Teaching in Higher Education

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Schedule for the Day

- Learning and Teaching Theory
- Quality Assurance Overview
- Modular Systems and Assessment Method
- Programme and Module Design
- Learning and Teaching Case Study
- Review of the Day

Learning and Teaching Theory

Introductions

Teaching Theory – Some Basics

How do people learn?

"Tell me, and I will forget. Show me, and I may remember. Involve me, and I will understand."

Confucius c.450

Teaching Theory – Some Basics

Learning Preference

How do you like to receive information?

VARK

- V - Visual
- A - Aural
- R (&W) - Reading and Writing
- K - Kinesthetic (Doing!)

Teaching Theory – Some Basics

Learning Preference

Exercise 1:

What is your Learning Preference?

Teaching Theory

Learning Preference

Visual People Intake Information by:

- Underlining
- Using highlighters
- Flow Charts
- Graphs
- Pictures

Teaching Theory

Learning Preference

Aural People Intake Information by:

- Attend Lectures
- Attend Tutorials
- Discuss with people
- Remember interesting stories/Jokes

Teaching Theory

Learning Preference

Reading & Writing People Intake Information by:

- Write List
- Write Headings
- Glossaries
- Text books
- Handouts

Teaching Theory

Learning Preference

Kinesthetic People Intake Information by:

- Using all the senses
- Laboratories
- Field Trips
- Example classes
- Hands on sessions

Teaching Theory – Some Basics

Learning Approach

- Surface Learning - rote learning and memorising
- Deep Learning - meaning and understanding
- Strategic Learning - what will get the best mark? (Modular Systems)

Teaching Theory – Some Basics

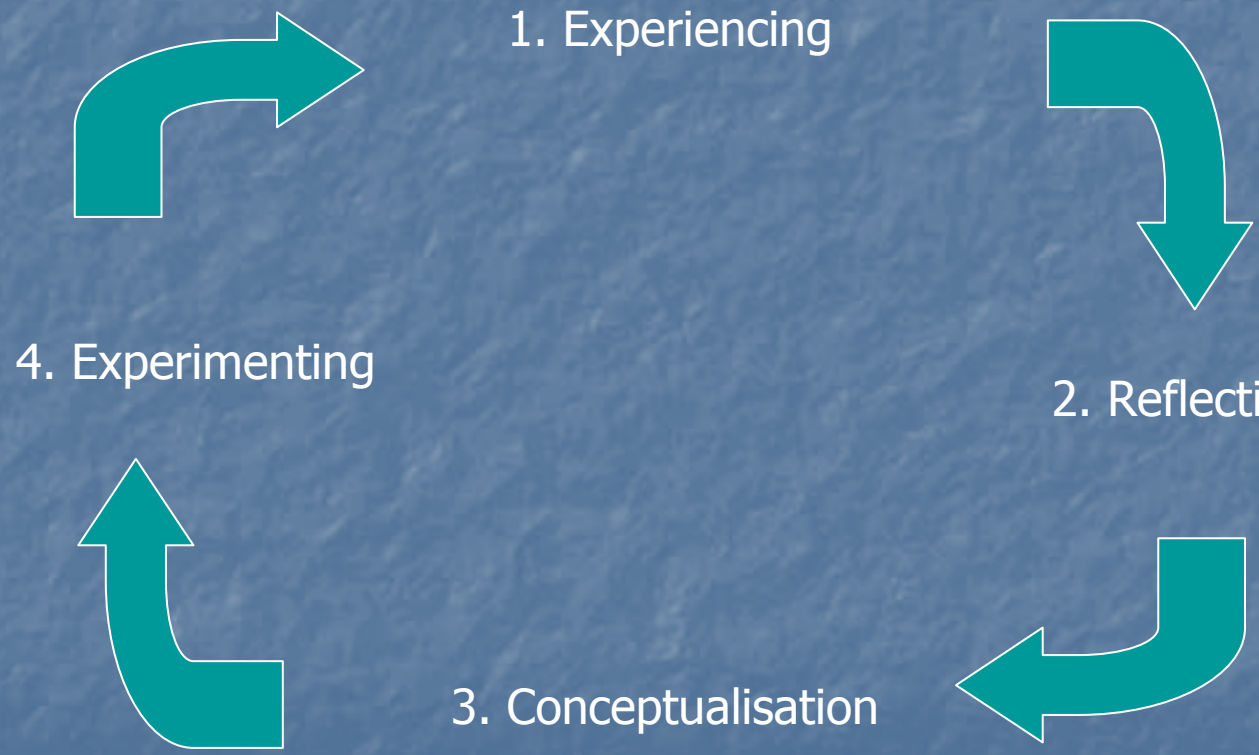
Learning Style

KOLB - experiential learning theory

Honey and Mumford - development of KOLB

Teaching Theory – Some Basics

Experiential learning - Kolb learning cycle



The ‘perfect’ learner would excel at each stage

Teaching Theory – Some Basics

Experiential learning - Kolb learning cycle

Kolb developed the:

Learning Style Inventory LSI

Teaching Theory – Some Basics

Experiential learning - Kolb learning cycle

Exercise 2:

Complete the Learning Style Inventory

Teaching Theory – Some Basics

Experiential learning - Kolb learning cycle

Do different subjects favour certain types of learner?

- People from the arts, tend to be Divergers
- Pure scientists and mathematicians are Assimilators
- Applied scientists and lawyers Convergers
- Teachers, tend be Accommodators

Teaching Theory – Some Basics

Experiential learning - Honey and Mumford

- A development of Kolb
- Defined four styles

- Pragmatists

- Activists

- Reflectors

- Theorists

Teaching Theory – Some Basics

Experiential learning - Honey and Mumford

Exercise 3:

Learning Style Questionnaire

Teaching Theory

SUMMARY

- FACT - People learn in different ways
- SO - Make sure your teaching reflects this

Teaching Theory
In more Depth

‘Learning Styles and Pedagogy in Post-16 Learning – A systematic and Critical Review’

http://www.lsda.org.uk/files/PDF/1543.pdf

Learning and Skills Research Centre

Teaching Theory In more Depth

Models fall in to five main categories:

1. **Learning styles and preferences are largely constitutionally based – VARK**
2. **Learning styles reflect deep seated features of the cognitive structure**
3. **Learning styles are one component of a relatively stable personality type**
4. **Learning styles are flexibly stable learning preferences**
5. **Move on from learning styles to learning approaches, strategies, orientations and conceptions of learning**

Teaching Theory
In more Depth

1. Learning styles and preferences are largely constitutionally based

(It's in the Genes!)

e.g. Dunn and Dunn

'Three-fifths of style is biologically imposed'

Four main strands:
- Environmental and Physical elements are fixed
- Emotional and Sociological factors are more open to change

Teaching Theory In more Depth

2. Learning styles reflect deep seated features of the cognitive structure

e.g. Riding

Cognitive style – 'The way the individual thinks'

