

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/311365200>

TEACHER 4.0: REQUIREMENTS OF THE TEACHER OF THE FUTURE IN CONTEXT OF THE FOURTH INDUSTRIAL REVOLUTION

Conference Paper · November 2016

DOI: 10.21125/iceri.2016.0880

CITATIONS

2

READS

6,008

5 authors, including:



Anas Abdelrazeq

RWTH Aachen University

13 PUBLICATIONS 10 CITATIONS

SEE PROFILE



Daniela Janssen

RWTH Aachen University

21 PUBLICATIONS 37 CITATIONS

SEE PROFILE



Anja Simone Richert

Technische Hochschule Köln

188 PUBLICATIONS 531 CITATIONS

SEE PROFILE



Sabina Jeschke

Faculty of Mechanical Engineering, RWTH Aachen University & Member of the Ma...

705 PUBLICATIONS 2,440 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



ELLI 2: Excellent Teaching and Learning in Engineering Science [View project](#)



INAMOSYS [View project](#)

TEACHER 4.0: REQUIREMENTS OF THE TEACHER OF THE FUTURE IN CONTEXT OF THE FOURTH INDUSTRIAL REVOLUTION

Anas Abdelrazeq, Daniela Janssen, Christian Tummel, Anja Richert, Sabina Jeschke

Abstract

In 2011, the German government introduced the term “Industry 4.0” to indicate the potential fourth industrial revolution. The term is extending to cover wider areas other than just the industry such as higher education and the current teaching methods. Meaning that education has to adapt to new methods to follow up with the changes happening in technology.

The paper gives a first definition of the Teacher 4.0 and extend the discussion to the challenges and requirements that are facing it.

For this study, different teaching scenarios are derived to cope with the current technological revolution in context of Industry 4.0. Within these scenarios, innovative technologies were used introducing new methods to support teaching. The presented scenarios of Teacher 4.0 are analyzed in comparison with traditional teaching methods in a form of scenario analysis method aiming at identifying key challenges and requirements for the future teachers. Three categories are presented: human-based and didactical, technological as well as organizational.



Different innovative media are used in the future classes by the teacher 4.0

Teacher 4.0 Challenges & Requirements



Teacher 4.0 Example Scenarios

Three teaching scenarios are derived to cope with the current technological revolution in context of Industry 4.0

Direct Students Response

Students' focusing and attention level in large classrooms has been and still a long-term challenge in academic teaching.

Audience response systems are mainly used for gathering feedback and questioning and display analysis.

Technology:

Smart augmented reality devices are used by teachers to capture movements and detect student's physiological status. It sends the result to the teacher's notification device.

Teachers get direct feedback on the student's status through automatic, emotional and physical feedback systems.

Through augmented reality devices, teachers are notified on what is attracting the student's attention from the taught content.

Effect:

Teachers will consequently be able to respond to the feedback directly. They will be able to decide whether to let student's work in groups to activate them or simply lecture them giving necessary information in a phase of high focusing level.

Teachers Self-Feedback

This scenario implements a self-feedback system regarding the teachers performance in the class room, Helping them to improve it.

Technology:

Teachers get self-feedback, on their own status with the help of wireless earphones and other notification devices such as augmented reality glasses.

Teachers may be notified with augmented reality about the status of their voice level with a message such as “increase your voice volume” and “make a wider eye contact” appearing on the notification device of the teacher every specific time or when it is need. Such notifications can be also extended to the teachers' movement around and other presentation skills aspects.

Effect:

Along with the self-feedback through augmented reality devices, certainly it ensures that not only teachers but more importantly students will benefit from the beginning of the class session to its end. A teacher is able to correct mistakes, increase attention or ensure proper understanding at exactly the right time.

Multilingual Communication

This scenario focuses on enabling teaching multilingual students in the same classroom.

Teachers as well as students not only see but also hear the presented information in their native language.

Technology:

Electronic translation devices, wireless earphones and communication channels will automatically translate information and allow students from different backgrounds with different native languages to understand the presented content without any language barriers.

Teachers present in their foreign language and therefore impedes misunderstanding.

Effect:

Students will be able to work under the same condition for successful learning. The student from China, for example, can ask whatever question in their native language whenever they need to. The teacher will be able to answer the question without having to face communication barriers. This ultimately leads not only to greater activation, participation and understanding.

Teacher 4.0 is a name or a concept to be adapted for future teachers who are able to handle new technology and who implement it efficiently in their classes

Conclusion & Outlook

Driven by new and innovative technologies, universities and higher education have to find solutions to adapt daily in higher education. In the following, recommendations on new technologies adaption are listed:

- Teachers have to cope with the new requirements and get a new role of their teaching behavior.
- Universities have to prepare and support teachers in their new teaching role.
- A full adaption of a new technology in the education system needs a decision on the higher organizational level from the ministries of education and university directors.
- Universities have to provide trainings and open the opportunities for teachers to get access to technology and to learn how to use them in a technical way as well as to apply it properly in didactical concepts.
- Higher organizational level (i.e. ministries of education and university directors) are required to provide plans on the needed equipment and infrastructure.
- Any newly introduced technology for helping teachers in classrooms has to meet a set of requirements and handle the challenges that faces its implementation.



Cybernetics Lab IMA/ZLW & IfU at RWTH Aachen University

Institute of Information Management in Mechanical Engineering (IMA)

Center for Learning and Knowledge Management (ZLW)

Assoc. Institute for Management Cybernetics e.V. at the RWTH Aachen (IfU)

Anas Abdelrazeq, M.Sc.

anas.abdelrazeq@ima.zlw-ifu.rwth-aachen.de

Dennewartstrasse 27, 52068 Aachen

+49 240 80 911 02