

## **Soft skills training for battery gigafactories 4.0**

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### **Round table discussion about integration of soft skills training**

We probably all agree that well developed soft skills are essential for any human to have, both in private social life and the workplace. However, it has recently come before our eyes (read below) that soft skills maybe even more in demand than hard technical skills, even for high-tech machine operators in Industry 4.0.

In this roundtable, we want to discuss how to integrate soft skills training in any course at any level of education. The participants inputs and contributions in discussion are essential for ongoing massive education and training development on the European level.

1) First, we want to exchange general and personal experiences and models for soft skills training among participants.

2) Then, we will shortly present the case we are working with, education and training development for battery cell factories, to discuss pedagogy and models in this "blend" between hard skills, academic knowledge and soft skills training. We here pre-suppose the ICT-integrated "blended learning" as a normality today (Dziuban et al. 2018), but now we want to blend in more soft skills training in this concept. We need the participant's ideas and sharing of experiences.

3) We will conclude the roundtable with a discussion on where Industry 4.0 and 5.0 trends may lead us, philosophically and pedagogically. We take help from innovative terminology in Floridi's Philosophy of Information (Floridi 2018). Today's automated manufacturing machines communicate with one another along the production line and constantly learn from production data through machine learning. In contrast to common beliefs, working together with robots, computers, and algorithms can maybe make us more human, not less? The current manufacturing development may not lead to "dark factories" but instead to very clean, light, social, problem-solving, creative, sustainable and social job environments (Industry 5.0). We may increasingly understand what exclusive human abilities are.

The background to our roundtable is the following:

Two of the authors coordinate a big European education development project, ERASMUS+ Sector Skills Alliances ALBATTs (Albatts, 2022), with 20 partners in 11 countries developing a "blueprint" for education and training for the battery and electromobility value chain in Europe. Sectoral intelligence, analysis of skills needs, new job roles descriptions etc are being developed, as well as curricula, learning material, learning concept pilots (as adaptive learning units) and train-the-trainer solutions. Our results will be implemented as a service to European national education and training providers for designing customised national solutions. Already are national alliances between industry and education emerging to cope with these huge skills need ahead. To our slight surprise, the soft skills seem pivotal for job-seekers employability.

This transformation to green energy for transport will affect 3-4 million European jobs (Šefčovič 2021) in about the coming five years. The emergence of a European battery value chain is happening before our eyes in just a narrow window of time until about 2025-2030, and the demand for a trained workforce is vast, a lot more than can be solved with up-and reskilling. However, we have no battery production experience before in Europe, and the production process is highly complex. First out in Europe is the gigafactory Northvolt Ett in Skellefteå, Sweden (Northvolt, 2021), ramping up production in the spring of 2022.

The project ALBATTs concentrates on education levels EQF4-5 mainly, the vocational education levels (operators and technicians). Northvolt Ett is commissioning in the spring of 2022. About 40 other European

battery gigafactories are lined up to start in 2 to 5 years from now, each with the need for thousands of qualified workers. This European training challenge is monumental for European competitiveness. For technical skills training, there are advanced robotic labs, but how do we blend that with soft skills training? We need more conceptual and practical models for that, easy to implement and use.

More than 50 years ago, German universities were recommended to complete at least 20% of soft skills training (Ihsen, 2003). Today, soft skills are discussed more than ever. The reason is usually that employers today want flexible employees who can grow in the company and its constant change and at the same time make the employee successful with their work. A person with excellent technical skills (hard skills) but lacking soft skills will have a more challenging time succeeding in their workplace. Therefore, the demand for social and emotional skills will increase by 30% and a significant restructuring of today's education is needed to achieve this increased demand. It is estimated that 80% of existing staff in companies also need skills development in soft skills (Heckman, 2012).

Soft skills are often considered more complex to train than hard ones. Defining soft skills is not very easy because soft skills differ from context to context. Soft skills often complement the hard skills, but to name a few examples of soft skills and abilities are communication skills, structured and creative thinking, teamwork, adaptability, negotiation skills, scheduling skills, conflict management, initiative, analytical, cultural awareness, flexibility awareness, empathy, work ethic, project management, self-esteem and active listening. (Heckman, 2012).

This complexity of skills requires new pedagogical tools and approaches. The question is how we can design new education approaches where the soft skills are integrated and trained in a structured way. In the paradigm shift that is currently taking place, the role of future industrial workers will be a new and more multifaceted profession. The industrial worker will not disappear, but their role will be decisive from entirely new perspectives. The soft skills are important factors for the company / business to offer a good working environment, and to have good relationships and motivated employees. Workers could feel that they are part of a larger context, which leads to increased efficiency, development and profitability in the company and its operations (Lindmark and Örnevik, 2011).

Join us for this important discussion where your experience and ideas meet our urgent reality case!

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