Equip EQF level 5 trainings for managers in the transport sector with inclusive teaching methods, tools and training material to ensure online and distance teaching and learning, continuous learner monitoring and the evaluation of learning outcomes

Guidelines for developing and implementing digital training

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1. Introduction

The e-ManTRA project aims to help transport and logistics training providers to overcome barriers to online and distance learning and instruction and to ensure continuous learner monitoring and assessment of learning outcomes.

For this purpose, the e-ManTRA project intends to:

- Guide learners and teachers for an optimised digital learning experience.
- Improve digital education readiness by providing free (OER) and inclusive online tools and innovative resources for training providers.
- Allow flexible combinations of a distance, blended and in-class learning offer.
- Provide teachers with useful decision-making tools to design and implement innovative training approaches tailored explicitly to digital learning needs.
- Overcome the hurdles of the Covid-19 pandemic by facilitating distance learning formats.

The aim of the present document is to provide teachers and trainers with guidelines of how to go about transferring (elements of) face-to-face training to the virtual world, including pedagogical and practical considerations to be made in the process. These guidelines are based both on the extensive experience gained by the e-ManTRA project partners in the context of transferring training into the virtual world and on the results of questionnaires and interviews conducted with teachers and trainers from five EU countries (Finland, France, Germany, Romania and Spain) during the first part of the project. They consider best practice experiences of trainers from numerous international educational institutions. In addition, the project partners conducted desk research to collect complementary and innovative methods for the digital classroom and to draw on valuable experiences from outside the consortium.

Furthermore, this overview presents experiences and thoughts on developing successful and effective training for the virtual classroom. This includes guidance that specifically addresses the changing conditions when training moves from face-to-face environments to the virtual classroom, the (changing) role of trainers, aspects of inclusion and general thoughts on possibilities and limitations of virtual learning environments. To support teachers in this transition, this guide is rounded off by an Inventory of pedagogical methods, tools and media suitable for distance and online learning, continuous monitoring of learners and assessment of learning outcomes achieved.

To ensure a clear understanding of all technical terms used, you may find a detailed glossary at the end of this document.

2. Meeting new challenges - the need for transforming face-to-face training

The coronavirus pandemic and the measures taken by governments to contain the virus have created major challenges for the training industry. In this context, the necessity arose to look for alternatives to classroom training. Moving training to the virtual classroom is a way to ensure that training work can continue without physical interaction between learners and instructors during these difficult times.

Reasons and necessity to move face-to-face training into the virtual classroom:

During the pandemic, virtual training has proven to be a safe way to provide training remotely and to support the mitigation of the virus while ensuring the continuation of training. However, there are more advantages of virtual classroom.

Reduce load on working memory: The human brain is no computer. This has many advantages, but it also means that you cannot "upload" too much content at once. Virtual learning allows for dividing learning content into shorter elements or microlearning nuggets (e.g., videos, manuals).

Adapt learning to the individual needs of the learners: It is possible to design more individualised training elements according to learners' needs and specific prior knowledge and to adapt the training pace. As the trainer[1], you can for instance organise the training by providing a general introduction first and then give tasks to the learners, which they will solve self-paced. For those who need support, you should stay available as a coach and tutor, whether in a virtual room or by means of asynchronous communication (e.g., e-mail, etc.).

Digital training offers many opportunities and possibilities, some of which go far beyond face-to-face learning: Learners can participate synchronously in an event anywhere in the world, no matter where they are. This circumstance reduces travelling time and costs as well as CO2 emissions. With the appropriate tools, media of any kind can be integrated, and the self-learning units can be combined with lectures or live sessions. However, there are also difficulties and challenges when transferring training to the virtual classroom. New skills are required on behalf of both trainers and learners when dealing with technology (including the variety of devices students may use, such as tablets, smartphones, etc.), stability of the internet connection, the concentration of the learners, interaction, monitoring, validation and assessment. In addition, during our interviews and surveys, many learners and trainers expressed that they miss the opportunity to convey and learn practical skills in the virtual classroom.

[1] To facilitate the reading of this guide, the term 'trainer' is mostly used. It includes both teachers at initial public VET schools as well as trainers at private initial or continuing VET providers.

