


How to effectively learn with

Innovative Problem Solving

 Tutorial for Students



The University of Georgia

The Department of Educational Psychology & Instructional Technology

The Department of Biological & Agricultural Engineering

Welcome to the Innovative Problem Solving Site

Hello! This tutorial will help students manage the Case-Based e-Learning Group's Food & Sustainability case.

The project was created through the collaborative efforts of University of Georgia's Department of Educational Psychology and Instructional Technology and the Department of Biological and Agricultural Engineering.

The goals of the project are to provide undergraduate engineering students with an online option for participating in community design projects. The website also provides students with an opportunity to learn problem solving skills and develop multiple perspectives through an exploration of ill-defined issues with input from consultants and community members.

This tutorial is made up of two parts:

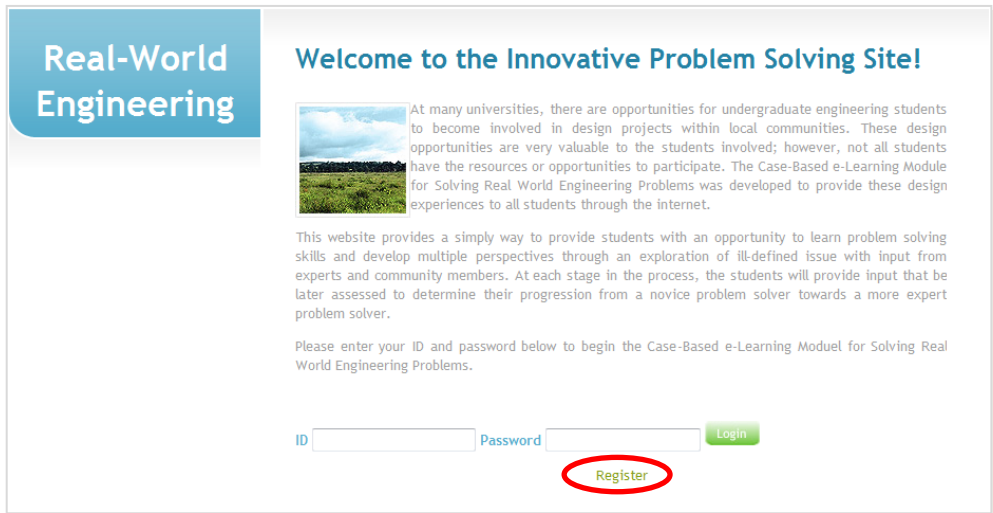
1. How to use this site
2. How to study the case

"How to use this site" shows general guidelines for using this site and "How to study the case" presents specific guidelines for learning the case.

HOW TO USE THIS SITE

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How to Register



Real-World Engineering

Welcome to the Innovative Problem Solving Site!

At many universities, there are opportunities for undergraduate engineering students to become involved in design projects within local communities. These design opportunities are very valuable to the students involved; however, not all students have the resources or opportunities to participate. The Case-Based e-Learning Module for Solving Real World Engineering Problems was developed to provide these design experiences to all students through the internet.

This website provides a simply way to provide students with an opportunity to learn problem solving skills and develop multiple perspectives through an exploration of ill-defined issue with input from experts and community members. At each stage in the process, the students will provide input that be later assessed to determine their progression from a novice problem solver towards a more expert problem solver.

Please enter your ID and password below to begin the Case-Based e-Learning Modul for Solving Real World Engineering Problems.

ID Password

- In order to begin the case study, you need to register with this site first. Please click **Register**.



Real-World Engineering

Registration

Last Name

First Name

User ID

Password

Email

Institution

Course

Course Code

Semester

Year

Instructor

College Year

- After entering all needed information on Registration page, click **Submit** button.
- Course code will be given by an instructor.
- In order to proceed to the case study, the instructor's approval is needed.

How to Log in/ Log Off



The screenshot shows the login page of the 'Real-World Engineering' website. On the left is a blue sidebar with the text 'Real-World Engineering'. The main content area has a header 'Welcome to the Innovative Problem Solving Site!' followed by a paragraph about design projects and a small landscape image. Below this is another paragraph about the website's purpose. At the bottom, there is a login form with fields for 'ID' and 'Password', a green 'Login' button circled in red, and a green 'Register' link.

