

The Development of a LEGO MINDSTORMS-based Curriculum for Human Factors Design Students

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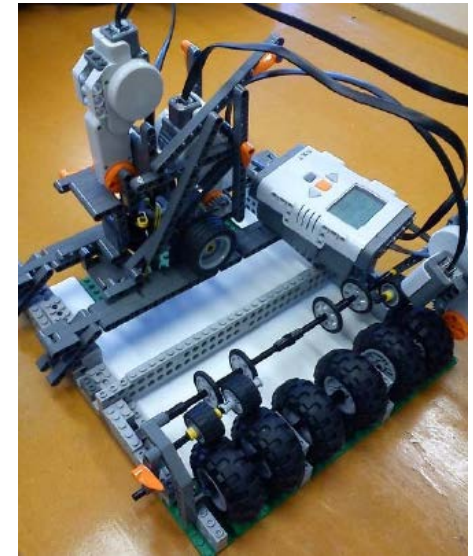
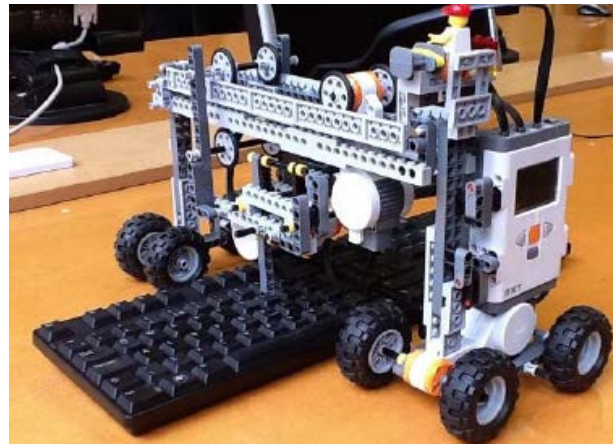
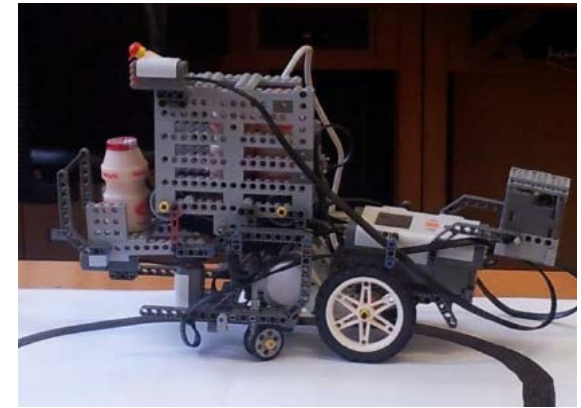
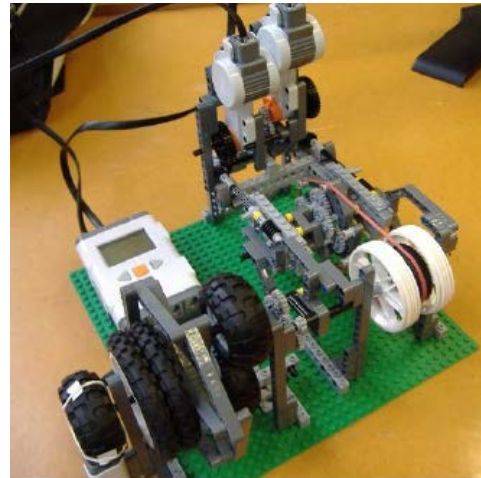
Problem?

How can **Lego-Mindstorms** be used to help **human factors design students** understand **overall system design processes**?



LEGO Mindstorms in Higher Education

- Countries
- Year group
- Courses
- Class size
- Group size
- Learning objectives
- LEGO project types
- LEGO project number
- Control software
- Assessment



Develop our own curriculum

- A line-following electronic wheel chair for two different sizes of Teddy Bears
- A design brief
- Training materials
 - ✓ LEGO S/W
 - ✓ Wheel base design



Develop our own curriculum

- Four design roles
 1. Control engineer
 2. Mechanical engineer
 3. Human factors engineer
 4. Project coordinator

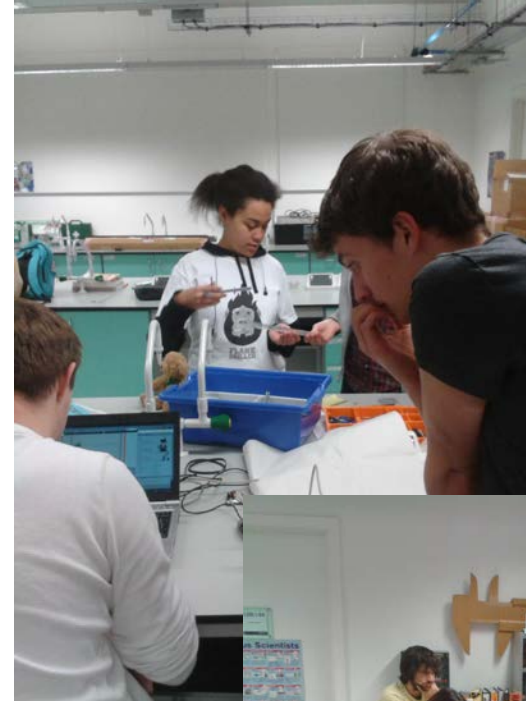
How successfully or unsuccessfully the team manage challenges during design processes?

	Exploration	Generation	Evaluation
Uncertainties			
Interdependencies			
Iteration			
Trade-offs			
Constraints			

Reflection sheet

Piloting Sessions

1st session (week 1)	2nd session (week 2)
Introduction (10 minutes)	Group work (85 minutes)
Group discussion (10 minutes)	Time-trial competition (10 minutes)
Technical introduction (10 minutes)	Group reflection (15 minutes)
Group work (90 minutes)	Final evaluation (10 minutes)



Results - Observation

- Different team work and design strategies
- Improved understanding of the nature of the design process



Results – Student feedback

- **Positive responses**

- ✓ Relevant to their wider design studies
- ✓ Improved confidence in tackling future design tasks

- **Mixed Responses**

- ✓ Insufficiency of the introduction and handout materials in supporting the different roles

Next

- Revised curriculum (step-by-step, multiple projects)
 1. Instruction-based simple individual project
 2. Goal-based team project
 3. Open theme team project
- In discussion with ADT and programme leads in LDS