

USING AND DEVELOPING AN ECOSYSTEM APPROACHES TO HEALTH CASE STUDY IN YOUR TEACHING

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INTRODUCTION

DESCRIPTION

Case studies are carefully constructed learning scenarios that enable students to grapple with key educational content on their own and in groups. A case study can be used in ecohealth teaching as a catalyst for the introduction of concepts and methods, since it provides the opportunity for students to practice these collaboratively.

In teaching with case studies, the emphasis is on the learning process within which skills are developed, rather than the acquisition of knowledge and the attainment of subject matter expertise. The case study is an opportunity to practice techniques, exercise skills, and bring knowledge in relation to concrete problems and action. It stresses the importance of transdisciplinarity to ecohealth research projects, by providing a space for transdisciplinarity to emerge during collaborative work on an ecohealth problem.

The purpose is to provide a manageable and realistic problem, embedded within a complex system that will introduce the students to the ecosystem approach to health and require them to grapple with the principles of the approach and to explore and utilize key concepts and methods.

LEARNING OBJECTIVES

During case study tasks and activities, students will:

- Be able to analyze concrete problems.
- Integrate multiple knowledges including ecosystem, social, and community.
- Apply course material.
- Grapple with seeing an issue from multiple perspectives.
- Practice transdisciplinarity.
- Link knowledge to action

Kinds of case studies

Closed

In closed case studies the problem is clearly defined, and students work through how to respond. Closed case studies tend to be simpler and more discrete components of the curriculum. They are easier to teach with because the path of learning may be more fully anticipated, as the case is less dynamic.

Open

In open case studies the problem is poorly defined, and students work through defining the problem. In this case, students need to determine which features and perspectives

to take into account in order to define the problem and will often have to redefine the problem as new perspectives and information surfaces. Teaching with open case studies involves a high degree of uncertainty, the learning paths cannot be fully anticipated, and the case is very dynamic.

Key components

Since your case study is meant to provide students with an opportunity to practice ecohealth research, you should include several different kinds of activities:

- Research
- Field work
- Hands on activities
- Meeting with people outside the classroom
- Interaction with community
- Group work
- Qualitative and quantitative analysis
- Reflection

Try to include individual components that have their own focus, even though they are part of the case study issue. The component tasks should have their own objectives which address specific ecohealth knowledge and skills. For instance, if you would like participants to conduct a stakeholder meeting, the design of this meeting could be one of their tasks, and it can have its own learning objectives related to ecohealth, even though it is part of the participation and research component of the case study.

BUILDING A CASE STUDY – A STEP BY STEP PROCESS

STEP 1: Know your participants

Knowing your participants (i.e. students) allows you to factor their capacities and prior skills into the design of your case. In order to engage them you need to have an issue that speaks to them. The following are suggestions of factors to consider about your participants:

- Languages – primary and other, comfort levels, spoken and written
- Disciplinary backgrounds
- Ecohealth research experiences
- Learning objectives
- Where they live or have lived

NOTE: you may be able to collect this information through the course application process, by asking for a bio sketch or through assignments i.e. a journaling exercise.

STEP 2: Picking a case

When picking your ecohealth case there are some factors to keep in mind:

- **Community contacts** – You will be able to develop a far richer case study learning experiences if you already have some contacts in the community. The insight they will provide and the advice they will give will help you to construct a very believable case scenario and an in-depth simulation of an ecohealth research project.
- **Defined area of study** – Picking a case that is geographically defined with clear affects on human and other biological communities will provide for a more workable scenario.
- **Existing research** – If you can find a case where there is already existing research, this will greatly help you in developing your case scenario and in providing research materials for your students to use.
- **Complexity** – You want a case that is complex and will call upon students to have to grapple with a problem that they cannot reduce to pre-existing knowledge domains and where they cannot just apply a simple solution.
- **Recognition of a problem** – Picking a case where there is already recognition that there is a problem will help you to get your students thinking about the issue. If there are already policy issues in place (such as remedial action plans) to address the issue, these can be used as part of your critical analysis.
- **Clearly related to health** – Picking a case that is clearly a health issue will help your students to get to work more quickly than one where it may not yet be clear.
- **Relevance to students** – When picking your case, consider who you are teaching to and how they will be able to assess the case.

STEP 3: Define the Problem

This is a delicate and important part of designing a case study. You want a problem that is ill-structured enough that it will allow students to further develop the problem through processes of exploration and discovery. At the same time, you want your problem to be clear enough that it will be accessible to students so they can begin their work.

