Strengthening Gamified Digital Learning for Learners and VET Personnel in Professional Driver Training

Implementation Guidelines

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Table of contents

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Introduction

The aim of the **GamingDRV Implementation Guidelines** is to present a methodological framework for the long-term transfer of the results for high-quality, innovative, and integrative virtual training with a focus on driver CPC training. In transport and logistics, the Certificate of Professional Competence (CPC) is an essential qualification for professionals engaged in road haulage and passenger transport operations mandated by the European Union. Online CPC training has been emerging for years as technology continues to shape the digital transition of society and the workforce. Likewise, for driver CPC training, online training components can provide a convenient, flexible, and effective method for drivers to maintain their licenses.

The topic will be approached from three angles:

- A **temporal** angle to make virtual learning exceed the GamingDRV project's lifespan,
- a **sectoral** angle to have virtual learning extending to other sectors and occupation profiles,
- a **geographical** angle to go beyond the borders of the project partner countries.

The Implementation Guidelines for training providers and trainers represent practical and easy-to-use guidelines for VET practitioners, enabling them to apply the project outcomes in their daily working practice. For example, they can transfer existing training content to a Virtual Classroom (VC) format or plan, implement, and evaluate VC-based training and the use of GLEs (Gamified Learning Elements).

Issues such as recognition and certification of qualifications, legal provision, other relevant regulatory frameworks, hindering and helping factors, and other factors have been considered and analysed, forming the basis for the **roadmap to sustainability**. The roadmap addresses how the project results can be implemented into regulatory practice in the long term in countries that do not yet allow for virtual training in driver CPC.

Practical recommendations complement the argumentative scope of the document to facilitate the use of new technologies for efficient learning.

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1. Understanding the regulatory framework around Driver CPC training

Any individual who aspires to pursue a career as a professional driver within the European Union (EU) is required to complete and successfully pass a course leading to a professional qualification card.

European legislation regulates the right to work as a professional driver. Directive 2003/59/EC established the initial qualification and ongoing training requirements for professional lorry and bus drivers across Europe.

It requires all drivers of goods vehicles (over 3.5 tonnes) or passenger vehicles (over 8 seats) to hold an initial qualification and undergo ongoing training (Driver CPC training) every 5 years to uphold their licence. The underlying aim is to improve road safety and professionalise drivers towards sustainable mobility.

This Directive was subsequently amended in 2018 (Directive 2018/645) and 2022 (Directive 2022/2561) to specify certain exemptions, training content, and procedures. The members of the European Union have applied and transposed it with varying degrees of flexibility and with practices differing from one Member State to another.

The following chapter aims to show the diversity of application patterns in the various European countries involved in the GamingDRV project following the application of Directive 2022/2561 and provide an overview of transpositions.

1.1 Transposition of Directive 2022/2561

Framework and organisation of Driver CPC training

Directive 2022/2561 stipulates that, to be able to continue in the profession, professional drivers must undergo compulsory periodic training (CPC training).

An approved training centre must organise compulsory periodic training courses. They must be 35 hours long every five years, given in periods of at least seven hours, which may be split over two consecutive days.

Training shall consist of classroom teaching, practical training, and, if available, training using information and communication technology (ICT) tools or a top-of-the-range simulator.

Member States have organised compulsory periodic training differently. A distinction is made between countries where:

- The organisational system is free. In this case, training bodies are free to organise the training as they see fit, as long as the periods are at least 7 hours long and the 35 hours of training have been given within 5 years.
  In practice, for example, in Finland, it is customary to provide one 7-hour module per year, while in other countries, single 35-hour sessions are more common.
- The 5-day training course must be organised over a calendar year, as in Denmark, Spain, and France. In general, training is given over 5 consecutive days, but it is possible to divide this up.
- One day of training per year is compulsory; this is the case in the Czech Republic.

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Current training content by country

Country	Program	Practice
 Germany	The minimum content for the 35-hour training must cover all knowledge areas and content of the EU directive. Additional content may be included. The content of the composition is flexible but must be approved beforehand or ensured by using approved training material, such as books from Vogel Verlag, which has been approved by the IHK (Chamber of Commerce). This applies to all driver types, including bus and truck drivers. It is important to note that special training courses, such as dangerous goods training, are not part of the driver CPC training in Germany and are offered separately.	A total of 35 hours of training is mandatory, which can be completed at a flexible time. It is essential to complete five modules in the required knowledge areas of the EU directive, each lasting 7 hours, and have them recorded in the driver's license. Only after the recording can drivers accumulate the same mandatory training module again for 35 hours for the next five years. It is theoretically possible to take the same modules in sequence. However, taking one module immediately and the other within the next 5 years is recommended. Only classroom training and top-of-the-range simulators are permitted. This is potentially subject to change, as there is currently a draft law under consideration that would allow for virtual training elements (status May 2024). Trainers in Germany must meet specific minimum requirements outlined in the German directive (in the appendix) to conduct driver CPC training. In accordance with state law, the provision of initial and further training for professional drivers requires state recognition of the provider. This is to be granted by the competent authority. No training is allowed on Sundays and holidays; the Working Hours Act applies.
 Finland	The topics of training programs are free but must be related to central truck and/or bus driver work and relate to at least one of the subjects in the Annex to Directive 2003/59 / EC in accordance with one of the targets. A compulsory part of 7 hours is establishing a safe, economical and environmentally friendly driving style.	All modules can be theoretical, with no compulsory practical parts or no compulsory tests
 France	Set program (covering the 3 themes of the directive). No specific training offered (like Dangerous goods…) The training lasts 35 hours and is done in one week (5 days x 7 hours) every 5 years.	At least 2 hours driving, including a maximum of 30 minutes on a simulator
 Ireland	Topics are fixed in accordance with Directive 2022/2561. The program allows the 35 hours to take place when it suits the driver and/or employer, as long as they are completed within the 5-year timeframe.	The authority manages and implements Driver CPC controls and issues that content training providers use to deliver the training. No variation in the content is allowed, and only the authority can make changes based on industry input.
 Sweden	Some topics are listed as mandatory for continuous training: Continuing training specialising in freight transport, divided into five modules, shall cover at least the following subjects in each module: Module 1: 1.2 kinetic energy and braking systems and 1.3 optimisation of optimisation of fuel consumption. Module 2: 1.4 Load and load securing in freight transport Module 3: 2.1 Social Legislation Module 4: 3.3 Ergonomics and 3.4 Physical and mental fitness Module 5: 1.3a Risk awareness, 3.1 Risk awareness and work-related accidents, and 3.5 Responding to crises.	

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	Suppose a training organisation intends to carry out distance training. In that case, the implementation must be described in the training plan, and a request for modification of the training activities to meet the competence of professional drivers must be submitted to the Swedish Transport Agency.	

Driver CPC training and online training

Directive 2022/2561 allows for the incorporation of online training (e-learning and blended learning) into drivers' CPC training.

(25) "Member States should be provided with a clear option to improve and modernise training practices with the use of information and communication technology (ICT) tools, such as e-learning and blended learning, for part of the training, while ensuring the quality of the training".

Directive 2022/2561 also provides a framework for e-learning, setting a maximum duration of 12 hours and the conditions to be met:

"Member States may allow part of the training to be delivered by the approved training centre by means of ICT tools, such as e-learning while ensuring that the training's high quality and effectiveness are maintained and selecting the subjects where ICT tools can most effectively be deployed. In particular, Member States shall require reliable user identification and appropriate means of control means".

"*Whenever e-learning is used, the approved training centre shall ensure that the proper quality of the training is maintained, including by selecting the subjects where ICT tools can most effectively be deployed. In particular, Member States shall require reliable user identification and appropriate means of control. The maximum duration of the e-learning training shall not exceed 12 hours".*

The possibility of using e-learning was then transposed, or not, in the various European countries. Below is an overview of the GamingDRV partner countries (Ireland, Finland, France, Germany, Sweden) in comparison with other EU countries.

Countries	E-learning	Further explanation
Austria	✓	12 hours
Germany	✗	This is potentially subject to change, as there is currently a draft law under consideration that would allow for virtual training sessions. (Status May 2024)
Belgium	✗	Recent developments in Belgium will allow for e-learning in driver CPC training, first in Flanders only after an experimentation phase. Each driver may take a maximum of 12 hours of periodic training with e-learning within a period of five years Training on a module is divided into two half-days: the first half-day is devoted to e-learning, where drivers review the theoretical aspects at home. The following day, they go to the training centre to see what they have learnt and put it into practice.
Denmark	✓	12 hours: In order to use up to 12 hours of distance learning on the periodic training, the approved training centre must have approved a curriculum for the course in question. Distance learning in statutory continuing education can be used on all non-practical subjects.

