

# Enquiry and Creativity: Tools of the Trade

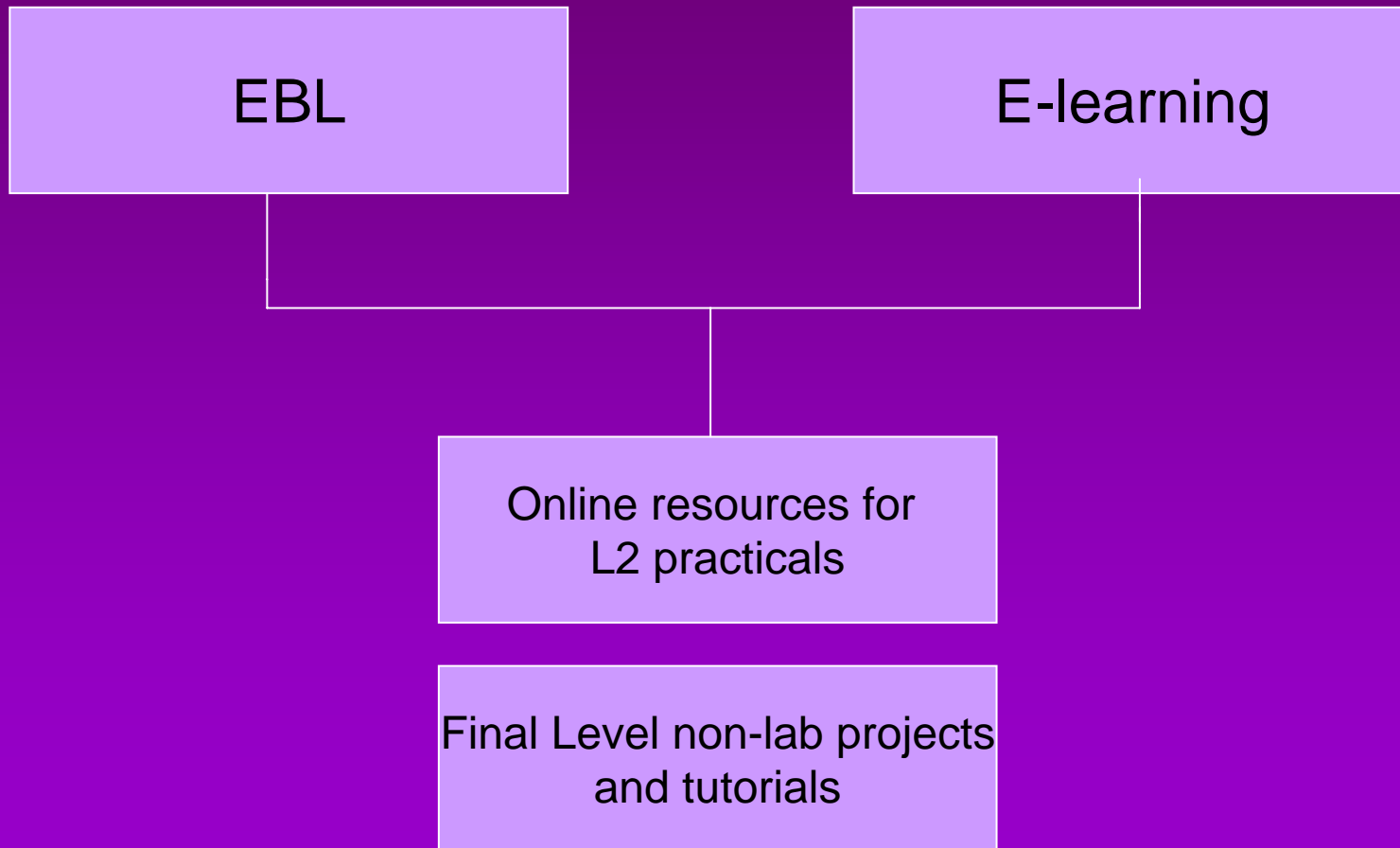
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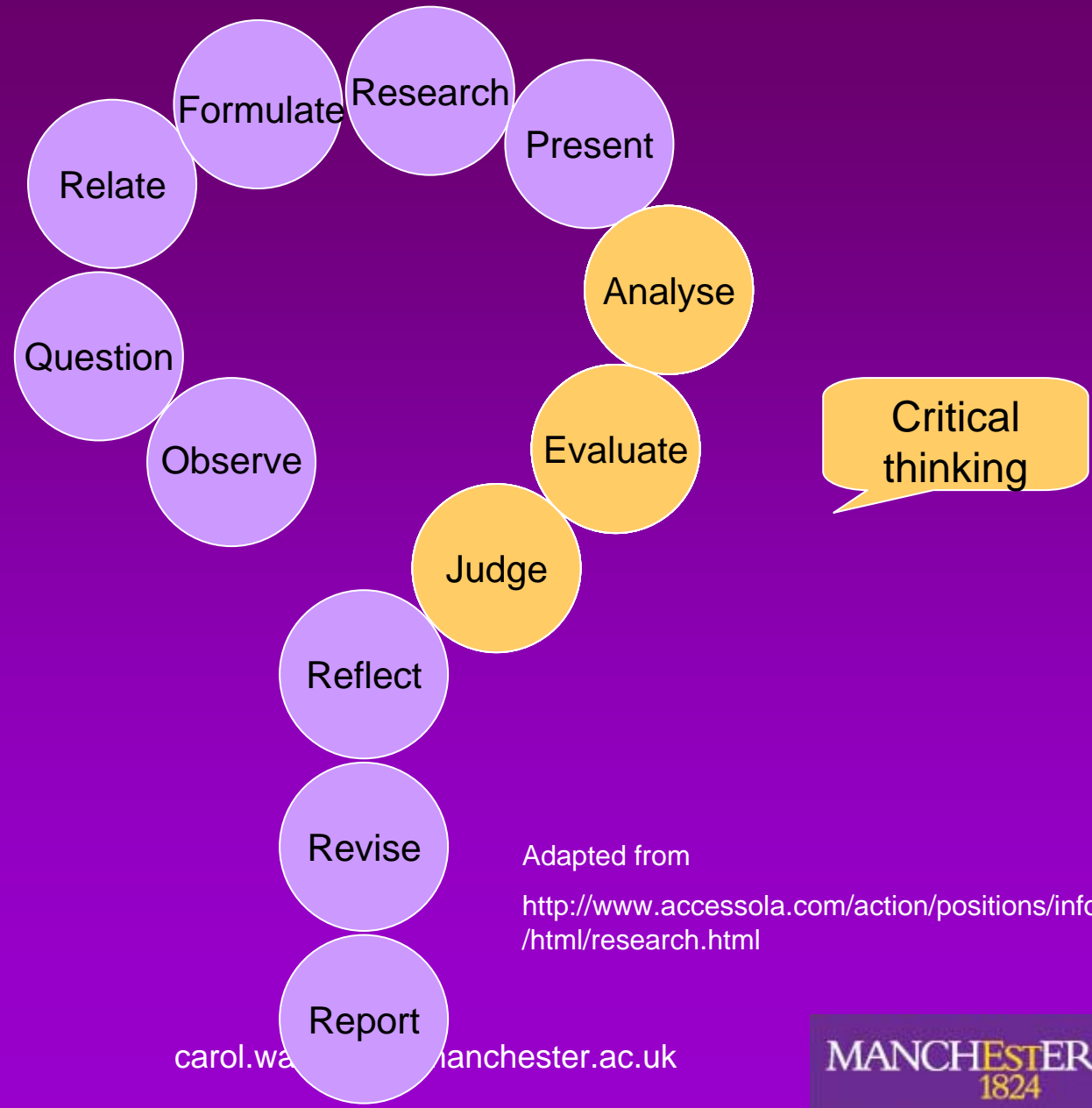
# Context

