Developing and Adapting Case Studies

ASMCUE

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Workshop Agenda

Introduction
Usage of Case Studies
Getting Started – Adopt & Adapt
  • Case study resources
Group work
Report Out
Additional ASMCUE Reminders
Lunch and posters
Faculty development panel
Usage of Case Studies

Why use case studies?

How do case studies work?
Getting Started - Adopt and Adapt

“How can I find time to write a new case?”

Adapt and Adopt

Finding Cases

Additional Case resources
- News Outlets (CNN, BBC, etc.)
- Datasets
- Scientific papers

Adapt a case to the learning objectives for your class/module
- Develop SMART Goals/Objectives
- Add additional resources to facilitate your objectives

Adapt active learning strategies for your case

Adapt the main story line or “hook” to your students interests and/or case learning objectives

Adjust & re-adapt as needed (aka rinse and repeat)
Where to find cases?

ScienceCaseNet (sciencecasenet.org)
National Center for Case Study Teaching in Science (NCCSTS)
CasesONLINE (http://www.cse.emory.edu/cases/)
BioQuest (bioquest.org)
Case It (www.caseitproject.org)
Text Publishers

Case It!
Case-based learning in Biology
ScienceCaseNet

The Science Case Network, a Research Coordination Network for Undergraduate Biology Education (RCN-UBE), centers on expanding the use of and knowledge about two effective teaching approaches: case studies and problem-based learning (PBL). The Science Case Network seeks to connect case study and PBL innovators, researchers, and user groups to further the understanding of the effectiveness of these methods.
National Center for Case Study Teaching in Science

The mission of the National Center for Case Study Teaching in Science (NCCSTS) is to promote the nationwide application of active learning techniques to the teaching of science, with a particular emphasis on case studies and problem-based learning.
CasesOnline

CASES Online is a collection of investigative lessons, or "cases," for K-12 and undergraduate science education. Using principles of Problem-Based Learning and Investigative Case-Based Learning (and related student-centered pedagogies), our cases are designed to engage students in exploring the science behind real-world problems. Our cases address a variety of learning objectives across the sciences and mathematics. Although our K-12 cases were designed for use in Georgia and meet our state education standards, we have also included the relevant National Science Education Standards.
Case It

Case It is a project providing molecular biology simulations for case-based learning, free of charge to educators. The software reads DNA and protein sequences and simulates lab techniques such as electrophoresis, PCR, ELISA, Western blot, and microarrays. It connects directly to MEGA software and to online tools for bioinformatics applications.

The software is packaged with sequences for case studies in genetic and infectious diseases, among other cases, but can also be used with any sequences for open-ended investigations.
<table>
<thead>
<tr>
<th>NCCSTS cases</th>
<th>Case It cases</th>
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<tbody>
<tr>
<td><strong>Genetics and Genetic Diseases</strong></td>
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<tr>
<td>The Physiology of a Neurodegenerative Disease: Hunters' Disease</td>
<td>Huntington's disease</td>
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<tr>
<td>Analysis of the symptoms, neuroanatomy and physiology, and treatment of HD</td>
<td>Genetic testing by PCR or Southern blot and associated ethical issues, sequence alignment to show triplet repeats</td>
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<tr>
<td>&quot;Not exactly..&quot; The complexity of a human genetic disease</td>
<td>Cystic fibrosis</td>
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<tr>
<td>Genetics of Cystic fibrosis inheritance, implications for genetic counseling</td>
<td>Genetic testing for CF, using PCR, RFLP, and dot blot</td>
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<tr>
<td>PKU Carriers: How Many Are in Your Hometown?</td>
<td>Phenylketonuria</td>
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<tr>
<td>Genetics of inheritance for phenylalanine hydroxylase mutation, Hardy-Weinberg principle</td>
<td>Genetic testing for PKU using PCR and dot blot</td>
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<td>Sickle Cell Anemia</td>
<td>Sickle Cell Disease</td>
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<tr>
<td>Original description of the disease, properties of abnormal hemoglobin</td>
<td>Genetic testing for Sickle cell disease using Southern blot</td>
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<tr>
<td>Living With Her Genes: Early Onset Familial Alzheimer's Disease</td>
<td>Alzheimer's disease</td>
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# SMART Objectives

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<th>Specific</th>
<th>Measureable</th>
<th>Achievable</th>
<th>Realistic</th>
<th>Time-bound</th>
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<tbody>
<tr>
<td><strong>Examples of poorly and properly written learning objectives</strong>&lt;br&gt;<a href="http://sph.washington.edu/gateway/learning_objectives.asp">http://sph.washington.edu/gateway/learning_objectives.asp</a></td>
<td><strong>Poorly written</strong>&lt;br&gt;Know how to use t-tests and chi-square tests in data analysis&lt;br&gt;Understand how to measure the association between a given risk factor and a disease&lt;br&gt;Basic strategies for assessing environmental health hazards&lt;br&gt;Know about Medicare and Medicaid</td>
<td><strong>Well-written</strong>&lt;br&gt;Describe the assumptions underlying t-tests and chi-square tests and use these tests to statistically compare two samples&lt;br&gt;Define and calculate measures of association between a given risk factor and a disease&lt;br&gt;List, describe, and compare the advantages and disadvantages of the basic strategies for assessing environmental health hazards&lt;br&gt;Compare and contrast Medicare and Medicaid with respect to political history, governmental roles, client eligibility, financing, benefits, and cost-sharing</td>
<td></td>
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Characteristics of Good Learning Outcomes

Measurable/Assessable
Clear to the student & instructor
Integrated, developmental, transferable
Use discipline-specific competencies/standards as a basis not an end
Similar scope and scale
“In order to” gets to the uniqueness and real world application of the learning
Use a variety of Bloom’s Taxonomy levels
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What is Active Learning?

Active learning occurs when students are given the opportunity to interact with the subject matter of a course. It is anything students do in the classroom other than passively listening to a lecture.

Students generate rather than receive knowledge.

The teacher facilitates rather than dictates the students’ learning.

Active learning can vary from occasional use in a course to the main “teaching” strategy used by the instructor.
An ever-growing list of active learning techniques

- Case studies
- Muddiest point
- What do you know?
- Crowd-sourcing
- Ranking items on a list
- One minute paper
- PBL
- Think-pair-share
- Podcasting
- Mnemonic practice
- Sequential ordering
- What do you want to know?
- Figure explanation
- Clarification pause
- Presence Diary
- Misconception check
- JITs
- PLTL
- What do you think you know?
- Predict the experiment
- Videos
- Active multiple choice
- Notes share
- Wake up call
- POGIL
- Concept Maps
- Predict the experiment
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Group Work

Workshop Product: Using group and online resources begin to adapt a case study for your classroom focusing on:

- #3 – Curriculum Outcomes – aka Learning Objectives
- #4 – Active Learning Techniques
- #6 – The Hook

Group members should focus on adapting a case they already use or finding a new case to adapt for usage in their classroom
Report Out
Additional ASMCUE Reminders