

Boosting digital innovation in VET by integrating Extended Reality
to train work-readiness skills for work-based learning programmes

WP2/PR2: Training Curriculum on training work-readiness skills for WBL through XR

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Definition of the Training Curriculum on training work-readiness skills for Work-based Learning (WBL) through XR

The specific document presents a structured training curriculum related to work-based learning (WBL) and the integration of Extended Reality (XR) technologies. It includes a framework for developing trainers' competences and learning objectives across multiple modules. Each module focuses on a different aspect of XR, such as its introduction, computing competences, pedagogical approaches, inclusivity, regulation, infrastructure, and stakeholder communication.

The main elements include:

1. **Trainer Profile Definition:** This outlines the expectations for trainers who will be working with XR in a WBL context, specifically targeting those at EQF Level 6 (bachelor's level). **The target group of the trainers** should be:
 - VET teachers, VET authorities
 - In-company trainers
2. **Modules:** The document breaks down various modules (seven in total), each with specific learning objectives focused on different aspects of XR technology in WBL:
 - Introduction to XR Technology
 - Computing Competences in XR
 - Pedagogies in XR for WBL
 - Inclusive Use of XR
 - XR Regulation and Government Policies
 - Setting and Maintaining XR Infrastructures
 - Stakeholder Communication in XR-enhanced WBL.
3. **Learning Outcomes:** Each module outlines expected knowledge, skills, and responsibility/autonomy outcomes that trainers should achieve upon completion. These include theoretical knowledge, practical skills in using XR technology, and strategies for fostering inclusivity and navigating regulatory frameworks.

The purpose of the document is to offer a comprehensive guide for trainers to implement XR technology in WBL environments, with a focus on developing both the technical and pedagogical skills needed to create effective, inclusive, and regulated learning experiences.

Module 1: Introduction in XR Technology - CARDET

Learning Objective: This module will equip trainers with a comprehensive set of learning outcomes focused on knowledge, skills, autonomy, and responsibility in terms of digital competencies in XR Technologies.

In terms of knowledge, participants will gain an understanding of the principles and applications of Extended Reality (XR) technologies, including virtual reality (VR), augmented reality (AR), and mixed reality (MR), within the context of work-based learning (WBL). Learners also will adopt a positive attitude towards innovation, demonstrating openness to new technologies and environments.

Learning outcomes	Knowledge	Skills	Responsibility and Autonomy
	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none">• Describe and discuss the basic principles and applications of XR technologies (including VR, AR and MR) in various industries, particularly in work-based learning environments (WBL).• Outline the benefits and limitations of VR, AR, and MR in educational and professional settings.• Explain the impact of XR technologies on the efficiency and effectiveness of training programs in a work-based learning context.	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none">• Employ XR tools to create simple interactive experiences that could be used in work-based learning.• Choose XR applications for specific training needs.• Model and formulate or produce a prototype XR-based training module tailored to a particular industry or training requirement.	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none">• Adopt a proactive and open attitude towards technological innovations in XR and integrating XR technologies into training programmes.• Foster an inclusive, supportive and collaborative learning environment when introducing XR technologies into training programmes.• Assess personal experiences with XR technologies to continuously improve one's approach to training and learning.



Module 2: Computing Competencies in XR Technology – INFODEF

Learning Objective: This module will equip trainers with a comprehensive set of learning outcomes focused on knowledge, skills, autonomy, and responsibility.

Learners will develop practical skills in using XR hardware and software, designing XR environments, and integrating digital technologies into WBL programs. Furthermore, the module will foster autonomy and responsibility by empowering participants to independently explore and experiment with XR technology, solve technical challenges, and make informed decisions about its application in educational settings

Learning outcomes	Knowledge	Skills	Responsibility and Autonomy
	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Understand the key principles of designing effective and engaging XR environments, including user experience (UX) design, interaction design, and accessibility considerations. • Comprehend how to integrate digital technologies, specifically XR tools, into WBL programs to enhance learning outcomes and engagement. 	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Demonstrate practical skills in using XR hardware and software • Create and customise XR environments using industry-standard tools, incorporating multimedia elements, interactivity, and feedback mechanisms. • Apply XR technologies to create immersive educational experiences, align them with curricular goals, and assess their effectiveness in real-world WBL scenarios. 	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Independently explore new XR tools and technologies, staying up-to-date with the latest advancements and trends. • Independently identify and solve technical challenges related to XR hardware and software. • Make informed decisions regarding the selection, implementation, and adaptation of XR technologies in educational settings, based on a thorough analysis of needs and potential benefits, and commit to lifelong learning and continuous improvement in their practice.