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Finland	✓	12 hours of e-learning for theoretical subjects only. The e-learning module needs to be approved by the competent authority
France	✗	
Ireland	✗	
Czech Republic	✓	Drivers CPC training is a regular annual course of 7 hours. It includes 6 hours of teaching (theory) and 1 hour of training (practice). After 6 hours of classroom training, 1 hour can be e-learning.
Romania	✓	12 hours with conditions: Allow learners to log in to become users, only with a username and password; (ii) keep the automatic records of the learners and keep the history for a period of 2 years; (iii) automatically issue messages to users in situations in which they have not used the digital platform enough and/or have not attended all the necessary course hours to be considered completed the training and improvement course. (iv) processes personal data in compliance with Regulation (EU) 2016/679; (v) has implemented complex methods and procedures to ensure cyber security and data protection.
Sweden	✓	A maximum of 12 hours of distance learning are authorised for 35 hours of continuing education. A teacher must lead distance learning, and trainees also need a certificate stating that they have completed the distance learning part of the course.

1.2 Description of the Finnish model – Focus on using e-learning and distance training for driver CPC training.

Finland is the first country in the project consortium to adopt regulations recognising and authorising the use of virtual training (e-learning and virtual classes) in driver CPC training. Notably, Finland's experience in this area is more advanced than that of other countries, even though Sweden, another GamingDRV partner country, permits e-learning for driver CPC training as well.

Generally, in Europe, recognition of digital learning in virtual classrooms is slow and subject to contradictory regulations. For example, public authorities require proof of participation through the registration and/or transfer of personal data, which presents a challenge due to GDPR.

Similarly, some public authorities are firmly opposed to using digital learning in driver CPC training because they lack a framework or scheme for its implementation.

Analysing the Finnish implementation framework and drawing inspiration from the Finnish model seemed appropriate for considering viable solutions for resolving the problems identified and removing the major obstacles that currently prevent the wider application of high-quality digital training formats.

1.2.1 Course content and organisation

Driver CPC Training organisation

The 35 hours of the drivers' CPC training can be run freely in Finland. Continuing education may be divided into periods. Each period must be at least seven hours long. The seven-hour

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period may be divided into two parts of 3.5 hours, the parts to be completed on consecutive days.

The training may take the form of theoretical instruction, practical exercises, driver training or a combination of these. Theoretical instruction may take the form of classroom instruction, virtual classroom instruction or online instruction.

The driver or the transport company can choose the content of the training. However, the training must always be related to the driver's duties. One of the seven-hour periods must be devoted to training that reinforces safe, economical and environmentally friendly driving. The rest of the 35 hours can be chosen freely.

The usage of GLEs is at the discretion of the trainer and they are not limited; some trainers do not use them.

The Finnish Transport and Communications Agency (TRAFICOM) must approve the training programme used for continuing education.

The training centre shall inform the supervisory authority of the place and time of the training to be carried out 10 days in advance and of the training program used. The training provider notifies Traficom in advance of the training course. This makes it possible to supervise the training and the training organiser. A Traficom supervisor can come and follow the training.

Each training day must be approved in advance by the authority and must relate to the driver's work and the objectives of the directive/law. Training courses that explicitly include practical exercises in the training programme, e.g., with a real vehicle or real first aid equipment, must be done face-to-face at the training provider’s location.

After the course, the training centre must notify those who have taken part either on form E 703 or electronically via the Finnish Transport and Communications Agency's interface. The notification must be made no later than two weeks after the course. The training centre must issue a certificate of completion no later than two weeks after the end of the course.

1.2.2 E-learning and virtual classes for driver CPC training in Finland

Definitions

To keep the terminologies clear, the terms virtual classroom training and e-learning will be used to serve the GamingDRV project’s objectives.

A virtual classroom refers to training that takes place in a **virtual environment** and typically takes place in a traditional classroom. Trainers and learners are connected **synchronously** via virtual meeting software. Virtual classroom training enables **direct exchange, interaction and communication** between the trainer and learners and between the learners themselves.

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E-learning refers to a learning system organised **remotely and online**. It uses IT tools (computer, tablet, smartphone) to deliver educational content and includes various interactions such as mini-games and quizzes for learners. Learners are **on their own and follow their course remotely**, **with no links to the trainer or other learners**.

Virtual classroom in driver CPC training

In Finland, the transposition of Directive 2022/2561 for driver CPC training considers virtual classes equivalent to face-to-face classes. There is no time limit for virtual classes, as they fulfil the same training requirements as in-person sessions. This equivalence is based on the ability of virtual classes to provide real-time interaction and engagement, mirroring the benefits of traditional classroom settings.

In Finland, virtual lessons are designed to include real-time discussions, direct communication with trainers and interactive activities. There is also a desire for drivers CPC training to be flexible and accessible to drivers who may not be able to attend physical courses due to geographical, logistical or scheduling constraints. In this case, virtual classes help to ensure that all drivers have equal access to the necessary training, while maintaining the required training standards. For example, Swedish-language local education has been provided in a very limited geographical area and partly with a limited supply. Distance learning enables a wider range of subjects to be offered in small language groups.

As a result, the theoretical part of driver CPC training can be implemented in different ways:

- Face-to-face teaching,
- Virtual class (also called distance learning)
- E-learning (also called online courses)

In both face-to-face and virtual class, a trainer must be present to facilitate communication in real time with the students. There is no limit to the number of lessons, hours, trainees can take.

In e-learning, there is no trainer because trainees' study independently and there is no possibility of real-time communication with a trainer. The amount of online teaching is limited to 12 hours out of the 35 hours of continuing training. Any online teaching that exceeds the permitted 12-hour limit will not be considered for professional qualification.

The rest of the training can be done in either virtual classroom or in-class training. i.e. the student can complete the whole 35 h training remotely by attending 12 h of e-learning and 23 h of virtual classroom teaching online (in practice, the student can only attend 7 h of e-learning, because training days are usually 7 h long and 12 h cannot be divided equally into two training days).

Organisation details

Virtual classroom training: Virtual training is similar to classroom teaching but takes place at a distance online. The course allows trainees to interact with the trainer/teacher and other participants. Groups of trainees follow lessons given by a distance trainer at the same time, using a computer. The trainer gives a time frame to join. The trainee's presence must be

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confirmed every hour (the trainer will check this by video). The trainer and trainee communicate with each other in real time. It is possible to split this training into two sessions of 3.5 hours.

Authentication process: Drivers must identify themselves and can be monitored for the training through the system that must allow strong authentication and two-way speech and vision. The verification of participant is based on a strong electronic identification: - Bank ID - Mobile certificate - Camera connection (Zoom, Teams, WhatsApp...) where the trainer can see the trainees in real time video connection. - Use of a microphone to answer questions and participate

E-learning: The trainee connects remotely to a platform to learn at his or her own pace.

Framework to respect: - E-learning must always be electronically authenticated. - There must be at least one assessment per 45 minutes of teaching. - During online training, there must be a training supervisor with the required qualifications. - The trainee must be able to ask questions in real time and have a conversation with the supervisor, whether by chat, voice or video. - Transport and Communications Authority has access to the training. - The amount and topic of e-learning should be verifiable for each trainee afterwards. - - An online curriculum approved for online teaching should be used.

The necessary equipment can be owned by the company or the drivers themselves, and there is no pre-qualification training on using the hardware and software.

There is no certified software or software the digital tools used are decided between the training provider and the approver of the training programme.

1.2.3 Implementing the virtual classroom in drivers CPC training: steps taken in Finland

Consensus and agreement between different parties have made the introduction and implementation of virtual classrooms in driver CPC training in Finland possible.

The Ministry of Transport and Communications is responsible for national transport policy and regulations. They have drafted a regulation on professional driver qualifications, which leaves the regulation and supervision of the practical implementation of training to the Finnish Transport and Communications Agency (Traficom).

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Traficom has drawn up a general regulation on the implementation of training, which defines the framework conditions for professional qualification training, including virtual training. By fulfilling these conditions, each training provider can thus carry out the training as they wish, as long as the boundary conditions are met.

Traficom sets out the conditions for the training, and the training providers must meet these conditions. To some extent, the legislation also sets conditions for training. The conditions consider the wishes of training providers and others, but the authority looks at the public interest, not the interest of the individual training provider or others.

