A Multi-Disciplinary Project to Enhance Workplace Readiness

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Target Graduate Skills

▶ Teamwork & Leadership

▶ Communication with colleagues

  ▶ Effective approaches

  ▶ Technical appreciation

IPENZ Graduate Competencies (IPENZ, 2009)

▶ "Work cooperatively and understand team dynamics"

▶ "Produce effective reports and design documentation"

▶ "Give and receive clear oral instructions"

Shortcomings of Traditional Approaches

► Lacking some work-readiness

► Isolated disciplines

    ► Little mutual technical understanding

    ► Few collaboration opportunities

► Project management isolated from technical projects

Exemplars Elsewhere

▶ Wintec 'Disaster Week' for year 1 students

▶ 'Project-based Engineering School' at Universidad Europea de Madrid, Spain

  ▶ Student feedback: "projects as a tool to promote a deep and long-lasting knowledge of specific technical and soft skills."

▶ "Non-technical skills cannot be taught in isolation from the technical context in which they will be used" (Martin et al, 2005)

Martin, R., Maytham, B., Case, J., & Fraser, D. (2005). Engineering graduates' perceptions of how well they were prepared for work in industry. *European Journal of Engineering Education, 30*(2), 167-180.

Terrón-López, M. J., García-García, M. J., Velasco-Quintana, P. J., Gaya-López, M. C., & Escribano-Otero, J. J. (2015). Design and Implementation of a Comprehensive Educational Model: Project Based Engineering School (PBES). *International Journal of Engineering Pedagogy, 5*(3), 53-60.

The Students

- **Mechanical Engineers, BEng Tech**
  - Manufacturing, L6
  - Year 3

- **Electrical Engineers, BEng Tech**
  - PLC Programming, L5
  - Year 2

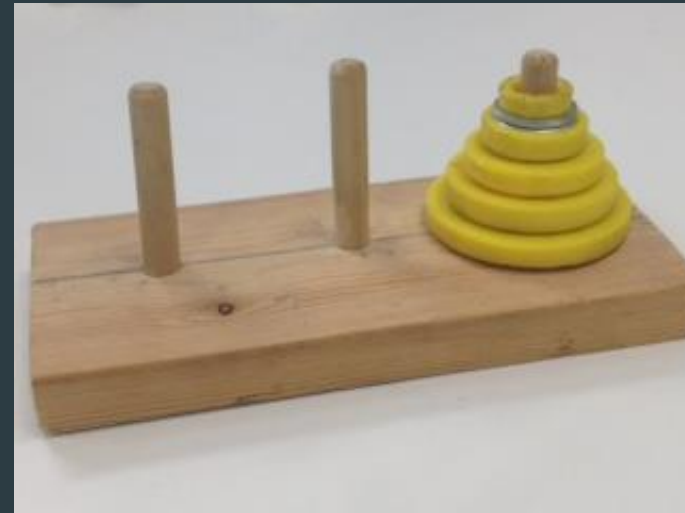| Team 1 |
| --- |
| 2 Mechanical students |
| 4 Electrical students |

Team 2
2 Mechanical students
4 Electrical students

The Project

Design & Construct an Automated System

- Achievable scope
- Creativity potential
- Assessment requirements
  - Demo
  - Manual
  - Planning & Management
  - Group / Individual