'Strategies may vary from time to time, and may be learned and developed. Styles by contrast are static and are realtively in-built features of the individual'

http://www.learningandtrainingtechnology.com/

Teaching Theory
In more Depth

3. Learning styles are one component of a relatively stable personality type

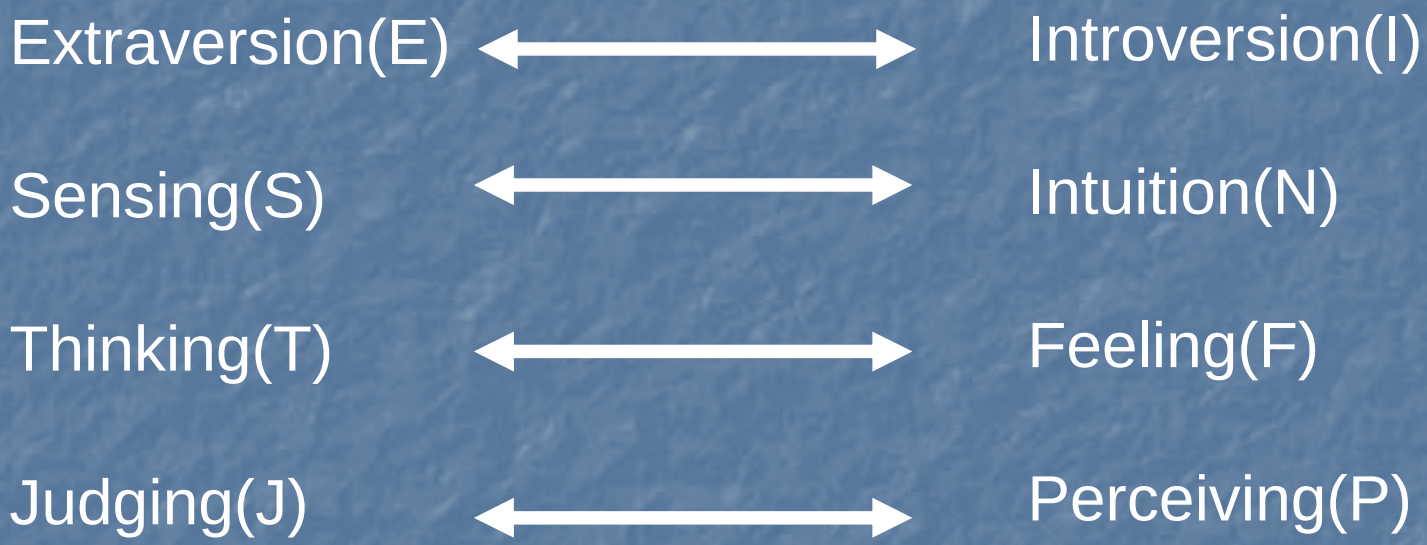
e.g. The Myers-Briggs Type Indicator (MBTI)

‘Learning Styles is one part of the observable expression of a relatively stable personality type’

Rooted in the work of Jung

Teaching Theory
In more Depth

MBTI



Individual characterised by letter combinations e.g. ENFJ, ISFP etc.

http://www.humanmetrics.com/cgi-win/JTypes2.asp

Teaching Theory
In more Depth

4. Learning styles are flexibly stable learning preferences

e.g. Kolb

‘A learning style is not a fixed trait but a differential preference for learning, which changes slightly from situation to situation. At the same time there is some long term stability in learning style’

Teaching Theory In more Depth

5. Move on from learning styles to learning approaches, strategies, orientations and conceptions of learning

e.g. Sternburg

An ability is how well someone can do something
A style is how someone likes to do something

Based on Sternburg's theory of mental-self government

The systems of government we have in the world are not arbitrary but are mirrors of our minds

What's the use of Lectures?

A book by Donald Bligh

The Lecture - A period of more or less uninterrupted talk from a 'teacher'

What’s the use of Lectures?

Opinions of what may be achieved by lectures:

1. The acquisition of information
2. The promotion of thought
3. Changes in attitudes

What the evidence demonstrates:

1. The lecture is as effective as other methods for transmitting information, but not better
2. Most lectures are not as effective as active methods for the promotion of thought
3. Changing students' attitudes should not normally be the major aim of a lecture

What Factors go into the preparation of a lecture?

The Content

The easy bit!
Content available everywhere - books/internet etc.

So what's the point of the lecture?

The Learning

What are you going to do that will lead to the students learning something?

The Learning

Overview

What factors affect the acquisition of information?

Memory

Attention

The Learning

Exercise:

Split in to two groups

A and B

What Factors Affect the Acquisition of Information?

Factors causing forgetting

EVERYBODY Look at the following slide for 30 seconds

What Factors Affect the Acquisition of Information?

Factors causing forgetting

Group A - On your own write down as many objects as you can remember

Group B - Relax! Do nothing

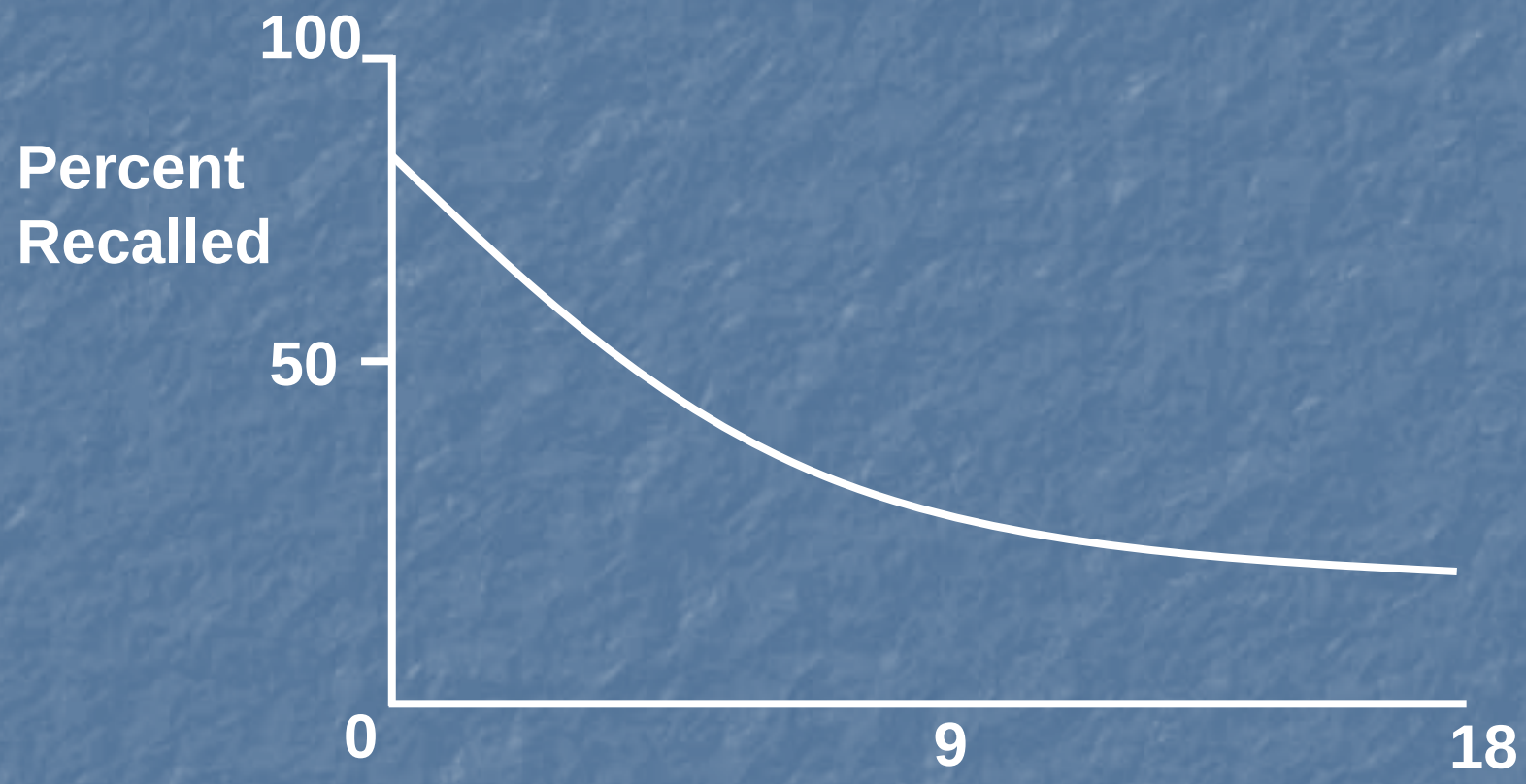
What Factors Affect the Acquisition of Information?