Module 3: Pedagogies in Extended Reality for Work-Based Learning – SBG

Learning Objective: Equip trainers with the knowledge, skills, and autonomy necessary to design and implement XR learning environments, create interactive XR content, and integrate pedagogical strategies into work-based learning (WBL) programs.

Participants will understand the components and requirements for designing XR learning environments, including different technology tools and their applications. They will explore the pros and cons of using XR in educational contexts, along with the benefits and limitations of various immersive instructional approaches such as visualization, virtual field trips, and storytelling/annotation. Participants will also gain knowledge of different ways of learning, including asynchronous and synchronous methods, and the importance of lesson planning to enhance teaching and learning in diverse vocational contexts.

Learning outcomes	Knowledge	Skills	Responsibility and Autonomy
	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Explain the teaching and learning potential of Extended Reality (XR) as an educational technology in WBL • Explain the pedagogic potential of different XR forms such as AR (Augmented Reality) remote training, digital twins etc. as well as no-code and coded solutions in low and high-risk environments 	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Identify the teaching and learning potential of Extended Reality (XR) as an educational technology in WBL • Identify the pedagogic potential of different XR forms such as AR (Augmented Reality) remote training, digital twins etc. as well as no-code and coded solutions in low and high-risk environments. 	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Take responsibility for planning XR use in WBL learning environments, ensuring they meet educational goals by enhancing the learning experience for example. • Determine the pedagogic potential of different XR forms such as AR (Augmented Reality) remote training, digital twins etc. as well as no-code and coded solutions in low and high-risk environments.



	<ul style="list-style-type: none"> • Explain different communication and collaboration forms, such as a-/synchronous and in-/direct learning to illustrate how to effectively plan lessons to enhance teaching and learning in diverse vocational contexts • Relate to different pedagogical frameworks such as the DICE Model, SAMR, and TPACK, and their relevance in integrating XR into educational practices. • Select suitable evaluation methods 	<ul style="list-style-type: none"> • Develop skills in planning and delivering lessons that incorporate XR technologies, ensuring they are pedagogically sound and effectively meet VET/WBL learning outcomes. • Develop the ability to evaluate the teaching and learning “effectiveness” of XR use, and provide constructive feedback for continuous improvement. 	<ul style="list-style-type: none"> • Assume responsibility to deliver pedagogic-sound XR content to support different learning styles by choosing suitable communication and collaboration forms. • Process suitable evaluation methods concerning XR use in WBL • Act independently to seek out new knowledge and skills related to XR technologies and pedagogies, promoting ongoing professional development and growth.
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Module 4: Inclusive use of XR – CSF

Learning Objective: Equip learners with the knowledge, skills, and attitudes necessary to design, implement, and evaluate XR-enhanced learning experiences ensuring inclusivity for all learners.

Learners will gain a comprehensive understanding of ethical frameworks, guidelines, and best practices for creating XR-enhanced learning experiences that emphasize digital citizenship, privacy protection, and cultural sensitivity. This includes learning how to design XR content that addresses the diverse needs of all learners, including those with disabilities such as dyslexia, epilepsy, and speech or writing difficulties, as well as considering gender, accessibility, and screen viewing problems.

Learners will acquire practical skills in designing XR experiences that prioritize accessibility and usability, ensuring inclusivity for learners with disabilities, language barriers, and cultural differences. By understanding and applying these principles, learners will be able to create XR-enhanced learning environments that are respectful, safe, and effective for a diverse range of users, promoting a more inclusive and equitable educational experience.

