The evolution of teaching strategies by discipline faculty: some examples

Kathryn G. Miller
Biology Department
The course

• Biology 3191: Molecular mechanisms in development
  – Writing-Intensive
  – Read primary literature (no textbook)
  – Analytical essays
  – Foster understanding, organization, synthesis of ideas and information
# My goals for the course

<table>
<thead>
<tr>
<th>Goal: Developmental biology concepts and molecular mechanisms</th>
<th>Why: Interesting area of Biology; many different aspects of biology encompassed within</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science discovery process</td>
<td>Knowledge construction in field, how is new knowledge created?</td>
</tr>
<tr>
<td>Relationship between evidence and ideas</td>
<td>Understanding not facts</td>
</tr>
<tr>
<td>Express ideas clearly, use empirical support</td>
<td>Understanding not facts; transferable skills</td>
</tr>
</tbody>
</table>
Why Writing Intensive?

• Active rather than passive
• Understanding instead of facts
• Ask questions and engage in dialog, not acquire information
• Bean ‘Engaging Ideas’ (2001), p. 29-31
  – “What…..students need to understand is that for expert writers, the actual act of writing causes further discovery, development, and modification of ideas.”
Teaching writing and teaching in the discipline

Expert writer’s process: unanswered questions and a dialog with the ‘material’

1. Starting point: perception of a problem
2. Exploration
3. First draft
4. Reformulation and revision
5. Editing
Tools

- Primary literature
- SMARTBOARD
- Tablet PC’s/classroom network
- Telesis
- Writing assignments
  - Journal
  - Analytical essays
  - Reflections on writing and content
  - Research paper
- Analysis of reading assignments in class
- Discussion not lecture
- Group work in class
- Analysis of writing examples in class
  - Writing issues
  - Content
    - Background information
    - Arguments/evidence
Amit et al. (2000)

“Clonally derived Human Embryonic Stem Cell Lines Maintain Pluripotency and Proliferative Potential for Prolonged Periods in Culture.”

Developmental Biology 227: 271-278.

Reading assignment #1; posted on Telesis
Abstract of Amit et al.

Work in groups (3-5)
Main question being addressed
Main conclusions
Why is this work important?
10 mins

Examples slide from ppts used in class
Examples slide from ppts used in class

Abstract of Amit et al.

- Main question
- Sub-questions

- Main conclusion
- Sub-conclusion
LGL can be phosphorylated by aPKC

LGL can be phosphorylated by aPKC

Evolution of a course

• What do you want your students to know / be able to do six months (or 5 years) after the course?

• Changing your teaching:
  – Go slow. You don’t have to do it all in one semester
  – Learn about what others are doing that works
  – Try different approaches, use those that work for you
  – Keep a teaching journal
  – Help your students understand why you are doing what you are doing (metacognition)
  – Use formative assessment as well as summative assessment
  – Use information from education specialists and cognitive scientists about how people learn to improve student learning
Thank you for listening

Additional questions/thoughts:

miller@wustl.edu