PROFESSIONAL EDUCATION
Short Programs

L1: LEGO® Manufacturing Game

Round 1: Mass Production

ESD.39s

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ACTIVE LEARNING

What is Active Learning?

- Teaching techniques that stress students' active involvement in their own learning
- "*. . . interactive engagement of students in heads-on (always) and hands-on (usually) activities which yield immediate feedback through discussions with peers and/or instructors.*" (Hake)

Why active learning?

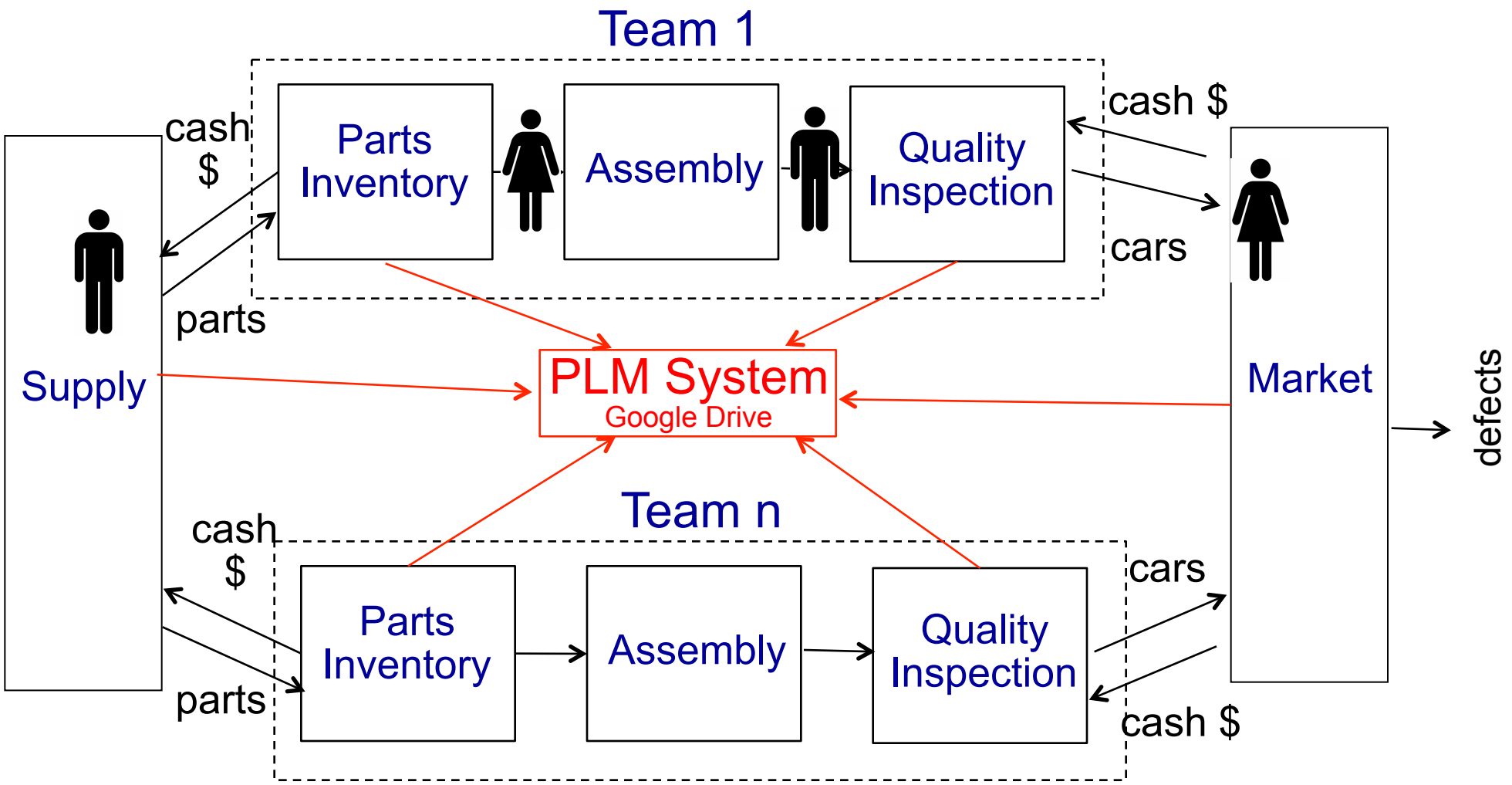
- Increased gain in understanding
- Provides more feedback to instructors
- More motivating to students … Have Fun !
- Accommodates different learning styles

LEGO® Manufacturing Game

- Experience challenges and rewards of the manufacturing paradigms using a simple LEGO® game
  - Manufacture small toy cars with ~ 25 parts each
- Round 1 (Today)
  - Mass Production – manufacture cars with efficiency and quality, but no variety (only one model)
- Round 2 (Tomorrow)
  - Production with Variety – manufacture a family of three cars, while managing inventory and cash, but no platform
- Round 3 (Day 3)
  - Mass Customization – manufacture a family of three cars which are designed based on a common platform
- Each round will take approximately **1 hour** to play

