Giving Microbes A Second Life

How Can A Virtual Microbiology Laboratory Experience Improve Learning?

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Louisiana’s leader in Catholic healthcare higher education.
Overview

- Microbiology course demographics
- Concept of a 2nd life micro lab
- Process (from start to finish)
- Assessment
- Concept Map of Project
- Questions/Comments
Micro at the Lake

• The Fundamentals of Microbiology course is required in admission for all clinical degree programs offered by the College (~80% of total enrollment)
• The majority of students are also required to enroll in the micro lab course
  ▫ Concepts are typically covered in tandem.
• Meets the laboratory competency component of the general education curriculum
• For many of our students, this will be their only wet lab experience prior to clinical program admission.
Micro Course Assessment

- Primary assessment instruments indicate that 4 of 5 course learning outcomes failed to reach acceptable benchmarks.
- Student survey data indicates a lack of student engagement in the sciences.
  - 43% of students surveyed reported that OLOLC contributed “little” or “not at all” to their development in working effectively with modern technology, like computers.
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Virtual Microbiology Labs

- Various VML experiences are currently available online
  - HHMI
  - Univ. of Utah Learn Genetics
- **Opportunities**: someone has done the work for us!
- **Problem**: how to adequately assess student learning using these exercises?
  - Inability to populate significant data
The Origin of 2\textsuperscript{nd} Life at the Lake

- Summer 2008: 2\textsuperscript{nd} life island purchased and faculty think tanks generated by Administrative assessment of computer-based technology, leading to generate multiple endowment proposals
- Pilot programs currently in development or implemented:
  - Physician’s Assistant (ABG interpretations)
  - Plato’s Cave
  - St. Francis Museum
2nd Life in Education

• Educational institutions have begun using Second Life to formulate various educational networks devoted to specific fields
  ▫ Education
  ▫ Computer programming
  ▫ Liberal Arts
  ▫ Physical Sciences
• Opportunities: Moodle integration (SLoodle)
• Problem: Where are the natural science modules?
The Concept of a Home-Grown 2nd life Virtual Micro Lab

- Primary assessment data indicates that courses are deficient in inquiry-based scientific exercises
- Secondary assessment data indicates that students are not engaged in scientific coursework
- Current program curriculums are deficient in laboratory and computer-based coursework
- Course-level assessment data collection is cumbersome due to current technological resources
Project links to Assessment

Strata

Institution

- enhance knowledge and thinking in support of further study and advanced education in the health sciences

Program

- computative competency
- natural science competency

Course

- Analyze integrative, conceptual topics in microbiology
The Process: Step One

- Within the first weeks of course, lectures and readings focus on microbial cell composition and microscopy.
- In-class training on the 2\textsuperscript{nd} life platform
- Students will create an avatar for 2\textsuperscript{nd} life and be granted access to the College’s virtual island
- Students will be asked to locate the island’s hospital.
The Process: Step Two

- Students are distributed numbers that are tagged to a specific, but unknown blood-borne bacterial pathogen.
- When students identify the patient room, they will move the cursor towards the patient.
The Process: Step Three

- Once the cursor makes contact with the patient, a case study appears on the screen.
- This information acts as a supplementary aid for correct diagnosis.
- Students are then instructed to walk their avatars to the virtual micro lab.
- Med term questions are linked to this interface to assess A&P retention.
Personal Information
Name: Smith, Jane
Age: 65
Weight: 130 lbs
Height: 5 ft 6 in
Race: Black
Religion: Catholic

A 65 year old female arrives at the hospital with a 2-week history of low grade fever and general fatigue. She was taking acetaminophen to relieve the fever. Initial physical examination showed an oral temperature of 102°F, blood pressure 100/50 mmHg, regular pulse at a rate of 104 beats per minute and respirations of 34 per minute.

Vitals
Temperature: 102°F
Blood Pressure: 100/50 mmHg
Pulse Rate: 104 beats per minute
Respiratory Rate: 34 per minute

She also noted myalgia and arthralgia. There was no sign of diarrhea or vomiting. She has recently noticed a painful nodule at the tip of one of her fingers. She reported that she had a tooth extracted 4 weeks prior to symptoms.

A blood sample was obtained from Ms. Smith and taken to room lab 101 on the second floor. Go there to evaluate the results of the sample.
The Process: Step Four

- Once in the micro lab, the students enter a designated room (based upon their patient).
- Scrolling the cursor over the microscope results in the appearance of integrated questions.
The Process: Step Five

• The questions correlate with current lecture content
• Questions synthesized to assess significant learning
  ▫ Inquiry-based
• Questions are formatted so populate student answers
• In some cases, students cannot proceed until they answer correctly
• Instant feedback allows for lecture course adjustments
Student Workload

• **Early-semester:**
  ▫ One class period to be used to train students on registering and using Second Life
  ▫ Cases distributed to students

• **Mid-semester:**
  ▫ Laboratory exercises completed and assessed, in tandem with wet lab exercises. Eight 15-minute classroom discussions on the exercises.

• **Late-semester**
  ▫ Summative written submission on the experience
  ▫ One 30 minute classroom discussion on the assignment
  ▫ One 60 minute classroom discussion dedicated to reflection

• **Total estimated classroom time:** 3.5 out of 30 classes
Questions for the Audience

• Do you feel that this model is an appropriate exercise for a introductory microbiology lecture course (science + non-science majors)?

• Is this exercise too “nifty” for its own good?

• Is the allotted classroom time dedicated to this experience appropriate?

• What additional learning objects could be inserted into this platform?