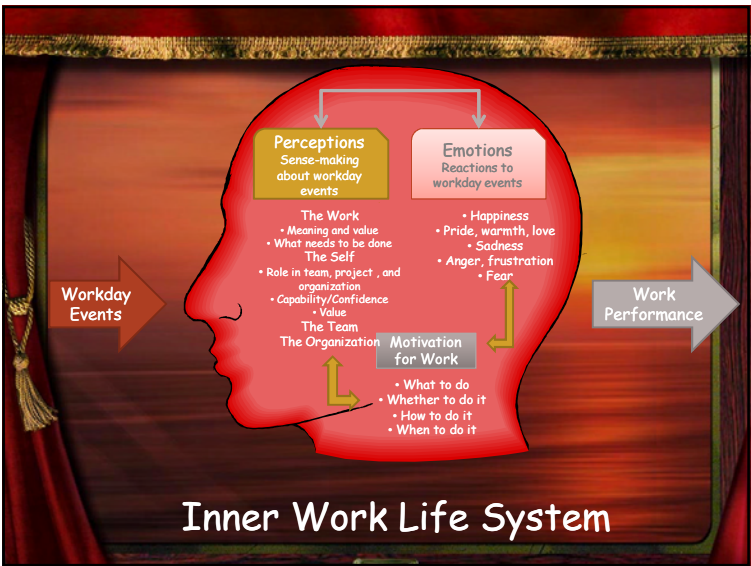
'Bring in it all together'

Plato Kapranos
2008

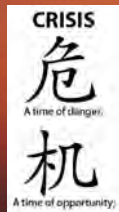
 For University
Of Medical
Sciences



What was this module about?



We talked about Leadership,



Motivation, Conflict,
Negotiation and how decisions
are made.

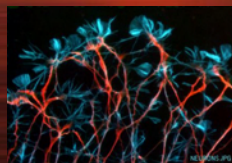
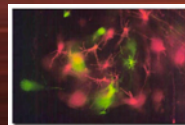
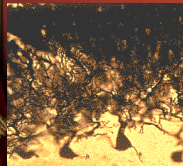


and enterprise

- How organizations operate
- How new products are developed
- How they are marketed
- How new ideas are protected
- How technological developments take place
- How all these operations are financed
- What are the ethics involved



Brain: the most complex thing in the
Universe (Sir Robert Winston)



Mice with the gene for
Huntington's Chorea:
An example of
Nurture trumping Nature?

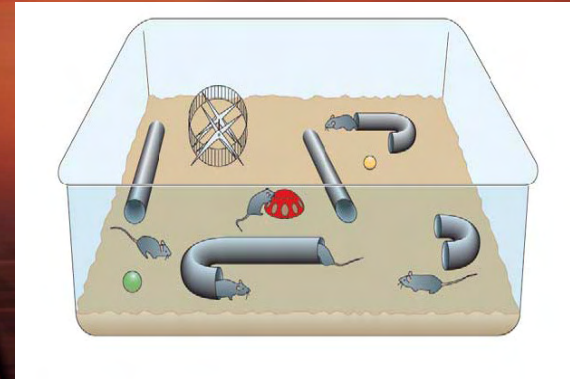
van Dellen, Blakemore, Deacon, York & Hannan 2000, *Nature*