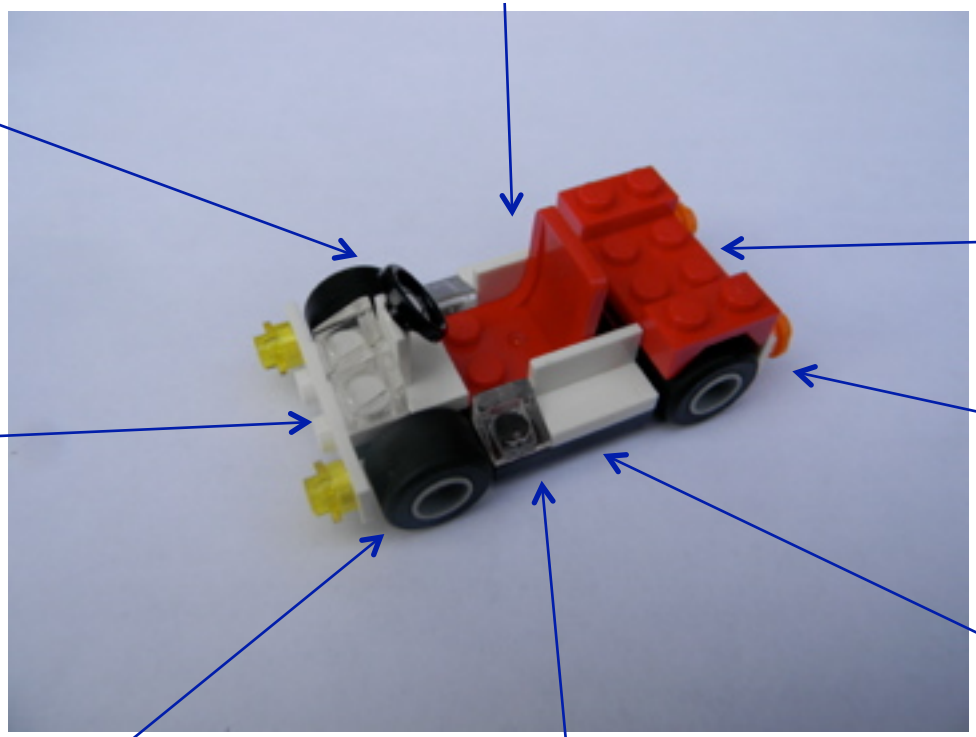
Round 1 Setup

- Each team has same initial inventory, except for chassis
- $100 cash at start, get more cash by selling product to market



Model S ("Sport")

- Sport car type design
- Standard design for all teams, each car has a S/N
- Each team has a "master" car, need to build exact copy



PLM System

- Purpose of PLM System is to track events in the game
  - Purchases of parts from supplier
  - Start and end of assembly process
  - Sales to Market
  - Defects
- Each team has its own live Google Spreadsheet
  - URL: http://tiny.cc/LEGO-Team1 (replace "1" with your team number)
  - Sales can only take place when info is complete for each S/N

	A	B	C	D	E	F	G
1	**Team 1**	Supplier	Purchasing	Assembly	Customer	Customer	Customer
2	**S/N**	**Time Chassis Sold**	**Time Assembly Start**	**Time Assembly End**	**Time Car Sold**	**Defect**	**Price**
3	*Sample*	*0:35:00*	*0:47:00*	*1:55:00*	*2:14:00*	*0*	*$20*
4	**1**	0:00:00	0:21:00	2:01:00	2:45:00	0	$20
5	**2**	0:05:00	0:54:00	2:23:00	3:01:00	1	-$10
6	**3**	0:08:00	1:12:00	2:45:00	3:32:00	0	$20
7	**4**	1:10:00	1:50:00	3:20:00	4:15:00	0	$15
8	**5**	1:15:00	2:05:00	4:20:00	5:12:00	0	$15
9	**6**	2:13:00	3:15:00	5:05:00	5:15:00	0	$10
10	**7**	3:35:00	4:34:00	6:17:00	7:15:00	0	$5

Goals and Rules for Round 1

- Learning Goals
  - Power of the Learning Curve ("practice makes perfect")
  - Speed versus Quality Tradeoff ("haste makes waste")
  - Specialization and Monotony ("specialization is good, but beware of boredom")
- Rules
  - Each team has an identical starting inventory and starting cash $100
  - Teams gets 5 minutes to get organized
  - Purchase chassis for $5 each (stable price)
  - Initial car price for a correctly completed car is $20
    - But prices fall over time, look at board for current selling price
  - Cash upon delivery of a correct car and complete PLM record
  - A defective car is rejected and causes a penalty of $10
    - Reflects warranty and reputational cost
  - Game ends when clock expires (about 30 minutes)
  - Team with maximum cash in hand wins (unsold inventory is worthless)
  - Disqualified if caught stealing cash or parts from other teams
  - Copying other team's processes or strategies is allowed
- Questions? … Lets Go !

Lego Game Round 1 Impressions

- Team Cash Results
- Lets go around the teams and discuss:
  - How did your team do?
  - What was your initial strategy?
  - How did your team learn and adapt during production?
  - What would you do differently if you could start over again?
- More in-depth look at results tomorrow morning