Teaching in Virtual Environments
APRU Global Health Program at the University of Southern California
in collaboration with
Global STEM Education Program at the University of Oregon

March 3, 6-7:30pm US Pacific
March 4, 10-11:30am Hong Kong
Supporting Students Beyond the Classroom
Eleanor Vandegrift, University of Oregon & Catherine Zhou, Hong Kong University of Science and Technology

March 29, 6-7:30pm US Pacific
March 30, 9-10:30am Hong Kong
Creating an Active Learning Environment
Eleanor Vandegrift, University of Oregon
Maria Vassileva, Nagoya University

April 26, 6-7:30pm US Pacific
April 27, 9-10:30am Hong Kong
The imperative need for collaboration during COVID for Higher Education
Eleanor Vandegrift, University of Oregon
Claudia Tobar, Universidad San Francisco de Quito

More info or to register: apru.org/our-work/pacific-rim-challenges/global-health
Welcome and Introduction

Mellissa Withers, University of Southern California
Goals for today:

1. Provide pedagogical, technology, and peer support to faculty across the APRU network teaching remotely.

2. Create opportunities for APRU affiliated faculty to connect and share resources and experiences
Format

30 MINUTES EXPERT PANEL

30 MINUTES SMALL GROUP DISCUSSION

30 LARGE GROUP DISCUSSION
Zoom Interactions Today

Feedback and Polls

Writing

Video and Audio

Breakout Rooms

Chat #Aha
Elly Vandegrift, University of Oregon
Chat: How do you know when you’ve learned something?
Chat: How do you know when your students have learned something?
Active Learning Meta-analysis 225 papers (1942-2009)

Chat: What do you see in the data?

Active Learning Meta-analysis 225 papers
(1942-2009)

Fail rate
Active learning  21.8%
Lecture  33.8%
55% increase with lecturing!

Grades
Half of letter grade increase

Average achievement gaps are smaller in active-learning classes than traditional-lecturing classes.

Active Learning supports....

1. Confronting alternate conceptions or misconceptions
2. Constructing new knowledge
3. Monitoring progress during learning
4. Learning for all students
Consider a tiny acorn, and a giant oak tree.

A log from that tree weighs 10,000x as much as the acorn.

Where does MOST of the mass come from?

1. Sunlight
2. Water
3. Dirt
4. Minerals in the soil
5. The air
Making Thinking Visible

- How do you know what you know?
- What evidence from your experience supports your choice?
  - Ashes in campfire
  - Increasing atmospheric CO$_2$ with decreasing forests
  - No hole in the ground as tree grows
- *If you don’t think about your process very often then it is hard to make your thinking visible to students.*
Photosynthesis

$$6 \text{ CO}_2 + 12 \text{ H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2 + 6 \text{ H}_2\text{O}$$

carbon dioxide + water → sugar + oxygen + water

The correct answer is 5. “The air.”

Carbon dioxide from the air!
Polling Method


Q2 Poll

During weight loss, where does the mass of body fat go?

A) It’s mostly breathed out.
B) It’s mostly excreted as solid waste.
C) It’s mostly excreted as liquid waste.
D) It’s mostly converted to heat energy.
Maria Vassileva, Nagoya University
Breakout Room Questions (30 minutes)

Introduce yourselves (Name + Institution)
Select a Discussion Leader, Time Keeper

Questions.

1. How do you already use active learning?
2. What is one topic that you lecture about that students struggle with that could be designed into active learning?
3. What are the benefits and challenges with online active learning?
Chat: What one idea from today would you like to try out in your courses?
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Maria Vassileva,
Nagoya University
Tools to enhance conceptual and analytical learning
How do you know when you’ve learned something of value?

How do you know what you need to learn?
Course’s learning objective

We often define learning objectives around mastery of FACTUAL information.

What is our LONG TERM GOAL for our students?

How do we teach it?
How do we test it?
To students, new academic material often looks like a thick forest of facts.
Lecturers' task is often seen as creating a path in the woods and walking students through it.
However our real goal for our students is for them to grasp the bigger picture, and see the facts in their interconnection and hierarchy.
What is our goal for the students, REALLY?

Independent analytical thinking
Independent conceptual learning

OUR EXPECTATIONS

Basic factual knowledge
Detailed factual knowledge

STUDENTS REALITY

Basic factual knowledge
Detailed factual knowledge
Horisontal VS Vertical learning

One can learn new facts by spreading them horizontally as independent entities, or by creating vertical hierarchy connections.
Horisontal VS Vertical learning

How do we take students from “pile” to “stacks”?

We can build stacks for them, or we can show them how to build themselves.
How to TEACH conceptual learning?