STEP 4: Incorporate Reflective Activities

- **Developmental:** You could ask the same question at 3 different times throughout the course so that students can see how their thinking changes and develops. It could be something as simple as: What is the issue?
- **Task debrief:** Take time to speak with the students about the learning process. Expose to them the purpose of the task design and what aptitudes and skills they were intended to learn. Ask them to reflect upon what skills they think they got out of it. (This is also a good time to gain feedback on how adequate your learning design was - you may wish to make adjustments next time.)
- **Reflective follow-up to community consultation process:** If your case involves a community consultation, it is important to build in some kind of reflective component. This could be a reflective writing assignment or a group discussion. Some examples of questions you could ask students to reflect on are:
 - Who was missing? How did their absence change the discussion?
 - Who spoke, who didn't?
 - What other kinds of consultation would you need to have if you were doing a larger project?

EMBEDDING A CASE STUDY IN A COURSE CURRICULUM

Embedding an extensive case study within a course can provide a way for students to work with and test the knowledge and skills that they are learning in the course. When embedding a case study into a course, the case should be broken into several steps, which will work towards a final project or presentation. Many of these steps can have tasks associated with them.

Step	Description	Tasks and Objectives
1. Introduce the case study place.	This could be a film, images, or guest lecturer which introduces the people and the place that the case study connects with.	Gain a sense of place.

Step	Description	Tasks and Objectives
<p>2. Introduce case scenario or narrative and clearly articulate the case study work and expectations.</p>	<p>Outline the ecohealth issue(s), and introduce some of the various stakeholders which the case study will explore and address.</p> <p>State the tasks, time, supports and resources with which students will accomplish the tasks.</p>	<p>Confront a complex ecohealth issue.</p>
<p>3. Site visit. (If possible.)</p>	<p>Plan this so that students can get multiple perspectives on the place in question, both from socio-economic and cultural perspectives, but also from geographical perspectives.</p>	<p>TASK: Have students take photographs during the site visit that they can later use in constructing a <i>Rich Picture Map</i>.</p>
<p>4. Site visit debrief (1/2 hour)</p>	<p>Facilitate discussion about the site visit where participants are able to reflect on their perceptions and experiences, share questions, and develop a deeper understanding of the place.</p>	<p>Reflective activity</p>

Step	Description	Tasks and Objectives
<p>5. Assign groups. (You could do this as part of step 2. If you want students to experience the place independent of any group task, then you would wait.)</p>	<p>These are the groups that the students will work in to develop their final presentation. When constructing groups you should consider language of choice, gender and discipline.</p>	
<p>6. Prepare students to facilitate community engagement.</p> <p>NOTE: Try to find ways to make this a two-way process, so that students are also involved in the community context and events.</p>	<p>Since the case study aims to give students a simulated ecohealth research experience, it is good where possible to prepare students for facilitating community engagement.</p>	<p>This could be done by providing sessions on conducting stakeholder meetings, focus groups and other forms of consultation.</p>
<p>7. Students prepare for conducting a community consultation.</p>	<p>Students will need to come together as a large group to decide how they will facilitate their time with community members.</p>	<p>Students practice building consensus, planning in large groups and collective action.</p>
<p>8. Community consultation</p>	<p>Students meet with members of the community in order to enhance their understanding of the case issue. This could be a stakeholder meeting or a community discussion.</p>	<p>Students practice communicating with multiple members of a community and conducting careful and respectful inquiries into complex issues with the people involved.</p>
<p>9. Case Study Presentations</p>	<p>Students present their work in groups.</p>	

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Step	Description	Tasks and Objectives
10. Final Debrief	Ask students to discuss (in small or large groups): <ul style="list-style-type: none"> - What worked and why? - What didn't work and why? - How did you do it? - How would you do it differently at other time? - How did your perceptions change at different stages 	Students learn by reflecting on the learning process. Instructors gain valuable feedback about how to conduct future case studies.

PRE-COURSE PLANNING

Step 1. Compile resource materials

Depending on the length of your course, the case study could run from anywhere from 1 week to several months. This length of time will impact the extent to which students will be able to conduct research.

When you have several weeks or months to facilitate student learning with a case study, it is important to set up the issue by providing some initial information, and then to provide time and support for students to conduct their own research and discover what is missing.