Learning outcomes	Knowledge	Skills	Responsibility and Autonomy
	Upon completing this module, learners should be able to: <ul style="list-style-type: none">• Define the key ethical frameworks, and the guidelines for creating inclusive XR-enhanced learning experiences, emphasising digital citizenship, privacy protection, and cultural sensitivity.• Illustrate best practices of XR learning experiences that address the diverse needs of all learners.	Upon completing this module, learners should be able to: <ul style="list-style-type: none">• Design XR-enhanced learning experiences that are inclusive, ensuring they meet the diverse needs of all learners, including those with disabilities and considering factors such as gender, accessibility, and cultural differences.	Upon completing this module, learners should be able to: <ul style="list-style-type: none">• Assess the inclusivity and accessibility of XR-enhanced learning experiences.• Estimate the potential impact of XR-enhanced learning experiences on learner engagement and outcomes, considering factors such as accessibility, usability, and cultural relevance.



	<ul style="list-style-type: none"> • Outline the practical steps involved in designing XR learning experiences that prioritise accessibility and usability 	<ul style="list-style-type: none"> • Develop XR learning environments that prioritise accessibility and usability, making sure that learners with disabilities, language barriers, and cultural differences can effectively engage with and benefit from the learning experiences. • Select the most appropriate XR content in order to create respectful and safe learning environments ensuring they are effective for a diverse range of users, using established ethical frameworks and guidelines to assess inclusivity and equity. 	<ul style="list-style-type: none"> • Identify areas for improvement, appropriate strategies and modifications to ensure that XR experiences meet the needs of all learners, including those with disabilities and diverse backgrounds.
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Module 5: XR Regulation and Government policies – GOI

Learning Objective: Equip participants with the knowledge and skills necessary to navigate regulatory frameworks, government policies, and ethical considerations for the safe and responsible use of XR technologies in educational settings.

Participants will gain an understanding of the regulatory frameworks and government policies governing XR technologies in education. This includes key legal and ethical considerations such as data privacy, accessibility, and intellectual property rights. They will explore existing guidelines, standards, and initiatives at national and international levels aimed at promoting the safe and responsible use of XR in teaching and learning. They will learn to critically evaluate the impact of regulatory frameworks and government policies on the adoption and integration of XR in education systems and curricula. Additionally, participants will gain the ability to handle legal documents related to ethics and inclusion, ensure privacy and data protection, and address intellectual property and copyright issues.

Learning outcomes	Knowledge	Skills	Responsibility and Autonomy
	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none">• Recall key legal and ethical considerations such as data privacy, accessibility, and intellectual property rights in the context of XR technologies in education.• List the major regulatory frameworks and government policies governing XR technologies in education at international levels and explain their importance at both national/international level	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none">• Analyse how legal and ethical considerations impact the adoption and use of XR technologies in educational settings• Apply national and international legal and ethical guidelines to real-world scenarios involving XR technologies in educational settings	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none">• Instruct trainees and team members on best practices for data privacy, accessibility, and intellectual property management in the context of XR technologies• Develop and act on a roadmap for handling legal documents concerning ethics and inclusion, ensuring privacy and data protection, and tackling intellectual property and copyright matters



Module 6: Setting and Maintaining XR Infrastructures - DIMITRA

Learning Objective: Equip participants with the knowledge and skills necessary to set up, maintain, and manage XR infrastructures in educational contexts, ensuring optimal performance, scalability, sustainability, and cost-efficiency.

Learners will develop an understanding of the components and requirements involved in setting up and maintaining XR infrastructures. This includes hardware specifications, network connectivity, software integration, and physical infrastructure considerations essential for effective XR deployment. They will also explore best practices and emerging trends in XR infrastructure management, focusing on strategies for optimizing performance, scalability, and sustainability while minimizing costs and resource utilization.

