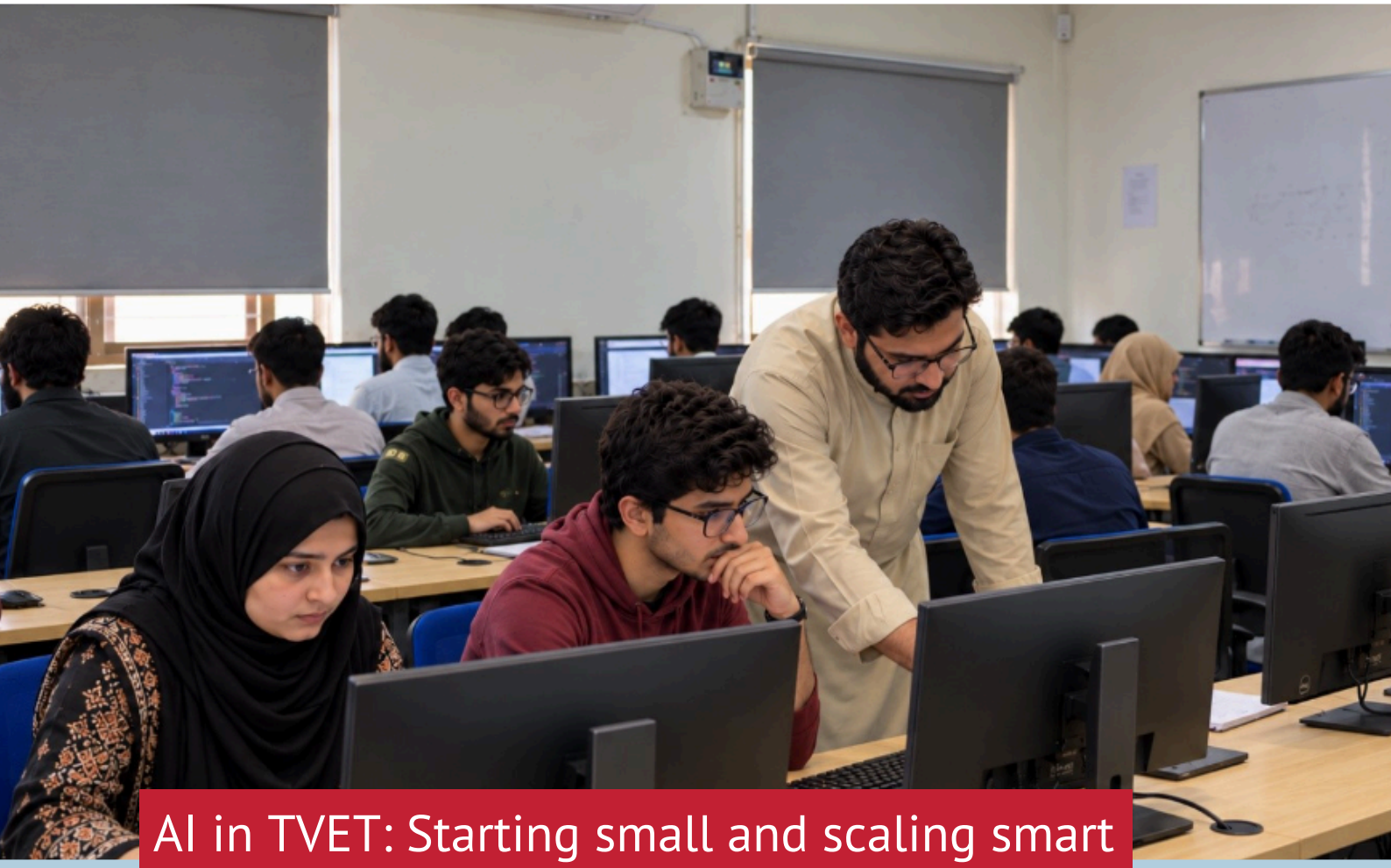
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AI in TVET: Starting small and scaling smart

A low-cost approach to integrating AI in TVET through lab modules, project-based assessment and instructor training

Promising Practice

Where: Islamabad, Pakistan

Implemented by: National Skills University

Status: January 2024 – ongoing

Summary: This initiative integrates AI literacy into TVET computing programmes through reusable lab kits, project-based assessment and instructor micro-trainings, with responsible use of AI and integrity safeguards built into the design.

