

Introduction to simulation/ role play

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Introduction to simulation/role play

background

Background:

Background: Despite the apparent abundance of water, potable water is often in short supply in many parts of the world. Affected by drought, contamination, pollution, and war, sources of clean and safe drinking water are constantly impacted. Access to potable water is a basic human need and should be a fundamental human right. However, in today's world, water is increasingly treated as a commodity – people own water rights and water rights are bought and sold.

Although there have been some improvements over the last 10 years, there is still about 1.1 billion people around the world that do not have access to safe drinking water. Lack of a healthy water supply or poor water sanitation kills about 4,500 children each day. Many African and Asian women carry 20kg containers on their heads on daily multi-mile round-trips to get water for their family. This water is often brown and full of dangerous microorganisms, chemicals, and pathogenic bacteria. The time people spend collecting water or suffering from water-related diseases undermines productivity and economic growth. The water they collect is from rivers, ponds, or simply from holes dug in the ground, and is often shared with animals and polluted with waste and excrement. Drinking this water is a choice that no one should have to make. The average person in the developing world uses 10 liters of water every day for their drinking, washing and cooking. This is the same amount used in the average flush of a developed country's toilet. With populations growing rapidly in developing countries, many scientists feel that this dilemma may increase exponentially in the near future.

Drinking Water:

Percentage with Access to Safe Drinking Water

Region	1990	2002
World	77%	83%
Developed countries	100%	98%
Eurasia	92%	93%
Developing countries	71%	79%
Northern Africa	88%	90%
Sub-Saharan Africa	49%	58%
Latin America and the Caribbean	83%	89%
Eastern Asia	72%	78%
South Asia	71%	84%
Southeastern Asia	73%	79%
Western Asia	83%	88%
Oceania	51%	52%

Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation and The water report – World Water Day 22 March 2007



Time Required: Two – 45 to 60 minute class periods

goal

Goal:

Students will learn how to clarify a goal and set criteria that are important in obtaining a goal.

Standards Met: S6, S7, LA1, LA3, LA4

materials

Materials
(for a class of 30
working in groups
of five):

- 30 copies of Introduction to Simulation/Role Play – The Scenario
- Six small (letter size) envelopes
- Five copies of Introduction to Simulation/Role Play – Role Card sheets
- 30 large envelopes
- Large piece of poster paper
- 30 copies of Introduction to Simulation/Role Play-Table 1 Student Sheet
- 30 copies of Introduction to Simulation/Role Play-Table 2 Student Sheet
- 30 copies of Introduction to Simulation/Role Play-Table 2 Teacher Key
- 30 copies of Introduction to Simulation/Role Play-Community Goal and Criteria Student Sheet
- 30 glue sticks
- One overhead of Introduction to Simulation/Role Play-Table 2 Teacher Key
- Costumes for each stakeholder (Optional)

objectives

Objectives:

Students will...

- Actively listen to different perspectives, concerns and opinions
- Evaluate input from a variety of stakeholders
- Understand the importance of potable water to a community's sustainability
- Classify concerns into the 3 Es of sustainability
- Clarify a goal from a list of concerns
- Determine what criteria are important for attaining a goal

Proc

Prep

- From each of the 30 Introduction to Simulation/Role Play-Table 2 Teacher Keys, cut out the six stakeholder roles and the six stakeholders' concerns and put one set into each of the 30 large envelopes. You will have 12 cut slips in each large envelope.
- Also place in each of the large envelopes:
 - One Introduction to Simulation/Role Play – Table 2 Student Sheet
 - One Introduction to Simulation/Role Play – Community Goal and Criteria Student Sheet
 - One glue stick
- Cut up the five Introduction to Simulation/Role Play-Role Card sheets and put five copies of the same role in six small envelopes.
- On the night before this activity have the students research on the Internet the availability of potable water around the world. Each student should research at least two sites and be ready to report on them the first day of this activity.

In Class

Day 1

Set the Stage:

- Using the background material listed above, Introduction to Simulation/Role Play – Water Facts and Figures found at the end of this activity, and the research that the students did as an assignment, discuss with the class the availability of potable water throughout the world.