Conditions to be met:

- In order to provide driver qualification training in Finland, the organisation must be approved by Traficom.
- Training providers will use appropriate technology platforms involving virtual training and ensure their trainers have the necessary tools to deliver practical virtual training.
- Training providers will have their training programme/programme of training days approved by Traficom or use programmes approved by other organisations.

Additional conditions for training using ICT tools:

- The teaching must be organised so that the supervisor of the Transport and Communications Agency (Traficom) can observe the learning.
- The training centre must have an interface for monitoring the teaching, allowing it to be observed in real-time.
- The training must always include tasks to ensure that the customer learns. Each lesson must consist of at least one task in which each trainee must participate. The system or the teacher must provide feedback on the functions immediately.

Additional conditions for distance learning:

- An instructor must provide distance learning with the teaching qualifications required by the Council of State Regulation on the professional qualification of lorry and bus drivers and sufficient technical knowledge of using the system.
- The trainee must always have the opportunity to ask questions in real-time and attend the course in real-time. The trainee must also be able to discuss the course with the instructor in real-time, either by chat, voice, or video link.

1.2.4 Feedback - Testimonials from Finnish trainers

We interviewed four Finnish trainers to obtain feedback on the implementation of virtual classrooms in driver CPC training. This section summarises their testimonies.

General perception of the virtual classroom

The virtual classroom makes driver CPC training more flexible and accessible to drivers who may not be able to attend physical courses due to geographical, logistical, or scheduling constraints. In this case, virtual classes help ensure that all drivers have equal access to the necessary training while maintaining the required training standards.

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"In some case online teaching is excellent, because when you think about a truck driver is very hard to get them going to the school. It's very good that they can do it from home or work."- Finnish Trainer.

Transport companies praise the possibility to organise training flexibly and in a way that causes as little disruption to their business as possible. On the other hand, others find it quite tiring and lonely to be alone at the computer.

Virtual classrooms are flexible and easy to use, making them attractive for training providers and drivers, especially in remote areas. However, providing training also requires a new level of effort from the trainer. Both trainers and trainees need to master the technology used in virtual classrooms, which can be a challenging. Not everyone has access to the same level of computers, mobile devices or telecommunications connections, which pose different challenges. The traditional classroom-based training day at a training centre has also given drivers a social break from their working day, but a virtual classroom does not provide this. For these reasons, some trainers prefer traditional face-to-face training.

Tools used

In Finland, virtual lessons are designed to include real-time discussions, direct communication with trainers and interactive activities.

Virtual classrooms for driver CPC training typically use PowerPoint or other presentation software to convey the course content visually. They may also include videos, animations, and sound clips to illustrate key points and enhance understanding. To make training more interactive, it is typical to use some form of quiz or survey, perhaps most commonly Kahoot! There are also virtual classroom chat facilities to encourage discussion and interaction between trainees and virtual meeting platform sharing rooms for group work and collaborative tasks.

Traficom does not need to approve the tools as long as the programme is validated. If online games are used, the program sent to Traficom must specify this, but it will not be necessary to specify the game used.

Participant engagement and interaction

As in a traditional classroom, the virtual classroom allows interaction and exchange through microphones, video, and chat.

Trainers generally use tools to facilitate exchanges or regularly question participants. This allows trainers to check that drivers are paying attention and have understood the course. However, they have some difficulty knowing whether all the learners have understood their explanations online. Trainers have said that this is easier to see in a face-to-face classroom.

"If you compare this to classroom teaching, you don't see the drivers, you cannot see their reactions"- Finnish trainer.

They pointed out that this also depended very much on the trainer and how they organised and delivered their course.

If the driver is not active during the course or when questioned, the trainer has the option of cancelling the driver's participation in the module. The driver will then have to repeat the entire module to validate their training.

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Perceived effectiveness of training

The trainers interviewed saw no difference between the virtual and traditional classrooms. They insisted that it was also up to the trainers to organise their modules so that they were fun and interactive and not just a presentation. *"It's a very big role to organise a training online. If you have only text, it's very boring, and nobody wants to be 7 hours behind a computer. If you really use the time and think about how to create an interesting online training, it can work really well"- Finnish trainer.* Some trainers see the use of tools such as GLEs as a way of improving information retention.

Challenges and Improvements

Instructors need to master the use of virtual classroom platforms such as Zoom, Microsoft Teams, Google Meet or other specialised e-learning platforms. This includes understanding features such as screen sharing, breakout spaces, interactive whiteboards and managing participant control. In case of problems, the trainer must also master basic troubleshooting skills during virtual sessions. Typical problems include connectivity issues, audio/video problems and platform-specific glitches. Older generation drivers find it harder to use virtual classroom courses and computers: *"When you are teaching a truck driver, it can be difficult. We have different kind of drivers. Some drivers have been working for 5 years and are 30 years old, and others are 55 years old and have long careers. They don't really use computers. And if you have one day of teaching, educating these drivers first to use a computer takes a very long time. So that's why I'm saying that it depends on your skill level on computers". - Finnish trainer* Typically, training is attended from home or work (not while driving, although this has sometimes been observed). *"Sometimes drivers are doing something else, sometimes they put the phone on their desk and are driving at the same time"- Finnish Trainer.*

2. Implementation of virtual learning in driver CPC training

According to the American Society for Training & Development's (ASTD) E-learning Glossary, e-learning covers various applications and processes such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration.

Many terms are used when talking about distance education and learning via ICT, such as "web-based learning," "virtual classroom," "e-learning," "computer-based learning," "online instruction," etc.

The variety of concepts is confusing. In this context, we propose to define the concepts of virtual classroom and e-learning as we see them in the GamingDRV project.

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2.1 What is a virtual classroom?

Virtual classroom (VC) training takes place in a virtual environment that would normally take place in a physical classroom. Trainers and learners are connected via virtual meeting software simultaneously. The focus of the training is on direct exchange, interaction, and communication between the trainer and the learners and between the learners themselves.

Unlike e-learning, the virtual classroom is a synchronous online live session, with learners and trainers connected simultaneously in the same virtual space, usually via meeting software.

2.2 What is e-learning?

E-learning is distance and online learning (via electronic media on a computer, tablet, or smartphone) that delivers educational content. It may include various interactions such as mini-games and quizzes for learners. It often relies on individuals' self-motivation to learn effectively.

Another definition of e-learning:

A learning system based on formalised teaching but with the help of electronic resources is known as e-learning. While teaching can take place inside or outside the classroom, using computers and the Internet is the main component of e-learning. E-learning can also be referred to as a network-based transfer of skills and knowledge and the delivery of education to many recipients at the same or different times.

Standard features of e-learning: Learning done by studying at home using computers and courses provided on the internet

2.3 A shared European vision of the implement of virtual learning

To conduct an elaborate analysis of the recognition and needs for the long-term integration of virtual learning elements in driver's CPC training, each GamingDRV partner conducted an agile online workshop between January and May 2023 for participants to work out a shared vision for a successful implementation of virtual training.

Partners gathered ten training provider representatives (from independent or leading organisations dedicated to passenger or freight), one National Association of Drivers Educators representative, four employees from transport and logistics companies, a trainer, a game and software developer, and a university lecturer on transport and logistics. These workshops also provided an opportunity to address legal obstacles already identified.

During the workshops, eight points of attention concerning the implementation of the virtual classroom in driver CPC training were raised with the participants:

- **Supporting learners:** guidance, completion data, possibility of sub-grouping / individual support, personalised feedback,
- **Ideas of training content:** potential training resources identified during the workshop,
- **Accessibility:** multi-platform, off-line availability, ergonomic for all audiences, maintenance and revision of digital tools,
- **Organisation of the training:** total duration of the training, training programme, number of participants,
- **Flexibility:** fragmentation of modules, the possibility of doing it in class and/or remotely, the possibility of doing it at your own pace,

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- **Communication:** messaging within the platform, notifications to remind the learner,
- **Training recognition:** by legislation/sustainability of the virtual CPC,
- **Certification:** of the whole course, badge by unit.

For each category, participants were asked to describe their needs, difficulties, and possible solutions for implementing the virtual classroom in driver CPC training.

How do we support learners during virtual learning?

Participants mentioned the fact that drivers/ learners could have difficulties signing in to the training providers' network and learning environment, the digital learning environment is difficult to use and not designed for trainees who are not used to ICT tools, and the learning situation could be chaotic due to many technical challenges, lack of skills, and lack of time.

