Digl-VET Fostering Digitization and Industry 4.0 In Vocational Education and Training



Learner Module B : Industry 4.0 and history

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Partners:











# WHAT THIS MODULE WILL COVER

## **SECTION A**

• What is industry 4.0? & Task

## Terms

- Cyber-physical systems (CPS) & Cloud computing & Task
- The internet of things (IoT) & The Industrial internet of things (IIoT) & Task

## **SECTION B**

- History of Industry 4.0 & Task
  - Industry 4.0 The Fourth Industrial Revolution (video/task)

## **SECTION C**

- Agriculture 4.0 and Industry 4.0 & Task
  - How the use of drones will assist agriculture in Industry 4.0 & Task
- Contact
- References

# WHAT IS INDUSTRY 4.0?

- Industry 4.0 is essentially the Digital Networking of people, machines and products.
- It is also known as the 4<sup>th</sup> industrial revolution that concerns industry.
- Although the terms "industry 4.0" and "fourth industrial revolution" are often used interchangeably, "Industry 4.0" factories have machines which are intensified with wireless connectivity and sensors, connected to a system that can envision the entire production line and make decisions on its own.
- Essentially, industry 4.0 is the trend towards automation and data exchange in manufacturing technologies and processes which include cyber-physical systems (CPS), the internet of things (IoT), industrial internet of things (IIOT), cloud computing, cognitive computing and artificial intelligence (AI).



## 1. Concept of Industry 4.0

Submitted by DigiVET on Fri, 01/24/2020 - 11:30

TASK

Which of the following is NOT included in the Industry 4.0 concept?	
O Automated production using electronics and IT.	
O Lights out (manufacturing) also known as dark factories	
O Internet of Things (IoT)	
O Smart Manufacturing	
Check	

Exercise can be found in the link <u>https://h5p.org/node/705021</u>

## WHAT ARE ALL THESE TERMS?

## Cyber-physical systems (CPS)

## Artificial intelligence (AI)

## Cloud computing

The internet of things (IoT)

Industrial internet of things (IIOT)

## Cognitive computing

## CYBER-PHYSICAL SYSTEMS (CPS)

CPS are objects which have embedded software and electronics connected to each other in a system, for example, robots, drones and other movable machines. This way physical and mechanical objects and processes are connected with software-controlled objects and processes – with the real and virtual worlds converging. CPS can be used for traffic control or for managing intelligent electricity networks.



mage from Pixabay https://pixabay.com/illustrations/cloud-computing-network-internet-2001090/



Image from Pixabay https://pixabay.com/illustrations/industry-4-0-web-network-points-2741774/

## **CLOUD COMPUTING**

Cloud computing covers all activities taking place on an online service (For example: sending e-mails, processing documents via an online platform and saving them there, playing videos or analysing data). It makes an IT infrastructure which makes it possible for data to be saved on decentralised computer systems via the internet and to be available at any time at any place as long as there is an internet connection. Thus, a cloud provider offers a complete working place in a virtual form (such as computer, memory, platforms and software applications) creating great flexibility for the user.

### cyber-physical systems (CPS)

Submitted by DigIVET on Tue, 03/24/2020 - 16:20

#### O Thank you for trying out HSP To get started with HSP read our getting started guide

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### Exercise can be found in the link https://h5p.org/node/760844

### **Cloud Computing**

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Submitted by Dig/VET on Tue, 03/24/2020 - 16:25

#### O Thank you for trying out HSP. To get started with HSP read our getting started guide Drag the words into the correct boxes Cloud computing covers all taking place on an service (For example: sending e-mails; decentralised processing documents via an online platform and saving them there, playing videos or analysing data) III makes an IT infrastructure which makes it possible for data to be saved on computer systems via the internet and to online be available at any time at any place as long as there is an internet Thus, a cloud provider offers a complete connection working place in a virtual form (such as computer, memory, platforms and software applications) creating great activities for the user. flexibility

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Exercise can be found in the link <u>https://h5p.org/node/760853</u>

## THE INTERNET OF THINGS (IOT)

The IoT is a network of connected devices that can communicate with each other and provide data to users through the Internet. IoT devices can connect to the Internet and often have sensors that enable them to collect data. An IoT device can be useful on its own, but when you use numerous devices together, they become even more valuable.

IoT technology enables the user to collect data automatically from many different functions. IoT technology can also be used to automate equipment and parts of industrial operations.



Image from Pixabay https://pixabay.com/photos/turn-on-turn-off-industry-energy-2923046/

### Industrial internet of things (IIOT)

lloT is a subcategory of loT. The term refers to loT technology used in Industrial settings, namely in manufacturing facilities. IloT is a key technology in Industry 4.0, the next phase of the industrial revolution. Industry 4.0 emphasises smart technology, data, automation, interconnectivity, artificial intelligence and other technologies and capabilities. These technologies are revolutionising the way factories <sup>8</sup>/<sub>and</sub> industrial organizations are run.

## The Internet of Things

Submitted by DigiVET on Tue, 03/24/2020 - 16:30

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## Exercise can be found in the link <u>https://h5p.org/node/760859</u>

# HISTORY OF INDUSTRY 4.0



## HISTORY OF INDUSTRY 4.0

The **First industrial revolution** began with the mechanization and mechanical power generation in 1800s. It brought the transition from manual work to the first manufacturing processes (mainly in the textile industry). An improved quality of life was a main driver of the change.





ps://pixabay.com/vectors/factory-car-engine-assembling-35104/

The **Second industrial revolution** was triggered by electrification that enabled industrialization and mass production. It was a period when advances in steel production, electricity and petroleum caused a series of innovations that changed <u>society</u>. With the production of cost effective steel, railroads were expanded and more industrial machines were built.

The **Third industrial revolution** is characterized by the digitalisation with introduction of microelectronics and automation. In manufacturing this facilitates flexible production, where a variety of products is manufactured on flexible production lines with programmable machines. Such production systems however still do not have flexibility concerning production quantity.



Image from Pixabay https://pixabay.com/photos/company-factory-production-186980



mage from Pixabay https://pixabay.com/photos/industrial-4-0-information-2470457,

Today we are in the Fourth industrial revolution that was triggered by the development of Information and Communications Technologies (ICT). Its technological basis is smart automation of cyber-physical systems with decentralized control and advanced connectivity (IoT functionalities). The consequence of this new technology for industrial production systems is reorganization of the automation systems to a self-organising cyber physical production system, that allows flexible mass custom production and flexibility in production quantity.

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### Exercise: https://h5p.org/node/705116



TASK

Exercise can be found in the link <a href="https://h5p.org/node/705116">https://h5p.org/node/705116</a>

# INDUSTRY 4.0 - THE FOURTH INDUSTRIAL REVOLUTION

Check out this <u>video</u>, produced by the Siemens company regarding Industry 4.0 and the vision of tomorrow's manufacturing... What are your thoughts on this?



TASK

https://www.youtube.com/watch?v=HPRURtORnis





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# Thank you for your attention!