Participants will learn to assess the specific needs of educational institutions or organizations and develop comprehensive infrastructure plans. They will gain skills in selecting appropriate hardware, software, and networking solutions, troubleshooting technical issues, performing maintenance tasks, and ensuring the reliability, security, and accessibility of XR systems over time. This holistic approach will prepare them to manage XR infrastructures effectively, ensuring they meet the evolving demands of educational environments

Learning outcomes	Knowledge	Skills	Responsibility and Autonomy
	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Recall and Outline XR Infrastructure Components in relation to: <ul style="list-style-type: none"> - hardware specifications - network connectivity requirements - software integration (compatibility and functionality) 	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Develop and Build XR infrastructures by: <ul style="list-style-type: none"> - Organising and implementing step-by-step processes for setting XR systems with the use 	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Develop decision- making skills and assume responsibility as a team leader by: <ul style="list-style-type: none"> - Instructing trainees - Making informed decisions based on constructive criticism and adequate information



	<ul style="list-style-type: none"> - physical infrastructure - considerations for XR systems' deployment <ul style="list-style-type: none"> • Select and demonstrate cost- efficient actions and security measures by: <ul style="list-style-type: none"> - Developing skills in budgeting/ financial planning (in relation to XR projects) - Implementing ways to ensure XR systems' reliability/ security - Remaining informed on the latest trends/ security measures (in relation to the digital security of XR projects) 	<p>of no- code or low- code platforms</p> <ul style="list-style-type: none"> - Making use of gained knowledge on hardware specifications configuration in order to optimise device performance <ul style="list-style-type: none"> • Compare XR solutions and identify the most cost- effective ones by: <ul style="list-style-type: none"> - Examining the status and maintenance needs of XR systems - Analysing latest trends in software, hardware and networking solutions in order to be able to maintain cost- efficiency 	<p>sourcing (on costs, sustainability, efficiency)</p>
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Module 7: Stakeholders Communication - INQS

Learning Objective: Equip participants with the knowledge and skills necessary to facilitate effective communication, teamwork, and shared goals in XR-enhanced work-based learning (WBL) settings, enhancing the learning experience and employability of apprentices.

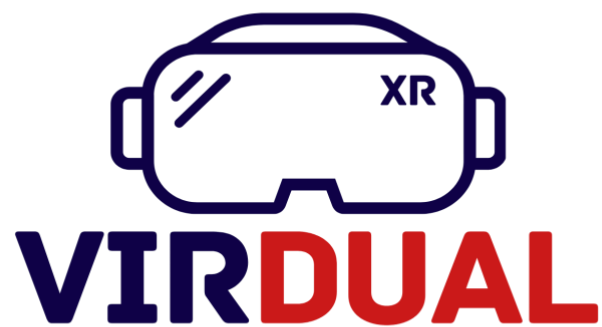
Participants will explore the importance of effective communication, teamwork, and shared goals in facilitating successful collaborations. They will gain an understanding of the roles and regulations of different actors in WBL training programs. Additionally, the module will provide an introduction to key stakeholders in XR development and deployment, offering insights into their roles and contributions.

They will also develop the ability to transfer knowledge between actors, enhance soft skills, and create training lesson plans. Additionally, case studies and examples of successful stakeholder collaboration initiatives in XR will be provided, highlighting best practices, lessons learned, and practical insights for fostering effective partnerships and achieving shared objectives.

	Knowledge	Skills	Responsibility and Autonomy
Learning outcomes	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Outline the importance and benefits of effective communication, teamwork and shared goals between stakeholders in XR-enhanced work-based learning settings. 	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Facilitate effective communication, teamwork and shared goals with stakeholders in XR-enhanced work-based learning settings. 	<p>Upon completing this module, learners should be able to:</p> <ul style="list-style-type: none"> • Compare case studies and examples of successful stakeholder collaboration initiatives in XR.



	<ul style="list-style-type: none"> • Define the roles and regulations of the different actors in XR-enhanced WBL training programmes. • Outline the key stakeholders in XR development and deployment in terms of their roles and contribution 	<ul style="list-style-type: none"> • Develop the ability to transfer knowledge between actors, enhance learners' soft skills and create training lesson plans. 	<ul style="list-style-type: none"> • Highlight best practice, lessons learned and practical insights in XR for fostering effective partnerships and achieving shared objectives.
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