Factors causing forgetting

1. ‘Trace-decay’
2. Retroactive and proactive interference
3. Amount of information

Factors causing forgetting

1. Trace Decay

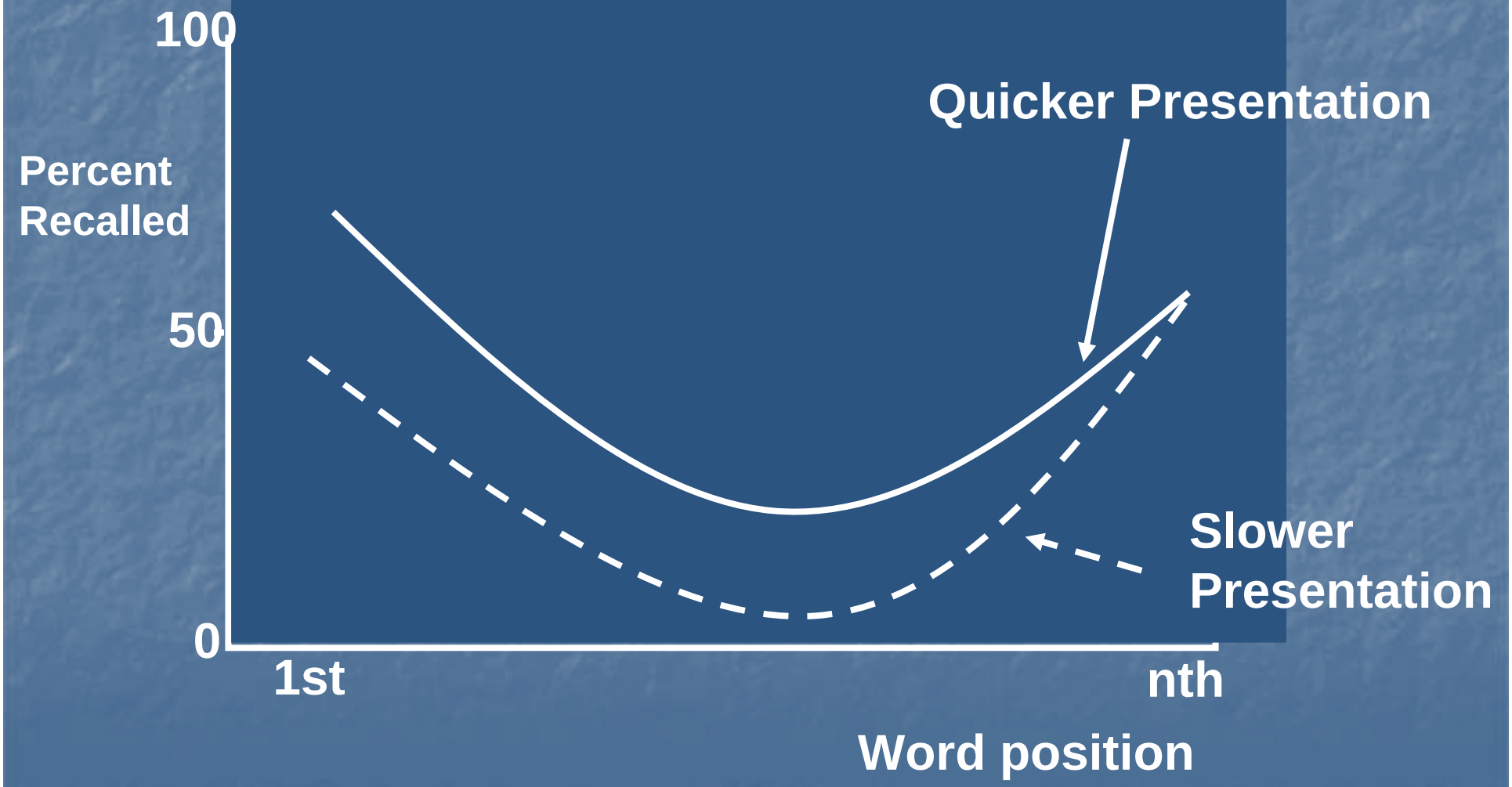


Based on three letter nonsense syllables

Factors causing forgetting

2. Retroactive and proactive interference

Memory of the first and last is better than memory of the middle



Factors causing forgetting

Group A - Relax!

Group B - Write down as many objects as you can remember

How many did you get right?

Factors causing forgetting

3. Amount of Information

There is a theory about how many pieces of information you can hold in your short term memory.

The average number of items that an individual can hold in their short term memory is

7 ± 2

What Factors Affect the Acquisition of Information?

Factors aiding Memory

1. Meaningfulness
2. Whole or part
3. Organisation
4. Rehearsal
5. Repetition
6. Feedback
7. Arousal
8. Transfer of learning

Factors aiding Memory

1. Meaningfulness

Look at the following list

pfj	ih
qb	H
ldd	ue
xv	Pw
ew	aGP
B	Lk

Factors aiding Memory

EVERYBODY on your own write down what you can remember

Look at this next list

mol	kg
cm	N
MPa	A/m
cd	Nm
nm	GPa
K	km

Factors aiding Memory

EVERYBODY on your own write down what you can remember

How many did you get right?

