Global Product Realization

A course over boundaries and thoughts
Globalization of business

Virtual enterprise: profit-driven, problem-centered, knowledge-related, volatile organizations in industry.
Case Study 1: Copeland Corporation - Emerson Electric Company

World leader in the production of compressors, condensing units and electronics for domestic and industrial refrigeration and air-conditioning.

Founded in Detroit, Michigan in 1921 by Edmund Copeland.
- 8,000 employees
- 10,000 compressor models (scroll, reciprocation and screw)
- 10 million compressors annual production
- Design and Manufacturing capacities installed in 11 countries
Case Study – Copeland VE
Copeland Global CAD Network

Number of CAD/CAE Users:
USA (Sidney) - 75
Belgium (Welkenraedt) – 8
China (Suzhou) – 16
India (2 locations) – 27

Web-Based Software Tools
Connect Design Centers To Common CAD Database
Welcome to e-GPR

Welcome to the portal of the Global Product Realization Course!
Bridging Delft, Lausanne, London, Ljubljana and Zagreb.

2005 course: finished

In February a new course involving Delft, Lausanne, London, Ljubljana and Zagreb started. The closing workshop was in the first week of June and took place in Lausanne, Switzerland. The students produced and tested working prototypes in a vineyard and presented the results of the project in an exhibition.

Pilot Project Finished!

Fall 2004 we had a pilot of the course as it will be slightly changed in Delft. Students from TU Delft, EPFL Lausanne and City University London worked together in this pilot. The workshop took place in Delft in the beginning of 2005. Company, Students and Staff were enthusiastic about the results.

Introduction

The course “European Global Product Realization” is a highly innovative course in which virtual classrooms will be formed via internet and other latest information technologies. Five universities, University of Zagreb, École Polytechnique Federale de Lausanne, University of Ljubljana, City University London and Delft University of Technology simultaneously offer lectures, case studies and a design assignment that will be attended by students at each of the universities.

2004: Symposium and Exhibition in Lausanne

Due to differences in the educational calendars, starting...
Our reply in education

- Conducting navigated active learning
- Establishing academic virtual enterprise
- Using network-based videoconferencing facilities
- Including operational research in design
- Hybrid prototyping of global products

European Global Product Realization (E-GPR)
E-GPR

• A video-conferencing based international design course with the participation of the:
  • Industrial Partner
  • Delft University of Technology
  • University of Ljubljana
  • EPF Lausanne
  • University of Zagreb
  • City University of London

• Altogether 48 students
**Academic virtual enterprise**

AVE is a project-oriented, volatile alliance of industrial and academic partners for mutual advantages.
**EGPR Virtual Enterprise**

**London:** Mechanical Eng., Communication, Computer Sci.
- Catia, Solid Works
  - MD & Inventor 7
  - MSC.ADAMS 2003
  - Comet, Comet-Works
- Star CD, Star CCM+

**Lausanne:** Micro engineers, Communication systems, computer sciences
- CATIA
- Solid works
- ProEngineer
- I-DEAS (not a lot any more)
- ACIS, Alphacam
- STEP, IGES, VDA, STL

**Delft:** Industrial Designers
- Catia
- Rhinoceros
- Solid Works 2001/2003

**Ljubljana:** Mechanical Eng.
- I-DEAS, Solid Works
- FE analysis with I-DEAS
- NC milling code generation
- 3D measuring FARO arm
- 3 axis rapid NC Milling
- 3D printer “Dimension BST” by STRATASYS

**Zagreb:** Mechanical Eng.
- AutoCAD 2006, Catia
- Algor, Pro/ENGINEER
- Pro/Mechanica
- Solid Works 2004/2005
- MSC visual Nastran
- Unigraphics NX3
- Boost
European Global Product Realization

- Using video-conferencing environment is not the goal but the means.

**Pedagogical innovation:**
- Using navigated active learning as a theoretical and/or methodological framework of the E-GPR course.
- Opening the conventional educational environment by establishing an academic virtual enterprise with industry.
- Consideration of the university students as evolving young professionals who act as academic knowledge producers.
- Working on real-life problems in multi-professional teams.
- Combining creative problem solving and operational research.
The three pillars

- The theoretical and/or methodological framework of the E-GPR course rests on:
  - opening the conventional educational institutions towards academic virtual enterprises,
  - consideration of the university students as evolving young professionals who act as knowledge producers,
  - using real life creative problem solving, operational research, and virtual/physical prototyping of products as means of constructive learning.
Opportunities for Students

- Work in multidisciplinary teams
- Gain experience in intercultural co-operation
- Get to know foreign students
- Challenging assignment
- Get skills of using video-communication
Opportunities for City University

- Establishing more Connection with EU Universities
- Fulfill RAE and IMechE expectation of our courses
- More connections with UK industry
- Get some funding for research in that area
- Gain Competence in Design
Infrastructure

- The information and communication technological infrastructure of the academic virtual enterprise consists of systems such as:
  - Viewstation with auxiliary cameras,
  - MCU
  - Net-meeting, Placeware,
  - Blackboard, whiteboard
  - CAD, CAE, CAPP, and CAM packages,
  - rapid prototyping facilities
  - office documentation and administration packages.
Collaboration
## Previous courses

<table>
<thead>
<tr>
<th>Year</th>
<th>University participants</th>
<th>Core company</th>
<th>Educational focus</th>
<th>Research focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>UoL, EPFL, and DUT VACUM CLEANER</td>
<td>LIV Postojna, Slovenia De Vlamboog, BV, the Netherlands</td>
<td>Redesigning and prototyping of consumer durables for global market</td>
<td>Dislocated cooperation in academic virtual enterprise</td>
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<tr>
<td>2003</td>
<td>DUT, UoL, and EPFL VELDING MASKS</td>
<td>De Vlamboog, BV, the Netherlands</td>
<td>Conceptualization and prototyping future product for the core company</td>
<td>Project oriented learning in virtual environment</td>
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<tr>
<td>2004</td>
<td>EPFL, UoL, UoZ, and DUT VELDING MASKS</td>
<td>De Vlamboog, BV, the Netherlands</td>
<td>Combining operational research and product conceptualization</td>
<td>Navigation of active learning</td>
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<td>2005</td>
<td>EPFL, UoL, UoZ, CUL, and DUT SPRAYING SYSTEM</td>
<td>AVIDOR, Switzerland</td>
<td>Human- and environment-centered product development</td>
<td>Development of comprehensive design competencies</td>
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<tr>
<td>2006</td>
<td>EPFL, UoL, UoZ, CUL, and DUT SPRAYING SYSTEM</td>
<td>NIKO, Ljubljana</td>
<td>Human centered product development for specific market</td>
<td>Design for the bottom of the pyramid</td>
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</tbody>
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**Abbreviations:** EPFL - Ecole Polytechnique Federale Lausanne, Switzerland, UoL - University of Ljubljana, Slovenia, UoZ - University of Zagreb, Croatia, DUT - Delft University of Technology, the Netherlands, and CUL – City University of London, England
E-GPR results (2003)
E-GPR results
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