• Focus on concepts in lectures
• Separate facts on “important” and “details”
• Center in-class discussions around “how” and “why” questions
• Provide tasks on summary or application of concepts
How to TEACH independent analysis?

• Give (low-stake) chances to summarize content BEFORE class:
  - Scaffolded summaries
  - Free summaries
    - Mindmaps
Assignments description:

Mindmap

Create a summary of the chapter content in the form of a visual hierarchical map. The mind map should be made in a way to be enough for you to revise the course material before exam.

Rules:

1. Format: 1 page per chapter (A4), hand-drawn/written;
2. Think about hierarchy - how concepts connect with each other? Which is the big theme, the sub-themes and which are details under it?
3. Think about color - use color codes to identify groups of concepts; draw diagrams and images to enforce the visual power of your mind map
Mindmap summaries for an introductory human physiology course

Too many details!
Scaffolded summaries

**Prep Doc preparation guide:**
Use the questions provided in the Prep Doc as a scaffold to determine the significant concepts in the chapter.
Provide answers to those questions in a concise creative way.
You are welcome to choose the best way to summarize the information:
- Drawings with labels
- Diagrams
- Mindmap
- SHORT Text
- Tables

The purpose is to create your own short version of the course content that will be your main exam preparation tool.
It needs to be YOUR OWN, original document, and hand-written (we remember best when more brain centers are involved in the process).
Scaffolded summaries for a human physiology course
How to TEACH independent analysis?

- Give (low-stake) chances to apply content AFTER class:
  - summary of a scientific paper
  - case studies
Case study preparation guide:

**Purpose:** Describing, from Physiology point of view, a disease/condition related to the studied organ system; practicing analytical skills (retrieving essential physiological information from a large clinical text source).

Please follow this structure to help you identify the information you need to present:

1) **Name and Description:**
   Name the disease/condition and provide very short disease description; 1-2 lines (NOTE: answer the question What is this disease about? NOT What are the detailed clinical symptoms?)

2) **Physiology:**
   - Concept title
   Identify the normal physiology concepts that underline the condition and describe them to the depth we study them in class. Give titles to your concepts! This will allow you to focus your attention and description. Provide a concise presentation of each identified physiology concept – this is the core part of the assignment.
   (NOTE: there are usually only 1-2 concepts that are directly relevant).

3) **Pathophysiology:**
   Describe how the normal physiological mechanism(s) described in (2) is disrupted. For each identified physiology concept, provide a short explanation how the normal physiology is altered.
Case studies for a human physiology course

Case Study (Endocrine Physiology)

Hypothyroidism

Description: A disorder of the endocrine system in which the thyroid gland doesn’t produce enough thyroid hormone.

**Physiology**

- Concept / Mechanism / How the thyroid secretes hormone
  - Hypothalamus → Pituitary → Thyroid axis (describe)
  - Hypothalamic → Pituitary → Thyroid axis is disturbed
  - What happens?

- Production of Thyroid stimulating hormone (TSH) is stimulated by Thyrotropin-releasing Hormone (TRH)
  - Production of TSH and TRH is decreased by thyroxine → feedback loop

- When blood calcium is low
  - PTH is not secreted because the gland doesn’t function properly
  - Ca²⁺ level in blood is still low → inability to block Na⁺ channels
  - Less sodium goes in → Blood calcium level stays low.

**Pathophysiology**

- When blood calcium is low,
  - Parathyroid hormone (PTH) is released
  - Blocks Na⁺ channel so that more sodium can go in
  - Blood calcium ↑

- This is not the only hormone

Your job in this assignment is:

1. Identify concepts that are related to the disease.
2. Describe these concepts at the level of detail we study them in class.
How to TEACH independent analysis?

Key elements of effective analytical assignment:

• **Limit space!** 1 page/5 slides

• Focus evaluation on
  • Identification of key concepts
  • Short schematic descriptions
  • Logical hierarchy of information
  • Student–own visuals

Consider assigning individual work or team work
How to TEST conceptual learning?

• Short-answer questions rather than multiple choice questions (if possible)
  • "How" and "why" questions

• Application questions

• Grade not only the provided information, but also logic of organization
PROS and CONS of conceptual learning approach

• PROS: getting closer to our real goal of fostering independent thinkers

• CONS: time and effort consuming, both for students and faculty
Thank you
Breakout Room Questions (30 minutes)

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Questions:

1. How do you already use active learning?
2. What is one topic that you lecture about that students struggle with that could be designed into active learning?
3. What are the benefits and challenges with online active learning?
4. How important is conceptual learning for your major/topic, and what strategies do you use to encourage students to learn conceptually?
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