List one – random letters

pfj	ih
qb	H
ldd	ue
xv	Pw
ew	aGP
B	Lk

List two – meaningful letters

mol	kg
cm	N
MPa	A/m
cd	Nm
nm	GPa
K	km

Factors aiding Memory

Meaningfulness

- **If you build on existing knowledge the new material is easier to remember**
- **In lecturing find the students level and work from that**
- **If you don’t you’re wasting your time and theirs!**

Factors aiding Memory

2. Whole or Part Learning

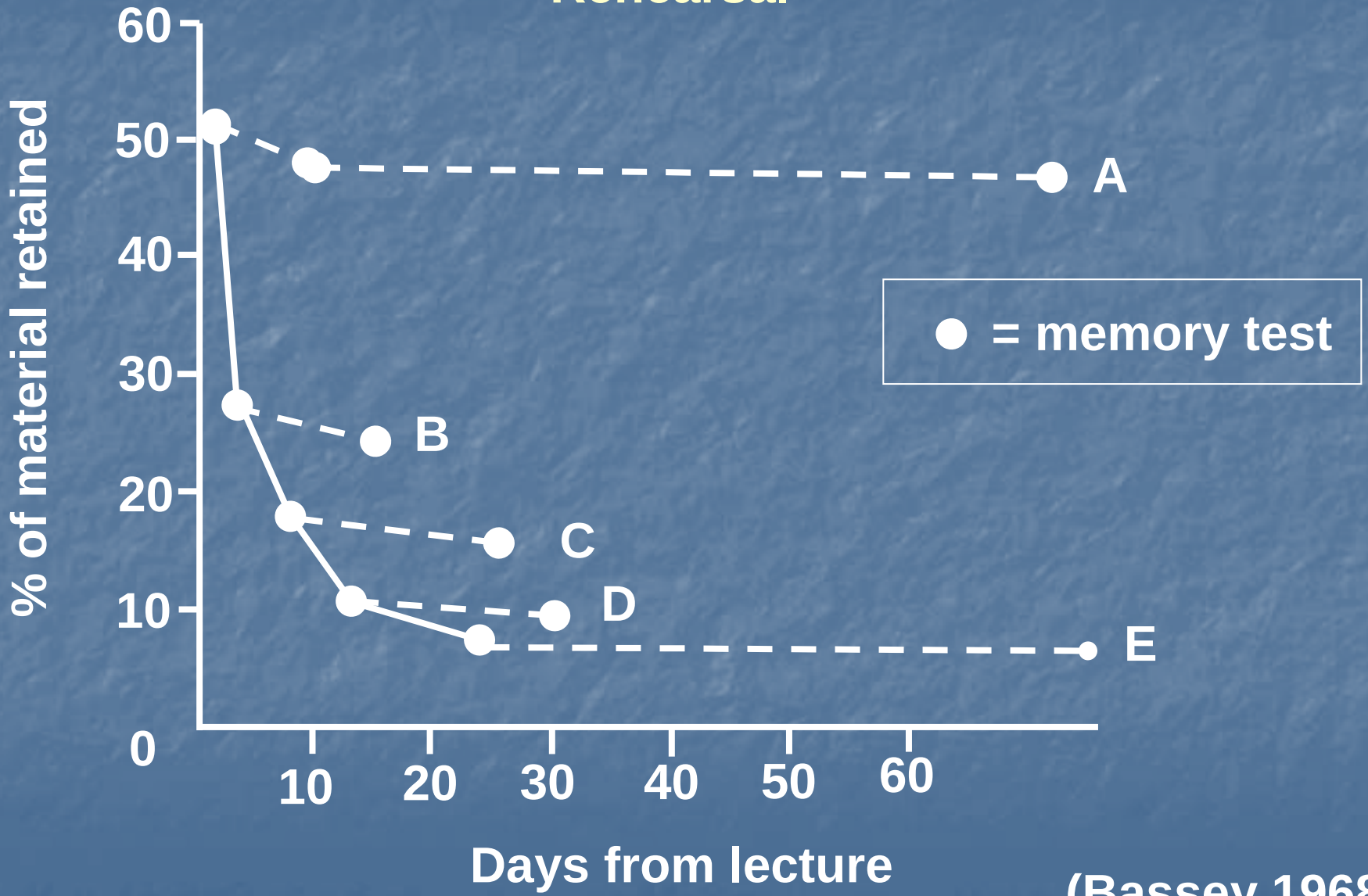
Arguable what is best

3. Organisation

If it is organised it is easier to understand

Factors aiding Memory

Rehearsal



(Bassey 1968)

Factors aiding Memory

4. Rehearsal

Do it in the lecture and your lecture is more likely to be remembered

Pause, review, add mini-tests

Basically - do something and then in some way ‘practice’ it

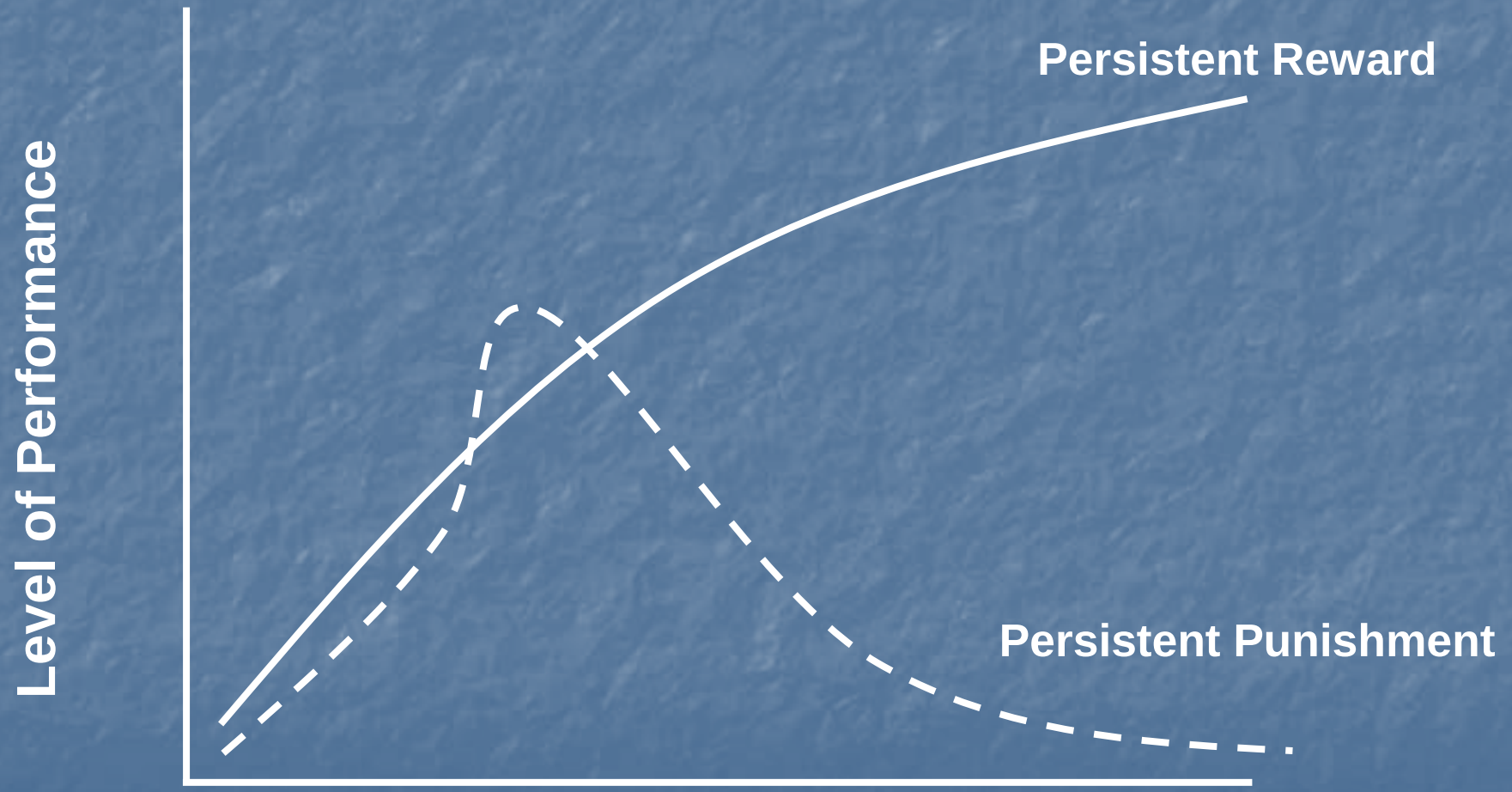
Factors aiding Memory

5. Repetition

Self - explanatory! Say it more than once!

