GE105
Introduction to Engineering Design
College of Engineering
King Saud University

Studio 10.

1. How to prepare Posters
2. Concept Generation and Evaluation

SPRING 2016
Guide for Poster Design

- Size A0 (Portrait/Vertical)
- Can use Microsoft PowerPoint to design it
- Apply The 20-40-40 Rule
  - 20% Text
  - 40% Graphics
  - 40% White Space
- Use Heavy lines for ease in viewing
- Should be easy to read from more than one meter away
## Font Types, Use and Size

<table>
<thead>
<tr>
<th>Font Use</th>
<th>Font Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>96 pt</td>
</tr>
<tr>
<td>Authors</td>
<td>72 pt</td>
</tr>
<tr>
<td>Affiliations</td>
<td>36-48 pt</td>
</tr>
<tr>
<td>Section Header</td>
<td>32 pt</td>
</tr>
<tr>
<td>Text</td>
<td>24 pt</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>18 pt</td>
</tr>
</tbody>
</table>

### Suggested Font Type:
- **Tahoma**
- **Helvetica**
- **Palatino**
- **Arial**
- **Times New Roman**
Poster Mandatory Contents

Your poster should include:

• A descriptive title
• Overview of the design project
• What? How? Why?
• Primary and secondary objectives
• Constraints and criteria
• Human factors
• Creative component
• Generated concepts
• Concept evaluation
• Conclusions
• Acknowledgements
Some Advices:

• Photographs as backgrounds lose quality when enlarged (use 150-300 dpi resolution)

• Dark backgrounds are easier on the eye but use more ink

• Colored backgrounds can often break the monotony of white posters, thus attracting a viewer

• Use light backgrounds with dark photos and vice versa

• Neutral/gray backgrounds enhance color photos while white backgrounds reduce their impact.
Be creative...
END of part one
....next
(concept generation and evaluation)
Reminder: Morphological Analysis

• The problem is divided into smaller sub-problems.

• Concepts are generated to satisfy each smaller problem.

• A four-step process

  1. list the functions and features required
  2. Identify as many ways as possible for each feature or function
  3. Draw a table with functions listed vertically and features or concepts listed horizontally
  4. Identify all practical combinations
Reminder: Morphological Analysis (Example)

Design a means of transportation for disabled persons

<table>
<thead>
<tr>
<th>Feature</th>
<th>Concept 1</th>
<th>Concept 2</th>
<th>Concept 3</th>
<th>Concept 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Support</td>
<td>armchair</td>
<td>under arm</td>
<td>leg support</td>
<td>sofa</td>
</tr>
<tr>
<td>Ground Support</td>
<td>rollers</td>
<td>tracks</td>
<td>wheels</td>
<td>skids</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Battery</td>
<td>solar</td>
<td>human</td>
<td>air</td>
</tr>
<tr>
<td>Speed Control</td>
<td>automatic</td>
<td>manual</td>
<td>on-off</td>
<td>-</td>
</tr>
<tr>
<td>Direction Control</td>
<td>side thrust</td>
<td>one side lock</td>
<td>reverse</td>
<td>Steering</td>
</tr>
</tbody>
</table>

**Design 1:** Armchair + Rollers + Solar + Automatic + Side-thrust

**Design 2:** Armchair + Wheels + Human + Manual + Steering
Reminder: Concept Evaluation

- Characteristics of Engineering Decisions
  - Multiple criteria
  - Criteria are of different importance
  - Criteria are conflicting
  - Multiple interested parties

- Use a Decision Matrix:
  A simple decision approach to weigh pros and cons applying weight and rate concept (multiply and sum)
Weights

- To determine the importance of each attribute, we use a simple approach based on weights that sum to 100%

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Direct Energy</th>
<th>Manufacturability</th>
<th>Flexibility</th>
<th>Holding Energy in Oven</th>
<th>Total Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scenario 1: Compromise</strong></td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Scenario 2: Most light in</strong></td>
<td>40</td>
<td>5</td>
<td>15</td>
<td>40</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Scenario 3: Easy to make</strong></td>
<td>20</td>
<td>40</td>
<td>20</td>
<td>20</td>
<td>100%</td>
</tr>
</tbody>
</table>
### Rating the Concepts

- This scenario uses weights \((40, 5, 15, 40)\)

<table>
<thead>
<tr>
<th>Concept</th>
<th>Direct Energy</th>
<th>Manufacturability</th>
<th>Flexibility</th>
<th>Holding Energy in Oven</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weighs</strong></td>
<td>40</td>
<td>5</td>
<td>15</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td><strong>Concept 1:</strong></td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>285</td>
</tr>
<tr>
<td>No reflector</td>
<td>40</td>
<td>50</td>
<td>75</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Big window</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Concept 2:</strong></td>
<td>4</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>545</td>
</tr>
<tr>
<td>1 reflector</td>
<td>160</td>
<td>40</td>
<td>105</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Small window</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Concept 3:</strong></td>
<td>9</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>590</td>
</tr>
<tr>
<td>Parabolic</td>
<td>360</td>
<td>10</td>
<td>60</td>
<td>160</td>
<td></td>
</tr>
</tbody>
</table>
Group Activity

• **Part 1: 40 minutes**
  • Each group generates concepts for their final design project using morphological analysis
  • At least three alternatives must be generated

• **Part 2: 20 minutes**
  • Use the weight-and-rate to evaluate your concepts

• **Part 3: 15 minutes**
  • Present your work to the Instructor and your peers in class