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

Tecnológico de Monterrey

Law, Economics and International Relations

Creative Studies

Business

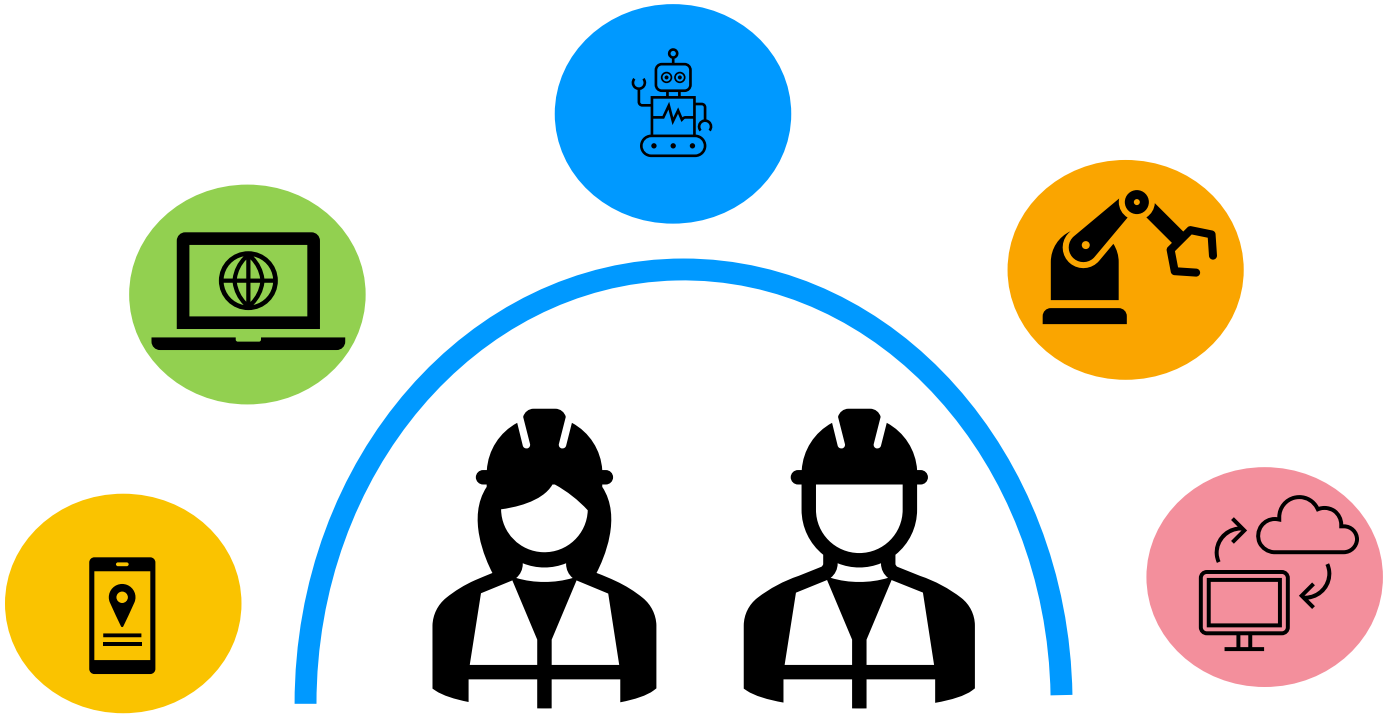
Health

Engineering and Science

Students

94,424	26,794	60,169	7,461
Total number of	High School	Undergraduate	Graduate

Introduction



Industrial technology collaboration

Digitalization skills

(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

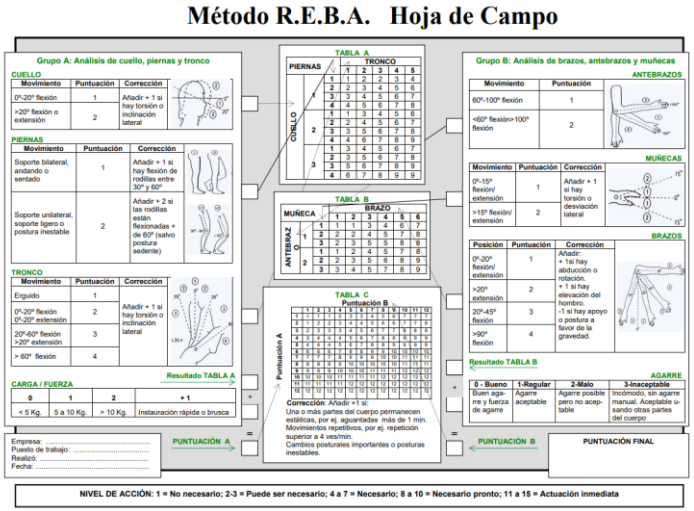
flexibility

creativity

innovation

Learning Space: Manual Assembly

