

Digitalization in TVET

4.0

Advanced Manufacturing 4.0 Lab

Submitted by Miguel Altuna, Spain

BILT Innovation and Learning Practice

The introduction and teaching of new technological, social and environmental trends is not possible without the adaptation of learning spaces and labs required by Industry 4.0 training. To make this a reality, new technologies must be included in training programmes and specific equipment procured. Moreover, mature processes and technologies, for example the industrial Internet of Things, communications, data management, and automation, must be adapted for use in training. In Basque Country, Spain, Miguel Altuna's Advanced Manufacturing 4.0 Lab/Workshop addresses these challenges with the creation of a Learning Cyber Physical Space.

- Start date: 11/2019
- Type of implementing insitution:
  Governmental Organization or affiliated

- Target group:
  TVET centres, industry and stakeholders in Advanced Manufacturing sector

Miguel Altuna, Spain

Miguel Altuna is a TVET centre in Basque Country, Spain, which works in close collaboration with the UNEVOC Centre Tknika. Qualified professionals at Miguel Altuna are trained dynamically, encouraging students' personal and talent development.

Description of activities

TIn the era of digitalization and industry 4.0, TVET learning environments must be fully digitalized to at least the same level that industry is digitalizing their production plants. With its Advanced Manufacturing Workshop, the Basque TVET centre Miguel Altuna offers a fully digitalized TVET training space designed to the same standards as industry. For example, the Advanced Manufacturing 4.0 Lab includes the following features:

- Communication between all the machines and facilities; a centralized booking system and usage control; tracking of students and their machine's usage level using Radio Frequency Identification (RFID) technology; intelligent warehouses to control tool usage; energy efficiency monitoring; smart maintenance systems; and, data monitoring and utilization.
- Open source Enterprise Resource Planning (ERP) system to manage all the system.
- Integration of robots into the labs and workshop spaces.
- Innovative learning methodologies to insert Industry 4.0 content into current and upcoming learning programmes.

Using the AM 4.0 Lab, every student must use RFID gadgets and upload technical information to the cloud for use on the machines. Furthermore, the data coming from the labs, including machine and tools usage, availability, and maintenance information, is the data that students are using in collaborative challenges.

Added value

What current challenges does your initiative address?

A challenge for TVET institutions can be access to and use of advanced technology in training. The AM space addresses this by integrating specific technological content of Industry 4.0 into current or newly created TVET programmes. This provides an opportunity for TVET students in industrial specialities to become familiar with work in digitalized environments before entering the workplace. Doing so can introduce approaches to digitalize machining and assembling workshops like the approaches used in industry, with similar hardware, communication and data acquisition systems, and management tools.

Why is this initiative a success?

The hands-on methodology has demonstrated its success in the acquisition of technical and transversal skills. From a student perspective, to be trained in such an Industry 4.0 environment is strongly motivating and enriching and allows a smoother transition to the workplace. A lesson learnt is that setting up a 4.0 workshop in a TVET school requires quick adaptation of trainers, teachers and staff to the industry 4.0 requirements.

What is the added value of this example?

This example demonstrates how a TVET centre can be adapted to a new scenario in terms of specific technical skills and transversal digital skills. With the new workshop, an Industry 4.0 culture is created among students and staff. Furthermore, this allows stakeholder input to be considered in the design of not only the training programmes but the learning environment, too.

Impact on curricula

What implications does this example have for current or future curricula?

The implications are wide reaching, with expectations to increase the impact on the curriculum in a short term. Not only are new TVET programmes being offered, but the creation of the lab and engagement with industry stakeholders has led to current degrees being updated or modified. The lab will be also a source of information to update curricula and training regulations concerning Advanced Manufacturing, especially in the framework of the EU-funded EXAM 4.0 project.

How does this example impact TVET systems?

The impact is at the local TVET institution and industry stakeholder level, but also has a system wide impact due to the implications for other sectors that could replicate a similar learning model.

How does this example respond to industry and social demands?

This example is a response to a clear need for incorporating digitalization skills and industry 4.0 methodologies that more clearly align with industry demands, while providing a space for TVET leaners to use the tools that industry utilizes, which accelerates their transition to the workforce.

Transferability

Which components of this practice may have practical value to other UNEVOC Centres/TVET institutions?

The model for TVET smart workshop can be transferred and adapted to the realities of other TVET stakeholders. The used solutions and communication architectures can be adopted and modified by others, for example the used ERP is open source. The pilot experience is integrated in the EU-funded EXAM 4.0 platform, an Advance Manufacturing HUB for VET which will be open for TVET centres across the EU.