Factors aiding Memory

6. Feedback



Factors aiding Memory

7. Arousal - Obviously if people are awake they can learn better!

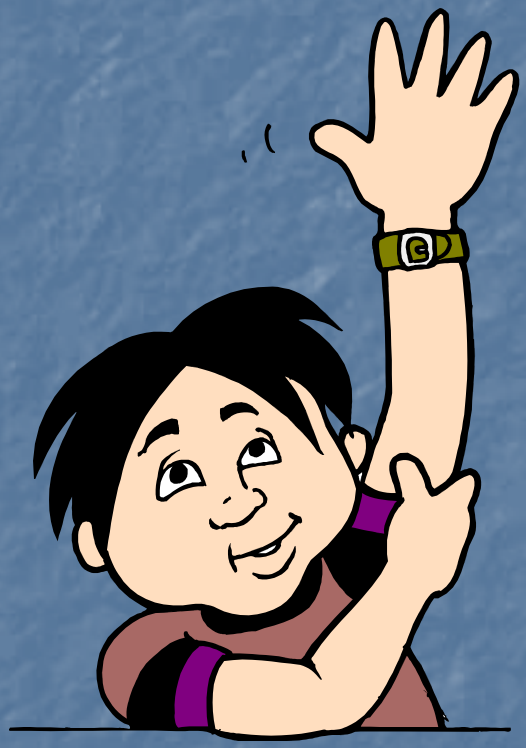
8. Transfer of Learning - Something is easier to learn if it is similar to something previous

Factors aiding Memory - Summary

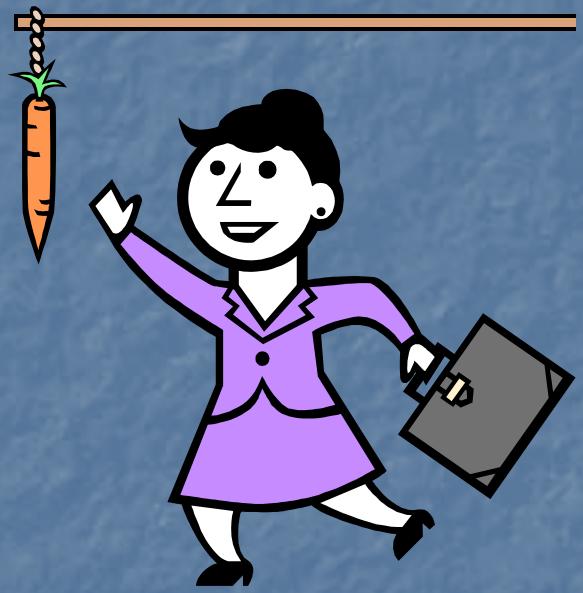
1. Meaningfulness
2. Whole or part
3. Organisation
4. Rehearsal
5. Repetition
6. Feedback
7. Arousal
8. Transfer of learning

What factors affect student attention?

