

Final Research Report for

EDUCATION for PRODUCT INNOVATION (EPI)

Martin Grimheden, April 2010

Education for Product Innovation (EPI) was a research project funded by PIEp, the Product Innovation Engineering Program, a Swedish national research and development program focused on changing higher education toward creativity, synthesis, innovation and entrepreneurship.

PIEp's Education Strategy aims to create sustainability by promoting a system change of higher education toward product innovation on all educational levels. The goals of PIEp Education are to effectively increase the number of:

- ▲ innovative students and students competent in product innovation engineering;
- ▲ products and companies from research education projects;
- ▲ teachers and supervisors competent to educate in product innovation engineering.

We seek to further increase the level of knowledge, skill and competence within product innovation engineering among all actors by drastically increasing the inclusion of Innovation (technology and business) in education at all PIEp node universities and motivate for deployment of new teaching and learning means in education.

The EPI project, which ran from October 2008 to September 2009, involved a state-of-the-art and best practices study of other groups and actors performing world class education in product innovation.

Objective /research questions

Higher engineering education often lacks good and relevant models for best practice and state of the art in terms of both teaching strategies and practices. EPI has investigated a number of world leaders in the fields of innovation, product innovation, innovative product development and engineering design. These world leaders provide material and insight that has been used to design a road map for the development of courses and programs in product innovation engineering.

EPI was based on a three-step process: a preliminary literature study together with interviews of a small number of educators from PIEp international nodes, a thorough research study and presentation and dissemination at a number of international conferences and workshops.

Findings and Results

EPI gathered international examples of good practices in product innovation education with the aim of establishing and communicating a common framework within PIEp. The following list represents our five main characteristics of good practices within Education for Product Innovation:

1. The importance of prototyping

Institutes such as the d.school at Stanford University and the Institute of Design in Umeå (Sweden), faculty emphasizes prototyping, hands-on experiments and the ability to very quickly visualizing ideas. Phrases such as ‘learning by doing’ and ‘prototype or die’ illustrate this.

2. Product design and innovation

Newsweek recently published in an article “World’s Best Design Programs” a list of 30 schools and their programs. A lot of the schools on this list are well known in product innovation circles. Design does not equal product innovation, but we definitely see a relation, particularly with programs such as with the Master’s in Strategic Product Design at Delft University of Technology.

3. Extreme affordability, base of the pyramid

Many schools and programs teaching product innovation include aspects of extreme affordability and base-of-the-pyramid contexts. We believe this in several ways promotes creativity by providing a real-life context, a product need as well as constraints such as limited resources.

4. Entrepreneurship

Many universities and schools have a strong tradition of entrepreneurship and graduating entrepreneurial students. Universities such as EPFL have extensive support systems with funding for student projects and elaborate mechanisms for the commercialization of both student ideas and research results.

5. Industrial relevance

We believe that courses and programs that clearly show an industrial relevance with assignments and student projects encourage product innovation. This includes giving a holistic view and clearly making a connection between a product idea, a technical solution and a business model. From our studies, we have seen this very clearly in several examples of entrepreneur programs such as in the ForSE program in Boston, at the Sloan School of Management as well as multiple examples within the NCIIA community in the US.

Publications

1. Grimheden, M., Berglund, A., Creating a Better World by International Collaboration in Product Innovation Engineering - The PIEp Way. Proceedings of the International Conference on Engineering and Product Design Education 2009, Brighton, UK. (2009).
2. Grimheden, M., The Product Innovation Engineering Program: Promoting Creativity, Synthesis and International Collaboration. Proceedings of the ASME 2009 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, San Diego, USA. (2009).
3. Grimheden, M., PIEp EDU: Education for Product Innovation. Proceedings of the International Conference on Engineering Design, ICED 09, Stanford, USA. (2009).
4. Grimheden, M., The Product Innovation Engineering Program and International Collaboration. Proceedings of the 116th Annual ASEE Conference and Exposition, Austin, USA. (2009).
5. Grimheden, M., Education for Product Innovation - A 'Good Practices' Report. Proceedings of the 116th Annual ASEE Conference and Exposition, Austin, USA. (2009).
6. Berglund, A., Understanding Innovativeness by Encapsulating Creativity in Higher Engineering Education. Proceedings of the International Conference on Engineering and Product Design Education 2009, Brighton, UK. (2009).

Research team

- ▲ Martin Grimheden, marting@md.kth.se, Royal Institute of Technology, Sweden
- ▲ Anders Berglund, andersb@md.kth.se, Royal Institute of Technology, Sweden
- ▲ Andreas Larsson, andreas.c.larsson@ltu.se, Luleå University of Technology, Sweden
- ▲ Fredrik Nilsson, fredrik.nilsson@plog.lth.se, Lund University

PIEp strives for collaborative projects and activities. Openness to innovation and to experience exchange is a key success factor. If you are interested in finding out more, please contact PIEp's Education Director Martin Grimheden ([Martin @ PIEp.se](mailto:Martin@PIEp.se)), or see www.piep.se.