APPRENTICESHIP WORKFORCE DEVELOPMENT

DELIVERED BY AOC aelp EDUCATION & TRAINING FOUNDATION SDN SQW UVAC UNIVERSITY VOCATIONAL AWARDS COUNCIL

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The 'Digital Practicum'

Introduction

This resource is designed to complement the content of the AWD course 'Integration of on-the-job and off-the-job learning/training' and 'Planning the integration of on and off-the-job training'. It can, however, also be used as a stand-alone resource if you haven't yet attended either course.

Purpose

This resource is designed to check the efficacy of a digital teaching practicum and support practitioners to connect different forms of knowledge from different fields in apprenticeship delivery, at all level of skills and across all occupations and professions. It allows practitioners to explore with apprentices the connection between theory and practice.

How to use

Use as part of your integrated curriculum design or review to think about the methods you will rely on to allow apprentices to apply and reflect what has been learned. It promotes further thinking on how digital technology can aid learning in many ways using appropriate pedagogies.

Definition

A 'practicum' is an environment dedicated to practice learning.

It can be situated in an actual workplace, in a specially constructed space such as a teaching workshop or scaled-down version of the real work environment, or in a digital or mixed-reality 'space'.

The main feature of a practicum is that it includes structured supervision and support for learning for instance to allow learners to develop from closely supervised to more independent ways of working. The practicum can be thought of as a halfway house between off-job learning and being in a real working environment with all the associated pressures and unpredictability.

A digital practicum aims to recreate relevant aspects of a work environment using digital technology. It can be fully digital (i.e. a simulation or virtual reality space), or it can involve a combination of real and digital spaces – so for instance the learner sees a real environment such as a hospital ward, construction site or emergency situation, but acts through the digital interface. Learners may be fully immersed in a digital environment, with all interaction being virtual, or they could engage with other learners and trainers face-to-face.

FIVE advantages of a digital practicum approach include:

1. Allowing learners to practise skills and make mistakes cheaply and without risk of causing harm.

2. Allowing more intensive training and supervision than would be possible in a real environment.

3. Allowing learners to tackle more complex, critical, dangerous or unpredictable tasks and scenarios than they would be able to in the live workplace.

4. Preparing learners in an off-the-job setting for work tasks.

5. Teaching practice and theory together, rather than waiting for suitable opportunities in the workplace.

The following are a small selection of examples that have been used successfully in different occupations and settings.

Digital simulations for the financial industry

NetEnquiry is a tablet-based app providing virtual scenario-based learning in financial services. Scenarios are available covering different aspects of banking. The app simulates processes in an actual bank, with a complete set of banking and communication tools along with virtual characters who act as clients and react to learners' inputs. Each scenario requires three learners to take on different roles (e.g. front counter, credit specialist, manager), and they need to collaborate effectively for the scenario to have successful results.

Project site (in German): https://www.qualifizierungdigital.de/qualifizierungdigital/de/projekte/praxisbeispiele/mobiles-lernen/netenquiry/netenquiry_node.html

Conference paper: https://files.eric.ed.gov/fulltext/ED571446.pdf

Virtual reality for manual tasks

Virtual reality is used quite widely to simulate manual tasks. It can have limitations for honing skills, but it can be a good way of developing basic skills cheaply and safely. Examples include:

1. Welding. The user operates a controller that looks and feels like a normal welder, while using VR glasses with a program that simulates welding operations. Using the controller feels like using a welder ('haptic VR'), for instance as the welding rod touches the materials. Learners can become reasonably proficient before they start using real materials, reducing waste.

2. Surgery. Immersive VR is becoming widely used in surgical training, enabling trainee (and experienced) surgeons to learn and practise procedures safely before working on patients. As with welding, surgical VR can use realistic instruments with haptic feedback. Evaluations indicate that VR leads to faster learning and more successful procedures.

3. Painting and decorating. Some aspects of painting and decorating can be simulated through VR, either via a computer screen (with less emphasis on practical skills) or more immersively through VR glasses and lifelike controllers. Trainees learn basic methods and techniques before using real materials.

Commercial sites: https://weldvr.com/, https://metaverselearning.co.uk/catalogue/painting-decorating/

Short paper (surgery) https://www.mja.com.au/system/files/issues/194_04_210211/dev10363_fm.pdf

Augmented reality in a chemical practicum

Augmented reality (AR) overlays digital information on real situations, either directly (e.g. through looking through AR glasses in a 'head-up' type display) or by representing both the real and digital scenes on a screen. A chemical industry training centre, which is in effect a practicum environment in itself (industrial processes are reproduced on a small scale in a controlled environment), uses a simple AR application to help learners to operate equipment. AR presentations (diagrams and video snippets) help learners to understand how the machine works, and guide them through the operations needed to set it up.

Academic paper: https://devmts.org.uk/arvet.pdf

Digital preparation for a real practicum

Some nursing programmes use a scaled-down ward environment as a real-life practicum before trainee nurses start their hospital attachments. The realism of these environments sometimes leaves learners feeling overwhelmed, and one university developed an interactive virtual representation of the practicum as a 'digital explorer' tool. This allowed learners to familiarise themselves with the environment and explore relevant principles and

practices before exposure to the actual practicum. Use of the 'digital explorer' was further developed in the coronavirus pandemic when learners were unable to access the real practicum, and it can also be used to bring the practicum into classroom sessions.

Academic paper: https://www.ijwil.org/files/IJWIL_21_5_545_557.pdf

Virtual reality safety training

Construction safety requires familiarisation with visible hazards as well as being able to identify and react to scenarios that are unlikely to be encountered in training. A technology institute has used immersive VR to build a virtual construction site for safety training. Learners can be exposed to hazardous situations and accidents, see for instance how a structure might collapse or respond to fire, and learn incident response as well as hazard perception. The VR environment also included learning resources that could be linked to the specific scenarios. The approach was evaluated with both construction and civil engineering learners, and demonstrated improved learning effectiveness and safety awareness.

Academic paper:
https://www.researchgate.net/publication/271667415_Construction_safety_training_using_ immersive_virtual_reality

Serious games for management learning

Serious games are learning environments that use the principles of gamification. They are particularly widely used in the military, healthcare and business and management, but have applications in almost any field. ERPsim is a digital serious game environment for enterprise resource management. It currently contains four different fields: distribution, logistics, manufacturing and retail, each with a range of scenarios that represent increasing complexity. Participants can work in teams, take different roles, and engage in different types of business transaction.

ERPsim site: https://erpsim.hec.ca/en/erpsim

Academic paper: https://www.mdpi.com/2071-1050/14/2/683