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

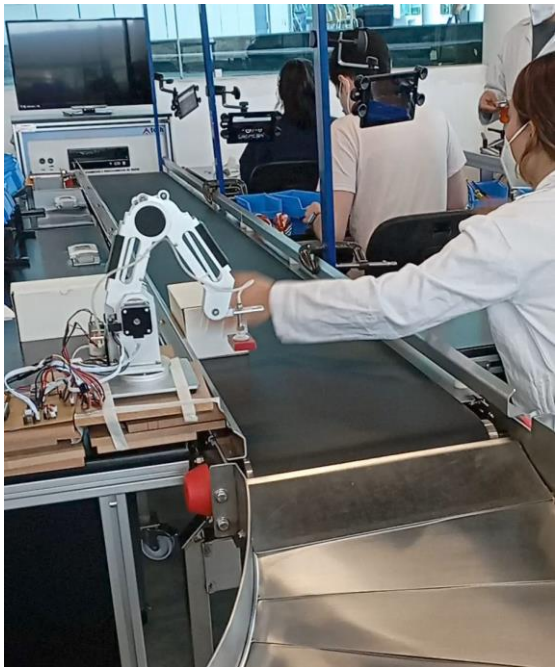


The goals for this production system are:

- Define number of workstations
- Time studies
- Light and noise level measurements
- Ergonomics assessment (manual)

Learning Space: Robot aided Assembly

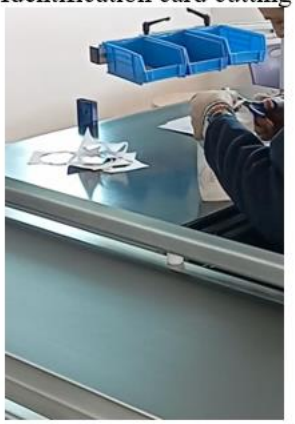
1) Collaborative robotic arm



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

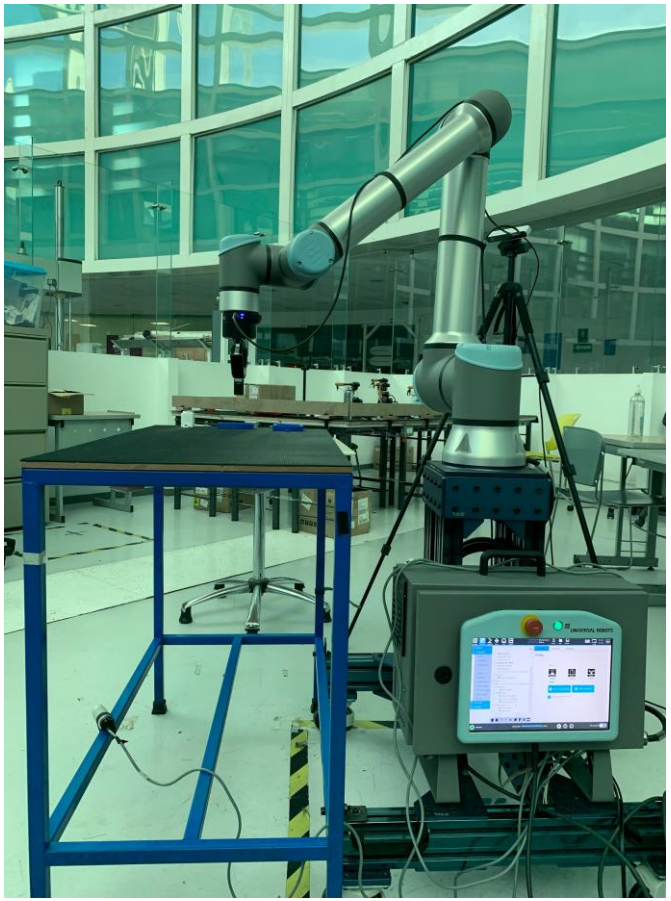
This process is carried out through the implementation of a collaborative robotic arm and a digital Andon system.