This was confirmed during the GamingDRV testing phase. The trainers in Finland reported that it was hard for the learners to use the GamingDRV Quiz Race game because some were unfamiliar with using the provided QR code or the link via email. It prolonged the training duration, and the trainer had to help individually. Some learners use cell phones with older technology, which is unsuitable for playing browser-based GamingDRV games. Technology creates a new layer for the training providers and needs continuous updating, security, and support for trainers and learners.

Solutions:

1. To ensure the best possible adaptation to learners' needs, a simple test on the use of technology could be carried out when registering for virtual modules.

2. Stakeholders have recommended providing a supporting module at the start or before the training course on how to use the GLEs/ VC to familiarise learners. This module could, for example, include a time with the trainer who explains the use of the digital tools used during the training and allows the learners to test these tools live. If there are any difficulties, the trainer is present to support the learners.

Benefits: Greater accessibility and reduced inequalities in terms of technological skills.

Remember that new drivers will already have most of the necessary digital skills; in the meantime, digital learning will help other drivers acquire those skills.

Difficulties during e-learning could also arise and jeopardise the effectiveness of the training.

Solutions:

1. Provision of a support service to deal with technical difficulties with a commitment to respond within 3 hours.
2. A trainer must be available to answer any questions relating to the training, with a set response time.
3. Besides the above, a chatbot (or other AI-enhanced tools) can first provide answers and help guide learners.

Organisation of the training and flexibility

Even though training and learning in a VC provide an experience similar to the physical one, it requires new pedagogical and didactical approaches and a redesign of the instructional model,

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which requires new knowledge, skills, and competencies from the trainers. This applies to the design of VC-based training formats, its organisation and planning, and implementation and evaluation. One example is that virtual learning requires splitting the learning content into shorter virtual “micro-learning nuggets”.

Moreover, the EU Directive only allows 12 hours of e-learning for driver CPC training. How do we manage this since a day of CPC training is mandatory for 7 hours? 12 hours is not even 2 days of training. The actual division organisation of the CPC training is not suitable,

Solutions:

1. The training must be organised so that it can be delivered partly virtually and partly face-to-face. A framework should clearly define (or approve in advance) the training program planned for the virtual classroom and the training program planned for the classroom. Finding the right balance is necessary.
2. Provide greater flexibility in dividing up the modules: Even if the course lasts 7 hours a day in total, the time of the online training sessions should be adaptable. For example, the 7-hour session could be reduced to 2 sessions of 3.5 hours on two consecutive days.
   Training content can be split into small units, allowing microlearning flexibility and improved concentration levels.
3. Allowing a combination of compulsory and optional modules in a hybrid format based on digital training to adapt to drivers' specialisations.
4. The number of participants should be limited to a small group to enable the trainers to adapt to the drivers' needs and support them if necessary.

Keep in mind that the main focus should be on learning outcomes and impact, not on how to learn.
Above all, training must remain professional and not appear to be just a game, as this could undermine its credibility and value. A balance needs to be found between the use of virtual/digital elements and actual training.

Ideas for training content

Conventional training does not always generate emulation and motivation among participants, particularly those not used to sitting in class for several hours a day. It is no secret that drivers sometimes perceive driver’s CPC training as repetitive and boring.

Solutions:

1. Driver training must meet drivers' needs, particularly in relation to significant developments such as new technologies and the mastery of onboard equipment.
2. Gamification can be incorporated into online learning, wrapped up in classroom-based tutor-led learning, or delivered as part of self-paced eLearning. It offers numerous possibilities to reinforce the learning objectives in interesting ways.
3. Virtual elements provide a variety of possible content that goes beyond the real possibilities of the training centre (e.g. driving on ice via a simulator, evacuating a coach via an LMS, etc.).
4. Work situation exercises could be used in face-to-face training or virtual reality/augmented reality to train on professional gestures (practical training) or soft skills.

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5. Possibility of individualised modules based on drivers' and companies' needs. Pre-testing before the training can identify learning needs/ skills gaps

Accessibility

How can online training be inclusive?

Solutions:

1. In the event of a disability such as dyslexia, dementia… a pre-course assessment could be done, and the trainer allows extra time or additional one-to-one virtual support.
2. Regarding barrier language: provide easier access to training with translation software
3. Anything involving gamification must include trainer support or should be facilitated through the trainer.
4. Even though game consoles are mainstream, there is still a disparity between learners (no computer at home). The potential lack of equipment implies offering digital training in class or in the training centre to ensure a homogenous experience.

Remember: Particular attention must be paid to the potential disparity of equipment at home among learners.

GDPR

In some countries where virtual learning is used, public authorities demand proof of participation through the recording and/or transfer of personal data despite GDPR stipulations.

Solution:

1. data storage and safety specifications must be reviewed and adapted for use in everyday life trainings.

Communication

The learners (who are drivers) are used to working alone; drivers' CPC training sessions are seen as a means of exchanging information and experiences between peers (leading to recognition). They also share the benefits of their company (working conditions, potential bonuses, CSR, etc.) and exchange views on their current problems. Therefore, it is necessary to provide time for informal exchanges on these subjects.

The distance between trainers and drivers can lead to losing contact and connection (with the trainer and other learners).

It seems complex if the training is entirely distance learning that these times should persist.

Solutions:

1. Trainers must organise a dedicated time to encourage communication and exchanges of experience between drivers, potentially in breakout rooms.
2. Using gamified material can encourage debate and exchanges between learners.

Training quality and recognition

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In some European countries, e-learning is neither desired nor authorised by public authorities in driver training: virtual tools are currently only possible in the classroom.

The Ministry and/or the professional bodies set the framework, and digitisation will depend on their wishes.

Solutions:

1. Policymakers must create framework conditions for the quality of training and qualifications of drivers. A necessary change of regulation and a defined framework of conditions are necessary to ensure virtual training quality and recognition.
2. A co-construction of the process by the relevant Ministry and professional organisations is key.
3. Trainings (virtual and face-to-face) need to be approved by authorities beforehand
4. Virtual training material is controlled by the authority or company rather than the individual, and updates are scheduled regularly

Assessment and certification

For now, driver training does not require drivers to pass and validate a test at the end of their training (except in Romania). Attending the course is enough.

How can the driver's participation be certified if the training is online? How can you certify that they have taken the course thoroughly and seriously? How can you monitor the learner's progress through the online course?

Solutions:

1. It could be interesting to have initial testing to evaluate the learner's skill gap and then a test to assess progress at the end of the training.
2. A framework could be defined beforehand with learning objectives, skills, and knowledge to attain. After each online module, drivers could have an online test to validate the module (a test as a final GLE to support learning). If the module is not validated, it must be validated in class.
3. Setting up a validation process through test and simulation practice that could be done either virtually or with mandatory attendance
4. The training organisation will be able to issue drivers with a certificate showing which modules have been validated.

2.4 How to get stakeholders interested in digitising the Driver CPC training?

The project partners considered ways of getting stakeholders interested in digitising the Driver CPC training, even if the regulatory framework for the transposition of the European Directive in certain countries does not allow it to be delivered via online training.

As part of this process, a workshop was organised for partners and gamification student designers involved in designing the GamingDRV Gamified Learning Elements (GLE). The method used was the Carousel or Speed Dating method, which enables short, one-to-one conversations between various participants using a rotation system.

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How do we demystify the impact of virtual training?

<table>
<tr><th colspan="3">GENERAL</th></tr>
<tr><td colspan="3">

Explain the concept of the virtual classroom: There are no clearly agreed-upon definitions of digital or online learning, so concepts like virtual, online, and e-learning are often used interchangeably. Virtual classroom is a more specific term. It describes synchronous Learning and development (L&D) activities with facilitators interacting with learners in real time.
Having an experience with the virtual training: an invitation to experience themselves. Presenting and testing our Gamified Learning Elements (GLE) could be a first step.
Demonstrate its positive impact in terms of learning and learner involvement. Consider what gains can be had for the learner and organisation from using virtual learning classes, and you can communicate these persuasively (VC GLE = time to breathe, reduce travel, can be more attractive, self-paced reviews...).
List the advantages of the virtual classroom and the pros & cons in a clear, honest and very direct way.
Provide testimonials of drivers and trainers who already have experienced VC training.

</td></tr>
<tr><th>FOR LEARNERS</th><th>FOR TRAINERS</th><th>FOR COMPETENT BODY</th></tr>
<tr><td>

Guide students beforehand.
Involve each student in the VC training.