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- Divide the class into six groups of five.
- Pass out a copy of Introduction to Simulation/ Role Play – Table 1 Student Sheet to each of the students.
- Working in their groups, have the students brainstorm the potential impacts (using the framework of the three Es of sustainability) that a lack of a healthy water supply could have on a community. They will need to come up with two examples for each E of sustainability.
- After the students have completed Table 1, have them share their answers with the rest of the class.
- Explain to the students that they are going to take part in a simulation and that each of them will have a role to play during the simulation.
- Pass out one copy of Introduction to Simulation/Role Play-The Scenario to each of the students along with one small envelope (contains five copies of the same role) to each group. Tell the students not to open the envelopes until they are instructed to do so.
- Select a student to read the scenario out loud. Have the students highlight or underline parts of the scenario that they feel are important.
- Instruct the students to open their Role Card envelopes at this time and distribute one copy of the role they received to each member of their group.
- Have the students discuss their assigned role within their group and how it relates to the scenario.

- Tell the students that one person within their group will be playing the role they have been assigned and making a presentation to the class. Have the groups decide who this person will be and then discuss what costume/props they may want to use to make their presentation more dramatic.
- Have the groups appoint a group leader and have the leader collect the five roles, place them back into the small envelope, and bring them again for the next day's activity.

Day 2

- Have the students return to the groups they formed from the previous day.
- Pass out one large envelope to each student.
- Have the students open up their large envelopes.
- Have each student sort out their Stakeholder Grid cards into the following categories – Stakeholders, Environmental Concerns, Economic Concerns and Social Equity Concerns. (Tell them to refer to the definitions on the Stakeholder Grid).
- Tell the groups to discuss how they sorted the cards and have them come to a consensus as to which cards belong in which category.
- Explain to the class that they will be listening to the concerns of six members of their community (including their role), and they will have to classify each of these individual concerns in relation to the three Es of sustainability.
- Explain to the students that you want them to present their role in the first person (I) and that they are expected to paraphrase and elaborate on their role. However, they must make sure to stress their character's main concern about the water problem in their community.
- Ask for a volunteer to present from the individuals that were selected within each group to play the role.
- After the first person has presented, have each student place on their Stakeholder Grid the stakeholder and the concern that they had (under the correct E of sustainability).
- Continue this process until all groups/roles have presented.
- Explain to the students that they are allowed to move around their cards on the grid if they think that they have made a mistake categorizing the stakeholder's concerns.
- Stress to the students that they should not glue anything down on their grid until the completion of the presentation and the debriefing.
- Have each group come to a final consensus as to how each of the concerns is classified on the grid.
- Project an overhead of the Introduction to Simulation/Role Play – Table 2 Teacher Key and have the students correct any mistakes they may have (allow for a discussion if there are disagreements) and glue their cards onto the blank grid for the next exercise.

- Have each student take out the Introduction to Simulation/Role Play Community Goal and Criteria – Student Sheet from their large envelope.
- Discuss the definition of a goal and a criterion.
- Working as a class, have the students come up with the goal that their community is trying to attain.
- Using the concerns that have already been classified, have the class brainstorm two criteria in each of the three Es that their community feels are important in relation to their goal. Explain that criteria are usually no more than a concern beginning with a quantifier – example: maximizes, increases, improves, reduces, assures, etc.
- Have a student recorder write the goal and six criteria (two for each of the three Es) on a large piece of poster paper. Hang the poster paper on a wall in the classroom for a later activity.

Assessment

- Successful completion of Introduction to Simulation/Role Play – Table 1 Student Sheet
- Successful completion of the Introduction to Simulation/Role Play – Table 2 (Stakeholder Grid)
- Successful completion of the Introduction to Simulation – Community Goal and Criteria Student Sheet
- Active participation in class discussions and role plays



Scenario

The time is the present. You are an inhabitant of a small community located in the tropics. Although your community has made some strides towards improving its standard of living during the last several years, one main problem still persists – inhabitants of your community have continual battles with a variety of diseases that are related to the consumption of contaminated water. Some of the diseases contained in the contaminated water are very serious, and they have caused several deaths within your community, especially among small children. Diarrhea is the most prominent health problem that your community experiences, which is directly related to contaminated water. Diarrhea is caused by a variety of microorganisms including viruses, bacteria and protozoans. Diarrhea causes a person to lose both water and electrolytes, which leads to dehydration and, in some cases, death. In past years, your community has also had outbreaks of typhoid and cholera, as well as other bacterial, viral and protozoan water borne diseases.