Learning Space: Robot aided Assembly

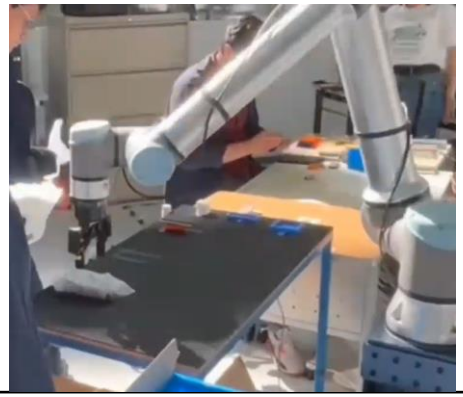
Station 1. Identification card cutting 	Station 2. Product assembly 
Station 3. Box assembly and packing. 	Station 4. Batch stamping in box packaging-collaborative robot arm station. 

Learning Space: Robot aided Assembly

2) Secondary process through Cobot



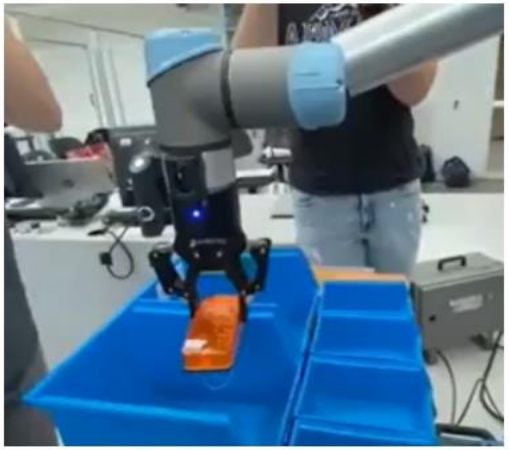
Learning Space: Robot aided Assembly

Station 1: Assembly the products 	Station 2: Pick and place / Cobot 	Station 3: Bagging the product 
Station 4: Carton box assembly 	Station 5: Pick and place / Cobot 	Station 6: Box closing 

Learning Space: Robot aided Assembly

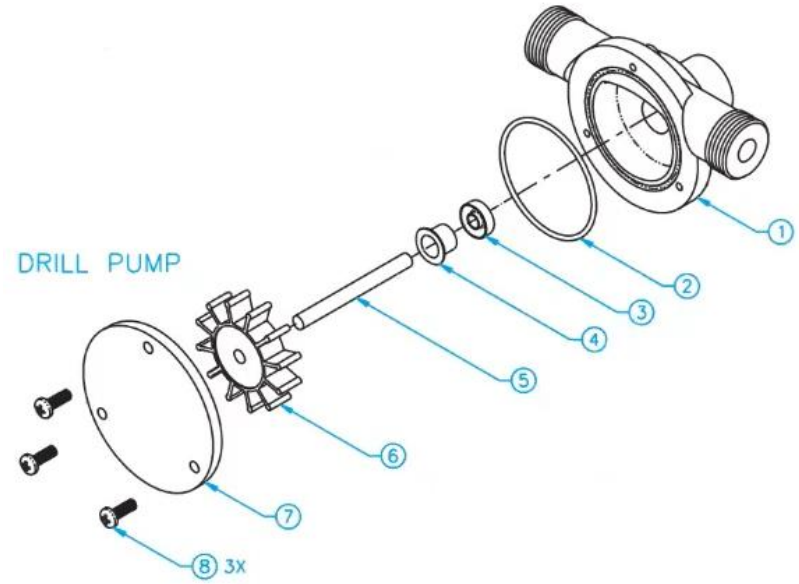
- Production line - Cobot

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

Conclusion

- Cobots have been used for student activities since 2015

BFH

- Cobots have been used for student activities since 2021

MEX

- At our univeristy 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 I4MI, 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 Netzhauttherapie** Christian Burri, Institute for Human Centered Engineering HuCE, BFH-TI

Biel / Bienne
Quellgasse 21, Aula

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 IEM, BFH-TI

27.4.2023 | **Die digitale Transformation des Exportgeschäfts** Prof. Dr. Paul Ammann, Institute for Data Applications and Security IDAS, BFH-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 I4MI, 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 Jlcoweg 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 Penrroz, Institut für digitale Bau- und Holzwirtschaft IdBH, BFH-AHB