

THE MINI-FACTORY – A PEDAGOGICAL RENEWAL PROJECT

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The CDIO initiative is based on pedagogical principles that fundamentally break old established structures and traditions in universities and colleges. That put demands for a pedagogical and collaborative renewal. *The Mini-factory* is a concrete example of a development project that integrates a new pedagogical concept, built on the CDIO Syllabus skills, such as engineers' attributes, a holistic approach, interpersonal skills, flexibility and responsibility. This extended synopsis addresses experiences from a pedagogical renewal project at the School of Engineering at Jönköpings University, Sweden.

Keywords: Experience based learning, collaborate, pedagogical renewal, mini-factory.



In 2004 the School of Engineering received a grant from the *Ljungbergs Utbildningsfond* with the purpose to start a “Pedagogical renewal project” related to subjects within industrial engineering and management. A group of senior lecturers had for a period talked about the need to create a more laboratory and experience based learning environment in courses concerning organization, management, change and leadership. Through the grant a base was created for realizing new ideas. A project group was formed and the project was titled as *The Mini-factory*. The road to that point has been both slow and struggling. One answer to that can be the difficulty in changing established structures and traditions and the need to work from a more holistic and integrated mindset. One example of the established structure is that the engineering curricula consists of subject specified modules (7,5 credit courses), where one lecturer is responsible for one module. Another example is that the modules can be divided into smaller examination-parts, where different lecturers are responsible for different parts and the degree of insights into other lecturers’ parts are low. *The Mini-factory* requires thinking beyond modules, credits and established planning structures. It is based on a holistic mindset and calls for an interdisciplinary teamwork and a pedagogical approach built on process- and experience based learning. It also challenge traditional teaching styles and open up doors for new forms of interdisciplinary co-operation.

So far the *Mini-factory* has been tested as a pedagogical tool in two parallel courses; Project management 7,5 hp and Manufacturing System and Production 7,5 hp. It has been carried out during half a day, in each course, where 25 students have been parted in smaller groups (8-9 students). The group has tested the *Mini-factory* in three laboratory lessons that have been focused on; production layout, production planning, cost of production, flexible production and project management.

Our experiences from planning, organizing and realizing the *Mini-factory* in the two courses are concluded as follows:

Strengths:

- The students appreciate the interactive and problem based pedagogical approach that combines teamwork, communication, decision-making and problem solving with knowledge in design of production system, production planning and production costs.
- We have been developed a practical and laboratory moment in our engineering program *Industrial Engineering and Management - Logistics and Management* that illustrates our system and process approach.
- The *Mini-factory* has opened up invisible boarders between departments and subject groups and developed new forms of interdisciplinary co-operation.
- *Mini-factory* is a simple and a mobile pedagogical tool – a factory in a box - that is easy to learn and easy to manage. Each game has its own purpose and learning goals. The pedagogy is built on “lego” pieces, posters and paper instructions that is booth easy to understand and easy to translate in to real situations in a production process. The *Mini-factory* also opens up for improvisation and change.
- The *Mini-factory* is also a flexible tool that can manage large group of students that are divided in small parallel groups.

Weaknesses:

- The *Mini-factory* is a simple and abstract tool, therefore it can not illustrate the fully complexity and all the different perspectives that real situations in an industrial and production environment includes.
- If the *Mini-factory* is going to be used frequently in different courses it is necessary that responsible teachers “owns” the concept and take a larger responsibility in the using and developing the *Mini-factory*. If not so, the ownership and responsibility remains lying in the hand of the project manager.
- The different games in the *Mini-factory* needs to be stronger related and integrated in the different courses purposes and learning-goals. That presupposes time and recourses to plan and coordinate courses that are linked to each other.
- The *Mini-factory* also put demands on the teacher’s ability to lead and facilitate group processes and to have good communication skills.