Your community has a small medical facility, but no full-time doctor. A doctor from a city 120km away makes weekly trips to your community to attend to any medical problems that may arise. Your community has only one main source of water, a river that runs nearby. This water is used for drinking, cooking, washing clothes, irrigation, animals, as well as bathing and general hygiene.

Members of your community council understand that it is vital that they secure a sustainable supply of potable water in order to improve the community's quality of life. However, your community does not have the expertise to solve the persistent problems associated with drinking contaminated water and has asked for assistance from an international organization called the Sustainability Corps.

The Sustainability Corps is a nonprofit organization of internationally renowned scientists and mediators whose main objective is to assist in the creation of solutions to difficult and challenging problems relating to environment, economics, or equity issues that arise around the world. The organization focuses on small rural sites that often do not have the scientific expertise and economic resources necessary to establish the steps that are necessary to design an action-taking plan necessary to create a sustainable solution. It is important to the Sustainability Corps that the communities they help are actively involved in the design and implementation of the solution that is necessary to rectify their problem. They realize that scientific solutions, without the addition of the human element, rarely lead to a sustainable solution. The Sustainability Corps allows communities to focus on the evolution, process and products of human creativity and their impact on life and society. They focus

on giving communities the opportunities to appreciate and develop in themselves the human capacity to create, transform, enjoy and improve the quality of their life. In particular, the Sustainability Corps stresses the way humans can initiate change within their own communities and emphasizes both the importance of researching the developments made by people across space, time and cultures, and the importance of taking time to reflect on these developments.

By using a five-step, action-taking strategy, the Sustainability Corps guides community members through a process that allows them to:

- Clarify their specific goal
- Set criteria
- Select potential actions
- Collect and analyze data in relation to the potential actions
- Use *The Sustainable Decision Grid* to determine the most sustainable action to attain their goal



The Sustainability Corps has recently arrived in your community and has asked that members from your community attend a meeting where they will be asked to give their perspectives, opinions and concerns in relation to the problem. After hearing from a wide range of stakeholders, the Corps will ask your community to clarify the goal it would like to attain in the solution of the problem and the criteria that it thinks are important in attaining this goal. Once the goal and criteria have been clarified, the Corps will suggest several action-taking ideas that could be implemented to reach your goal.

The Corps will transport 30 members of your community by bus to a chemical water research facility located in a neighboring city where they (working in groups of five) will examine each potential action as to its effectiveness, cost, environmental and social impact. These 30 individuals will then return to your community and make presentations within their groups as to which action taking project they believe will be the most sustainable in reaching the goal your community has set.

Role

Local Youth

You are a local youth trying to improve the sustainability of your community. In past years, many practices your community has been involved with have severely impacted the environment in and surrounding your community. You understand that safe drinking water is essential for the sustainability of your community. You also believe the community should not “Rob Peter to Pay Paul.” In other words, safe drinking water should not be a trade off for further environmental degradation by your community.

Mother of Five Children

You are the mother of five children, ages 6 months to 8 years. You lost another child two years ago due to severe dehydration from diarrhea. The doctor told you it was something he contracted due to the poor water quality that exists within your community. Your main concern is the safety of your children. They must have safe water that does not contain harmful materials or organisms.


Prominent Community Elder

You are one of the oldest members of your community and your opinions are very respected. You realize that, like yourself, most of the members of your community are living below the poverty level. They live and sustain themselves on a day-by-day basis. Whatever solution is reached for this problem, it is essential that the cost is minimized and the effectiveness is maximized so as to not accentuate the poor economic condition of many members of the community.

Cards


Local Teacher

You have been a teacher in your community for over 20 years. You believe educating members of your community is a key factor in improving its standard of living. In determining the solution to the water problem within your community, you believe it will be essential that all members of the community be thoroughly educated in how to implement it.