NURTURE CAN TRUMP NATURE



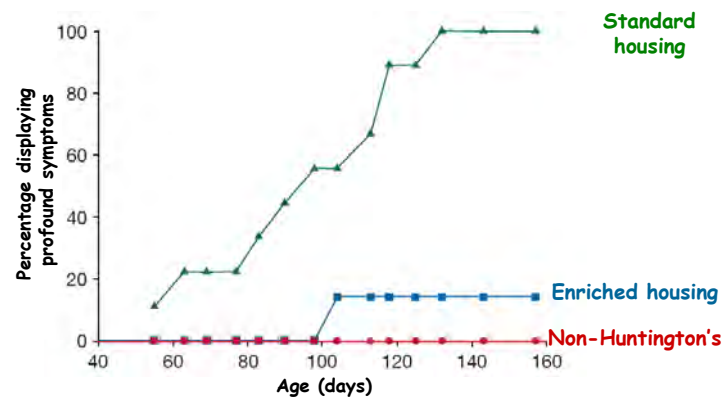
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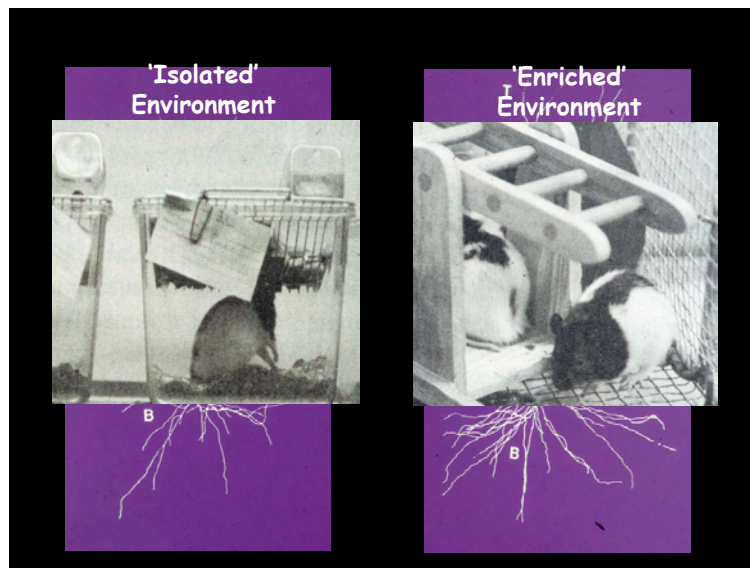
van Dellen, Blakemore, Deacon, York & Hannan 2000, *Nature*

NURTURE CAN TRUMP NATURE



CAUTION!

**THERE IS NO
ONE-TO-ONE RELATION
BETWEEN A SINGLE
GENE AND
A COMPLEX MENTAL
TRAIT!**

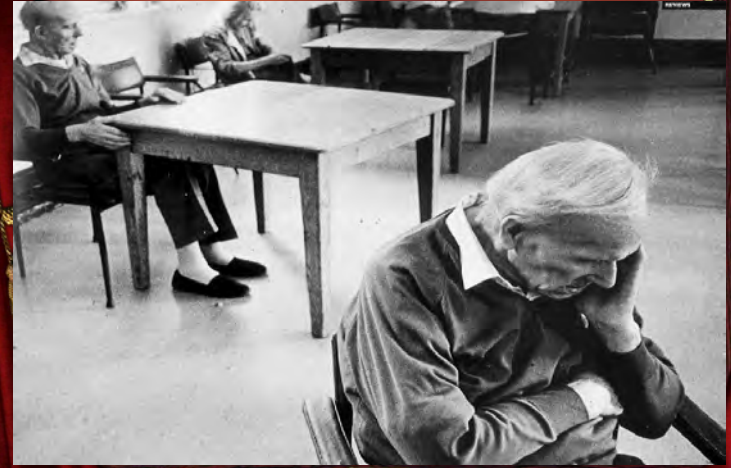


Developing And Losing One's Mind...

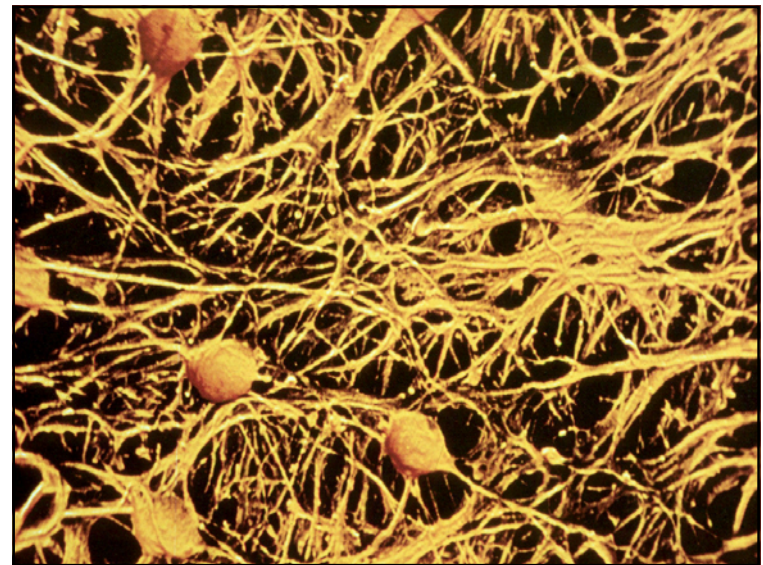


.....Reflected In Brain Cell Connections

Losing your mind (dementia)....