- To login to the site, enter your valid ID and password and then click on [Login](#).



The screenshot shows the dashboard of the 'Real-World Engineering' website after a successful login. A green navigation bar at the top contains links: HOME, ABOUT US, TUTORIAL, DEMO, INSTRUCTORS, and HELP. On the far right of this bar is a red 'LOG OFF' button circled in red. The main content area features a blue sidebar with 'Real-World Engineering' and 'Case 1 (in progress)'. The central text says 'In this website, you will be going over the following cases. Please proceed from case 1.' Below this is a large image of a food processor with the text 'FOOD & SUSTAINABILITY' at the bottom.

- To logout of the site, simply select [LOG OFF](#) on the upper right hand of the screen.

How to Enter/ Choose the Case



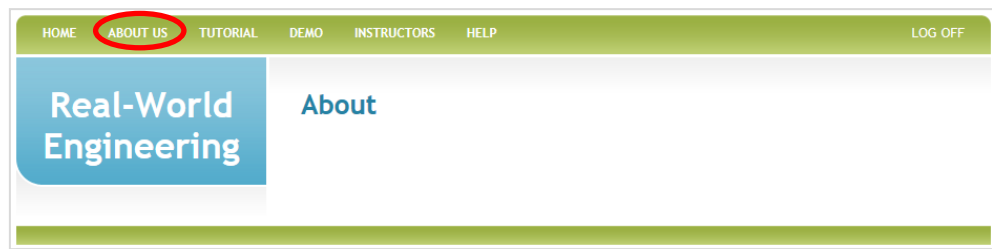
- After logging in on the homepage with your username and password, select the Food & Sustainability module by clicking on either Case 1 on the left or the large Food & Sustainability graphic in the center of the screen, as noted above.

The navigation bar

There are two ways to navigate the site. To navigate throughout outside of the module, you must use the navigation bar, located at the top of the screen.



- **HOME** takes you back to the first page of the site, the module selection screen.



- **ABOUT US** gives you general information about this project.

The navigation bar

 How to effectively learn with Innovative Problem Solving   The University of Birmingham The Department of Educational Psychology & Behavioural Technology The Department of Biological & Agricultural Engineering	HOW TO USE THIS SITE I How to Register 4 I How to Log In/ Log Off 5 I How to Enter/ Choose the Case 6 I The navigation bar 7 I The sidebar 10	HOW TO STUDY THE CASE I Stage 1. Exploring the Situation 12 Step 1: Discovering the Situation 12 Step 2: Applying Coherent Approach 14 I Stage 2. Constructing Reality 16 I Stage 3. Creating Solutions 22 Step 1: Articulating the Solution 22 Step 2: Exploring alternative solutions 25 Step 3: Refining the Solution 26 I Stage 4. Reflecting on the product and the process 28 Step 1: Reflecting on the Product and the Process 28
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- **TUTORIAL** takes you back to this tutorial to help you navigate the site and module.

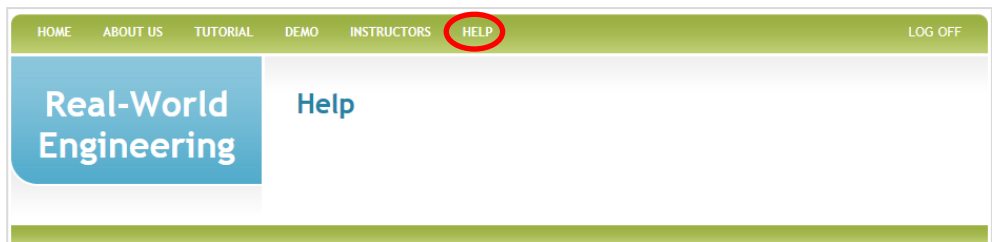


- **DEMO** takes you to a brief video introduction to the site.