Education 2030

Overview

Rapid digitalization in Pakistan has increased demand for graduates and technicians who are comfortable working with artificial intelligence (AI) tools and workflows, creating a need to modernize TVET learning to remain practical and employability-focused. At the same time, the growing uptake of AI tools by TVET students brings new challenges regarding responsible use, academic integrity and basic security that need to be addressed. In response to this gap, the National Skills University (NSU), a UNEVOC Centre, embedded AI literacy directly into existing computing programmes by adapting curricula, revising learning assessments and building instructor capacity, while keeping the approach budget-conscious and scalable.

NSU is a public-sector skills university in Islamabad focused on workforce-ready education and modern TVET delivery aligned with national standards and accreditation requirements. NSU's Office of Research, Innovation and Commercialization (ORIC) developed the initiative and leads research, innovation and partnerships that support applied projects and build capacity to strengthen students' practical skills and employability.

Description

NSU identified four specific gaps motivating this initiative:

- limited applied exposure to AI tools and workplace workflows among students
- uneven instructor readiness and a lack of repeatable lab activities
- assessments that do not reflect real-world job tasks
- weak guidance on responsible use, integrity and basic security

The initiative aims to support TVET-aligned undergraduate learners in computer science, information engineering technology and artificial intelligence, alongside instructors and in-service trainers, and short-course participants in computing, data and cybersecurity.

Objectives

- Build AI literacy and hands-on AI skills.
- Promote responsible AI use, integrity and basic security awareness.
- Strengthen instructor capability and address uneven instruction and readiness.
- Align training tasks with local industry needs and employability skills.

Outcomes and impact

Expected outcomes include stronger student capability in applying AI concepts in laboratory and capstone projects, increased instructor confidence and consistency in course delivery, and closer alignment between learning outcomes and workplace competencies, particularly in the areas of responsible AI use, practical application and basic cybersecurity awareness.

Early evidence indicates that students are producing stronger portfolios and higher quality capstone outcomes through the effective use of AI-enabled workflows and documentation practices. Instructors are also delivering more consistent laboratory activities and assessments through the use of shared toolkits, manuals and rubrics.

Insights and challenges

Challenges

Instructor familiarity with AI and approaches to course delivery varied considerably across departments, while lab time and computing resources were limited for some student cohorts. NSU also faced the challenge of ensuring academic integrity and the secure use of AI.

Responses to challenges

To address variations in instructor readiness, NSU introduced short, targeted workshops paired with peer mentoring. Resource constraints were addressed through lightweight laboratory modules designed for modest hardware and open-source tools, alongside shared lab scheduling and standard assessment rubrics.

Academic integrity and security concerns were addressed through documentation requirements, viva-based verification and clear guidance on responsible use and basic security.

Key components

Five interconnected actions:

Revised course learning outcomes
NSU began by updating course learning outcomes across existing courses to include AI literacy, workflows and responsible use.

