UNESCO
International Centre for Technical and Vocational Education and Training



Innovating TVET for regional development

Fostering regional excellence through makerspaces

Promising Practice

Implemented by: Šolski center Nova Gorica (Slovenia), in collaboration with the Mauritius Institute of Training and Development and École d'Hôtellerie et de Tourisme Paul Dubrule, Cambodia

Where: Slovenia, Mauritius and Cambodia

Status: August – November 2025

Summary: This initiative equipped TVET students and teachers with skills through challenge-based learning (CBL), teacher upskilling and the use of makerspaces for applied, real-world problem solving.

Education 2030

Overview

Vocational education systems need to prepare students for digital, green and societal challenges. Makerspaces are often underused as drivers of applied innovation and teachers frequently lack the training needed to shift from traditional instruction to mentorship-based, learner-centred teaching.

This initiative responds to these gaps by embedding challenge-based learning, teacher mentorship training and makerspace-based innovation directly into TVET practice, explicitly linking student learning to the Sustainable Development Goals.

The initiative was developed by Šolski center Nova Gorica (ŠCNG), a UNEVOC Centre in Slovenia. ŠCNG is recognized for its close collaboration with industry, development of makerspace environments, involvement in numerous Erasmus+ innovation projects and leadership in pedagogical innovation within Slovenia's VET system.

The initiative was implemented in partnership with the Mauritius Institute of Training and Development (MITD) and École d'Hôtellerie et de Tourisme Paul Dubrule (EHT) in Cambodia, as part of the UNEVOC Network Coaction Initiative. The UNEVOC Network Coaction Initiative is coordinated by UNESCO-UNEVOC and funded by the German Federal Ministry for Education, Family Affairs, Senior Citizens, Women and Youth (BMBFSFJ). The initiative is part of the coordinated effort "Towards a global TVET agenda".

Description

The project introduced a structured challenge-based learning (CBL) model that engages TVET learners in solving authentic challenges identified by companies, NGOs, community organizations and sector-specific partners.

The approach combines teacher professional development, interdisciplinary student teamwork and makerspace-based learning, enabling students to investigate real-world problems, design solutions and produce tangible prototypes.

Target group

The primary target group comprises TVET students, teachers and trainers, and makerspace mentors. Local industry partners, community organizations and school leadership teams are engaged as secondary beneficiaries, with the wider UNEVOC Network expected to benefit through knowledge sharing and collaboration.

Key components

Designing a common CBL framework
Partners co-created a shared pedagogical model on problem identification, prototyping and presentation, with agreed learning phases, assessment approaches and makerspace integration.

Building teacher capacity for new pedagogies
Teachers took part in online workshops and a 3.5-day training programme on mentorship and coaching, sustainability integration and the use of generative AI.

Implementing authentic challenge cycles with students
Each institution ran its own challenges, co-created with companies, NGOs and community partners. Students worked in interdisciplinary teams to research problems, design solutions and produce tangible outputs.

Engaging the skills ecosystem in co-creation
The practice actively involved industry partners, cultural and community organizations, NGOs, government representatives and universities.

Supporting the practice through shared resources and standards
An online hub was created to share materials, makerspace standards and good practices.

Outcomes and impacts

Qualitative outcomes
The approach strengthened learner engagement by connecting education with authentic societal, environmental and industry challenges. Students developed technical, digital and transversal skills, including teamwork, creativity, communication, project management and problem solving, while gaining greater awareness of sustainability and emerging technologies such as artificial intelligence.

At the teacher and staff level, the initiative strengthens teachers' capacity to apply modern pedagogies. Through targeted training and mentoring, teachers transition from traditional instruction to facilitating and coaching roles, gaining confidence in challenge-based, interdisciplinary and learner-centred approaches. This contributes to longer-term pedagogical change within participating institutions.

System impact
At the institutional level, makerspaces are increasingly used as integrated learning and innovation environments, not only as technical facilities. They support prototyping, experimentation, collaboration with external partners and applied research activities. Institutions also benefit from stronger collaboration with industry and community stakeholders, who contribute real challenges and feedback to the learning process.

At the international level, the initiative creates structured cooperation and peer learning among partners in Slovenia, Mauritius and Cambodia. Shared methodologies, joint reflection and contextualized implementation strengthen institutional capacity and contribute to the dissemination of good practices within the UNEVOC Network.

Challenges

Transition from traditional teaching to challenge-based learning
Teaching and learning practices were traditionally structured around clearly defined tasks and outcomes, requiring a gradual transition towards more open-ended, learner-driven, challenge-based approaches.

Integrating makerspaces into formal curricula
Makerspaces were not originally designed as core learning environments, making it challenging to align activities with curricular requirements and schedules.

Coordinating international collaboration across diverse contexts
Differences in institutional capacity, infrastructure, and socio-economic conditions required careful coordination and adaptation.

Responses to challenges

To enable the transition towards challenge-based learning within a limited timeframe, the initiative focused on practical orientation sessions and ready-to-use challenge templates. Teachers and students were introduced to the approach through concrete examples and short pilot activities, allowing them to quickly understand expectations and roles without extensive preparatory phases.

To integrate makerspaces despite time and curricular constraints, the initiative used compact, challenge-driven activities that could be implemented within existing lessons or project days. Instead of redesigning curricula, makerspace use was embedded into clearly defined learning tasks with tangible outputs.

To manage international collaboration across diverse contexts, the project relied on simple coordination structures and shared digital tools. The focus on common themes with locally adapted challenges allowed each partner to contribute meaningfully while respecting differences in capacity and context.

Lessons learned

Implementing the initiative showed that innovation in TVET does not require long preparation cycles or large-scale reforms. Even short-term projects can generate meaningful impact when they are clearly focused and well structured. Starting with a limited number of realistic challenges helps institutions test new approaches without overwhelming teachers or learners.

Another key insight is that clarity of roles and expectations is essential. When students, teachers and external partners understand what is expected from the beginning, collaboration becomes smoother and learning outcomes improve. Simple frameworks and concrete examples are more effective than complex methodologies, especially in pilot phases.

The initiative also highlighted the importance of using existing resources strategically. Makerspaces, digital tools and partnerships already available in institutions can be activated quickly if they are linked to concrete learning tasks and visible outcomes. This reduces resistance to change and demonstrates value early on.

Finally, the experience confirmed that flexibility and reflection are critical success factors. Allowing space for adaptation during implementation, encouraging short feedback loops and accepting multiple possible solutions support innovation and learning.

Conclusion and next steps

Partners plan to build gradually on the pilot results by integrating core elements into existing TVET structures through flexible and modular implementation rather than systemic reform.

Challenge-based learning will be further applied through selected modules, project days and interdisciplinary activities, enabling continued experimentation and adaptation within current curricula.

In parallel, partners plan to continue sharing challenges, materials and reflections through the UNEVOC Network, using the pilot experience as a practical reference point for future cooperation, scaling opportunities and potential follow-up initiatives.



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Learn more

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