

TIDEE

Transferable Integrated Design Engineering Education



UNIT 2: Creating Teams and Learning Problem Definition Skills

Session 2: Developing a Problem Definition, Part I

- **Developing Criteria (activity)**
- **Components of a Problem Definition (activity)**
- **Examples of Problem Definitions for Planning a Bike Trip**
- **Creating a Problem Definition (activity)**

Unit 2: Creating Competent Teams and Improving Problem Definition Skills

Session 2: Developing a Problem Definition, Part I

Announcements and Objectives for the Day (5 minutes)

- a. Develop techniques on how to formulate problem definitions.
- b. Review the design process through participation.
- c. Develop better team communication skills.

Developing Criteria (25 minutes)

Problem definition is a difficult task to do. It requires every member of the team being focused on the same issue. Often the real problem definition does not occur until information is gathered and the team discusses the objectives to be reached. In this unit you will be asked to develop skills for writing problem definitions.

Components of a Problem Definition (25 minutes)

Creating a Problem Definition (25 minutes)

Assignment:

For the next session, each team will prepare bring their latest problem definition, which will be assessed by other teams. Other teams will review your problem definition to determine how well you have met the goals outlined in the previous activity, "Creating a Problem Definition."

Activity: Developing Criteria

Objective: To Establish Criteria for a Successful Bike Trip

Tasks

1. Keep the same team roles that were assigned in Session 1.
2. Begin thinking about how your team would take a bike trip that would last one week. Decide what you want to see or do on this trip. Share that information with your team members. Discuss whether you want to visit a few places, cover lots of miles, visit friends or relatives, go on mountain trails, have any physical or medical issues that would effect the trip, special needs for food, etc.
3. Create a commons set of objectives that your team will do on this bike trip. Prioritize them in order of importance to the team.
4. Discuss how these "team desires" can be written into objectives or criteria that someone else could use to develop your team's "dream bike trip."
5. Begin to formulate these into sentences. Check your wording. *Are the objectives or criteria broad enough so that a travel agent could work on developing your trip? Or, is the solution already provided and there would be no need to do any more work on the problem?*
6. Complete the following sentence on an overhead transparency: For our bike trip to be successful the following five criteria must be met. They are listed in order of importance: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____

Deliverables

- Reporter presents the criteria.

Criteria for Success

- Team members begin to know the strengths of other team members.
- Criteria are broad enough so that a travel agent could work on the problem.
- Criteria provide the opportunities for multiple solutions to the problem.
- Team members are supportive of each other.
- Team quickly focuses on issue, uses time efficiently and effectively.

Resources

- Past experience from bike riding.
- Past experience of teaming skills.
- Seventeen minutes of team activity.

Activity: Components of a Problem Definition

Objective: To understand what makes a good problem definition

Tasks

1. Review the handout *Examples of Problem Definitions for Planning a Bike Trip*.
2. Discuss what kinds of information should be included in a problem definition. How do you keep them generic but not give a solution. Typical issues can often be answered by what, when, how, where, who, etc. **A good problem definition will allow multiple solutions to any problem!**
3. Use this list to help you develop what should be included in a problem statement. Complete the following statement on an overhead transparency: A good problem statement should include: _____

Deliverables

- Team reporter prepared to describe what a good problem definition should include.

Criteria for Success

- Class becomes more aware of what makes a good problem definition.
- Team members become more supportive of each other and function as a more cohesive team.

Resources

- Fifteen minutes of team activity.
- Results from previous activity on *Planning a Bike Trip*.
- Handout: "Examples of Problem Definitions for Planning a Bike Trip"

Handout

Examples of Problem Definitions for Planning a Bike Trip

Team 3

With the use of touring road bikes, an ideal bike trip would:

- Take place on the highways or the Pacific coast of northern Oregon, Washington and include the islands of the San Juan's and Whidbey.
- Maximize fitness by 100 miles/day and sight see while traveling.
 1. Minimize excess equipment by staying at hotels, motels, etc.
 2. Minimize familiar sites by avoiding the I-5 corridor.
 3. Utilize ferry system.
 4. Last six days.

Instructor comments: This establishes a good sense of what team 3 expects from a bike trip without being too specific. Many good solutions could be found from this problem definition.

Team 1

Where could you plan a seven day northwestern coastal bike trip, covering no more than 30 miles per day with at least two stops per day for sightseeing?

Instructor comments: This is very general. The customer may be surprised by the results unless it contains information about the expectations of the team.

Global Travelers

What is the best way to bike from Gig Harbor to Bow, utilizing the ferry system, while seeing the San Juan's, all within a week and have fun doing it?

Instructor comments: This describes a particular area. It leaves out other details that should be specified.

Full Spectrum Unlimited

What would be the ideal Oregon Pacific Coast bicycle trip for a group of 4 people who wish to travel about 80 miles in a week, starting at Reedsport, OR and ending the trip in Newport, OR, but not riding more than twenty miles on a bike in any day?

The group wishes to use cross-training mountain bikes which can be ridden on pavement and all terrain vehicles to do the traveling. This summer vacation will visit attractions such as the Dunes National Park, Sea Lion Caves, and the town of Newport. We will also look additional exercise from hiking, swimming in the ocean, and playing Frisbee. The nighttime accommodations will consist of staying at luxurious hotels at the beginning and end of the bike ride, and the other nights will be spent camping.

While camping, the group hopes to have a salmon bake (with native Indian if they find some) and maybe a native sun dance. They also hope to learn how to fly-fish.

Instructor comments: *This one gives the solution. Why would this group need to consult someone else to work on their problem?*

Activity: Creating a Problem Definition

Objective: Create a problem definition and test the quality of it

Tasks

4. Check each of your written criteria for appropriateness.
5. Review the issues that other teams presented for their criteria. Decide whether your team might want to expand your list of criteria.
6. Determine if some of the criteria can be combined.
7. Write a final list of criteria that a travel agent could use to develop a bike trip for your team. ***A good problem definition will allow multiple solutions to any problem!***
8. Analyze your statement to see if you have already solved the problem and no further work is needed by an outside agency.
9. Write your team's problem definition on an overhead transparency. For fun, solve your problem by using the criteria to plan a one-week trip around Washington or Oregon State for your team.
10. Check to see if your five criteria in your problem definition are met.
11. Adjust your problem definition if needed.
12. On a blank page in your team journal, write your team's final version of your *Problem Definition for a Bike Trip*. In the first activity in the next session your problem definition will be passed to another team for peer evaluation and suggestions on how to improve the definition.

Deliverables

- Your team's problem definition for a bike trip is written on a blank page in your team journal.
- Team Reflector prepared to describe how the results of other team reports from the previous activity and the creation of a trip affected the focus and functioning of your team.

Criteria for Success

- Problem definitions are broad enough to allow multiple solutions.
- Team develops a comprehensive bike trip that meets all their criteria.
- All team members feel that this is a good trip that they want to take.

Resources

- Criteria and problem definitions presented by the team reporters from the previous activities.
- States of Washington and Oregon road maps.
- Seventeen minutes of team activity.