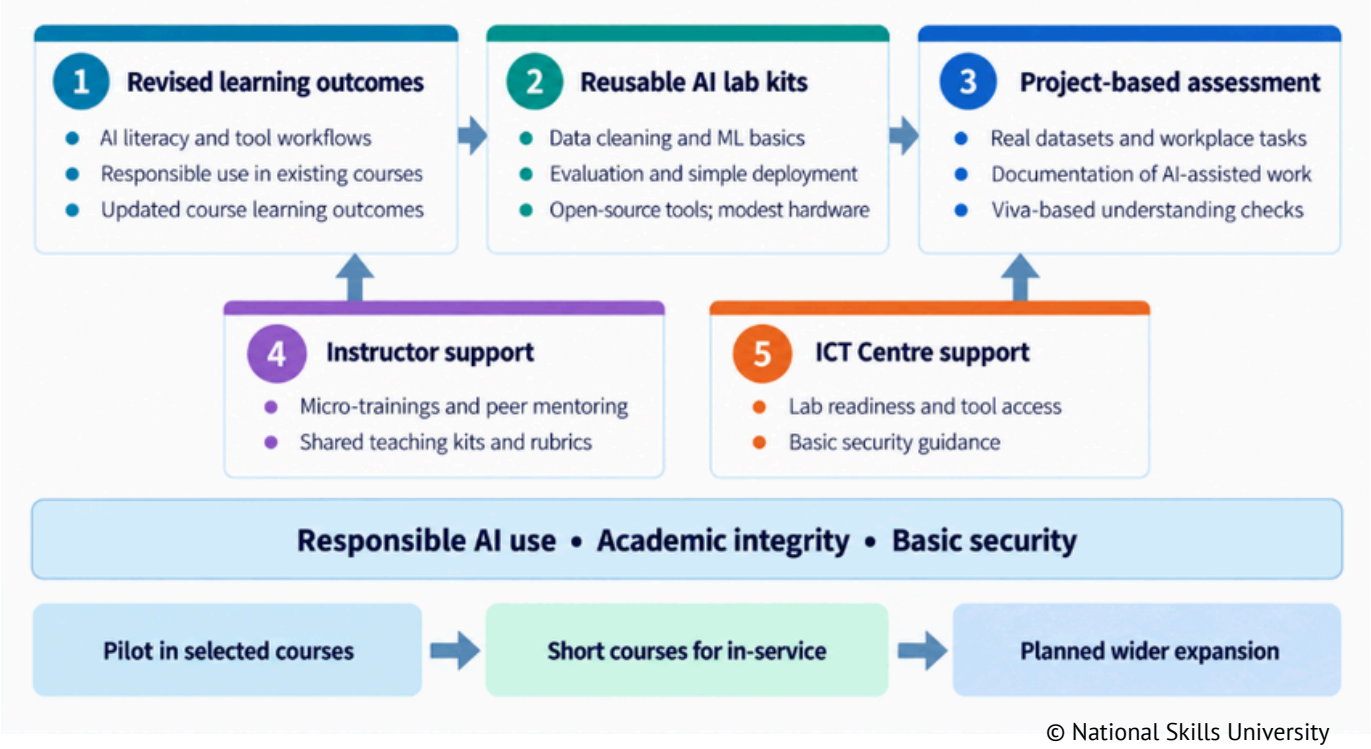
Reusable lab kits
Structured, well-documented lab kits were developed covering data cleaning, machine learning basics, evaluation and simple deployment, designed specifically to run on modest hardware using open-source tools.

Project-based assessment
Assessment shifted to a project-based format using real datasets and workplace-style problem statements, with documentation requirements and viva-based checks introduced to confirm that students genuinely understood their own AI-assisted work.

Instructor support
NSU strengthened instructor capability through micro-trainings, peer mentoring and shared teaching kits, building consistency in how courses were delivered.

ICT Centre support
The university's ICT Centre provided laboratory readiness, access to tools and basic security guidance throughout the implementation.

The initiative was piloted first in selected courses and then scaled to short courses for in-service trainers and technicians. Implementation involved internal faculty, the ICT Centre and quality assurance focal persons, with industry and alumni contacts providing input on workplace-style problem statements.



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Lessons learned

This experience highlights several lessons that may be relevant across the TVET sector. First, integrity and security in AI-supported learning can be safeguarded in practice through deliberate design choices. These considerations can be effectively embedded into learning and assessment processes through appropriate verification mechanisms and clear expectations for learners.

Second, differences in instructor readiness should be expected when introducing new technologies, but they can be addressed through practical, accessible professional development opportunities and the provision of simple, user-friendly teaching resources.

Third, institutions do not need extensive resources or a long preparation period to begin integrating new technology into TVET. Starting with small, manageable and scalable interventions can help institutions build experience, demonstrate value and create momentum for broader adoption.

Next steps

NSU's planned next steps include expanding AI lab modules to additional TVET-aligned programmes, formalizing an instructor micro-credential on AI integration in TVET and strengthening industry co-designed projects and internship-linked problem sets. NSU also plans to share selected lab kits, rubrics and guidance within the UNEVOC Network, along with a short replication playbook for partner institutions.

Learn more

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