Out of your mind: A booming, buzzing confusion



**THE MIND IS THE
PERSONALISATION OF THE
BRAIN THROUGH UNIQUE
DYNAMIC CONFIGURATIONS
OF NEURONAL
CONNECTIONS, DRIVEN BY
UNIQUE EXPERIENCES**

A shift from SENSORY to COGNITIVE
experience.....

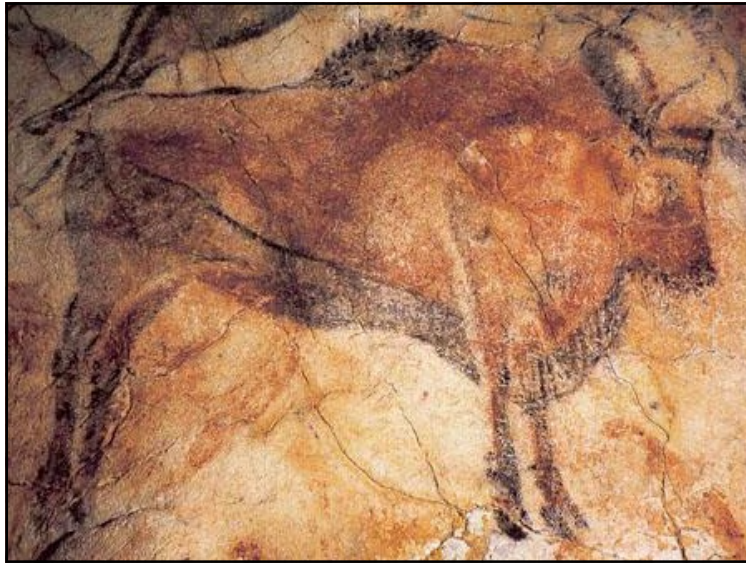
**What is
'HUMAN NATURE'?**

Ubiquitous, irrespective of historical era
or geographical location

Even chimps do not have our brain
capacity for post-natal growth...



'HUMAN NATURE'?
Thinking symbolically.....



Examples of Human Nature

Behaviours that 'stand for'
particular social values and
status in a society

BUT

Although the context will be very
varied, the response is uniform



More Branches,
More Connections,
More 'Understanding'

MORE SIGNIFICANCE!

Examples of Human Nature?

- **Anger:** Inappropriate **aggression** to promote self
- **Greed:** Excessive **feeding** for compensation of self
- **Sloth:** Excessive **sleeping** to escape self
- **Lust:** Inappropriate **copulation** to promote self
- **Vanity:** Inflated view of self relative to others
- **Envy:** Diminished view of self relative to others
- **Avarice:** Accumulation of symbol to promote self

Are you Creative or Analytical?

Our brain has two halves - the right and the left. People using left part of the brain are usually logical and analytical. While those who use the right half of the brain are creative, innovative and imaginative.

Do you want to know whether you are right or left brained?

Try this! Read aloud, as quickly as possible, the colour in which the words are written but not the actual words.

GREEN YELLOW BLUE ORANGE
WHITE RED GREEN BLUE ORANGE
YELLOW WHITE GREEN RED BLUE
WHITE GREEN ORANGE YELLOW
ORANGE BLUE GREEN RED WHITE
YELLOW RED BLUE YELLOW
ORANGE RED WHITE BROWN
WHITE