The navigation bar



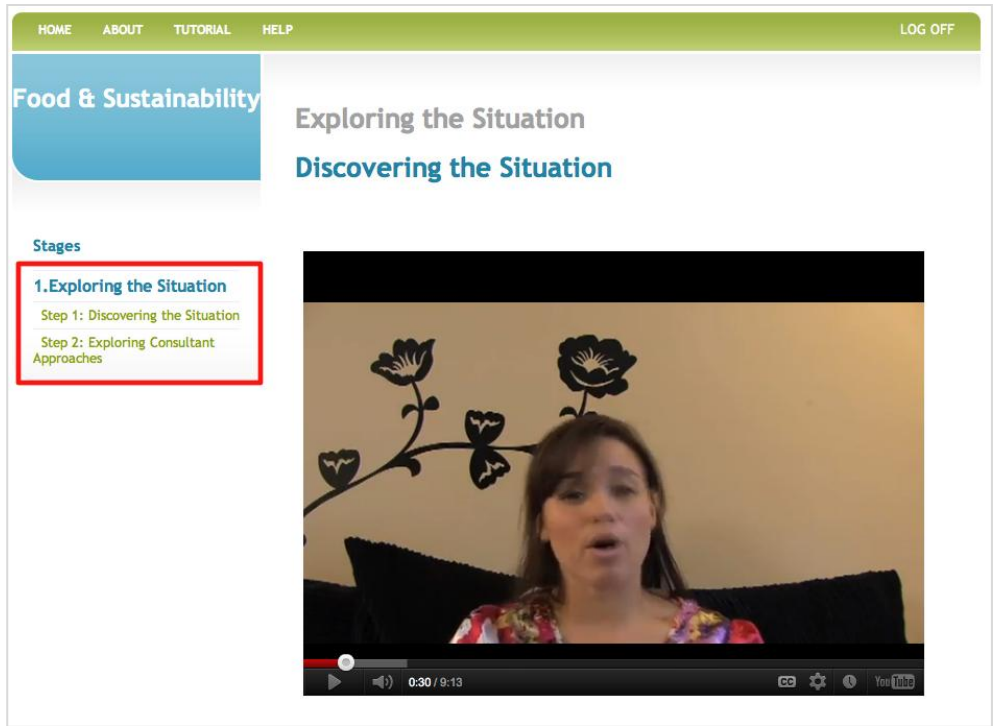
- **INSTRUCTORS** gives instructors the ability to request a class account, manage classes, and explore the evidence of the effectiveness of this project.



- **HELP** can give you further assistance with the project, site, or module.

The sidebar

On the left-hand side of the screen is the sidebar. This helps you navigate within the topics and sections of the module itself, from one stage or step to another.



- To navigate between stages and steps, simply click on the stage or step on the left-hand side of the screen.
- Only stages that have been previously viewed will display in the sidebar.

HOW TO STUDY THE CASE

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Stage 1. Exploring the Situation

Learning Goal

To realize the limitations of their thinking and to consider engineering design a process instead of a product.

Activities

Step 1: Discovering the Situation

Step 2: Exploring Consultant Approaches

Step1: Discovering the Situation

The screenshot shows a video player interface. On the left, a blue sidebar contains the text 'Food & Sustainability' and a 'Stages' section with two items: '1.Exploring the Situation' (highlighted in blue) and 'Step 2: Exploring Consultant Approaches'. The main area of the player has the title 'Exploring the Situation' and the subtitle 'Discovering the Situation'. The video frame shows a woman with dark hair and a colorful floral top, sitting in front of a wall with black floral wall art. A red arrow points from the '1.Exploring the Situation' stage in the sidebar to the video frame. The video player controls at the bottom show a play button, a progress bar at 0:30 / 9:13, and icons for closed captions (CC), settings, and a YouTube logo.

