**Education 4.0: Which changes can be foreseen regarding students, higher education institutions and industry?**

Michael Wilk1, Steve Rommel2, Marcel Liauw3, Willi Meier4, Hans-Ulrich Moritz5,
Bernd Schinke6, Horst-Werner Zanthoff7

*1 Merck KGaA, Darmstadt, Germany\*; 2 Konica Minolta Business Solutions GmbH, Darmstadt, Germany;
3 RWTH Aachen, Aachen, Germany; 4 Dechema e.V., Frankfurt, Germany; 5 Universität Hamburg, Hamburg, Germany; 6 Hochschule Mannheim, Mannheim, Germany; 7 Evonik Technology & Infrastructure GmbH, Marl, Germany*

*\*Corresponding author: michael.wilk@merckgroup.com*

**Highlights**

* Need for change in education matters due to digital transformation / Industry4.0 highlighted.
* Changes in student learning behavior and expectations discussed.
* Changing role of HEI considered.
* Increasing significance of life-long-learning for industry reviewed.

**1. Introduction**

The impact of the 4th Industrial Revolution on our future working environment is supposed to be highly significant, which already triggered a broad social discourse. Apart from many more or less speculative assumptions around the magnitude of potential job losses or which job profiles will become obsolete, an intensified discussion on the essential change requirements in educational terms is observed.

Regarding process engineers (and similar education profiles), these change requirements have been discussed within the late 2017 “Educations Days” organized by the German ProcessNet section “Education and Innovation” and hosted by Dechema e.V. in Frankfurt.

**2. Methods**

A highly interactive discussion in World Café and Design Thinking formats was structured following three dimensions introduced by key notes:
a) HEI 4.0: what needs to be done to make higher education institutions more agile and adaptive?
b) Student 4.0: how can we describe the learning behavior of digital natives? What is the impact?
c) Industry 4.0: what is the need for change regarding life-long-learning during professional life?

**3. Results and discussion**

Results have been summarized in form of theses and a White Paper is under development.
Main theses will be presented in the conference.

**4. Conclusions**

Three theses may serve as examples of the outcome:

1. Mastering the engineering fundamentals will remain a core competency requirement for graduates from HEIs and must be addressed appropriately. Moving towards the “VUCA world” (volatile, uncertain, complex, ambiguous), this mastery will be key to assess and solve highly complex problems or those with very limited known facts.
2. “Digital Natives” have outstanding capabilities in using and learning from digital media and benefit strongly from collaborative learning environments. Therefore, certain modern teaching and learning formats are especially well suited to improve knowledge dissemination and maximize learning outcomes.
3. To maintain employability in times with ever increasing speed of knowledge development and changing job profile requirements, the life-long-learning framework needs to be fostered. HEIs are invited to develop educational programs and offers for professionals and need to be mandated for this purpose.