PraLe
Practical learning at remote in the transport sector

Co-funded by the European Union

Result 2: Final report

Innovating new forms (a combination and application of modern digital technologies) of distance and on-line-learning to enable independent learning of new core competencies in the transport sector

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Content

1. Introduction

The main goal of the PraLe project is development of new, resistant to pandemic limitations (and other of similar nature) transportation training due to integration of methods within which students practice practical work tasks even independently with use of ICT solutions and remote & network connections, and the trainer (can also be a virtual trainer) gives them feedback on the practice done. In this way, the development of professional competence can be promoted in a modern way.

Result 2, the Road Map, in the PraLe project is central. It undertakes the development of a comprehensive Road Map, meticulously outlining the fundamental practical skills and responsibilities of truck and bus drivers. By focusing on the integration of new technologies and employing innovative methods, R2 aims to facilitate independent, remote, and online learning for these essential work tasks. The outcome of R2 not only addresses the needs of trainers, students, and training organizations, but also provides valuable input for subsequent project phases. The Road Map generated by R2 becomes a crucial design basis, offering insights into hands-on exercises, technology integration, assessment tools, and applicable practices. Essentially, Result 2 plays a pivotal role in shaping the trajectory of the PraLe project, ensuring its coherence, relevance, and impact in the dynamic landscape of driver training and education..

2. Description of the Road Map

The Road Map tool is implemented in a web browser in such a way that the user of the tool first selects a driver training course and then searches for a possible new and technology-enabled implementation.

Once a choice is made between bus and truck training, the core competence area to be developed is selected. The following 3 areas have been selected as core competences:

1. Applying principles of eco-defensive driving

Applying the principles of economic driving is important for new drivers working as professional drivers. Economic driving includes environmental friendliness, foresight, safety and correct use of the vehicle. The heavier a vehicle, the more fuel economic driving saves. When practicing the principles of economic driving, we discuss vehicle control at different speeds, correct acceleration and proactive approach, the importance of a safety distance for fuel economy, and we try to avoid stops (when start to move with stopped vehicle always consumes a lot of energy). Economic driving training includes a theoretical basis, practical training with a simulator, for example, and finally an economic driving test, where fuel consumption is measured using a real vehicle.

2. Understanding and handling the dashboard

Understanding the dashboard and using it correctly is an important part of heavy equipment training. Getting to know the vehicle almost always starts with the control devices and other vehicle control switches (additional and auxiliary devices, hatch openings, light switches, heating, fan, things affecting driving safety and travel comfort, etc.). There is also some variation in the symbols between different brands, so familiarizing yourself with a new vehicle is very important.

3. Preliminary inspection of the vehicle

The primary objective of a preliminary vehicle inspection is to ensure the safety of goods and passengers, other road users, and the driver. A properly conducted inspection can identify any potential hazards or defects in the vehicle that

may affect its performance and safety on the road. By conducting a thorough inspection, the driver can identify any issues with the vehicle and address them before the journey begins, preventing any potential accidents or breakdowns.

During a preliminary vehicle inspection, the driver must examine the vehicle's critical components, such as the engine, lights, tires and battery. Additionally, the inspection must include an assessment of the vehicle's fluid levels, including the engine oil, hydraulic fluid and coolant. Any defects identified must be repaired or addressed before the vehicle is deemed roadworthy.

Traditionally, a preliminary inspection is first studied theoretically and then exercised with a real bus. The students must also show their competence by completing a practical test that is monitored by a teacher.

Once the core competences for driver training have been selected, the next step is to choose the remote learning method. Each core competence has a few options which are presented in more detail on the next page of the Road Map -tool. Each remote learning method is briefly described with a general description, the technology used and a SWOT analysis of the implementation.

3. Development Process of the Road Map

The implementation of the PraLe project's second deliverable (R2), the Road Map, proceeded in stages. The first step was the identification of core competences, where 2-3 key skills and responsibilities for truck and bus drivers were decided. For this, the Slido tool was used for voting, focusing on the core competences rather than just the names of modules or titles.

Once the core competences had been selected through voting, partners were invited to suggest ways of implementing practical exercises for distance learning. Both existing and future implementations were considered, especially from the perspective of CTRL Reality.

A SWOT analysis was conducted for each proposed delivery mode, assessing strengths, weaknesses, opportunities and threats. All project partners were involved in these analyses.

The information collected, including the selected core competences and the SWOT analyses of the delivery modes, was then integrated into a "RoadMap" tool intended to serve as a practical guide on the PraLe project website. The technical implementation was carried out by KOMAG.