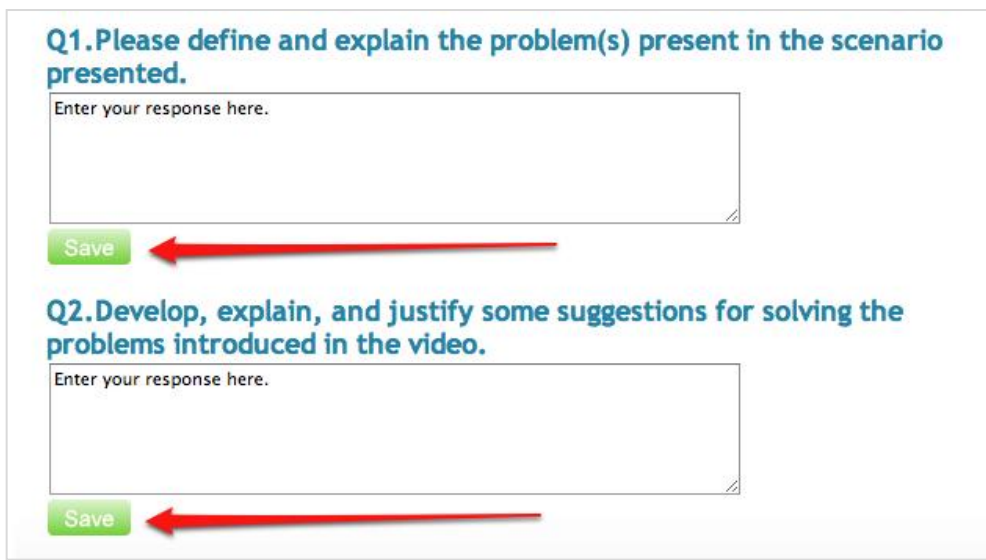
Watching videos

- In most stages and steps, videos are available to watch.
- To watch any video, click on the play icon in the center or bottom left side of the embedded YouTube clip.
- By clicking on CC, at the bottom of the navigation bar of the video, you can read the subtitle while watching the video.
- In this stage, the video contains the problem situation that needs to be discovered.

Stage 1. Exploring the Situation

Answering/responding to questions.

- After watching the videos in the module—or reading given information on a subject—you will be asked to respond to a series of questions or statements.
- In Stage 1, you are asked to develop and justify a definition of the problem, which is the first step in building a basic understanding of the situation and possible solutions.



Q1. Please define and explain the problem(s) present in the scenario presented.

Enter your response here.

Save

Q2. Develop, explain, and justify some suggestions for solving the problems introduced in the video.

Enter your response here.

Save

- Type your response in the boxes and **then hit the **Save** button.** This is **very important**. If you do not hit **Save** then your response will be lost if you leave the page.
- After entering *and saving* your responses, you can move to the next section of the module by selecting **Submit and Continue**. **IMPORTANT: once this is clicked, you may not submit new responses to the questions. Make sure you have saved your responses before pressing this button and moving on.** You may return to any section by selected the stage or step in the sidebar, but you may not enter new responses. The only way to unlock new stages of the module is to select this button.





Stage 1. Exploring the Situation

Step2: Exploring Consultant Approaches

Consultant perspectives and outside information.

- This module offers you an opportunity to hear the perspectives of experts in the field as well as read information from websites outside the module.

Exploring Consultant Approaches			
 JOHN SCHRAMSKI	• Profile	V EX1SQ	Text
	• Initial reaction to the problem	V EX1SQ2	Text
	• Other expertise to bring to the team	V EX1SQ3	Text
	• Knowledge necessary to solve the problem	V EX1SQ4	Text
 JULIA GASKIN	• Profile	V EX2SQ1	Text
	• Initial reaction to the problem	V EX2SQ2	Text
	• Other expertise to bring to the team	V EX2SQ3	Text
	• Problem constraints	V EX2SQ4	Text
	• Suggestions for dealing with real-world problems	V EX2SQ5	Text
	• Profile	V EX3SQ1	Text

- To select the videos on the left you would like to watch, click on the corresponding link on the right.
- To read the experts' perspectives rather than watching a video, click *text* on the rightmost column next to each topic.

Stage 1. Exploring the Situation

Q1. Summarize how each of the consultants would address the problem.

Save

Q2. Explain how your solutions to the problem(s) differ from theirs.

Save

Answering/responding to questions.

- In this step, you reflect on your initial approaches while summarizing the consultants' approaches to the problem and explaining how these consultants' approaches are different from your initial ones.
- Type your response in the boxes and **then hit the** **Save** **button.**
- After entering *and saving* your responses, you can move to the next section of the module by selecting **Submit and Continue**.
- The only way to unlock new stages of the module is to select this button.



