

LEARNING FACTORIES

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INCREASING RESOURCE EFFICIENCY AND SUSTAINABILITY THROUGH EDUCATION AND TRAINING

Thomas Dahlgren



Thomas Dahlgren is currently the manager of the Nordic Holding company in Atlas Copco. He holds a M.Sc degree in Mechanical Engineering from KTH in 1986. He studied Business Administration at University of Michigan in 1992-1994. He has been employed by Atlas Copco since 1986 and has held various positions in engineering, production, marketing, sales and service.

He has been the Managing Director of the Nordic Customer Centre for the Industrial Technique business area as well as the Managing Director for the Desoutter/Chicago Pneumatic Operations (production/sourcing/logistics).

He has lived overseas for 11 years, with postings in the US and in the UK.



Atlas Copco is an industrial group with world-leading positions in compressors, expanders and air treatment systems, construction and mining equipment, power tools and assembly systems. With innovative products and services, Atlas Copco delivers solutions for sustainable productivity. The company was founded in 1873, is based in Stockholm, Sweden, and has a global reach spanning more than 170 countries. In

2012, Atlas Copco had 39 800 employees and revenues of BSEK 90.5 (BEUR 10.5). Learn more at www.atlascopco.com.

Hakan Akillioglu



Hakan Akillioglu is currently a Ph.D. candidate in the Royal Institute of Technology (KTH), Stockholm. He obtained his MSc degree on "Production Engineering and Management" from KTH in 2008. He received his BSc degree in "Industrial Engineering" at the Middle East Technical University, Ankara in 2006. He pursued yet another degree in Computer Engineering department on "Information Systems and Management" at the Middle East Technical University in 2006.

- His primary research interests are;
- adaptable production systems,
- demand responsive planning methods,
- multi agent based distributed planning,
- continuous workload control,
- dynamic capacity adjustment methods,
- learning factories in engineering education.

He is the coordinator of two courses in KTH, one for master and one for bachelor level. These courses are covering production systems from planning and control perspective.



The Royal Institute of Technology, KTH, in Stockholm is the largest and oldest technical university in Sweden. No less than one-third of Sweden's technical research and engineering education capacity at university level is provided by KTH. Education and research spans from natural sciences to all the branches of engineering and includes architecture, industrial management and urban planning.

The educational programs lead to Bachelor, Master or PhD degrees in engineering, science, or architecture. There are a total of more than 12,500 undergraduate students and more than 1,800 active postgraduate students. KTH has just over 4,800 employees (www.kth.se).

IMPACTS OF LEARNING FACTORY OVER PERCEPTION OF LEAN PHILOSOPHY

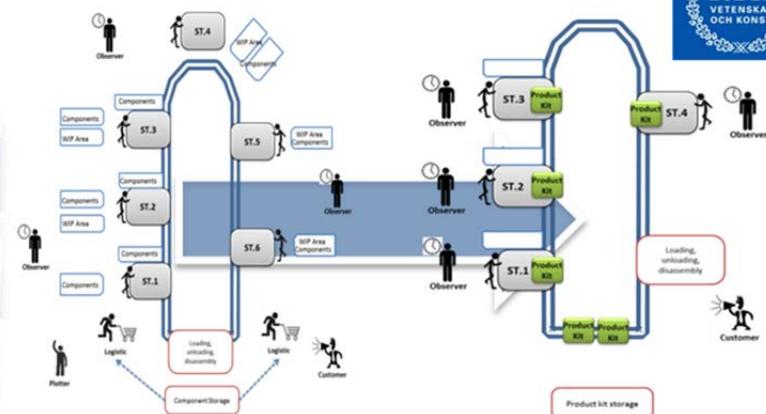
The concept of learning factory is an emerging paradigm. Researchers in production domain claim that by learning factories, real factories can be taken into classroom and become the new learning-by-doing method in education both for students and engineers. This study presents an investigation about how learning factories influence students' perception of lean philosophy. In this sense, the study of the influence is performed through student interviews by evaluating the achievement of deep understanding and threshold concepts in the context of lean production.

Learning factory activity is carried out in Atlas Copco, Stockholm for production engineering master students. Students' understanding has been assessed for each of the studied lean concepts in the learning factory activity. The outcomes of the interviews have been classified into two pedagogical norms; achievement of deep learning and threshold concept. Three characteristics of the threshold concept are considered in this study which are transformative, irreversible and integrative. The results show that the implementation of the learning factory activity facilitated improved understanding of the lean philosophy and increased awareness of efficacy of the lean tools.

Impacts of Learning Factory over Perception of Lean Philosophy

Thomas Dahlgren, Hakan Akillioglu

Atlas Copco



	Deep learning achievement	Threshold concept		
		Transformative	Irreversible	Integrative
Pull production	Yes	Yes & No	Yes	Yes
5S	Yes	No	Yes	No
One piece flow	Yes	Yes	Yes	Yes
Line balancing	Yes	No	Yes	Yes
Takt time	Yes	Yes	Yes	Yes
Built in quality	Yes	Yes & No	Yes	No
SMED	Yes	Yes	Yes	No