Arousal and Motivation

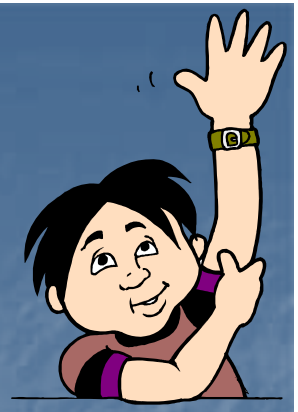


Arousal

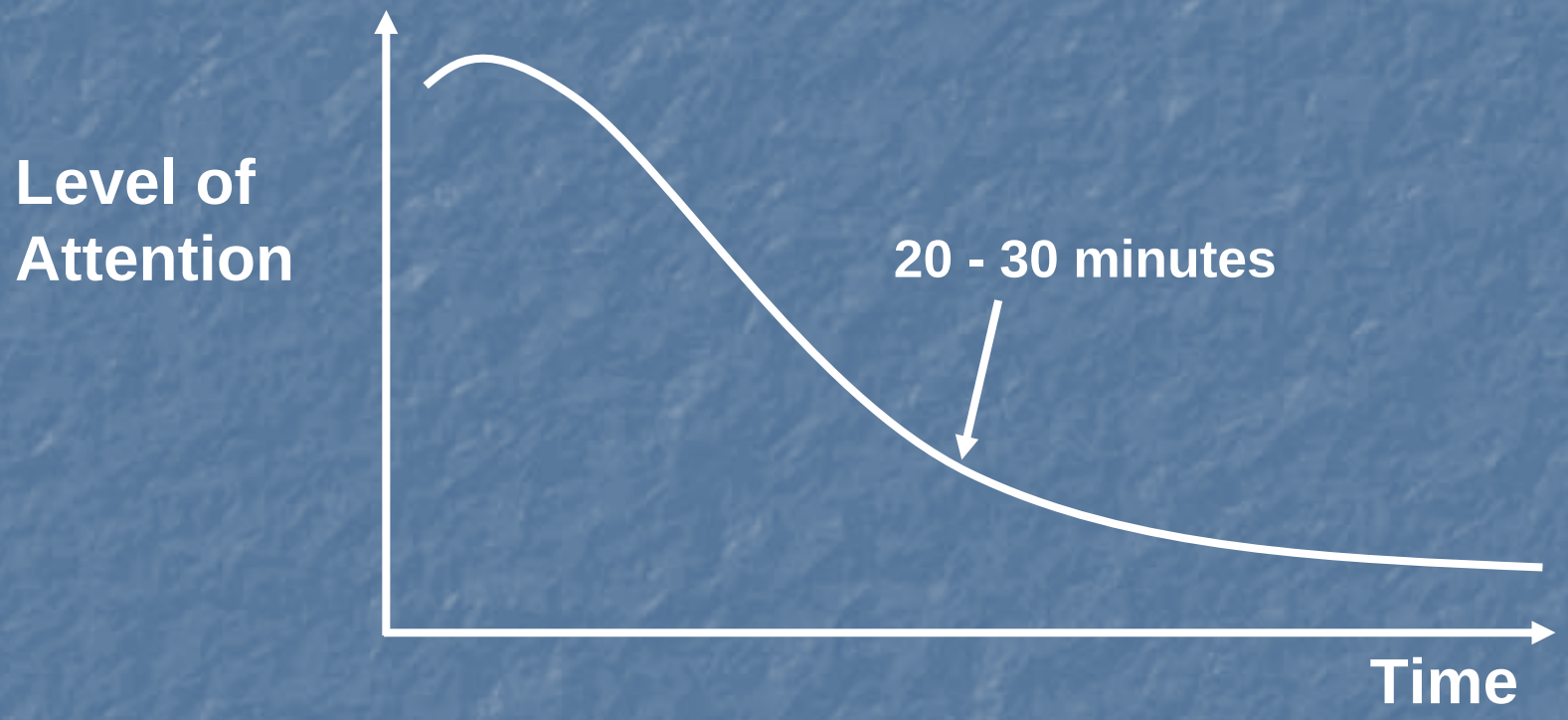


Motivation

The effects of arousal



The fall in attention span for a single task over a period of time



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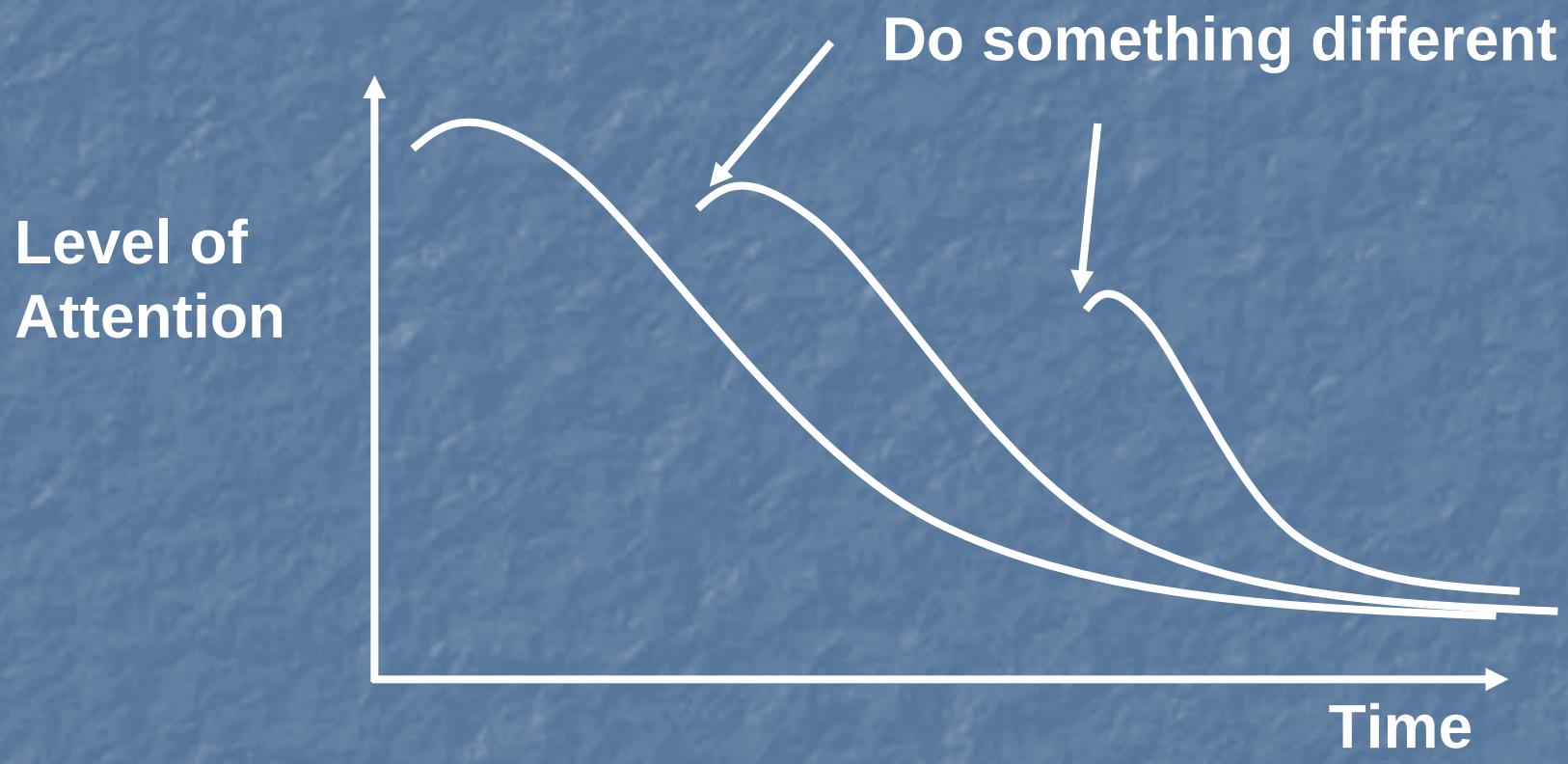


Change things and you should be able to stop the slide!

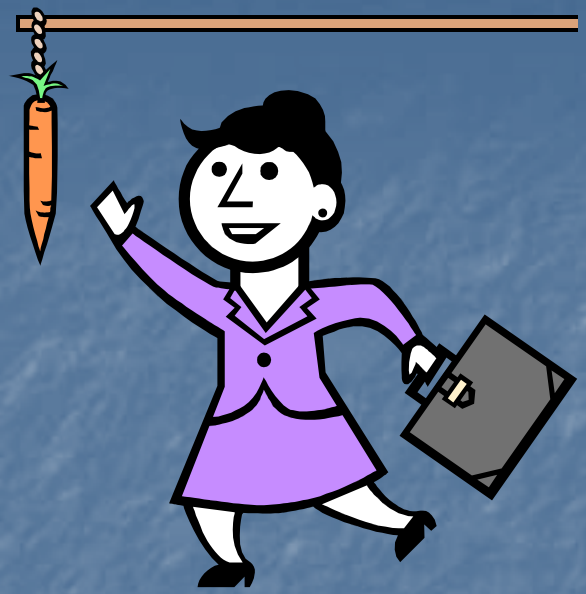
Arousal

Factors affecting student arousal

Variations in the learning situation

1. **Auditory stimulation - Different speakers (students, audio)**
2. **Visual illustrations - Endless options nowadays (Video, clip-art, diagrams, animated graphs etc.)**
3. **Postural position - e.g. group exercise**
4. **Novel stimulation - try something different!**
5. **Intensity of stimulation - e.g. lower or higher the voice**

+ students' work/rest regime and physical environment



Motivation

'...measures of motivation correlated more highly with achievement [ ] than measures of intelligence or social background' [1]

'...achievement is only related to intelligence when the teaching is bad' [2]

1 Bligh on Himmelweit and Swift
2 Bligh on Stolurow

Motivation

Common motivations of students:

- **Relevance**
- **Curiosity - Ask questions rather than give facts**
- **Enthusiasm from the lecturer**
- **The need for social interaction**
- **Achievement and fear**
- **Activity and esteem**

Assessment Method

- Designing Assessments
- Marking Assessments

Designing Assessments

- All assessment must be designed to address the learning outcomes specified in the module
- You don’t assess it if it is not a learning outcome!