Stage 2. Constructing Reality

Learning Goal

To navigate necessary information among the rich contexts and to revise their initial understanding of the problem.

Activities

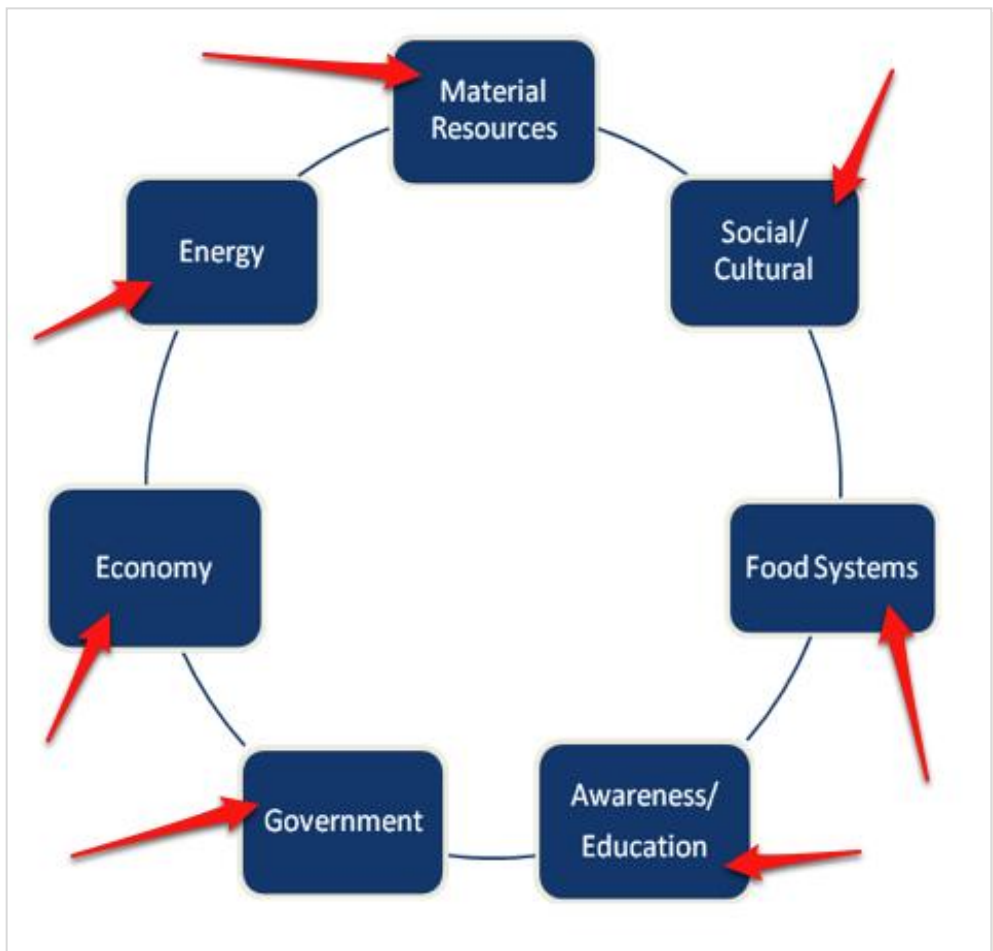
Step 1: Articulating Questions

Step 2: Exploring Reality

Step 3: Exploring Interpretation from Consultants

Navigating the Seven Steps.

In a major portion of the module, you will be asked to engage with seven separate steps, each related to a different issue brought up in the scenario.



IMPORTANT: to finish the module, you must select and complete each one of these steps, watching the videos and responding to each question. Remember to hit *save and continue* after responding.

Stage 2. Constructing Reality

Example of Social/ Cultural Issue



Watching videos

Let's take social/cultural issue as an example. You are provided a video clip that represents the social/cultural aspect of the overall problem. To watch this video, click on the play icon in the center or bottom left of the embedded YouTube clip. By clicking on CC, at the bottom of the navigation bar of the video, you can read the subtitle while watching the video.