- FLS CEEBL Project  
(CETL: Centre for Excellence in Enquiry Based Learning)
- Enquiry and the scientific method
- The role of creativity
- Logical *versus* lateral thinking
- The workshop: aims and activities

# FLS Project



# Enquiry and the scientific method



Adapted from  
[http://www.accessola.com/action/positions/info\\_studies/html/research.html](http://www.accessola.com/action/positions/info_studies/html/research.html)

# Programme

- 30 - 40 students per year opt for e-learning projects
- 12 weeks spanning semesters 1 and 2
- Blended delivery: Virtual laboratory environment
- Online tasks complemented by online discussion forums
- Peer review of project materials in online groups – critical thinking

# Tools for enquiry

- Scenario-based resources (Template)
- Problem-based resources (case histories, data-analysis problems)
- Decision trees (to encourage problem-solving skills)
- Individual activities

# Creativity

- Generation of new ideas
  - Blank sheet: totally new ideas
  - Modify existing design
- Skills
  - Lateral thinking
  - Taking different perspective
- 4 considerations:
  - **Fluency**; ability to generate many ideas
  - **Flexibility**; ability to generate many types of idea
  - **Originality**; ability to generate novel ideas
  - **Elaboration**; ability to flesh out a particular idea

# A requirement?

Ministers believe creativity is of benefit and can raise academic standards.

Government response to **Creative Partnerships** initiative (brings artists and other creative professionals into schools):

“There is a growing body of evidence that creative teaching and learning does have an impact on attainment.”

<http://news.bbc.co.uk/1/hi/education/7246498.stm>

## The Department for Innovation, Universities and Skills

Part of the mission is to:

*“Accelerate the commercial exploitation of creativity and knowledge, through innovation and research, to create wealth, grow the economy, build successful businesses and improve quality of life.”*

<http://www.dius.gov.uk/>



# Do you do it?

- Word Association Tests
- Think of the first word that you associate with the word.....

