LEGO Engineering Symposium 2009

Competition Development Lab

CEEO Facilitators:

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General Schedule of Development Lab

- Morning:
  - Introductions
  - Introductory “Mini-Competition”
  - General Group Discussions
  - Sub-Group Work
  - Morning Wrap-up
- Afternoon:
  - Continued Sub-Group Work
  - Presentations of Activities/Findings
  - Afternoon Wrap-up & Discussion

Concepts to Consider while Developing

- When/where is the competition happening?
  - In Class vs. After School
- Evaluation and scoring of the competition?
  - Winning Graciously vs. Losing Sorely
- Aspects of Competitions
  - The Good vs. The Bad

Introductory Mini-Competition

“Competitions” Brainstorming

- Girls ARE just as competitive
  - All girl environment takes out distraction of boys
- Forced in-school introduction to tool-set fuels the after school leagues
  - Lean that “not as scary” as previously thought
- Delivery of Message
  - Important! How it is delivered is crucial/critical
  - E.g.: In Australia, RoboCup JR (“win win win”) is male dominated vs. JrFLL (“gracious profesionalism”) which has 60-40 F-M split

“Competitions” Brainstorming

- Open ended activities
  - Not just ONE goal that determines success/winner
  - Multiple parameters within which the teams work
  - These parameters not just set by teacher
    - Have students come up with criteria (ownership)
- Evaluate not just final machine/creation
  - Portfolio, process, presentation, etc
- Whole solution vs. Tweaking Technical Aspects

“Competitions” Brainstorming

- CONTEXT, Real World Context
  - Important to present the context in which the competition falls, not just the competition itself
- Family involvement
  - Parental encouragement
- Misperceptions
  - “Guys know how to work with tools”
  - This can be mentally discouraging to females, even if not true fundamentally

“Competitions” Brainstorming

- Competitions arises naturally, even when not intentionally designed into the activity
- Seeing what other teams have done, even during competition
  - Collaboration (e.g. “stop & present” along the way) generates better output from all teams
- Don’t underestimate the idea of play
  - Get hands on materials and explore
  - Provide time to experience materials before jumping into the competition

“Competitions” Brainstorming

- Research about real-world devices
  - Again, bring in context; what is important to students
- Categories of Challenges vs. One Big Competition
  - Winners in each category vs. Overall winner
  - Have different groups collaborate to determine “best features” combined together for final machine
  - Challenges vs. Competition

“Competitions” Brainstorming

- Make steps to competition
- Evaluation not just judged on final product
  - Research on existing products
  - Students set goals
  - Student groups become experts in each category, and collaborate to incorporate the different features into one final class product
  - Presentations and collaborations required between groups in order to achieve final success

Competition Activity Brainstorm

- WeDo Exploration
  - Great entry to the product
  - For parents (& others unsure about robotics) in addition to just the younger students
  - Ideal for smaller specific tasks (vs. long-term “big” projects
  - Build confidence, then move to more open-ended projects
  - 2-3 students max; and 2 group minimum to encourage collaboration between groups

Competition Activity Brainstorm

WeDo Exploration

Competition Activity Brainstorm

- Relay-Race
  - Collaboration between steps
  - Cooperation required during pre-building negotiations
  - Opened ended + choices, leading to student buy-in

Relay Race Videos

Competition Activity Brainstorm

- Lawn Mower
  - Competition in several categories (students pick category most relevant/of interest to them)
    - Sense when lawn needs to be mowed (height)
    - Sense obstacles (keep children/pets away from blades)
    - Navigate rough terrain
    - Locating (+ picking up) dog doo
    - Algorithm for covering entire lawn area (pen to track where it has been, what needs to be covered, etc)

Lawn Mower Prototypes

Competition Activity Brainstorm

- Lots of Activity Categories Relevant to Students
  - Parade Float
  - Amusement Park
  - Recycling Machine (sorting)
  - Alternate Interfaces
  - Digital Music
  - Rube Goldberg
  - Search & Rescue
  - Real Needs
  - Home Gadgets (vacuum, dishwasher, lights/alarms, appliances)
  - Systems
  - Advertisements (moving signs)
  - Lawn Mower
  - Fetch Snacks/Drinks

Prettiest Flower Competition

- Limited number of pieces; already have something built
- Programming competition
- Judged by teacher (criteria?)
- Discovered: drawing stem + petals is difficult!
- Not about speed or destructive or attack or race
- Emphasize programming creativity

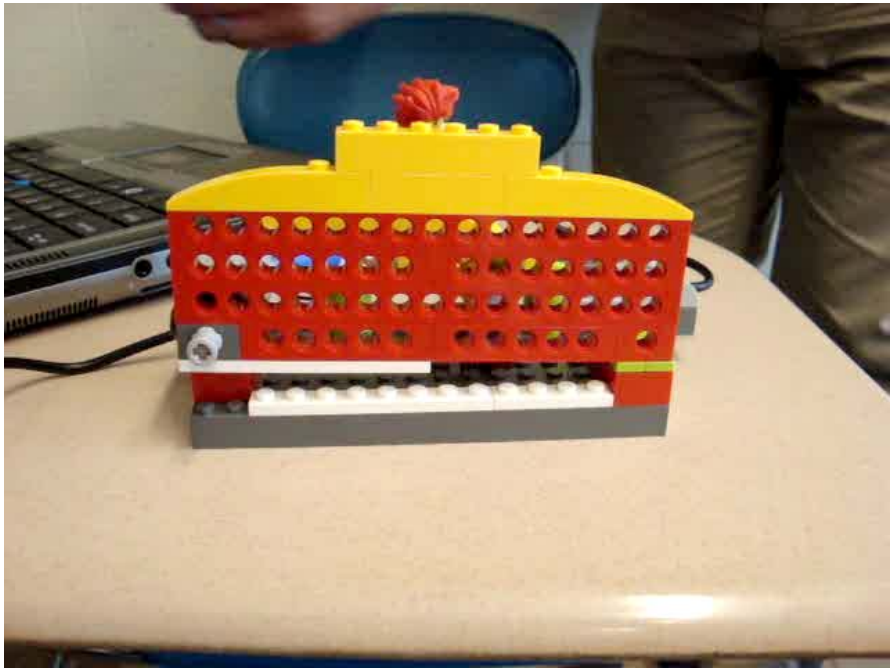
Competition Exploration

Broadway Performance (WeDo)

- Build a Broadway Performance, with curtain, actor, sounds, etc.
- Not a car!
- The whole picture
  - Not just a single task: lots of choices
  - Bring everything together, after each group builds portions

Broadway Performance Prototype

Curtain Exploration Video



Performance Video

Competitors to start, Collaborators at the end

Thanks to everyone who attended our "Competition" Development Lab

Morgan Hynes

and

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