IN-CLASS ACTIVITY #1
(Adapted from Benoit and McDougall, 1995)

Objective: Compare and contrast craft production and mass production.

Method: Groups of nine (9) will be producing paper airplanes in a simulated production process. Aircraft are produced following these nine steps:
1. Write an aircraft identification number in the serial number box on Side 2 of the aircraft pattern; turn the pattern over so that Side 1 is facing up.
2. Fold #1: The first right nose sweep.
3. Fold #2: The first left nose sweep.
5. Fold #4: The second right nose sweep.
6. Fold #5: The second left nose sweep.
7. Fold #6: The third (last) right nose sweep.
8. Fold #7: The third (last) left nose sweep.
9. Acceptance Test Flight: Stand behind the launching line and fly the aircraft into the box. If the test pilot misses, s/he must retrieve the aircraft, adjust the trim tabs to control the flight, and try again. Each aircraft must be successfully tested (i.e., flown into the box) in order of production before the next aircraft can be tested. Note: the serial numbers help to control the flight testing sequence.

Warm-Up – Each worker should produce an aircraft and practice flying it.

Pass 1 – Craft Production: Each worker produces and tests his/her own paper airplane.

Pass 2 – Mass Production, Assembly Line 1: Each group forms an assembly line with each worker in the group performing one step in the process.

Pass 3 – Mass Production, Revised Assembly Line: Each group takes five minutes to analyze its production process and make recommendations for improvement. No additional workers may be hired, and all workers must be assigned a task. Reorganize the assembly line to meet the revisions.

Each production run lasts 5 minutes. At the end of each run, the number of acceptable paper aircraft is counted, and the average output per worker is computed.
**Discussion:** Consider each of the following questions individually and as a group; **the team recorder should document the team’s discussion and hand in a copy of the team’s responses to these questions along with the names of everyone on the team at the end of class.**

Team members: ____________________________________________

**Pass 1 – Craft Production:**
- What did you observe about the process?
- Did all the aircraft take the same amount of time to produce and test?
- If not, to what can you attribute the variation?

**Pass 2 – Mass Production, Assembly Line 1:**
- How did the assembly line process differ from the craft production process?
- What were the implications for the workers?
- What are the implications for the process as a whole?

**Pass 3 – Mass Production, Revised Assembly Line:**
- What recommendations did your group make and why?
- Did the recommendations improve the line? If so, how? If not, why not?
- What effect did the recommendations have for the process as a whole?

ME/IE546: Designing Product Families  
T. W. Simpson

PENN STATE UNIVERSITY  
Department of Mechanical & Nuclear Engineering  
Department of Industrial & Manufacturing Engineering

ME546 DESIGNING PRODUCT FAMILIES IE546

IN-CLASS ACTIVITY #1

Please rate each of the following on a scale of 1 to 7, 1 being the worst, 7 the best.

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<tr>
<th>Rating</th>
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<td>Rate your understanding of <strong>craft production</strong> before the exercise.</td>
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<td>Rate your understanding of <strong>mass production</strong> before the exercise.</td>
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<td>Mass production – Run 2</td>
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| Rate your understanding of the word **bottleneck** before the exercise. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Rate your understanding of the word **bottleneck** after the exercise. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Tear this sheet off and hand it in on your way out.