TEA

Bag

Leaf

Cup

Pot

'U' or coffee

# Tools

- **Brainstorming** – generate ideas in groups
  - with post-its
  - brain-writing using proforma
- **SCAMPER** – questions to stimulate flow of ideas
  - **S**ubstitute (what else could we do/use?)
  - **C**ombine (how about a blend/combination?)
  - **A**dapt (what could I copy?)
  - **M**odify (what could I change?)
  - **P**ut to other uses (can the context be changed, re-purposed?)
  - **E**liminate (“less is more”)
  - **R**earrange or reverse (what can be interchanged, transposed?)
- **Random words**
  - to trigger new ideas
- **Attribute listing or Fractionation**
  - List component elements and revise/modify each in turn

# Ideas

- Design a decision tree to help students select appropriate experimental methods.
- Design a resource to facilitate hypothesis formulation.
- Design a resource to facilitate problem-solving.
- Adapt a practical experiment to make it more enquiry-based.
- Adapt a tutorial activity to make it enquiry-based.
- What is the best way to teach maths to bioscientists?
- A resource for the use of analogies in Bioscience

# Workshop

## Aims

- To use tools to promote Enquiry and Creativity
- To apply tools to practical, tutorial and/or problem-solving activities
  - Decide on topic / teaching and learning activity that you would like to make more enquiry-based and/or creative
  - Use one or more tools from the sheet to modify this activity - or create a new one.
  - Record key points on flip chart and prepare a 5 min presentation (chair, scribe)

# Acknowledgements

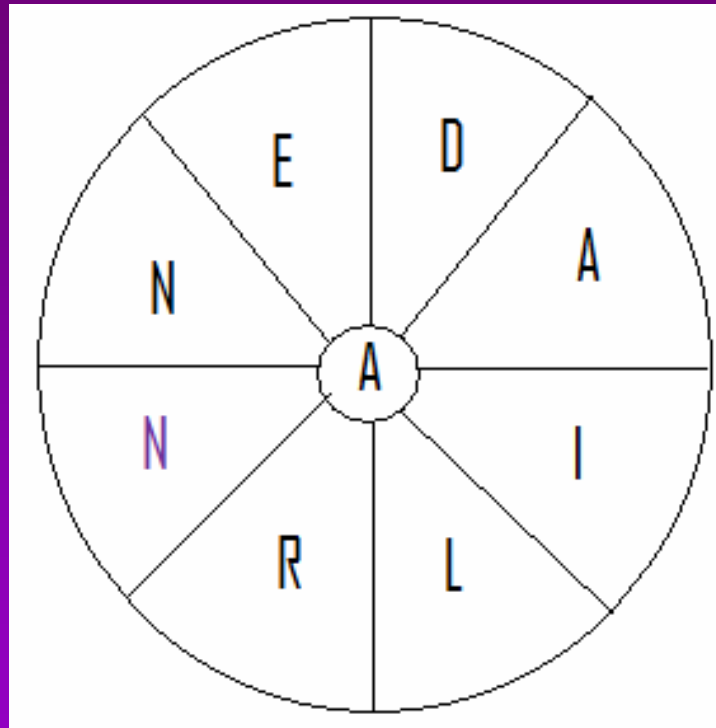
- Centre for Excellence in Enquiry Based Learning, University of Manchester, for funding the project
- Bill Hutchins and Norman Powell at CEEBL
- Ian Miller, e-learning Manager , and his team

# Lateral vs logical Test yourself

Spot the word

- EATCROSS
- SOCRATES
  
- Crossword Clue: WATER, 8 letters
- Solution: H I J K L M N O

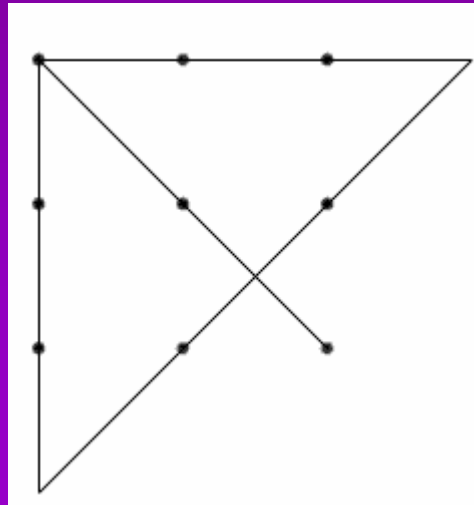
# Wordwheel



Adrenalin

# Thinking outside the box

- Place your pen on one of the dots and, without lifting your pen from the paper, connect the dots with 4 lines only.
- Think outside the box!





# References

- De Bono, Edward (1996) *Teach yourself to think*, Penguin Books, London
- Isaken, S. G., Dorval, K. B., Treffinger, D. J. (2000) *Creative Approaches to problem solving: A framework for change*. Kendal/Hunt Publishing Co., USA
- Nickerson, R.S. (1999). *Enhancing Creativity*, in *Handbook of Creativity*, ed. Sternberg, R.J. Cambridge University Press