In shorter case studies (1 – 2 weeks) it is a good idea to compile some research materials for them to work with so that they can develop a more in-depth understanding of the issue in a short period of time. You can make these materials available on a class computer, on a USB stick, on a CD or DVD, or in paper package. Some materials useful to include are:

- Maps of different scales
- Research studies which have been done on the issue in question (or a closely related issue).
- Associations and organizations related to the issue and any materials that they have produced. For instance, a naturalist association might have materials on environmental issues related to your case scenario, or a community group may have materials on a health issue.
- Government policy related to the issue along with any government studies that have been conducted.

STEP 2. Connect with community partners

In order to provide a full experience for students, case studies work best when there are real opportunities to connect with members of the community. Since this is a learning experience and not an official research project, it is important that the community members that you plan to involve are aware of this. You need to discuss with them:

- The main idea of ecohealth, the purpose of the course, and who the students are.
- The learning scenario and tasks which the students will be working on and the kinds of things the students will be interested in learning from them.
- Who else will be involved – it is important that your community partners know who else is included, as there may be existing tensions or they may have suggestions for the involvement of others.

- The mode of interaction that they will have with students and with each other.
- Make sure that this is a learning project and not a research project, and address any uncertainty surrounding their engagement with the students.
- What their interests, concerns, hopes and curiosities are in being involved in this learning exercise. Be sure to communicate these with your students so that they understand the affective landscape in which they will be intervening.

STEP 3. Plan your site visit

The site visit is an important aspect of the case study, so it is important that you have planned the visit carefully. You want students to gain a multi-faceted and varied perspective of the place in which the ecohealth case study is based. When you speak with the community members, you should ask them for input into what they think would be good places to visit or things to see.

NOTE: Always remember that the community is composed of a many different kinds of people with different kinds and degrees of power. It is important that you consult different kinds of community members, not just community leaders.

STEP 4. Include multiple perspectives on health

- **Animal and plant** – Try to find ways to illustrate to the students how the issue is affecting plant and animal life in a concrete way. This range from looking at mutated fish to visiting gardens.
- **Industry** – Show the side of the issue from the local industry and economic perspective.
- **Labour** – Try to find ways to incorporate the perspective of the labour forces which is often not the same as that of industry.
- **Multicultural** – Make sure you see the site from multiple cultural vantage points.
- **Gender** – Try to find ways of looking at the issue while considering gender.
- **Multiple disciplines** – You could invite researchers from different disciplines who have worked on the issue to participate in parts of your site visit and to give some perspective.

FACILITATING THE CASE STUDY LEARNING PROCESS

Groups may be formed/designed in various ways, such as:

- Create transdisciplinary groups
- Create groups based on gender, discipline or language
- Create groups around ecohealth pillar or principles
- Create groups with different learning objectives
- Later, groups can be mixed up to make for holistic presentations (so that there are a variety of view-points, skills and experiences coming together).
- Look for logical places to recombine groups during the case study process. It could work to recombine groups at the stage of the case study where participants are developing policies, recommendations or action plans.

Transdisciplinarity

Design groups, when possible, to allow for a mix of disciplines to help foster transdisciplinarity. Transdisciplinarity is a primary feature of ecohealth research projects, and an important aspect of using case studies in teaching ecohealth, is the opportunity to approximate, as much as possible, the process and functions of actual ecohealth research projects.

Multilingualism

When teaching courses with participants whose language of choice is different, try to enable people to work in the language of their choice. Keep in mind that this is NOT always their first language, as sometimes they would like the opportunity to practice a second or third language. The important thing is to enable people to work, where possible, in the language in which they are most comfortable.

Pedagogical Heritage

Experiential Learning (John Dewey): The work of the educator is to arrange for and organize certain kinds of student experience. This includes paying attention both the physical environment in which student learning is going to occur, but also the inter-subjective environment, which includes individual work, group work, discussion and time for reflection. The way you schedule your course or workshop is a key component of organizing the conditions of experience. When you are designing your curriculum, consider how you can influence the experience of learners by setting up an environment which interacts with the capacities and needs of those taught in a way which will enable worthwhile experiences.

Problem based learning: Problem based learning is a kind of experiential learning where students work together to solve problems and reflect upon their learning experiences. The teacher facilitates learning by providing students with a problem, and supports them through the process of working through it. Some advantages of problem-based learning are that it helps students to develop a flexible and extensive base of knowledge, and build skills in integrating ideas, methods and information from multiple domains. "A good problem affords feedback that allows students to evaluate the effectiveness of their knowledge, reasoning, and learning strategies. The problems should also promote conjecture and argumentation. Problem solutions should be complex enough to require many interrelated pieces and should motivate the students' need to know and learn" (Hmelo-Silver, 2004).