</td><td>

Proof of the added value of the training in VC
Involve trainers in developing VC content (consultation, workshops…)

</td><td>

Analyse examples of countries like Finland where a part of CPC training can be done at a distance and learn from it (best practices)
Establish a clear framework for the use of VC in CPC training

</td></tr>
<tr><td></td><td colspan="2">

Show statistics and results, illustrate with success stories (videos)
Measure training impact / collect data to prove it works.
Comparison between face-to-face training and virtual training with the same set-up.

</td></tr>
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3. A roadmap towards the use of virtual classroom in driver CPC training

How can virtual learning be possible for the sector, other sectors, and European countries?

3.1 A response to European's needs

The move towards greater automation and digitalisation in the transport sector highlights the need for appropriate initial and continuing training programmes, including vocational education and training. As automation and digitalisation are likely to lead to a gap between skills supply and demand, these programmes must effectively and timely prepare workers for tomorrow's professional challenges.

One of the priorities of the European Digital Education Action Plan 2021-2027 is to strengthen digital skills and competencies for digital transformation, particularly by promoting inclusive, high-quality digital education from an early age.

Labour market developments will be influenced by technology, including its cost and acceptance, as well as other factors, such as globalisation, demographic change, the green transition, economic and other social trends, and the regulatory environment.

Upskilling and reskilling are crucial for managing the green and digital transitions. The transport sector has been identified as one of the sectors where the implementation of the European Green Deal (as well as relevant national strategies) will require new skills and labour and where the skilled workforce is already scarce.

According to EU regulations (Directive 2022/2561) on the qualification and training of bus drivers and lorry drivers, the subjects taught as part of continuing training must keep pace with technological developments.

Moreover, the text stipulates: "*Progress should be made towards low-emission mobility, among other things, through research and the introduction of technological advances that are already available. Drivers need to be properly trained to drive most efficiently.*"

3.2 The national legal path towards the recognition of virtual learning in Driver CPC training

3.2.1 Lever via Decision-making stakeholders

France

The political decision-makers involved in transposition of the Directive 2022/2561

In France, the Ministry of Transport (DGITM) is in charge of transposing this European directive, which is done by publishing decrees and orders.

The current French transposition of the Directive does not allow the use of e-learning for driver CPC training, but it is not clear whether virtual classroom training makes a difference.

Covid derogation:

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Due to the exceptional circumstances surrounding the COVID-19 epidemic, the Ministry of Transport (DGITM) has tightened up the Decree of 12 May 2020, which temporarily derogates from certain procedures for implementing driver training courses.

In this context, it was possible to set up semi-autonomous computer-based learning sequences for trainees within training organisations.

At the time, AFT surveyed around 30 training organisations and 18 company instructors. The results showed that over a third of the training bodies/instructors who responded felt that this measure improved training quality, simplified training organisation, and reduced teaching costs.

However, it is suggested that this device should be supervised and limited and that it should be discussed with the trainer at the end.

The concept of the virtual classroom: how is it perceived?

In France, the Ministry of Transport indicated no changes or plans.

In France, e-learning or virtual classes are not envisaged for drivers' CPC training.

It must be ensured that the driver is present, so that they complete the required number of hours, and that they actually take the initial training (FIMO) and continuous training (FCO).

If the training includes e-learning, it must be in class, in the presence of the teacher/trainer or for revision, but it's not counted as an hour to be deducted from the 140 hours of the initial training. The transposition decree for CPC training does not currently allow e-learning.

Germany

In Germany, driver CPC training courses for professional drivers are conducted in accordance with the Professional Driver Qualification Act (BKrFQG) and the Professional Driver Qualification Ordinance (BKrFQV). These training courses are mandatory every five years and comprise a total of 35 hours. The various providers are responsible for offering the modules.

The Kraftfahrt-Bundesamt (KBA) (Federal Motor Transport Authority) is responsible for monitoring and implementation. All data about driver qualification certificates and certificates of participation in training is recorded in the Berufskraftfahrerqualifikationsregister (BQR) (Professional Driver Qualification Register).

A regulatory framework is still needed. The Federal Cabinet has approved the draft bill submitted by the Federal Ministry for Digital and Transport Affairs (BMDV) to amend the Professional Driver Qualification Act in May 2024. The draft regulation on professional driver qualification law provides, among other things, for introducing e-learning in digital teaching as part of professional driver training. This will enable online components in the training process (probably limited to 12 hours as part of the 35 hours).

To integrate e-learning[1] effectively, some steps outlined in the roadmap are necessary. Competent authorities must establish clear guidelines for e-learning in CPC training and ensure that e-learning content meets the required standards. Trainers need training to use e-learning platforms, tools, and methods effectively. A difference between terms would help identify e-learning, virtual classroom learning, or synchronous and asynchronous online learning. A technical infrastructure such as platforms, identification systems for training participants and

[1] Similar to other countries, there is no distinction in the terminology in Germany, yet.

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resources for e-learning must be provided. A transition period from traditional to e-learning methods must be facilitated with guidance and support systems for all stakeholders. Implementing e-learning can enhance flexibility and improve access to training for professional drivers. Examples from countries such as Austria, which have similar systems to Germany's, could be helpful resources for advice.

Ireland

Directive 2022/2561 limits e-learning for drivers' CPC training to 12 hours, but it does not mention whether virtual classes are covered by this limitation.

The competent authority for professional driver training (RSA) does not recognise the difference between e-learning and the virtual classroom. They recognise virtual tools that can be used in the real classroom, though. A trainer cannot modify or update the training material provided and validated for road driver training courses.

Associations or training bodies can submit tools or training content for validation by the competent authorities.

Classroom training is still the preferred method. Of course, practical training is required for the license qualifications, but the classroom is the only option for ongoing/periodic training.

Traditional classroom training is still seen as a better method of driver education. The virtual classroom is still a new concept in Ireland, so introducing it will take some time.

A consultation is underway to discuss whether eLearning can be accepted for the 35 hours of periodic training. However, such a discussion is taking place for hybrid or blended learning, and it is unlikely to happen for quite some time.

The framework for drivers' CPC would need to change to allow blended learning. There would need to be a minimum amount of time for tutor / one-to-one support.

Would virtual classroom training be limited to 12 hours like e-learning for drivers CPC training?

I don't believe so. eLearning is limited to 12 hours because self-paced / self-managed courses using an online device can be tiring; there are no colleagues or tutor to 'bounce' off. The virtual classroom could be far more interactive, which means it would be possible for a full 35 hours to be delivered virtually.

Does the equipment/ material used in drivers CPC training have to be approved?

Regarding Driver CPC, in Ireland this regulation is delivered through a network of approved training centres. The material is generated by a state agency and is the only material that can be used by the approved training centres. The introduction of GLEs in drivers CPC training requires the permission of the Agency, and they may take the view that should the training method be acceptable it would have to be made available to all of the training centres so that training is delivered in a uniform way.

This structure limits the introduction of any new development in training delivery. It would be useful if the Agency would allow a trial of the material with several training providers who would be willing to invest in the hardware to allow trainees to witness the gamification experience.

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To comply with Driver CPC regulations the virtual classroom would have to be set up in a way that ensures that the trainees attend for the required duration to comply with the regulation and that classes could be inspected by an invigilator.

3.3 Getting inspired from other European countries

Belgium

In the region of Flanders, e-learning for driver CPC training was being tested in 2023. E-learning has recently been authorised in Flanders.

Each driver may take a maximum of twelve hours of periodic training with e-learning within a period of five years preceding the date of extension of the period of validity of the driver's certificate of professional competence.

Organisation

Art. 7 The continuing education module always consists of the following two parts:

- the e-learning part;
- classroom or practical training.

Art. 8 The e-learning part referred to in Article 7, 1°, lasts an average of **three hours.** The classroom or practical training component referred to in Article 7, 2°, lasts at least three hours. The continuing education module lasts a total of seven hours.

Once the participant has completed the continuing education module, seven continuing education module credit points are awarded.

Art. 9 If the continuing education module consists of an e-learning component and a practical component, the e-learning component will be taught first.

If the continuing education module consists of an e-learning part and a classroom training part, the training centre is free to choose the order in which the parts are taught.

The first part of the continuing education module must be completed before the second part can be started. The second part must be completed no later than 60 days after the start of the first part.
In practice, learners have free access, they are connected and alone in front of the module.
Only the theory modules are available as e-learning.

If a training centre wishes to obtain approval for a continuing education module using e-learning, it must submit an electronic application to the Department, using a model determined by the Department.

Checking procedure

In order to access the system, a participant must be identified via e-ID or by means of unique connection data.

