Authentic-based learning: linking theory to real-life experience by instructional design

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Development of learning environment

- Link constructivist theory and practice
- Link concepts to other concepts: “big picture”
- Provide multiple perspectives
- Real to life focus
- Facilitated collaborative discussion
- Learner centred & directed
- Provide authentic vs academic contexts
- Focus on process, not on product – active learning – explore, apply, contest, assimilate to prior knowledge

“To produce out of the chaos of human experience some grain of order won by the intellect”

Noel Annan, cited by S. Rowland (2001)

“Is the University a place of learning?
Compliance and contestation in higher education”

Evaluation: Mean Grade with OP score

One active learning environment promotes high-level engagement with the discipline

If increased engagement leads to enhanced performance, can instructional design influence engagement, outcome or performance?

Or…can authentic-based active learning promote understanding more effectively than fact-oriented active learning?
What is authentic learning?

- Learning that emphasizes meaningful activities that help the learner construct understanding and develop skills relevant to problem solving
  - Variety of resources, skills, experience
  - Exploratory/dialogical activities, connecting
  - Information to knowledge
  - Self-knowledge to others/environment
  - Real-world relevance...

Promoting intra-disciplinary relevance

- Learning activities that are 'constructively aligned' with teaching and assessment practice, or...
  - "This is a complete waste of time"
  - "I am planning to be a scientist, pharmacist, engineer, dentist, health professional, vet., exercise consultant...why do I need to know this?"
  - "Is this material examinable...?"

Intra-disciplinary vs real-life learning

- To determine whether students can construct and access knowledge for problem solving to the same degree via a fact-oriented or an authentic context-based learning activity
- To determine whether this knowledge can be re-accessed in the future to the same degree to solve a different, yet related, problem

RELEVANCE - DISCIPLINARY CONTEXT

AUTHENTIC PERSPECTIVE

RELEVANCE - PERSONAL INTRIGUE
**Problem 1 (P1)**

Fact-oriented activity (~100 students)
Pre- (P1+ P2) = control
Post- (P1+ P2) = test

**Problem 2 (P2)**

Authentic-based activity (~100 students)
Pre- (P1+ P2) = control
Post- (P1+ P2) = test

Exam, 3 weeks later

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**ENZYMES: REACTION WITH SUBSTRATE & COMPETITIVE INHIBITOR**

1) Write the general equation for the reaction between a substrate and an enzyme to form the product.

2) How do enzymes work? Describe how reaction velocity can vary with substrate concentration. Draw this graph and label areas on the graph that are first order and zero order with respect to [S]. Label Vmax, Vmax/2 and Km. What do these constants mean for a particular reaction?

3) What is a competitive inhibitor? How does the inhibitor interact with the enzyme? Using the equation in Q. 1, describe the interaction between an enzyme and a competitive inhibitor – MCQ1

4) In this equation, what is the Ki and what does it mean with respect to the effectiveness of the inhibition – MCQ2

5) Think back to the graph that you constructed in Q. 2: how would the graph change if a competitive inhibitor of the enzyme was added to the enzyme-substrate solution as well – MCQ3, 3 weeks later

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**Clinical application:** Acute pancreatitis is a disease caused by obstruction of the normal pathway by which pancreatic secretions enter the intestine. This can occur, for example, when bile stones that are formed in the gall bladder migrate and block the bile and/or pancreatic ducts. Thezymogens of the proteolytic enzymes e.g. trypsin are converted into their catalytically active forms prematurely, *inside the pancreatic cells*, and attack the pancreatic tissue itself. This causes excruciating pain and damage to the organ that can prove fatal.

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**Problem 3 - 3 weeks later**

* MCQ3:
  Which of the following statements is most correct with respect to inhibition of enzymes:
  
  (A) Inhibition of enzymes may be tested by assaying the activity in the presence and absence of the inhibitor
  
  (B) Competitive inhibitors are slowly converted to products
  
  (C) All drugs are competitive inhibitors of enzymes
  
  (D) Competitive inhibitors bind covalently to the active site of an enzyme because they resemble the substrate
  
  (E) None of the above is correct

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**Fact-oriented vs authentic study: P1**
Learning outcomes...

Positive**
- familiar context framing unfamiliar disciplinary based concepts
- while analogising complex concepts
- by encouraging discussion / interaction
  "from a perspective that does not conflict with our own"
- enhancing information retrieval
- enhancing engagement / performance

Adapted from Perkins (1999) cited by E. Meyer
UniServe 2007

Promoting real-life relevance?
- First level foundational courses, with peers
- Diverse student cultural, academic backgrounds
- One hour study session, complete in itself
- Generic problem for personal relevance?

Solution: lecturers, facilitators & students!
- Multi-cultural and multidisciplinary conceptual connections
- Contextual learning @ personal experiential understanding
- Real-world or quasi "real-world" relevance
- Variety of resources, skills, experience
- Exploratory/dialogical activities, connecting
- Information to knowledge
- Self-knowledge to others/environment
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The Murder Case @ BSc/LLB

- News flash: Freddo the Frog has been accused of killing Larry the Lizard
- For each case, designate one group for the presentation and one group for the defence
- Each group must present their case with as much specific factual information of the animals involved as possible, as evidence
- A graphic re-enactment of the crime is an optional extra

Who am I @ 2nd year BSc/BVSc?

- I am a free loader; I am good at gymnastics; I am not too fussy on food; you can find me everywhere. If you take me on board, I can make you HUGE. I can boost your confidence. I never had much use for a head. It kills me to give birth. I am the reason why your squirm in your chair. The last thing I need is a manicure
- I am a Nematode!