Designing Assessments

Table of Specifications sometimes appended to module forms

Learning Outcome

Assessment	A1	A2	A3	B1	B2
1	●		●		
2		●			●
3	●			●	
4		●	●		

Designing Assessments

- Formative assessment is used to inform the student or teacher of progress in a given area. It does not contribute to a final module mark
- Summative assessment is marked and contributes to the module mark.

Assessment Options

List them!

Group Project

oral exam (Viva!)

Essays

Visit Report

Open Book Exam

Laboratory Write Up

Example Sheet

Short essays

Multiple Choice

Exam

Long essays

Assessment Options

- Why use any particular method?
- What are you assessing? - The ability to learn facts or the ability to apply knowledge? A practical skill or creativity?
- What are you not assessing in terms of subject coverage?
- Will your chosen assessment method achieve what you want it to?

The pros and cons of two methods

- multiple choice or essay?

Multiple Choice Pros

- Can measure knowledge and comprehension
- A large number of questions means a lot of material can be covered
- Easy to mark as questions are either right or wrong

Multiple Choice cons

- Can not measure higher order ability like writing
- Questioning tends to be possible only at a fairly superficial level
- Writing good questions is not that easy!
- Students can guess answers
- Encourages surface learning in students

Essay questions pros

- Can assess ability to analyse, synthesis and evaluate
- Can give the opportunity for a more detailed look at a topic
- Easier to write essay questions than multiple choice
- Encourages deep learning in students

Essay questions cons

- Small number of questions limits the amount of topic coverage
- Marking will always be in some way subjective
- Marking is manual and time consuming, can’t be automated

Essay Mark Schemes

- Much more difficult!
- Look at the 'Typical Essay Marking Scheme' in the handout book

Assessment - Other Issues

- Double marking
- Blind marking
- Do you show students mark schemes?
- Do you show students exam papers?
- Do you show students their individual marks or just the degree class?
- How do you cope with student illness? Give them marks based on work to date?

Marking Assessments

- Degree awarding systems
  - how many credits need to be passed in order to get the degree
  - see Leeds example flow chart for 'the Relationship between Ordinary & Honours Degree Requirements'
  - also 'Rules for Award' based on standardised scale marking (e.g. 20-90, not 0-100) & pass level for different degrees

Quality Assurance Overview

The Presentation will Cover 2 areas:

- Quality Assurance at the National Level (The Quality Assurance Agency)
- Quality Assurance Locally (i.e. at the University)

Quality Assurance Overview

The quality assurance agency oversee the quality of Higher Education in the UK.

www.qaa.ac.uk

Quality Assurance Overview

- Established in 1997
- Independent body funded by subscriptions from UK universities and colleges of higher education, and through contracts with the main UK higher education funding bodies (HEFCE and RC).
- The mission: to safeguard the public interest in sound standards of higher education qualifications and to encourage continuous improvement in the management of the quality of higher education.

www.qaa.ac.uk

Quality Assurance Overview

The process:

- Quality standards are agreed and published
- Institutions are reviewed (audited) periodically against the agreed standards
- The Institutional Audits are published

Quality Assurance Overview

The standards are encapsulated in a number of documents
The three key groups of documents are:

- Code of Practice for the Assurance of Academic Quality and standards in higher education - How to do it
- Framework for Qualifications - What is the general standard?
- Benchmarks - What does it mean in each subject?

Quality Assurance Overview

- Code of Practice for the Assurance of Academic Quality and standards in higher education

1. Postgraduate Research Programmes
2. Collaborative provision and flexible and distributed learning (including e-learning)
3. Students with disabilities
4. External examining
5. Academic appeals and student complaints on academic matters
6. Assessment of students
7. Programme approval, monitoring and review
8. Career education, information and guidance
9. Placement learning
10. Recruitment and admissions

Quality Assurance Overview

Example: Code of Practice for Postgraduate Research Programmes

Quality Assurance Overview

Framework for Qualifications

The frameworks for higher education qualifications describe the achievement represented by higher education qualifications

Quality Assurance Overview

The main purposes of the framework are:

- to enable employers, schools, parents, prospective students and others to understand the achievements and attributes represented by the main qualification titles;

- to maintain international comparability of standards, especially in the European context, to ensure international competitiveness, and to facilitate student and graduate mobility;

Quality Assurance Overview

- to assist learners to identify potential progression routes, particularly in the context of lifelong learning;

- to assist higher education institutions, their external examiners, and the Agency's reviewers, by providing important points of reference for setting and assessing standards.

Quality Assurance Overview

The framework has 5 levels:

1. Certificate - C Level - Certificate of Higher Education
2. Intermediate - I Level - Foundation degrees, ordinary (Bachelors) degrees, Diplomas of Higher Education and other higher diplomas
3. Honours - H Level - Bachelors degrees with Honours, Graduate Certificates and Graduate Diplomas
4. Masters - M Level - Masters degrees, Postgraduate Certificates and Postgraduate Diplomas
5. Doctoral - D Level - Doctorates

Quality Assurance Overview

Example Framework Statement:

Descriptor for a qualification at honours degree level

Quality Assurance Overview

Subject Benchmark Statements

- Set out expectations about standards of degrees in a range of subject areas;
- Describe what gives a discipline its coherence and identity;
- Define what can be expected of a graduate in terms of the techniques and skills needed to develop understanding in the subject.

Quality Assurance Overview

Example subject benchmark statements:

- Chemistry
- Physics

Quality Assurance Overview

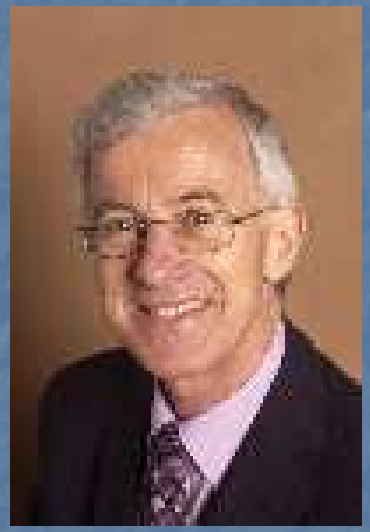
Other documents -

- Programme specifications
- Progress files
- Accreditation of prior learning

Quality Assurance Overview

Local Picture - University of Manchester

The Man at the Top!