Q1.What have you learned from the video on social/cultural issues?

Save

Answering/responding to questions.

After watching the video, you will be asked to respond to a question. Type your response in the box and then hit the Save button to save your response.

Stage 2. Constructing Reality

Example of Social/ Cultural Issue

Exploring Reality (Social/Cultural Issue)

Questions related to Social/Cultural Issues

- Q1. [Aren't there other means of putting someone through college, like financial aid or scholarships?](#)
- Q2. [How much different in price are healthy foods from junk foods?](#)
- Q3. [What kinds of health problems can happen from a junk food diet?](#)
- Q4. [Do food stamps cover healthy foods, too?](#)

Information related to Social/ Cultural Issues

- [Social/Cultural Issue](#)
 - [Population](#)
 - [Tradeoffs](#)
 - [Nutrition/ Health](#)
 - [Environmental Awareness](#)
 - [Eating Habits](#)

Exploring related to the issues

Under each stage and step in the module, you will encounter questions related to specific topics and issues as well as links to outside information. Click each one of these for further information, but keep in mind that each of these links to materials outside the website.

Q1. [What have you learned from the information related to social/cultural issues?](#)

Save

Q2. [What additional questions do you have and why?](#)

Save



Answering/responding to questions.

After watching the video, you will be asked to respond to a series of questions. Type your response in the boxes and then hit the [Save](#) button to save your responses.

Stage 2. Constructing Reality

Example of Social/ Cultural Issue

Exploring Consultant Interpretation (Social/Cultural Issue)

 MICHAEL OREY	• Profile	V EX3SQ1	Text
	• Material Resources	V EX3SQ5	Text
 DENISE EVERSON	• Profile	V EX5SQ1	Text
	• A role model	V EX5SQ6	Text
	• Meal time is no longer a priority in current society	V EX5SQ7	Text

Information related to Social/ Cultural Issues

- [Social/Cultural Issue](#)
 - [Population](#)
 - [Tradeoffs](#)
 - [Nutrition/ Health](#)
 - [Environmental Awareness](#)
 - [Eating Habit](#)

Exploring consultant interpretation

Under each stage and step in the module, you will also review/listen to how different consultants interpret the social/cultural aspect of the overall problem as well as encounter issues related to specific topics linked to outside information.

Stage 2. Constructing Reality

Example of Social/ Cultural Issue

Q1.What have you learned about social/cultural issues from the different consultants?

Save

Q2.How does your newfound understanding of social/cultural issues help you address the problem?

Save

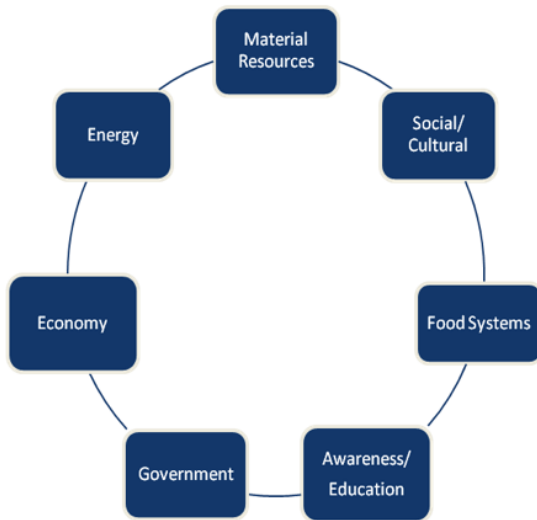
Answering/responding to questions.

After watching the video and exploring the related issues, you will be asked to respond to a series of questions. Through these questions, you refine your ideas by considering what you have learned from the related information and what other questions can be added. Type your response in the boxes and then hit the **Save** button to save your responses.

After entering *and saving* your responses, you can move to the next section of the module by selecting **Submit and Continue**. **IMPORTANT: once this is clicked, you may not submit new responses to the questions. Make sure you have saved your responses before pressing this button and moving on.** You may return to any section by selected the stage or step in the sidebar, but you may not enter new responses. The only way to unlock new stages of the module is to select this button.