A participant's access to the system is linked to an approved training centre and a specific continuing education module approved by the department head.

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The system is designed in such a way that participants' access and actions are traceable from the first connection to the completion of the e-learning course.

The system records all the following data:

- 1° the time taken by the participant to complete the entire e-learning section;
- 2° the number of days between the start and the complete completion of the e-learning part;
- 3° the results of the repeat tests and the final test.

Assessment

The e-learning part of the continuing education module is divided into **at least six blocks,** and it uses at least six different forms of interactive work.

The continuing education module's e-learning component includes at least six different repeat tests to check that the participant has understood the material in the blocks. The repeat tests are distributed throughout the module. In each repeat test, questions are asked about the material covered in the previous blocks.

A repeat test can only be taken once the participant has covered all the required material.

After the last block, a final test must be taken. This test contains at least ten questions covering all the material not asked in previous repeat tests.

Czech Republic

Organisation

Driver CPC training is divided into 7-hour annual courses, which can be divided into 2 consecutive days. If appropriate verification of the driver's identity is ensured, part of the training may be conducted to allow remote access.

Driver CPC training is taught in 7-hour modules once a year, 1 hour of which can be done through e-learning. The 1 hour of e-learning must be done after the 6 hours of training in the classroom.
In practice, e-learning is rarely used as

it might lower training quality and is not easy to implement for an hour.

Checking procedure

In the case of remote access teaching, it must be ensured that the person being taught is clearly identified, that the date and time of the start and end of the learning are recorded, that the topics covered are recorded and that the completion of the teaching by each person being taught is confirmed. Teaching conducted by remote access may be completed after the remainder of the learning and training.

Denmark

Organisation

In Denmark, training lasts 37 hours and must be completed within 12 months. It is usually carried out in a 5-day package, from Monday to Friday, every 5 years.

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E-learning for driver CPC training is allowed for a maximum of 12 hours.

The education centre may use ICT tools such as e-learning for certain parts of the education. Distance learning may be used for relevant subjects and to a limited extent after prior approval from the Danish Transport Agency.

The five days are divided into three days with compulsory subjects, and for the last two days, the trainee can choose from several courses.

Romania

A maximum of 12 hours of e-learning for drivers CPC training is possible.
All theory modules can be delivered via e-learning. National law stipulates that the minimum content of the specific theoretical training platform is the normative acts relevant to the directive's objectives and courses and lessons according to those objectives.

Checking procedure:

Learners must log in on the platform to become users only with a username and password. The training centre must admit on the digital platform only users who have correctly registered their data with personal character requests through the digital platform. No special identification equipment is required.

Assessment:

The e-learning platform must contain an examination module that must offer an interface similar to the one found in the theoretical examination. It will prepare the learners in time for the final assessment and accommodate them with the computer-based examination. The steps of an examination simulation must be identical to the steps encountered by the users during the exams. To complete the course, a student has to take a number (at least four) theoretical exams.

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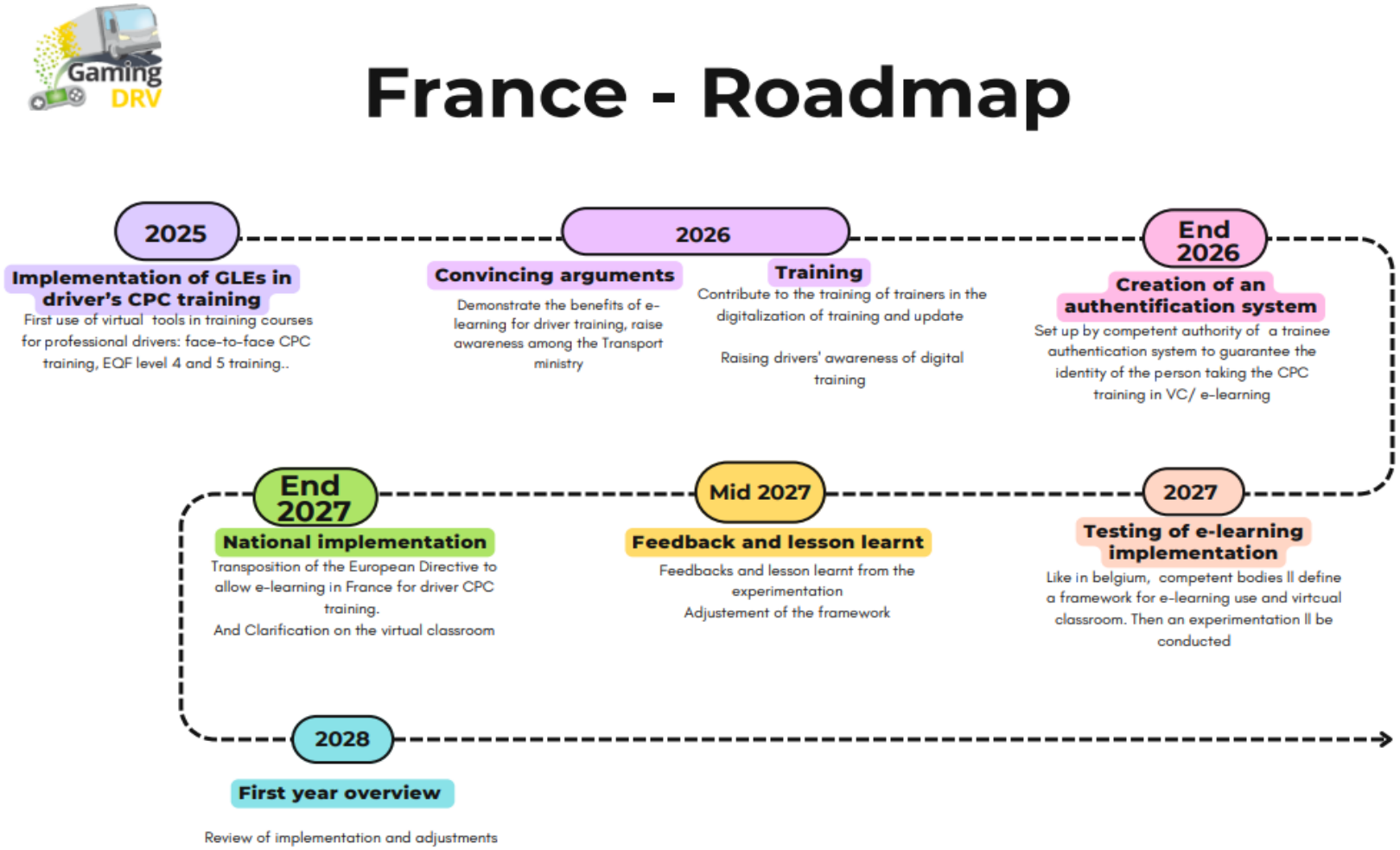
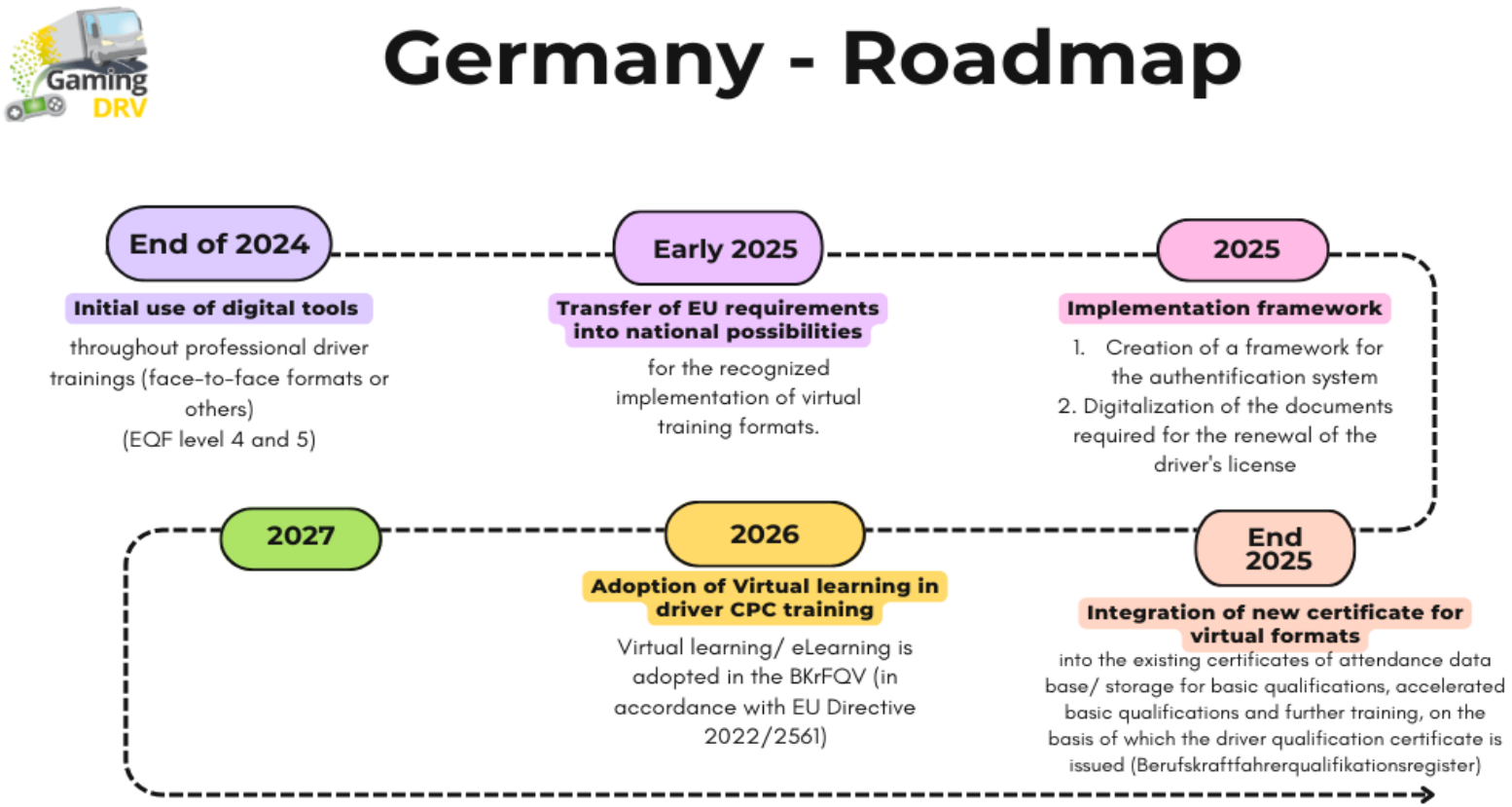
3.4 Roadmap