Collaborative Learning: "Collaborative learning produces intellectual synergy of many minds coming to bear on a problem, and the social stimulation of mutual engagement in a common endeavour. This mutual exploration, meaning-making, and feedback often leads to better understanding on the part of students, and to the creation of new understandings for all of us" (Smith & MacGregor, p.2).

EXAMPLES OF ECOHEALTH CASE STUDY ASSIGNMENTS

- Ask students to develop an ecohealth research proposal to address the ecohealth issue defined in the case scenario.
- Ask students to conduct a critical assessment of an intervention (with eco-bio-social impacts) from an ecohealth perspective. As part of this students can develop the criteria by which the intervention will be judged. If there is not time, you will need to provide some criteria.
- Ask students to examine an ecohealth issue and develop a proposal for an intervention.
- Ask students to develop a research plan with the aim of impacting policy.

OTHER WORKS CITED

Hmelo-Silver CE. (2004). Problem Based Learning - What and How do Students Learn?" *Educational Psychology Review*, 16, 235-266.

Smith B, MacGregor, J. (1992). What Is Collaborative Learning? *Collaborative Learning: A Sourcebook for Higher Education*, Goodsell A, Maher M, Tinto V, Smith BL, and MacGregor J (Eds.), Pennsylvania: National Center on Postsecondary Teaching, Learning and Assessment Pennsylvania State University.

APPENDIX I

EXAMPLE OF AN ECOHEALTH CASE STUDY SCENARIO

HAMILTON HARBOUR CASE STUDY

This case study was part of the 2009 CoPEH-Canada Ecosystem Approaches to Health Short course, held at the University of Guelph.

Background to Hamilton Harbour

Hamilton, a city of approximately 700,000, sits on the edge of the Niagara Escarpment in Southern Ontario, Canada. The city surrounds *Hamilton Harbour*, once one of the most beautiful and productive natural wetlands and freshwater fisheries in the country. Hamilton is a major shipping centre and supports the largest concentration of heavy industry in Canada. Hamilton is the “base” of the Canadian steel industry that is the major employer and historically the economic driver in the city. The steel industry has been the “life blood” of Hamilton and Hamiltonians still proudly refer to their city as “Steel town”.

The extensive industrial growth and development over the many years has exerted a toll on Hamilton Harbour. The harbour reflects its conditions (a small, shallow water body with a long retention time), a high volume of sewage treatment plant discharges, large scale industrial activities and extensive land use changes. The water and sediments are contaminated by metals, pesticides, PCBs and PAHs. The shoreline has been radically transformed with 75 percent of wetlands eliminated and 25 percent of the original shoreline filled in. The water quality of the harbour continues to be characterized by poor water clarity, low oxygen levels, high nutrient levels and high bacterial levels resulting from a combination of soil erosion in the watershed, industrial particulate discharges, partial treatment of urban sewage, urban runoff and combined sewer overflows. Significant remedial action has greatly improved the conditions of the harbour over the past 15 years, but it is still classified as a Great Lakes Superfund site.

Hamilton is a city of contrasts; on one hand an incredibly beautiful setting and yet one suffering significant environmental degradation. It is a vibrant community with burgeoning arts and cultural activities, areas that exude wealth, beautiful homes and estate properties and yet has other areas that reflect significant socioeconomic hardships. Approximately 20% of Hamilton’s population lies financially below the poverty line. Hamilton is the end destination for a significant population of new immigrants seeking to make a new life in Canada. The city struggles with water and air quality, employment and land use issues and the effects of these on individual and community health.

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The recent economic downturn has led to temporary closure of the two key industrial giants in the steel industry (US Steel and ArcelorMittal Dofasco). These closures, the uncertain future of steel, and the spin-off effects on other light industry associated with steel is having negative effects on the economy and employment.

Problem/Scenario

US Steel is a wholly-owned subsidiary in the US Steel Canada group that employs approximately 2200 people at the 445-hectare production complex at the western end of Lake Ontario. This plant produces 2 million tons of semi-finished steel annually. Due to the economy, production at the plant was stopped early in 2009 and the plant “temporarily” closed.