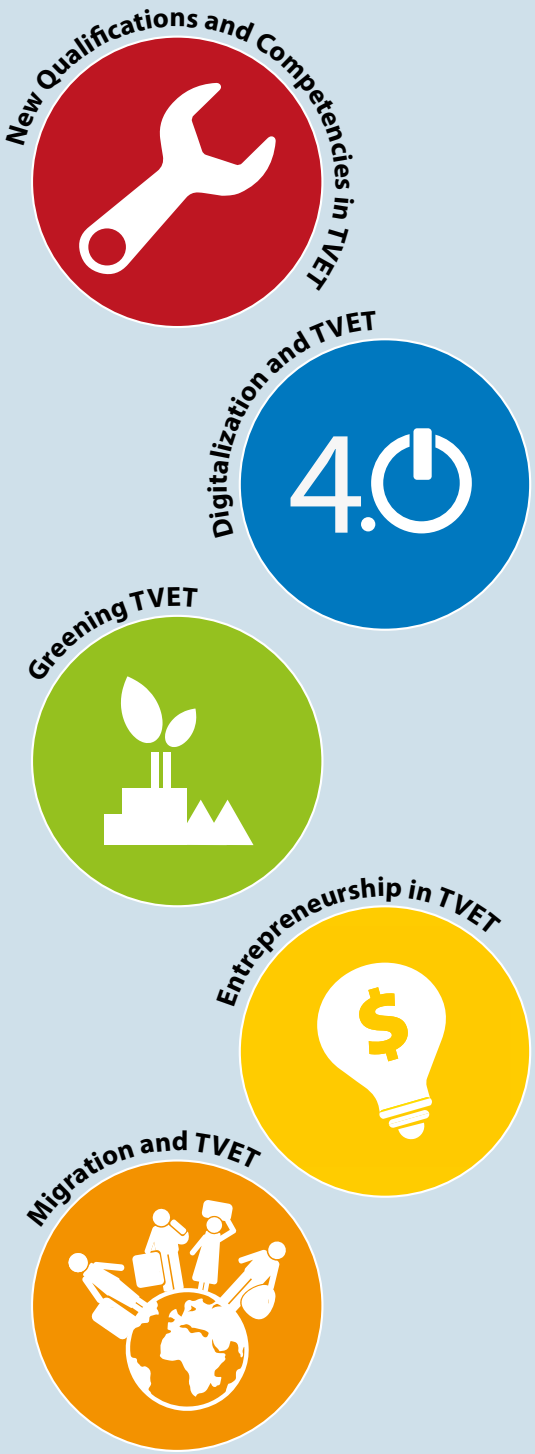
What challenges do you see if transferred to another context?

Each TVET centre has its contextual characteristics. However, the approach of digitalizing TVET labs (for example machining labs, assembly lab etc.) is applicable for all TVET institutions. A main challenge will be the needed funding to afford the hardware and equipment, and consideration must be given for low cost solutions to make the approach viable at a lower scale.

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Part of the BILT project involves collecting Innovation and Learning Practices that address systemic challenges within the five work streams of the project, with the purpose to understand what elements lead to their success and can be transferrable to other contexts.*

Access more BILT Innovation and Learning practices in the thematic areas of:



*UNESCO-UNEVOC does not endorse any of the practices included in this database and is not responsible for their management or implementation.

BILT
Bridging Innovation and Learning in TVET

The Bridging Innovation and Learning in TVET (BILT) project provides TVET stakeholders with a platform for exchange and supports them to address current challenges in TVET systems, which arise due to technological, social, environmental, and workplace changes.

Within BILT, the overarching thematic area is New Qualifications and Competencies in TVET, which is supported by four work streams:

- Digitalization and TVET,
- Greening TVET,
- Entrepreneurship in TVET, and
- Migration and TVET.

Through regular knowledge exchange, thematic project activities, and expert working groups, BILT offers opportunities for collaboration between UNEVOC Centres and TVET stakeholders in Europe, and a platform for bridging of innovation and learning between European UNEVOC Centers and TVET stakeholders in the Asia-Pacific and Africa regions.

The results of ongoing activities are accessible on BILT's web page and will be disseminated during a BILT Learning Forum.

The BILT project is carried out in collaboration with UNEVOC Network members, coordinated by UNESCO-UNEVOC with support of the German Federal Institute for Vocational Education and Training (BIBB), and sponsored by the German Federal Ministry of Education and Research (BMBF).

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