4. Possible uses in Vocational Education and Training and for Trainers

Vocational schools can leverage the Road Map as a comprehensive guide to design and enhance their training programs for truck and bus drivers. The identified core competences and practical skills, along with the proposed implementation strategies, provide a structured framework for curriculum development. Schools can align their courses with the Road Map, ensuring that the training addresses the most crucial aspects of the profession. The Road Map serves as a reference point for educators, aiding them in creating content that is relevant, up-to-date, and aligned with industry needs.

Trainers can use the Road Map as a planning tool for structuring their training programs. By referring to the identified core competences, trainers can tailor their curriculum to focus on the most essential skills and responsibilities. The proposed implementation strategies offer guidance on incorporating remote and online elements into training sessions. Trainers can use the SWOT analyses to understand the strengths and weaknesses of different implementation approaches, allowing them to make informed decisions. The Road Map serves as a roadmap for trainers to organize and optimize their training sessions effectively.

The Road Map provides a forward-looking perspective by considering technological advancements and alternative training methods. As the industry evolves, the Road Map offers a flexible framework that can adapt to emerging trends and innovations. Trainers and vocational schools can continually reference the Road Map to ensure that their programs remain relevant and aligned with industry demands.

5. Summary

The PraLe project aims to develop flexible transport training, especially in the face of pandemic constraints, by integrating methods that allow students to independently practice practical tasks using ICT solutions and receive feedback remotely. Outcome 2, the roadmap, is a key component of the project, which outlines in detail the basic skills and responsibilities of truck and bus drivers. It focuses on innovative methods and new technologies and aims to facilitate independent, distance and e-learning. The roadmap will become a central planning basis, providing information on practical exercises, technology integration, assessment tools and applicable practices.

The roadmap tool, accessible via a web browser, will allow users to select a driver training course and explore new technology-based implementations. Key skills such as eco-driving, understanding the dashboard and vehicle pre-inspection will be highlighted. Each core competency has different remote learning options, which are presented in detail in the tool, including overviews, technologies used and SWOT analyses of the implementations.

In vocational education and training, the roadmap serves as a comprehensive guide for curriculum development, ensuring that it meets the needs of the sector. Trainers use it as a planning tool and tailor their programmes based on the identified core competences and proposed implementation strategies. The roadmap provides a forward-looking perspective that adapts to industry changes and evolving technologies. Its flexibility allows trainers and institutions to continuously benchmark, ensuring that programmes are relevant and adapted to the needs of the sector in an evolving environment.

Appendix 1. R2 Tool Selection

Appendix 2. R2 Remote Technologies

Technique	Description	Examples
Learning with live lessons through distant video solutions with active teacher	Students at home, connect to remote online telco from their PC or mobile, see and hear the teacher, comments	Teams, Zoom, Webex, Hangouts
Learning with recorded lessons	Students at home, watch standard videos from their PC or mobile teachers instructs	Vimeo, YouTube
Learning with non-interactive digital materials	Students at home access traditional, albeit digital, learning materials via web pages or MS Office like tools. Text, photos.	web pages, PowerPoint
Learning with interactive platforms/software with feedback from the teacher	Students use learning platforms where they can study and complete (or retrieve and return) exercises which are evaluated by teachers.	Moodle
Learning with interactive platforms/software with automatic (robot) feedback	Students use learning platforms to study and complete exercises that are instantly evaluated by the platform. Can be used for both exercises and tests.	Ville, Quizlet
360 media (photos & videos)	360 (mono or stero) Images and videos taken from the training site added with additional information such as text, normal photos. Or 360 videos taken from the training site showing the procedure with audio. Students view with their own PC or mobile device through web pages or students view with VR glasses.	CTRL Training 360, Thinglink
3D Environments with animated contents, non-interactive / 2D or VR	A 3D modelled environment with animations. Students can use their own PC or mobile for a 2D view to the environment. Students use VR glasses to view the 3D content or students use VR glasses to view the 3D content.	Matterport
Learning with Simulating software	A separate software for simulating certain task. Students can use on their own PC or mobile,	
Simulated excercises in VR	A hands-on exercise created for specific task includes the 3D environment and practical tasks. Used with VR glasses and controllers.	Bus pre-inspection (created by CTRL to TTS)
Simulated excercises in VR with remote teacher	A hands-on exercise created for specific task includes the 3D environment and practical tasks. Used with VR glasses and controllers. Teacher can join remotely as an avatar.	Tire change demo (PraLe)
Virtual classroom / 2D	Students join a virtual classroom with their own PC or mobile device. They can move in the environment and see the content. Teacher and other students as avatars.	Mozilla Hubs, Viverse, Altspace VR
Virtual classroom / VR	Students join a virtual classroom with VR glasses. They can move in the environment and see the 3D content. Teacher and other students as avatars.	Meta Horizon, Viverse, Altspace VR
Learning with Augmented Reality (AR)	Students utilize AR hardware (mobile phones, goggles) to learn.	