In the event that the steel plant closure becomes permanent, *the impacts of this closure on “health” must be assessed and a plan developed to decide what should be done with this 445 hectare (1,100 acre) property.*

Students will work in interdisciplinary groups to tackle this problem using an ecosystem approach. At the end of the eleven day course, they will prepare and deliver a presentation outlining a **suggested plan or plans of action.**

Learning Activities

Mapping

- Rich picture mapping (see *Transversal Activities*)
- Conceptual mapping (see *Transversal Activities*)

Unfolding the data cycle

- Presentation of initial problem.
- Listen to overview of Hamilton from “expert” and view historical film.
- One day visit to multiple sites surrounding Hamilton Harbour to get a sense of place.
- Collect information from site visits and review reference information provided.
- Develop initial problem list (list of issues or concerns).
- Develop a list of stakeholders.
- Develop, plan and execute a stakeholders meeting (being cognizant of power, equity).
- Design questions, engage and consult with stakeholders.

- Collect additional data from the stakeholders meeting by following up with individuals, or digging deeper into the reference material.
- Utilize stakeholder information to develop and adjust the stakeholder list and redefine the issues.
- Refine and clarify the problem based on new information collected.
- Develop action plan to move forward.

Reflective Points

Throughout the course there are several things that participants can be asked to reflect on, either in groups or individually in reflective journals [[Transversal Activities](#)]:

- Research process
- Power dynamics in group work and at stakeholder meetings.
- Connections between power dynamics and Hamilton Harbour case.
- The problem of their role as researchers – to what extent are they participants in the research?
 - What is their connection to the fish in Hamilton Harbour?

Timeline of Case Study Activities

Day 2

- a. Introductory overview of Hamilton Harbour through a lecture and a documentary film (“The Bay and Its People”). This will provide some history of Hamilton Harbour including the development, success, and subsequent downfall of the industry. As well as the contaminant issues and effects on human and harbour health, and a broader picture of Hamilton and her successes.
- b. Introduction to “problem/scenario”, learning task, and the process of how the case study will unfold

Day 3 (all day)

Visit to Hamilton Harbour

- Bus trip to key sites around Hamilton Harbour
- 4 local experts travel join us for the bus tour to provide insight and answer questions. The purpose of the tour is for the students to get a “sense of the place” and begin gathering data pertinent to the problem. Students will be working independently at this point. They will not be assigned to groups until the next day.

Logistics

Participants are given an aerial map of the region and a disposable camera. They will update and annotate their map as they go and take pictures of things that they find pleasing, disturbing or of interest. These will be used later within their specific groups to develop *rich picture maps*. Each rich picture map will be different, and will thus provide an opportunity later in the course for discussion about values and differences.

Specific areas targeted during the tour include:

1. Panoramic view of city and environs from a high level lookout point
2. Heritage Arts and Cultural Centre
3. Steel industry and the steel production footprint
4. Selected neighbourhoods to reflect socioeconomic differences
5. Areas of harbour where remediation actions have occurred and areas that are still toxic wasteland
6. Water and sewage treatment facilities
7. Downtown working areas of Hamilton
8. Royal Botanical Gardens
9. Carp fish barrier and Project Paradise
10. North Hamilton Community Centre

Day 4

- a. Students will be divided into 4 groups and an instructor(s) will be assigned to these groups to act as resource facilitators. Each group will focus on the problem from the perspective of a particular pillar of the ecosystem approach. They will have access to research data and reference information about the harbour supplemented by what they have seen and learned during the harbour visit.
- b. A facilitated discussion on what was seen, and the scope of the task they have been given. Each group will initially work independently to identify issues and process and then groups will work together. They will be asked to self-organize and create a working plan that will: develop an initial stakeholder list; decide how to run a stakeholder meeting; decide what information they want from the stakeholders.
- c. Fish necropsy session at the Ontario Veterinary College. Fish (carp, bullheads) have been collected. These fish are part of ongoing health surveillance activities specifically looking for skin and liver cancer, gonadal changes associated with

chemical contamination of water and toxic loads in tissues. The session will link water health, fish health and human health.

Day 5

- a. Hours available for final preparations for the Stakeholders meeting.
- b. Stakeholder's meeting in Hamilton (2hrs). Approximately 15 stakeholders will take part. These folks range from the President of Steel Workers Union, to a local physician, representative from city planning, First Nations representative, local NGO (Environment Hamilton), and several neighbourhood group representatives.

Day 7

- a. Unscheduled time in the morning (available for group work to complete rich picture maps, if students choose).
- b. Rich maps completed and posted by 11:00 am.
- c. Presentation and discussion of maps will act as the catalyst and entry point for a session on values and attitudes.

Day 10

- a. Student Hamilton Harbour presentations and discussion with invited guests.
- b. Hamilton Harbour "wrap up" session:
 - What did we learn?
 - What worked, what didn't?