Stage 2. Constructing Reality



Summary of the issues visited previously

Material Resources

What have you learned about material resources from the different consultants?

How does your understanding of material resources help you address the problem?

Energy

What have you learned about energy issues from the different consultants?

How does your newfound understanding of energy issues help you address the problem?

Economy

What have you learned on economic issues from the different consultants?

How does your understanding of economic issues help you address the problem?

Q1. After exploring the different issues, how would you define the problem presented in the scenario and why?

Q2. In addition to the issues presented in the videos, what other issues might be important in understanding the given scenario?

Answering/responding to questions.

After exploring all seven issues, you will be taken back to the initial diagram.

At this point you are provided with a summary of your responses to each of the seven issues.

You are then given the opportunity to define the problem presented in the scenario in your own words as well as present other issues which might be important in understanding the given scenario. Type your response in the boxes and then hit the **Save** button to save your responses.

Stage 3. Creating Solutions

Learning Goal

To build your own solutions considering multiple perspectives from consultants

Activities

Step 1: Articulating the Solution

Step 2: Exploring Consultant Solutions

Step 3: Refining the Solution.

Step1: Articulating the Solution

Students' definition of the problem

After exploring the different issues, how would you define the problem presented in the scenario and why?

Q1.Develop, explain, and justify a possible solution to the problem(s) presented.

Save

Answering/responding to questions.

You are shown your definition of the problem from the previous stage and asked to articulate your initial solution. Type your response in the boxes and **then hit the** Save **button.**

After entering *and saving* your responses, you can move to the next section of the module by selecting Submit and Continue .

Stage 3. Creating Solutions

Step2: Exploring consultant solutions

 JOHN SCHRAMSKI	• Profile	V EX1SQ1	Text
	• Being aware of the baseline	V EX1SQ9	Text
	• Establishing borders for transporting food from different locations	V EX1SQ10	Text
	• Increasing the number of local farmers and providing them with education	V EX1SQ11	Text
	• Buying locally	V EX1SQ12	Text
	• Educating the public the limitation of the natural resources	V EX1SQ13	Text
	• Food co-ops	V EX1SQ14	Text

Expert perspectives

You will view consultants' solutions and justification for their approaches. Select the videos on the left to watch the videos of the experts related to each topic. To read the experts' perspectives rather than watching a video, click *text* on the rightmost column next to each topic.

Q1.Explain how your suggestions differ from the consultants' suggestions.

Save

Submit and Continue

Answering/responding to questions

You will be asked to compare your solutions with consultants' solutions. Type your response in the boxes and **then hit the** Save **button**. After entering *and saving* your responses, you can move to the next section of the module by selecting Submit and Continue.

Stage 3. Creating Solutions

Step3: Refining the Solution

Q1. Finalize, explain, and justify a possible solution to the problem(s) presented.

Save

Answering/responding to questions

You will be asked to finalize, explain and justify your own solutions. Type your response in the boxes and **then hit the** Save **button**. After entering *and saving* your responses, you can move to the next section of the module by selecting Submit and Continue.

IMPORTANT: Once this is clicked, you may not submit new responses to the questions. **Make sure you have saved your responses before pressing this button and moving on.** You may return to any section by selected the stage or step in the sidebar, but you may not enter new responses. The only way to unlock new stages of the module is to select this button.

Stage 4. Reflecting on the product and the process

Learning Goal

To reflect on the process of problem solving and the process' effect on their problem-solving ability

Activities

Step 1: Reflecting on the Product and the Process

Step1: Reflecting on the Product and the Process

Q1.Explain the weaknesses and strengths of your final suggestions and solutions to the problems presented. How would you assess their overall quality?

Save

Q2.How has your approach to solving the problem changed as you learned more about the given situation?

Save

Q3.How do you think this learning experience has influenced your problem-solving ability in general?

Save

Submit and Continue

Answering/responding to questions.

You are asked to reflect on the process of problem solving, including the strengths and weaknesses of their solution(s), changes to their approach based on information gathering, and the process' effect on their problem-solving ability. Type your response in the boxes and **then hit the Save button**. After entering *and saving* your responses, you can finish the module by selecting **Submit and Continue**.



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