Elected Official

You have been one of the elected leaders of your community for the last 10 years. You pride yourself on addressing all of the concerns of your constituents. In deciding what action should be taken in relation to your community's water problem, you want to be sure all stakeholders have their concerns heard. The solution to the problem should address as many of these concerns as possible.



Local Employer

You are a successful employer of the largest business in the community, with over 25 employees. You have a reputation of treating your employees fairly and being very concerned about their needs. You would like to see the solution to this problem not only provide healthy drinking water but also create more employment and increased revenue for your community. You believe once a successful solution has been achieved; it may be marketable to other communities with similar problems.



Potential Impact on Community Sustainability from Lack of a Healthy Water Supply

Name _____

Table 1

Sustainability Factor	Description of Potential Impact
Economic	
Economic	
Environmental	
Environmental	
Social Equity	
Social Equity	

Student

Stakeholder Grid Concerns

Name _____

Table 2

Stakeholder: Individuals, groups, organizations and/or institutions that have a role or stake in the problem and/or its solution	Economic: Concerns related, but not limited to – jobs, productivity, cost, income, human hours, etc.	Environmental: Concerns related, but not limited to – air quality, land use, green space, biodiversity, safety, etc.	Social Equity: Concerns related, but not limited to – diversity, equal opportunity and representation, access to education, etc.



Potential Impact on Community Sustainability from Lack of a Healthy Water Supply

Answer Key

Table 1

Sustainability Factor	Description of Potential Impact (Answers will vary)
Economic	<i>Industries (food production) that rely on freshwater will lose money</i>
Economic	<i>Cost for healthcare will increase dramatically</i>
Environmental	<i>Water recreational activities may be limited or nonexistent</i>
Environmental	<i>Lack of freshwater can harm wildlife</i>
Social Equity	<i>Lower income families may not have easy access to freshwater</i>
Social Equity	<i>Healthcare for water-related diseases may not be available</i>

Stakeholder Grid Concerns

Answer Key

Table 2

Stakeholder: Individuals, groups, organizations and/or institutions that have a role or stake in the problem and/or its solution	Economic: Concerns related, but not limited to – jobs, productivity, cost, income, human hours, etc.	Environmental: Concerns related, but not limited to – air quality, land use, green space, biodiversity, safety, etc.	Social Equity: Concerns related, but not limited to – diversity, equal opportunity and representation, access to education, etc.
Local Youth		<i>Preservation of local environment</i>	
Mother of Five Children		<i>Safety of children</i>	
Prominent Community Elder	<i>Economic impact on inhabitants, effectiveness</i>		
Local Teacher			<i>Education on how to implement</i>
Elected Official			<i>Input from all stakeholders</i>
Local Employer	<i>Employment opportunities</i>		

Community Goal and Criteria

Name _____

Goal: The purpose toward which an endeavor is directed; an objective.

Goal: _____

Criteria: A standard on which a judgment or decision is made. In this case, determining which action is the most sustainable in relation to your goal.

Take into consideration that criteria are:

- Tied to the three Es of sustainability
- Concepts that are important for the sustainability of your goal
- Factors to weigh or measure your action ideas to help you decide which is the most sustainable

Criteria for evaluating the most sustainable action plan

Environmental:

1. _____
2. _____

Economic:

1. _____
2. _____

Equity:

1. _____
2. _____

Student Sheet



Goal: The purpose toward which an endeavor is directed; an objective.

Goal: *Provide a safe, economically feasible freshwater drinking source for all of the community's inhabitants.*

Criteria: A standard on which a judgment or decision is made. In this case, determining which action is the most sustainable in relation to your goal.

Take into consideration that criteria are:

- Tied to the three Es of sustainability
- Concepts that are important for the sustainability of your goal
- Factors to weigh or measure your action ideas to help you decide which is the most sustainable

Criteria for evaluating the most sustainable action plan

Environmental:

1. *Promotes preservation of local environment*
2. *Maximizes safety*

Economic:

1. *Minimizes costs, maximizes effectiveness*
2. *Increases employment opportunities*

Equity:

1. *Assures maximum input from stakeholders*
2. *Incorporates educational strategies for implementation*

Answer Key

Water Facts and Figures

Did You Know...

