Welcome!

Industry 4.0 Activities in Higher Education
Gabriela Reyes Zárate

▷ Berner Fachhochschule TI
Agenda

- Introduction
- Digitalization skills and knowledge
- Experiential Learning Space
  - Manual Assembly
  - Robot aided Assembly
  - Virtual Reality
  - Kinect Ergonomic Evaluation
- Conclusion and future work
Introduction

学生们

- 总人数：94,424
- 高中：26,794
- 本科：60,169
- 研究生：7,461

Technológico de Monterrey

- 法律、经济学和国际关系
- 创意研究
- 商业
- 健康
- 工程和科学
Introduction

Industrial technology collaboration
Digitalization skills

Scientific mapping to identify competencies required by industry 4.0

(Liane Mahlmann Kipper et al., 2021)
Knowledge

- Information and communication technology
- Automation
- Software development
- Data analysis
- General systems theory
Experiential Learning Space
Skill focus in an Experiential Learning Space

communication

teamwork

Leadership

problem solving

flexibility

creativity

innovation
Learning Space: Manual Assembly

Initial stage in Phase 1: One workstation performs the entire activity.

The goals for this production system are:
- Define number of workstations
- Time studies
- Light and noise level measurements
- Ergonomics assessment (manual)
Learning Space: Robot aided Assembly

1) Collaborative robotic arm

This process is carried out through the implementation of a collaborative robotic arm and a digital Andon system.

Assembly products used in the case of study: three different models of car side lamps.
Learning Space: Robot aided Assembly

Station 1. Identification card cutting

Station 2. Product assembly

Station 3. Box assembly and packing.

Station 4. Batch stamping in box packaging-collaborative robot arm station.
Learning Space: Robot aided Assembly

2) Secondary process through Cobot
# Learning Space: Robot aided Assembly

<table>
<thead>
<tr>
<th>Station 1: Assembly the products</th>
<th>Station 2: Pick and place / Cobot</th>
<th>Station 3: Bagging the product</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Station 1" /></td>
<td><img src="image2.jpg" alt="Station 2" /></td>
<td><img src="image3.jpg" alt="Station 3" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Station 4: Carton box assembly</th>
<th>Station 5: Pick and place / Cobot</th>
<th>Station 6: Box closing</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4.jpg" alt="Station 4" /></td>
<td><img src="image5.jpg" alt="Station 5" /></td>
<td><img src="image6.jpg" alt="Station 6" /></td>
</tr>
</tbody>
</table>
Learning Space: Robot aided Assembly

- Production line - Cobot
Learning Space: Robot aided Assembly

**Pick**

**Place in the box nr1**

**Pick**

**Place in the box nr2**
Learning Space: Virtual reality

Virtual Reality
Learning Space: develop a VR environment
Learning Space: Kinect Ergonomic Evaluation

Ergonomic assessment with Kinect
Learning Space: Kinect Ergonomic Evaluation

TARGET DETECTION
Conclusion

• Cobots have been used for student activities since 2015

BFH

• Cobots have been used for student activities since 2021

MEX

• At our university we continue our effort to teach our students the benefits and solutions that Industry 4.0 is offering.
• We.
Future work Collaboration BFH – Tecnológico

- Global Shared Learning
- Sommer / Winter semester (5 weeks) in BFH
- International Conference papers
- Scopus Papers
  - Professors of BFH and Tecnológico de Monterrey
Next seminars

**Biel / Bienne**
Quellgasse 21, Aula

**2.3.2023** | **I4.0 Activities in Higher Education** Gabriela Reyes-Zárate, Associate professor, ITESM, Dept. of Industrial Engineering

**16.3.2023** | **Shaping Participatory Health Informatics** Prof. Dr. Kerstin Denecke, Institute for Medical Informatics 14MI, BFH-TI

**30.3.2023** | **Mit dem Handy das Auto aufschliessen? Hardware Protected Confirmation macht es möglich** Prof. Dr. Benjamin Fehrensen, Institute for Cybersecurity and Engineering ICE, BFH-TI

**6.4.2023** | **Von der Laborbank zum Patienten – Erste klinische Resultate zur selektiven Netzhaustherapie** Christian Burri, Institute for Human Centered Engineering HuCE, BFH-TI

**13.4.2023** | **Intégration d'un ensemble complet de logiciels pour la conduite autonome** Ahmed Hanachi, Institut pour la recherche sur l'énergie et la mobilité EEM, BFH-TI

**27.4.2023** | **Die digitale Transformation des Exportgeschäfts** Prof. Dr. Paul Ammann, Institute for Data Applications and Security IDAS, 3FH-TI

**11.5.2023** | **The Relevance and Hands-on Application of Biomedical Record Linkage in the Big Data Era** Prof. Dr. Murat Sariyar, Institute for Medical Informatics 14MI, BFH-TI

**1.6.2023** | **Averaging Model for Feedback Control of Ultrasonic Transducers** Diego Stutzer, Institute for Human Centered Engineering HuCE, BFH-TI

**Burgdorf / Berthoud**
Pestalozzistrasse 20, E013

**9.3.2023** | **From Sub-nanometer to Micrometer Films, or how to Combine ALD with PVD** Dr. Carlos Guerra, CEO, Swiss Cluster AG

**23.3.2023** | **Recycling von Traktionsbatterien aus Elektrofahrzeugen bei Librec** Denis Werner, Technischer Leiter, Librec AG

**20.4.2023** | **How Data Analysis Can Help to Better Understand the Degradation in PV Modules** Prof. Dr. Jasmin Wandel, Institute for Optimisation and Data Analysis IODA , BFH-TI and Sara El Hassani, Institute for Energy and Mobility Research IEM, BFH-TI

**4.5.2023** | **TPV 5000 – Beitrag zur Defossilisierung des Verkehrs** Dr. Albrecht Tribukait, CEO ad int., Silent-Power AG

**25.5.2023** am Jöcoweg 1 | **What is High Voltage Engineering about?** Prof. Dr. Roman Grinberg, Institute for Energy and Mobility Research IEM, BFH-TI

**8.6.2023** | **Waghalsige Holzkonstruktionen unter Anwendung moderner Technologie neu denken** Matias Penroz, Institut für digitale Bau- und Holzwirtschaft IdBH, BFH-AHB