Research Project

▶ Evaluate students' development

▶ Surveys
  ▶ Start
  ▶ Half-way point

▶ Reflections

▶ Observations of progress

▶ Improve future projects

Image source: www.pixabay.com

Progress

Survey: Early confidence in team & self

Team 1

- ▶ Designated leader

- ▶ Reporting structure

- ▶ Motivated

Team 2

- ▶ Weak leadership

- ▶ Less structure
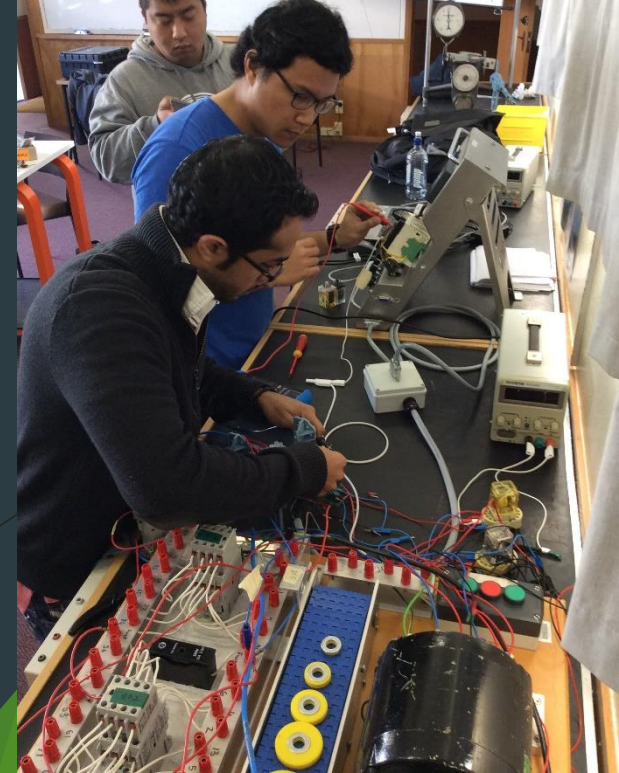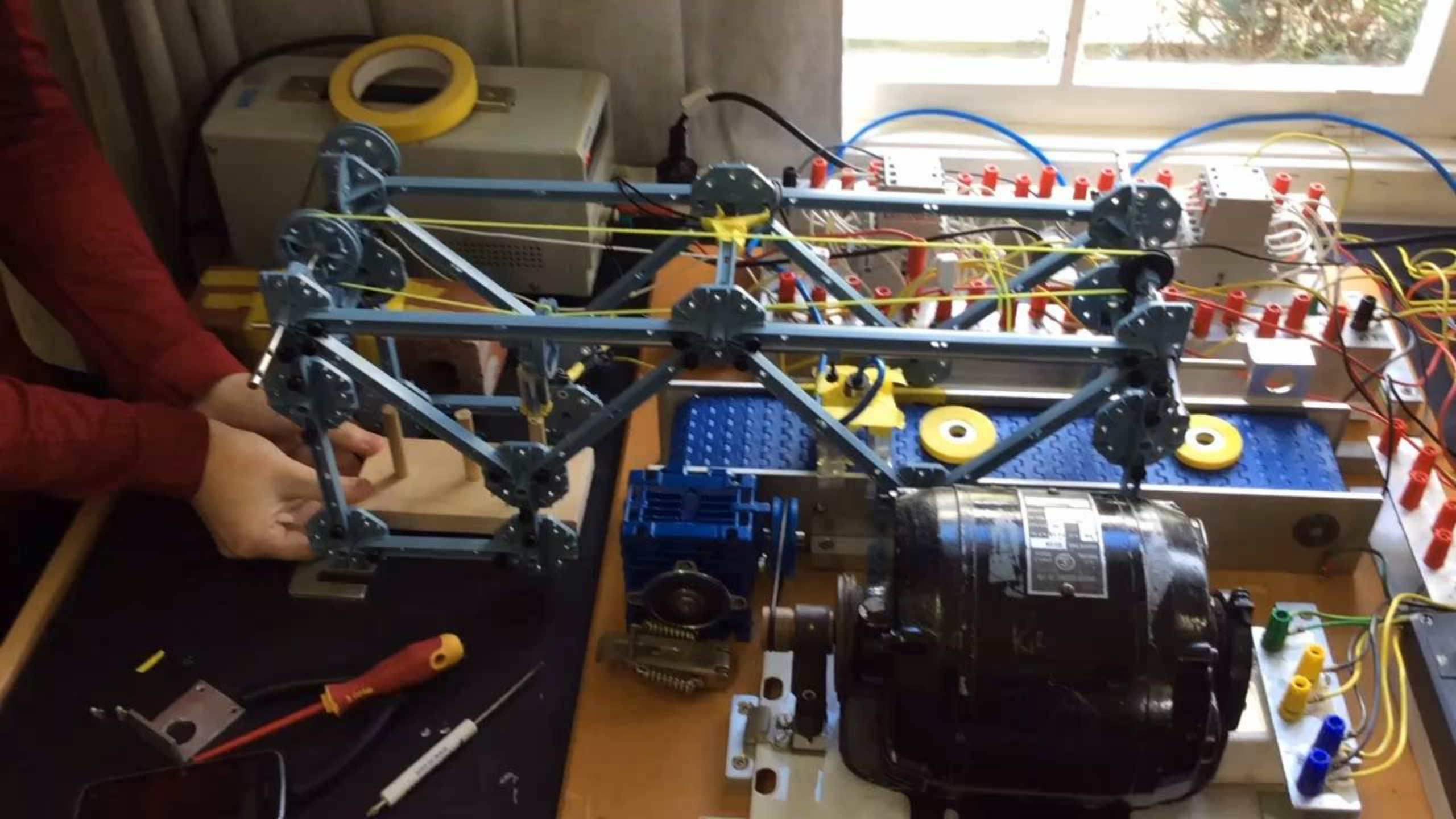
- ▶ Mixed motivation levels

D-Day

Team 1

- Fine-tuning

- Shared Contributions

- Successful demo

Team 2

- Debugging system

- Uneven contributions

- Unable to demonstrate

What worked well

Students said

▶ Enjoyed collaboration

"the level of interaction required between the design aspects and the programming aspects of this project was incredible and it was great that the whole group was able to show their individual talents and produce a working manufacturing system"

▶ Valuable workplace simulation

"feeling of working out in the industry, face to face with your co-workers (classmate) and bosses (teachers)"

What worked well

- Communication skills

- Planning importance

- Teamwork strategies

Students said

"Every member of the group was patient and understanding of each other. There was constant communication for meeting times, during meetings and project plans"

"Good experience as I've had very little experience in lead role"

Learnings from What didn't go so well

- Planning issues
- Workload balance
- Members' commitment
- Communication issues

Students said:

"We didn't really follow the Gantt chart as planned"

"leaving things to the last minute"

"We even ran out of time for some sections"

Generalising the Concept

▶ Modelling the workplace

▶ Develop essential non-technical skills

    ▶ Communication

    ▶ Teamwork

    ▶ Leadership

    ▶ Organisation

    ▶ Creativity

We Recommend

- Sell the benefits to students
- Start small
- Match suitable disciplines
- Suitable facilities & equipment
- Clear assessment requirements
- Track progress & team dynamics closely
- Reflections

- Have Fun!!

Ask us some Questions…

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