- Water supplies are falling while the demand is dramatically growing at an unsustainable rate. Over the next 20 years, the average supply of water worldwide per person is expected to drop by a third.
- By the middle of this century, seven billion people in 60 countries may be faced with water scarcity (at least 2 billion in 48 countries will face such a harsh reality).
- One liter of wastewater pollutes about eight liters of fresh water. There is an estimated 12,000 km³ of polluted water worldwide, which is more than the total amount contained in the world's ten largest river basins at any given moment. Therefore, if pollution keeps pace with population growth, the world will effectively lose 18,000 km³ of fresh water by 2050 – almost nine times the total amount countries currently use each year for irrigation, which is by far the largest consumer of the resource.
- Asian rivers are the most polluted in the world, with three times as many bacteria from human waste as the global average. These rivers have 20 times more lead than those of industrialized countries.
- Water consumption has almost doubled in the last 50 years. A child born in the developed world consumes 30 to 50 times the water resources of one in the developing world.
- People already use over half the world's accessible freshwater, and may use nearly three-quarters by 2025.
- Over 1.5 billion people lack ready access to drinking water and, if current consumption patterns continue, at least 3.5 billion people – nearly half the world's projected population – will live in water-stressed river basins in just 20 years.
- Two-fifths of fish species come from freshwater habitats. There is one species to 15 km³ of freshwater, as compared to one species to 100,000 km³ of seawater.
- Humans are already appropriating more than half of all accessible surface water runoff, and this may increase to 70% by 2025. The three largest water users in global terms are:
 - Agriculture, 67%;
 - Industry, 19%
 - Municipal/residential, 9%
- Water is becoming scarce due to higher pollution levels and habitat degradation. Contamination denies as many as 3.3 billion people access to clean water supplies. In developing countries, an estimated 90 percent of wastewater is discharged directly into rivers and streams without treatment. Each year there are about 250 million cases of water related diseases, with roughly 5 to 10 million deaths.
- Producing a fast food lunch – hamburger, french fries and a soft drink – uses 1,500 gallons of water. This includes the water needed to raise the potatoes, the grain for the bun, the grain needed to feed the cattle, and the production of the soda.

- At least one in three Asians has no access to safe drinking water, and at least one in two has no access to sanitation.
- Freshwater fish stocks have declined by up to 90 percent in many of the world's largest rivers.
- The freshwater fisheries of the Mekong River and tributaries are estimated to have a market value of nearly U.S. \$1 billion per year. The 73 million people living on and around the Mekong River depend on fish and other resources in the river system for most of the protein in their diets.
- WWF's Living Planet Index indicates that the world has already lost over half its freshwater biodiversity since 1970, more than for forests and marine habitats. Despite this, freshwater ecosystems continue to disappear or be altered at an alarming rate. Threats to these ecosystems include:
 - Conversion of wetlands to other uses. Many countries are under pressure to develop floodplains and other wetlands for agriculture or industry.
 - Large infrastructure projects such as dams and canals which alter riverflows, destroying populations of species like fish and floodplain forest trees.
 - Misuse and overexploitation of water resources, resulting in depletion of aquifers and falling water tables.
 - Many rivers are being sucked dry, including China's Yellow River.

- Introduction of non-native species, which can choke waterways and become health hazards by providing breeding grounds for mosquitoes.
- Indiscriminate sewage and industrial discharge. Asia's rivers average 20 times more lead than rivers in the industrialized world, and 50 times more bacteria from human feces than the World Health Organization guidelines allow.

Some Interesting Numbers:

- 1.1 billion – the number of people worldwide who lack an adequate and safe supply of water for their daily needs, approximately one in five.
- 5 million – the number of people, mostly children, who die each year from illnesses caused by poor-quality water supplies.
- 5 – the minimum number of gallons (about 19 liters) of water needed to meet a person's daily needs, according to the World Health Organization.
- 2.2 million – the number of people who die each year from diseases related to contaminated drinking water and poor sanitation.
- 50 – the percentage of people in Africa who suffer from water-related diseases such as cholera and infant diarrhea.
- 20 – the percentage of the world's freshwater supply that is in Canada, which recently banned bulk exports of water.
- \$90 billion – estimated annual global investments in public water supplies.
- \$4 billion – estimated annual sales of the U.S. bottled water industry.