Professor B[illegible]
Vice-Presid[illegible]aching and Learning

Retired

President Alan Gilbert is currently reviewing all teaching and learning policy and will report in early 2008

Quality Assurance Overview

Local Picture - University of Manchester

Our governing document:

The Manual of Academic Procedures (MAP)

http://www.campus.manchester.ac.uk/tlao/map/documents

1. **Student Support and Development**
2. **Teaching, Learning and Assessment**
3. **Approval, Monitoring and Review of Educational Provision**
4. **Collaborations and Partnerships**
5. **Review of Standards and Procedures**
6. **Useful Resources**

Quality Assurance Overview

Local Picture - University of Manchester

At University Level

Teaching, Learning and Assessment Office

- Covers academic quality
- Curriculum development
- Innovation and distributed learning

Quality Assurance Overview

Local Picture - University of Manchester

At Faculty Level

EPS - Dean of Teaching and Learning

Teaching and Learning Committee

At School Level

A member of Staff will be responsible for Learning and Teaching

+ Members of Staff will be responsible for individual programmes and modules

Modular Systems and Credit Rating

- Defined by another document!
- 'Credit and HE Qualifications' - Credit Guidelines for HE Qualifications in England Wales and Northern Ireland
- http://nicats.ac.uk/doc/prop_guidelines.pdf

Modular Systems - Issues

- Portability
- Widening Access
- Bologna Agreement and movement of people around Europe

Modular Systems - Put Simply

- Programmes are organised into discrete ‘chunks’ of material on a given topic
- The ‘chunk’ is called a module
- Each ‘module’ is given a credit value
- Pass the module and you are awarded the credit
- Collect enough credit and you get the qualification

Modular Systems - Definitions CREDIT

A quantified means of expressing equivalence of learning. Credit is awarded to a learner in recognition of the verified achievement of designated learning outcomes at a specified level

Modular Systems - Definitions CREDIT

- Credit provides a means of quantifying learning achievements, achievable in notional learning hours at a given level.
- One credit equates to 10 notional hours of successful learning activity.
- Notwithstanding the link between credit and notional learning time, the emphasis of assessment should be upon learning achieved and not time served.
- Credit is awarded for the achievement of specified learning outcomes. No additional credit can be awarded for achievement above the threshold level (although such achievement can be recognised through the award of marks or grades).

Modular Systems - Definitions NOTIONAL LEARNING TIME

The number of hours which it is expected a learner (at a particular level) will spend, on average, to achieve the specified learning outcomes at that level.

Modular Systems - Definitions CREDIT LEVEL/DESCRIPTOR

- Credit Level - An indicator of the relative demand complexity and depth of learning and of learner autonomy.
- Credit Level Descriptor - A statement which describes the characteristics of learning demand which the learner will encounter at each credit level.

Modular Systems - Definitions LEARNING OUTCOMES

- Statements of what a learner is expected to know, understand and/or be able to demonstrate after completion of a process of learning

Modular Systems - Definitions ASSESSMENT CRITERIA

- Descriptions of what the learner is expected to do, in order to demonstrate that a learning outcome has been achieved

Modular Systems - Definitions MODULE

- A self contained, formally structured learning experience with a coherent and explicit set of learning outcomes and assessment criteria

Modular Systems - Minimum Credit Values

The Recommended Minimum Credit Values of Postgraduate and Graduate Qualifications

Modular Systems - Positives

- Credits obtained at one University can have value and meaning at another University
- Students know the standards expected of them and the learning outcomes of a module/programme thus improving their ability to make the correct degree choice and career decisions
- Modular systems make it easier to learn on a part-time basis or over a number of years
- Modular systems allow for more flexible and tailored degree programmes

Modular Systems - Issues

- With a credit transfer policy a 10 credit module passed at the University of Oxford/Cambridge is of the same value as a 10 credit module passed at any other University in Europe
- Typically students only have to pass 300 of 360 credits of an undergraduate programme i.e. they can avoid topics
- Students only interested in activity that contributes to getting credit rather than trying to understand the whole subject area
- Any more?

Modular Systems - Issues

- Any comments?

Programme Specification

- Advice in this area is contained in the following documents:-
- Code of Practice Section 7: Programme approval, monitoring and review*
- Guidelines for Preparing Programme Specifications**

*http://www.qaa.ac.uk/academicinfrastructure/codeOfPractice/default.asp

**http://www.qaa.ac.uk/academicinfrastructure/programSpec/progspec0600.pdf

Other Issues to Consider?

- What is your market? HE is becoming increasingly commercial
- What will your programme cost? laboratory/Project work has great educational value but it is expensive
- What are the limitations in subject coverage your staff can teach?
- What are the teaching load implications?
- How do you cater for different learning preferences/approaches/styles?
- What is your admissions policy?

Exercise - Working through the process

- Write a programme specification for a BSc. in Rocket Science

What Do You Need to Teach

- Subject content?

Electives - Languages

Mechanical Engineering

Physics

Material Science

Chemistry

Astronomy

Explosives

Computer guidance systems

Mathematics

Medical effects on the body

How should the subject matter be ordered? The Programme Structure

- At what level should each topic come?
  - 1st -
  - 2nd - or
  - 3rd Year?

- **Remember the level descriptors for credit rating**
- **Remember the Benchmark Statements**

The structure of the programme

- Module titles?
- How many lectures per module?
- Project work?
- Short/Fat modules?
- Long/Thin modules?
- Lots of course work/few exams?
- Little course work/many exams?
- 10 credit module/20/30 credit modules

The aim of the programme?

- What is it!?

What are the intended learning outcomes?

- Write some

How will you assess the learning outcomes have been achieved?

- Assessment methods?

What resources will you need?

- Laboratory space
- Cost of any materials for projects
- Staff costs - lecturers/demonstrators

Module Specification

- Repeat process for each module in your programme!

Committee Procedures

- Don’t forget your programme and modules need approval at School/Faculty level
- Find out the dates when committees consider such programme approvals

Teaching Practice - Case Study

A Day in the life - A typical teaching schedule for a new academic

Teaching Practice - Case Study

Module co-ordinator:

MATS 1500 - First year laboratory module
MATS 2500 - Second year laboratory module
MATS 3500 - Masters laboratory module
MATS 1100 - First year Engineering Mathematics
MATS 2210 - Second year Engineering Mathematics

Additional:

Final year project
Tutor Group

Teaching Practice - Case Study

Programme Manager

CertHE - Engineering Materials Technology
BSc. - Engineering Materials Technology
MSc. - Ceramics Science and Engineering

Teaching Practice - Case Study

Jobs:

As module co-ordinator - to collect student feedback and write annual module review
As Programme manager - to collate module reviews and write biennial programme review

Teaching Practice - Case Study

The weekly schedule:

Monday - Lecture Engineering Maths: 10:00 - 11:00
Tuesday - Laboratory Class MATS 2500:
Session A 10:00 - 12:00 Session B 14:00 - 16:00
Wednesday - Problem Class Engineering Maths
11:00 - 12:00
Thursday - No teaching!!!
Friday - Laboratory Class MATS 1500:
Session A 10:00 - 12:00 Session B 14:00 - 16:00

Teaching Practice - Case Study

Setting up the Module:

- Write module specification for each module
  - MATHS
- Write handouts for each lecture (11 per module)
- Write problem classes (22 per module)
- Write answers to problems (22 per module)
- Write 5 Assessed Course Work sheets
- Write example and real exam paper
- Write exam marking scheme

Teaching Practice - Case Study

Setting up the Module:

Laboratories:

Collate all laboratory scripts from academics
Manage Technical Staff
Manage Demonstrators
Check equipment

Teaching Practice - Case Study

Marking:

Maths ~ 100 ACW every two weeks and 150 exam papers in January and June
Laboratories ~ 60 scripts per week

Teaching Practice - Case Study

SUMMARY

Be careful what you agree to!