Practical tools /R2

BUS	CORE COMPETENCE	TOPIC (smaller entities of the core competences)	Learning with live lessons through distant video solutions with active teacher	Learning with recorded lessons	Learning with non-interactive digital materials	Learning with interactive platforms /software with feedback from the teacher	Learning with interactive platforms/ software with automatic (robot) feedback	360 media (photos & videos)	Software or method 3D Environments with animated contents, non-interactive / 2D or VR	Learning with Simulating software	Simulated excercises in VR	Simulated excercises in VR with remote teacher	Virtual classroom / 2D	Virtual classroom / VR	Learning with Augmented Reality (AR)	COUNTRY
	Preliminary inspection of the vehicle	Engine inspection	3	3	3	2	2	2	2	2	2	2	3	3	3	FI
								1			3	2				PL
			0	0	0	0	0	0	0	0	4	3	2	1	0	BE
		Vehicles body inspection	3	3	3	2	2	2	2	2	2	2	3	3	3	FI
								1			3	2				PL
			0	0	0	0	0	0	0	0	4	3	2	1	0	BE
		Cabin inspection	3	3	3	2	2	2	2	2	2	2	3	3	3	FI
								1			3	2				PL
			0	0	0	0	0	0	0	0	4	3	2	1	0	BE
		Electricity and start	3	3	3	2	2	2	2	2	2	2	3	3	3	FI
								1			3	2				PL
			0	0	0	0	0	0	0	0	4	3	2	1	0	BE
			2	3	2	2	2	2	3	3	3	2	2	2	2	FI
								1								PL

Understanding and handling the dashboard	Buttons	0	0	0	0	0	1	0	0	2	0	0	0	0	BE
	Gearswitch	2	3	3	3	3	2	3	3	3	3	3	3	3	FI
							1			2	3				PL
		0	0	0	0	0	1	0	0	2	0	0	0	0	BE
	Meters	3	3	3	3	3	2	3	3	3	3	3	3	3	FI
							1			2	3				PL
		0	0	0	0	0	1	0	0	2	0	0	0	0	BE
	Pedals	2	3	3	3	3	2	3	3	3	3	3	3	3	FI
							1								PL
		0	0	0	0	0	1	0	0	2	0	0	0	0	BE
Handling the digital tachograph	Using drivers card	3	2	3	2	2	3	3	2	2	2	2	2	2	FI
		2							1						PL
		0	0	0	0	2	0	0	1	0	0	0	0	0	BE
	Functions	3	2	3	2	2	3	3	2	2	2	2	2	2	FI
		2							1						PL
		0	0	0	0	2	0	0	1	0	0	0	0	0	BE
	User interface	3	2	3	2	2	3	3	2	2	2	2	2	2	FI
		2							1						PL
		0	0	0	0	2	0	0	1	0	0	0	0	0	BE
	Functions	3	2	3	2	2	3	3	2	2	2	2	2	2	FI
		2							1						PL
		0	0	0	0	2	0	0	1	0	0	0	0	0	BE
	Moving vehicle	4	3	4	3	3	4	4	2	2	2	4	4	4	FI
		5						3		2	1	4			PL