Effects of mind-sets



1000

40

1000

30

1000

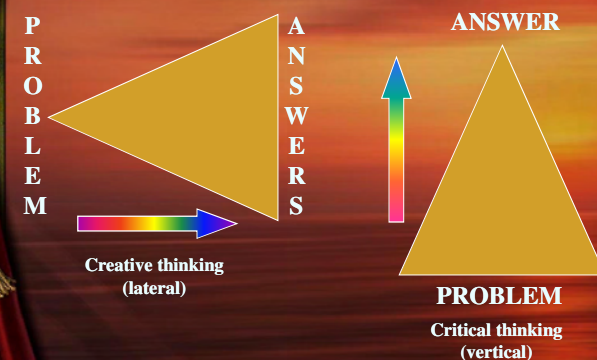
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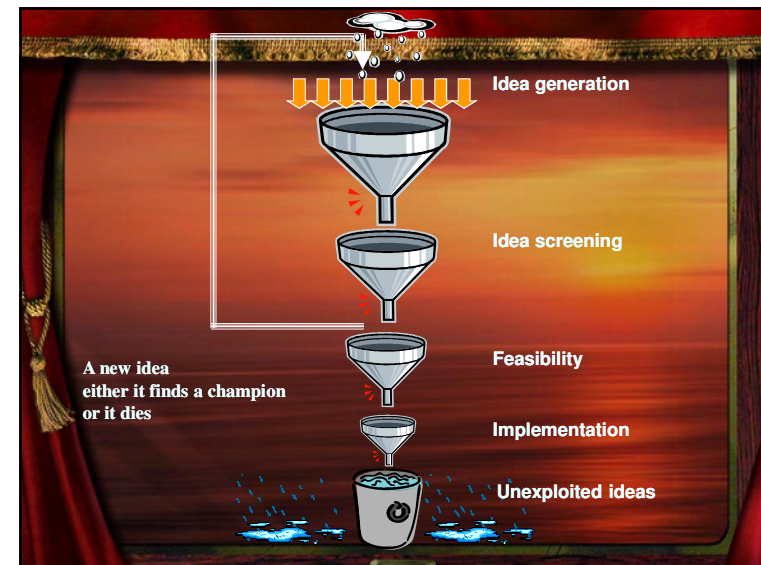
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4100

Critical & Creative Thinking





You

- You're right, hardworking and knowledgeable
- You have the best idea
- You want to be rich
- Tomorrow would be great

Recipe for entrepreneurial success

- Take a great market opportunity
- Apply a brilliant new idea
- Pour in one or more bright, hardworking founders to taste
- Apply large dollops of capital
- Bake in the oven of serendipity for few months and serve in generous slices

The idea

- The idea is important
- It is rarely unique
- Gives differential advantage
- Some barriers to competitors are necessary
- If from University look at licensing as well as spin-out

The people

- Chose your people with care
- Hire slowly
- Fire quickly
- Keep it simple
- Don't work with people you don't like or cannot get along

Venture Capital?

- Give up share of company in return for high risk capital
- Expect multiple rounds; founders end up typically with 7% at exit
- Good VC's add lots of value:
 - Market knowledge
 - Networking
 - Strategy & understanding
- Check that the VC's really, really understand your VISION.

Probable outcome

- Worked hard
- Made fantastic contacts
- Built experience
- Little cash first time
- Learned a lot
- Next time will be better!

The Professional Engineer

Core qualities

- Integrity
- Independence
- Impartiality
- Responsibility
- Competence
- Discretion



Integrity

Truth

Public Trust

Whose Ethics?

- I am all right Jack!

'Malpractice' model



- It's someone else's problem!

'Malpractice' model

- I am OK you're OK!

'Due care' & 'Good works' models



A direction

- Find things that you are dissatisfied with
- What should be but isn't?
- Cynics and complainers are great sources for inspiration
- Imagine a £50 million budget for your current project: how would your goals change?

Exercise

- Name something that is awful
- Name 5 specific reasons why
- Invert into possible ideas



"To know that we know what we know
and that we do not know what we do not know,
that is true knowledge"
Confucius - K'ung Ch'iu - Chinese Philosopher
(circa 551-479 BC)

"Reports that say that something hasn't
happened are always interesting to me,
because as we know, there are known knowns;
there are things we know we know. We also
know there are known unknowns; that is to
say we know there are some things we do not
know. But there are also unknown unknowns -
the ones we don't know we don't know"

Donald Rumsfeld

US Defence Secretary
(circa 21st century)



"I know one thing,
that I know nothing"
Socrates - Greek Philosopher
(circa 469-399 BC)

The search for optimal balance

‘Παν Μετρον Αριστον’



*‘Everything in good
measure is perfection’*

Creativity starts in dreams.....

P. Kapranos

Acknowledgements

Thanks are due to Baroness Susan
Greenfield for permission to use slides 11 -
34 from her recent Firth Lecture at the
University of Sheffield
*‘The future of the brain and the Brain of
the Future’*

The End