

TIDEE

Transferable Integrated Design Engineering Education



UNIT 3: Building Competent Teams

Session 3: Recycling PET Bottles, Part II

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Announcements and Objectives for the Day (10 minutes)

In this session you will create an implementation plan and then present the plan to the class orally. Your presentation should correlate elements of the engineering design process within the actions taken during the span of the short design process activities.

Establishing a Problem Definition (12 minutes)

You will work as a group to generate criteria and create a problem definition that will, in turn, provide a framework to implement the PET bottle recycling project.

Creating an Implementation Plan (18 minutes)

The focus of this activity is to develop implementation strategies for others to continue the process. The project is not completed at this stage. Plans need to be established to develop a prototype and then analyze that prototype for problems, which can be checked and modified.

Preparing and Presenting an Oral Report of Team's Design (12 minutes)

This focuses on developing communication skills. The team must pull together to synthesize their work by making decisions on:

1. What they are going to present such as their project's merits, use, and manufacturability, and
2. Who is responsible for each portion of the presentation?

This requires the team to organize their work so that it can be written succinctly, thus making the presentations proceed in a timely fashion. The entire team stands up at the front of the class and each member on the team is responsible for giving at least one statement. This helps break down the fear of being in front of an audience because

- Your team members are there to support you
- The focus is on what the team did as a whole rather than feeling like you are defending your own work
- There is pride in what "we" accomplished because it was better than what each individual could have done by themselves

Identifying the Engineering Design Steps Used during This Project (10 minutes)

Reviewing and revising the process is an important element for developing a better understanding of the process. This is the time to bring closure to this mini-design project and focus on the process rather than the product.

Activity: Establishing a Problem Definition

Objective: Generate criteria and create a problem definition that will provide a framework to implement the PET Bottle Recycling Project.

Tasks

1. Team members discuss issues related to manufacturability or process of recycling PET bottle.
2. Team members establish criteria that will define a good process.
3. Each team writes a problem definition statement that others in a different team could use to develop the process.
4. Team analyzes criteria to verify that it measures the success of their design.
5. Team prepares an overhead transparency listing problem definition and criteria.

Deliverables

1. Reporter gives the team's problem definition and criteria.
2. Reflector reports on greatest strength of the group during this activity, what the group could do to improve its performance, and an insight gained.

Criteria for Success

- Criteria are specific enough to evaluate the final design
- Criteria include requirements for safety, appearance, functionality, and manufacturability

Resources

- Criteria used previously to select their best idea
- Team understanding of design and manufacturing issues related to their best idea
- Twelve minutes of team activity

Activity: Creating an Implementation Plan

Objective: To plan the details for the design and manufacturing processes for the new product.

Tasks

1. Team members review their problem definition and explore possible techniques that they could use to create their new product.
2. Teams investigate manufacturing and use issues to select appropriate practices.
3. Team members identify steps that are needed to implement the process.
4. Team members develop their ideas so that the completed product to meet their design criteria.
5. The team draws a tree-diagram in their team journal showing the steps needed to implement the process.

Deliverables

A tree-diagram showing the steps needed in the process.

Criteria for Success

- All alternatives have been explored and the process is plausible and well defined.
- The team has defined procedures for manufacture and use of the product.

Resources

- Problem definition and criteria developed in earlier activities.
- Team members' understanding of product use and manufacturing options.
- Eighteen minutes of team activity.

Activity: Presenting an Oral Report of the Team's Design

Objective: To develop team-reporting skills when informing other teams about ideas and methods used in the design.

Tasks

1. Each team discusses how they are going to orally present their project's merits, use, and manufacturability.
2. Team members prepare overhead transparencies to use in their presentation.
3. Team members decide who is responsible for each portion of the presentation.

Deliverables

All team members participate in giving an overhead projector report about their project.

Criteria for Success

- Reports are interesting and effective in communicating to others
- All team members participate in the oral report for their design.

Resources

- Previous activities and materials generated.
- Creativity and communication skills of team members.
- Twelve minutes of team activity.

Activity: Identifying the Engineering Design Steps

Objective: To understand the iterative nature of the design process and the complex relationship between steps by analyzing the process used during the PET Bottle Project.

Tasks

1. As teams, identify the design process steps used in each activity of the PET bottle project, or alternatively, the activities in which each process step was used.
2. Fill in the following matrix to identify the process steps for various activities within the project. Use (+, 0, -) to evaluate the step in each activity, where + indicates that it was the main focus, 0 was included incidentally, and – wasn't significantly addressed.
3. Analyze how many engineering design steps were used within each activity.
4. Deduce which engineering design step was used the most during the project.
5. Decide how many times the process was repeated.

Deliverables

1. Reporter identifies which design process steps were used in the PET bottle project, and illustrates the repetitive nature of the process.
2. Reflector reports on greatest strength of the group during the entire PET bottle project, what the group could do to improve its performance, and any insights gained.

Criteria for Success

- Design process steps are interpreted with a broad meaning.
- Understanding how steps may be used more than once.

Resources

- PET bottle design process handouts.
- Record of team activities used in the project.
- Design process information used in previous activities.
- Ten minutes of team activity.

| Design Competencies | #1 Charact. | #2 Uses | #3 Criteria | #4 Category | #5 Best | #6 Decide | #7 Problem Definition |
|--------------------------------|----------------|------------|----------------|----------------|------------|--------------|-----------------------------|
| Evaluation and Decision Making | | | | | | | |
| Information Gathering | | | | | | | |
| Idea Generation | | | | | | | |
| Problem Definition | | | | | | | |
| Implementation | | | | | | | |
| Communication | | | | | | | |
| Teamwork | | | | | | | |
| Process Development | | | | | | | |