The Teaching Factory: A Manufacturing Education Paradigm

G. Chryssolouris, K. Georgoulias, D. Mavrikios, L. Rentzos

Laboratory for Manufacturing Systems & Automation (LMS)
Dept. of Mechanical Engineering & Aeronautics
University of Patras, Greece
www.lms.mech.upatras.gr
The Teaching Factory

... a view to the origins ...

Medical profession

Manufacturing

connecting education/training with real life

Teaching Hospital

≈

Teaching Factory

The concept of the Teaching Factory has its origins in the medical sciences discipline and specifically in the paradigm of the Teaching Hospital.

Indicative References:
KNOW-FACT Project, http://www.knowfact-project.eu
The Teaching Factory

… integrating the real factory environment with the classroom …

The Teaching Factory paradigm follows the developments by "bringing" the real factory to the classroom and the classroom to the real factory

Real life changes rapidly and so does industrial practice, i.e. manufacturing technology, industrial settings, engineering problems etc.

Indicative References:
KNOW-FACT Project, http://www.knowfact-project.eu
The Teaching Factory...

...using modern ICT...

The Teaching Factory paradigm uses **advanced ICTs** and **high-grade industrial didactic equipment** to operate as a **non-geographically anchored learning “space”**

Indicative References:

KNOW-FACT Project, http://www.knowfact-project.eu
Applications – Construction Equipment

Industry knowledge transfer Academia

Industrial problem:
- line balancing of a new production area
- planning of material kitting area

4 engineers of the industrial partner
20 LMS students
6 weeks (2h session per week)
Applications – Construction Equipment

In the framework of the course: “Introduction to Manufacturing Technology”

20 Mechanical Engineering Students (4 groups of 5 persons)

2nd Year of their studies

With the assistance of 4-5 Research Engineers (e.g. provide details and the problem’s background, supporting the students)

They provided an understanding of the optimal configuration for the material feeding process to be carried out.

The students managed to identify bottlenecks and provided suggestions to prevent such phenomena.
Applications – Industrial Automation

**Industrial problem:**
- new integration and control architecture for industrial robots

5 engineers of the industrial partner
7 LMS research engineers
3 weeks (1h session per week)
Applications – Industrial Automation

✓ Engineers from industry watch the tasks carried out by the cooperating robotic cells, taking place at academia, through a simultaneous presentation of the services controlling the operation.
Applications – Machine Design

- The industrial problem was a case of **designing a Multi-Technology Platform (MTP)**
- The students had to design the swivel table in collaboration with the machine shop.
- The pilot was organized in **five collaborative cycles**, following the design cycle of the particular **industrial practice**.
- Students presented their **final solution** as a result of this collaborative process that included the final **design and detailed dynamic and thermal analysis**.
Skills have a major impact on the economic growth of a society, on the innovation process as well as on industry’s competitiveness.

The Teaching Factory demonstrates high-degree of modularity and can therefore be adapted to the needs of both the academia and industry.

Multiple, remotely located “factories” and “classrooms” are envisioned.

New technologies and manufacturing concepts can be exchanged.

Use of the Teaching Factory concept can encourage entrepreneurship in universities and innovation within companies, through shared projects between academia and industry.
References


- AUTORECON Project, Funded by the EU under the FoF.NMP.2011-2 theme, [http://www.autorecon.eu](http://www.autorecon.eu)
- Know4Car Project, Funded by EU under the FoF-ICT-2011.7.4 theme, [http://www.know4car.eu](http://www.know4car.eu)
- KNOWFACT Project, Funded by EU under the EAC-19-2011-067, [http://www.knowfact-project.eu](http://www.knowfact-project.eu)
- ROBO-PARTNER Project, Funded by the EU under the FoF.NMP.2013-7 theme, [http://www.robo-partner.eu](http://www.robo-partner.eu)
Thank you for your attention!

Laboratory for Manufacturing Systems & Automation (LMS)
Dept. of Mechanical Engineering & Aeronautics
University of Patras, Greece

http://www.lms.mech.upatras.gr/