Taking into account the various analyses carried out by the partners and the multiple practices identified in other European countries that allow online training, we propose in the following section a roadmap by country to define the various stages that would enable countries that do not allow distance training to move in this direction.

France



Germany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Germany - Roadmap
End of 2024
Initial use of digital tools
throughout professional driver trainings (face-to-face formats or others)
(EQF level 4 and 5)
Early 2025
Transfer of EU requirements into national possibilities
for the recognized implementation of virtual training formats.
2025
Implementation framework
1. Creation of a framework for the authentification system
2. Digitalization of the documents required for the renewal of the driver's license
End 2025
Integration of new certificate for virtual formats
into the existing certificates of attendance data base/ storage for basic qualifications, accelerated basic qualifications and further training, on the basis of which the driver qualification certificate is issued (Berufskrafftfahrerqualifikationsregister)
2026
Adoption of Virtual learning in driver CPC training
Virtual learning/ eLearning is adopted in the BKrFQV (in accordance with EU Directive 2022/2561)
2027

3.5 Dedicated guidelines for each virtual learning stakeholder

Training developers/providers

Observation	The evolution towards virtual classrooms requires a redesign of pedagogy and didactics in driver CPC and beyond
Recommendation	- An overview of the technologies that will be used and the related skills of the trainers are key; before potentially training the trainers to support learners in the use of digital tools, - An adaptation of the training content to the virtual classroom will be necessary, as well as web hosting and maintaining the solutions developed, - If used in a virtual classroom, the training modules must be designed for this format and short enough to keep the participants' attention. - Versatile tools can be tailored to the group of learners by the trainer/teacher and align with learning mechanisms (stimulation through games, work situations, etc.). - Notes: Digitalised, virtual classroom training does not mean all training will be done remotely. With the trainers, consider elements of the course that can be delivered remotely and discuss with them how these modules can be implemented.

Trainers

Observation	Switching from in-class to virtual classroom training can be difficult, particularly when creating emulation among learners.
Recommendation	- A change in the working methods towards more interaction and participation (including games quizzes) facilitates the involvement and working as a team, - Learning design can be planned around learning outcomes, pedagogical objectives, and the interactions between the group of learners, - A dedicated period to have the necessary training on how to deal with netiquette, involvement & learning of learners and using tools in a virtual context.

Drivers

Observation	The vast age difference among drivers can hinder the use of digital tools.
Recommendation	- This issue does not affect all drivers, as younger generations are tech-savvy, - Using typical game dynamics and slowly introducing digital tools through an introductory course at the training centre, as those competencies will be key for their career.

Observation	One of the most challenging aspects of distance learning is organising one's own knowledge and the low frequency of synchronous interaction.

Recommendation	- More frequent feedback is needed from teachers during distance learning, using communication and collaboration tools to interact with their peers in real-time and foster cooperative classes, - Icebreakers and gamified activities allow participants to build trust and become comfortable sharing and participating; the effects are stronger with cameras.

Public policymakers

Observation	Virtual classrooms are challenging current training methods and a vector of apprehension.
Recommendation	- It is possible to slowly open training courses to virtual classrooms by first allowing them and then creating a pilot phase like Belgium did for hybrid or multimodal training before moving on to trying virtual training (synchronous and then asynchronous). - The question of training duration needs to be reviewed as it depends on the driver's ability to learn. In the end, professionalism and mastery of skills are more important than a rigid framework of imposed hours. - The question of e-learning duration (Maximum of 12 hours) needs to be reviewed: With a 7-hour day and a total training time of 35 hours, 12 hours would appear inappropriate. - The notion of the virtual classroom from one country to another remains unclear. Should we include the virtual classroom in e-learning or consider it equivalent to classroom training? - The maximum number of participants in virtual classrooms should be limited to a small group and standardised in all countries. To date, participant limits in driver CPC training have not been standardised in various European countries. The trainers interviewed during the project recommended that groups of around ten people be established when the module is taught in a virtual classroom.

Observation	Driver shortage is at an all-time high (600 000 bus and truck drivers) and will not stop soon as the IRU forecasted 2 million by 2026
Recommendation	- Distance learning allows an e-learning preparatory course, particularly for vulnerable populations such as people far from employment, school dropouts, people with disabilities and newcomers. - The use of simple digital tools, with tiny text or universal mechanisms, will limit translations and cultural barriers. - Working on colour contrast, using images, and being sensitive to the mouse and clickable buttons greatly helps everyone and makes learning possible for people with disabilities.

Observation	One of the main obstacles to using e-learning or virtual classrooms for training is verifying participants.
Recommendation	- The Directive should include a detailed framework and procedure of an authentication system to guarantee the identity of the person taking the Driver CPC training

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	- Many European countries have already set up an authentication system. It could be interesting for national decision-makers to be inspired by other European countries like Finland.

Conclusion

A new virtual training:

This is a different kind of in-house training, centred on practical application and a reflective approach. It's an opportunity to get together, create a connection between participants (both the trainer and the learners), and initiate the relationship that will be forged throughout the course.

Distance learning will be used to meet individual needs based on an upstream assessment. In this way, the time will be dedicated to improving specific knowledge and gaining a greater sense of comfort in their company tasks.

An interface will be required to connect these two training methods. First, it will enable the specific needs of each learner to be assessed. Then, it will serve as a link between the learners and the trainer during the distance learning course. Finally, it will evaluate the knowledge and skills learnt throughout the course.

The trainer's role will also be key. They must take a different stance from a top-down information provider with mostly passive learners, inviting participants to rethink their practices and knowledge together.

In this way, distance learning, combined with a reflective approach and practical application, can meet the needs expressed for using virtual classrooms while avoiding the obstacles identified. Rethinking teaching methods and the role of the trainer will make the virtual classroom fully effective.

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Appendix

Experimentation in the different partner's countries: Implementation of GLEs

After defining the ideal vision/solutions and the potential opportunities, threats and obstacles, the stakeholders were tested through the project's GLE pilot. This served two purposes:

- Test the project's Gamified Learning Elements (GLEs) in real conditions and define the characteristics of this Proof of Concept (POC).
- Testing the project's Gamified Learning Elements (GLEs) in countries used to face-to-face learning (Germany, France, Ireland, Sweden), getting feedback on their experience, and highlighting the obstacles, benefits, and advantages of incorporating these GLEs into driver training courses.