Basic vehicle manoeuvres		0	3	0	2	0	1	1	1	0	0	0	0	0	BE
	ateral displacement	4	3	4	3	3	4	4	2	2	2	2	2	2	FI
		5						3		2	1	4			PL
		0	3	0	2	0	1	1	1	0	0	0	0	0	BE
	Reversing	4	3	4	3	3	4	4	2	2	2	2	2	2	FI
		5						3		2	1	4			PL
		0	3	0	2	0	1	1	1	0	0	0	0	0	BE
	Meander / zigzag	4	3	4	3	3	4	4	2	2	2	4	4	4	FI
		5						3		2	1	4			PL
		0	3	0	2	0	1	1	1	0	0	0	0	0	BE
Riding on public roads	Bus lines	2	2	2	2	2	3	2	2	2	2	2	2	2	FI
		1					2				3	4			PL
		0	0	0	2	0	1	1	1	0	0	0	0	0	BE
	Bus stops	2	2	2	2	2	3	2	2	2	2	2	2	2	FI
		1									2	3			PL
		0	0	0	2	0	1	1	1	0	0	0	0	0	BE
	Using doors	4	4	4	3	3	4	4	2	2	3	3	3	3	FI
		1										2			PL
		0	0	0	2	0	1	1	1	0	0	0	0	0	BE
	Depot and terminals	2	2	2	2	2	3	2	2	2	2	2	2	2	FI
		1					2					3			PL
		0	0	0	2	0	1	1	1	0	0	0	0	0	BE
Applying principles of eco-defensive drive	Ecodrive	3	3	3	3	3	5	4	2	2	2	3	3	3	FI
		2					1					3			PL
		0	0	0	1	0	0	2	1	0	0	0	0	0	BE
	Defensive drive	3	3	3	3	3	5	4	2	2	2	3	3	3	FI
		2					1					3			PL
		0	0	0	1	0	0	2	1	0	0	0	0	0	BE
	Emergency braking	3	3	3	3	3	5	4	2	2	2	3	3	3	FI
		2						1				3			PL
		0	0	0	1	0	0	2	1	0	0	0	0	0	BE

	Passenger safety	3	3	3	3	3	5	4	2	2	2	3	3	3	FI
		1										2			PL
		0	0	0	1	0	0	2	1	0	0	0	0	0	BE
Behaviour in case of an accident	First aid	3	3	3	3	3	3	3	2	2	2	3	3	3	FI
		1					3				4	2			PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
	n case of an acciden	3	3	3	3	3	3	3	2	2	2	3	3	3	FI
		1										2			PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
	Avoiding new accidents / Traffic control	3	2	3	3	3	3	3	2	2	2	3	3	3	FI
		1									3	2			PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
	Passenger safety when evacuation	3	3	2	3	3	3	3	2	2	2	3	3	3	FI
		1									3	2			PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
Applying ergonomic principles	Adjust seat	2	2	3	2	2	3	3	2	2	2	3	3	3	FI
		1						2				3			PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
	Driving position	2	2	3	2	2	3	3	2	2	2	3	3	3	FI
								1							PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
	Lifting	2	3	3	2	2	3	3	2	2	2	3	3	3	FI
		1								2		3			PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE

	Job maintenance	2	3	3	2	2	3	3	2	2	2	3	3	3	FI
		1										2			PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
Communication skills (with customers, management and maintenance)	Customer service	2	3	3	2	2	4	4	2	2	2	2	2	2	FI
		1	2												PL
		2	0	0	1	0	0	0	0	0	0	0	0	0	BE
	Fault reports	2	3	3	2	2	4	4	2	2	2	2	2	2	FI
		1	2												PL
		2	0	0	1	0	0	0	0	0	0	0	0	0	BE
	Customer guidance	2	3	3	2	2	4	4	2	2	2	2	2	2	FI
		1	2												PL
		2	0	0	1	0	0	0	0	0	0	0	0	0	BE
	Announcements	2	3	3	2	2	4	4	2	2	2	2	2	2	FI
		1	2												PL
		2	0	0	1	0	0	0	0	0	0	0	0	0	BE
Handling luggage	Handling luggages	4	3	4	3	2	3	2	2	2	2	2	3	2	FI
		1	2												PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
	Handling parcels	4	3	4	3	2	3	2	2	2	2	2	3	2	FI
		1	2												PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
	Loading sequence	4	3	4	2	2	3	2	2	2	2	2	3	2	FI
		1	2							3					PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE
	Special baggage	4	3	4	2	2	3	2	2	2	2	2	3	2	FI
		1	2												PL
		0	0	0	0	0	0	0	0	4	3	2	1	0	BE

Filling in legal transport documents	Freight list	2	2	2	2	2	4	2	2	2	2	2	2	2	FI
		1	2												PL
		0	0	0	3	0	2	0	1	0	0	0	0	0	BE
	Crash report	2	2	2	2	2	4	2	2	2	2	2	2	2	FI
		1	2												PL
		0	0	0	3	0	2	0	1	0	0	0	0	0	BE
	Border documents	2	2	2	2	2	4	2	2	2	2	2	2	2	FI
		1	2												PL
		0	0	0	3	0	2	0	1	0	0	0	0	0	BE
	Waybill	2	2	2	2	2	2	2	2	2	2	2	2	2	FI
		1	2												PL
		0	0	0	3	0	2	0	1	0	0	0	0	0	BE