Methodology and description of the testing phase

Every partner was responsible for selecting, preparing and involving participants from their country to test the GLEs.

Before launching the testing phase, to collect feedback from the target audience (trainers, training providers, authority makers, drivers/trainees…), AFT, as leader of PR5 and DEKRA, as coordinator, developed two questionnaires:

- One for trainers, teachers, pedagogical staff
- One for Drivers/ trainees undergoing Drivers CPC training.

These questionnaires were composed of different parts:

- Part 1: Tester's profile (his experience with digital learning, background, training courses...)
- Part 2: Tools tested (specific questions depending on the tools) –
- Part 3: General part on the relevance and usefulness of the tools (improvement of learning, improvement of motivation, projection for use in the future, etc.)

After validation by all the partners, the two questionnaires were translated into the partners' languages for easy application and made available online through two questionnaires.

The partners were asked to organise presentations of the tools and test sessions among their national stakeholders (trainers, training providers, trainees/drivers in CPC training, teachers…, etc.).

As mentioned earlier, participants were invited to complete the online questionnaire after each test.

Partners established several methods:

The tools were directly tested by trainers and/or trainees in the partners that provide transport and logistic training.

- The tools were presented during meetings and tested directly.

- The tools were presented to interested and volunteer trainers/ pedagogical staff or teachers in webinars.

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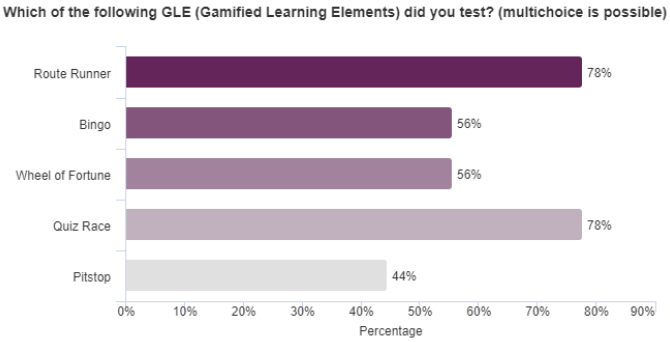
In Finland, pilot training days were carried out by adding GamingDRV games to the drivers' training days. The training days were conducted in a hybrid format, with both online and classroom training simultaneously. The following are the observations and impacts that were collected.

Results

Pedagogical test

Regarding educational staff, all the participating countries were able to collect feedback from transport and logistics training teachers, trainers from Drivers CPC training and pedagogical staff.

All the GLEs were tested, but two games were more tested: Route Runner and Quiz Race.



General Feedback received:

	Route Runner	Bingo	Wheel of fortune	Pitstop	Quiz race
Use	Flexible with the training content (100%) Easy to use (71%)	Flexible with the training content (60%) Easy to use (80%)	Flexible with the training content (80%) Easy to use (80%)	Easy to use (75%) Create group discussion (75%)	Flexible with the training content (71%) Easy to use (71%)
Difficulties	No (100%)	No (80%) Yes (20%)	No (100%)	No (100%)	No (100%)
Feeling using the tool	Liked the competition (86%) Felt challenged (43%) Had fun (71%)	Had fun (60%) Bored (20%)	Had fun (80%)	Liked the fact that it is possible to discuss many topics (100%)	Liked the competition (71%) Felt challenged (57%) Had fun (43%)
Adapted for	Virtual training in small groups (100%) Face-to-face training (100%)	Virtual training (100%) Face-to-face training (80%)	Virtual training (100%) Face-to-face training (100%)	Virtual training (75%) Face to face training (75%)	Virtual training (86%) Face to face training (86%)

100% of the participants indicated that the GLEs:

- are easy to use and implement,
- will help learners to revise knowledge

89% of the participants stated that there are no obstacles in using the GLEs in their training. The others pointed out areas for technical improvement.

Ireland feedback:

The fact that you can edit and create the questions in the games was considered a handy feature, which makes the solution flexible and bespoke.

There was a general feeling that these quizzes would improve delegate participation and present the learning outcomes to them in an interesting and competitive way.

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The general feeling was that the games represent a great opportunity to develop driver training, but only if Driver CPC regulations 2022/2561 were amended to allow the use of these interactive elements, especially considering the difficulty of getting drivers to attend a specific location.

These games will be of use in driver training sessions. Trainers will have little difficulty setting up and delivering games. The issue in Ireland is that interactive elements are not allowed at the moment; they are only just introducing the option for eLearning later this year.

Finnish trainers' feedback:

Positive impacts

Enhanced teaching tools:

- Games like Quiz Race and Route Runner provide instructors with innovative and engaging teaching tools. These tools can make the learning process more interactive and enjoyable, helping instructors keep students motivated and involved in the lessons.

Improved student interaction:

- The games foster a collaborative and competitive environment, encouraging students to interact more with each other and the instructor. This can lead to a more dynamic and engaging classroom atmosphere, making it easier for the instructor to facilitate discussions and group activities.

Feedback and adaptation:

- The immediate feedback from students during the games allows instructors to quickly assess students' understanding and adjust their teaching methods accordingly. This real-time feedback can help instructors identify areas where students struggle and address these issues promptly.

Negative impacts and challenges

Technical challenges:

- Instructors may face technical difficulties when implementing and using the games, such as problems with QR code scanning and delays in game setup. This requires instructors to be well-prepared and familiar with the technology, which can add to their workload and stress levels.

Time management:

- It can be challenging to manage the time spent on games and ensure that discussions do not overrun. Instructors must balance the time spent on interactive activities with covering the necessary curriculum content, which requires careful planning and time management skills.

Accommodating different learning speeds:

- The fast pace of some games may not suit all students, particularly those who need more time to process information. Instructors must find ways to accommodate different learning speeds and ensure that all students benefit from the gamified activities, which can be demanding.

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Preparation and familiarisation:

- Successfully integrating games into the curriculum requires instructors to invest time in learning how to use the games effectively and troubleshooting any issues. This additional preparation can be time-consuming and requires a willingness to adapt to new teaching methods.

Trainee test

Regarding trainees, the tests were only carried out in Finland, the only country participating in the project that can provide virtual classroom training for Drivers CPC training.

Only two of the games were tested: Route Runner and Quiz Race

General feedback received:

	Route Runner	Quiz Race
Evaluation	Adapted to the training (100%)	Easy to use (50%) Difficult to use (50%)
Feeling using the tool	Had fun (100%) Felt challenged (50%) Liked the competition (50%)	Felt challenged (100%) Had fun (50%) Liked the competition (50%)
Would you recommend the tool for training?	Yes (100%)	Yes (100%)

100% of the participants indicated that:

- They revised knowledge through the use of these GLEs
- They would like to have these kinds of GLE in their training
- That these GLEs are suitable to use in driver CPC training

Finnish driver's feedback

Positive impacts

Engagement and Motivation:

- Quiz Race and Route Runner generated excitement among participants, demonstrating that gamification can increase students' motivation and engagement in learning.
- Route Runner fostered a sense of competition and collaboration, enhancing participant interaction and creating a positive atmosphere. This can aid in developing group dynamics and improve the learning environment.

Enhanced Learning:

- The games helped participants learn about professional topics. Discussions around questions facilitated deeper understanding and practical application of knowledge.
- The conversational nature of Route Runner allowed students to compare different answer options and think critically about the correct solutions, deepening their learning.

Diverse Learning Methods:

- The games support various learning styles by providing visual and interactive elements. This can be particularly beneficial in practical vocational training, such as bus driver education.

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Negative impacts and challenges

Technical issues:

- Problems scanning QR codes and delays in sharing game links via email made starting the games difficult. This highlights the importance of technical smoothness in gamified learning environments.
- The fast pace of the Quiz Race caused frustration for those who needed more time to process questions and answers, emphasising the need to accommodate different learning speeds and customise games to participants' needs.

Timing and game duration:

- Discussions during Route Runner took up much time, potentially hindering the efficient use of the training day. The instructor's role is crucial in adequately managing time and pacing the games.

Game implementation:

- Implementing games requires careful planning and technical preparation. Instructors must be well-versed in the game's functionality and technical requirements to resolve any issues that arise quickly.

The experiences with games at TTS's Turku branch show that gamification can offer significant advantages in vocational training by increasing student enthusiasm and engagement and enhancing learning. It is crucial to anticipate technical challenges and plan the use of games carefully, considering participants' different learning styles and speeds. Effective integration of games into teaching requires precise time management and readiness to address technical problems, enabling gamified learning experiences to reach their full potential.

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