3. Different formats of virtual training

Virtual training offers a continuum of possibilities. You can choose between many different options, depending on the nature of your training content and, more importantly, your target groups' needs. Before going into detail about which format to choose for your target group and training contents, we would like to provide a brief overview of the existing virtual (and blended) training formats, their respective advantages and disadvantages, and suitability to different kinds of training and target groups:

- Self-directed e-learning (100% autonomous) with and without a predefined learning progression
- Self-directed e-learning with tutor support
- Flipped classroom (self-study followed by tutor-supported and/or social learning forms)
- Virtual classroom training (100% synchronous)
- Virtual classroom training (synchronous) with synchronous break-out sessions (either group sessions or self-study sessions)
- Blended formats (100% digital synchronous and asynchronous learning)
- Blended formats (digital training and face-to-face training)
- Blended formats (one part of the learners in the classroom, the other part online at the same time)
- 100% face-to-face training using digital tools

3.1 Self-directed e-learning (100% autonomous)

As the term suggests, pure e-learning takes place without or with very little interaction between the learners and the trainers. It is mostly self-directed by the learner. As such, it is particularly suited for autonomous learners.

The training can be done in a completely or nearly completely asynchronous manner, meaning that the learners can learn at a time that best suits them, independently from the learning times of their peers or the working hours of their trainer. Thus, this training format offers much flexibility to learners who are regularly working, learning from home, or learning groups based in different time zones.

Therefore, a good self-directed e-learning course offers many methods and media, such as pre-recorded online lectures, videos or podcasts, self-learning materials such as eBooks and presentations, and practical and engaging self-study tasks, for example, work-based tasks and reflection exercises. This training format's autonomous and self-directed nature requires a lot of learning support and clearly defined learning objectives, which must be integrated into the e-learning course itself, depending on the target group and the training content. It is important to integrate elements of social learning into this – mostly autonomous – learning format. This can be done by setting group tasks with fellow learners, whether in synchronous virtual sessions or through asynchronous means such as forum discussions where learners can exchange information, share reflections, or discuss concrete questions and solve challenges.

Advantages	✓ One trainer is enough to supervise many learners. ✓ Low technical risks usually associated with live streaming sessions. ✓ Flexible in terms of pace and time of learning for individual learners.

	✓ Clear course framework. ✓ Learning analytics facilitates the trainers' work and assesses student progress.
Disadvantages	- Learning management system (LMS) required. - Potential compatibility and / or technical implementation difficulties as not all LMS might support all learners' software and hardware components. - Potentially high effort in creating the learning material because it has to be suitable and motivating for many different learners. - Requires the learner to show a high level of engagement and commitment, self-learning skills, and motivation. Asking for help or clarification can become an obstacle for learners. Due to the lack of interaction, learners may feel isolated. - Trainers must adapt to no longer being knowledge providers but rather facilitators of the learning process.
Transfer effort	⇨ **Very high**

3.2 Self-directed e-learning with tutor support

Some of the disadvantages of the e-learning format can be cushioned by integrating more tutor support into the approach. Depending on the learners' self-learning competence, motivation levels, and the learning content's complexity, the trainer or tutor provides more or less support to the learners.

Scaffolding is a significant term, for that matter. There are various scaffolding methods such as assessing prior knowledge, competence and learning motivation, deconstructing complex training content, and arranging learning content into chunks. Another possibility is regular trainer intervention, such as regularly discussing progress and difficulties with the learners, setting interim tests and deadlines, etc.

Advantages	✓ Trainers can work with many learners (though more effort is needed than in e-learning formats with less trainer participation). ✓ Low technical risks associated with live streaming sessions. ✓ Flexible in terms of pace and time of learning for individual learners. ✓ Offers greater flexibility to respond to individual learners' needs.
Disadvantages	- Learning management system (LMS) required. - Potential compatibility and / or technical implementation difficulties as not all LMS might support all learners' software and hardware components. - Potentially high effort in creating the learning material. - High demands on learners' self-organisation, self-learning skills and motivation. - Trainers must adapt to no longer being knowledge providers, but facilitators of the learning process.

	Transfer effort	⇨ Very high

3.3 Flipped classroom approach

The flipped classroom approach has received increasing acceptance in adult learning. In traditional learning concepts, theoretical knowledge is imparted in the classroom (be that physical or virtual), reflection and practice then take place afterwards, either autonomously in a classic "homework" setting or in the same classroom setting as the theoretic input. In the "flipped classroom setting," this approach is turned around. First, learners acquire the necessary theoretical knowledge/contextual information by means of self-study using different types of learning materials and methodological approaches (such as reading text-based material, watching or listening to pre-recorded lectures/trainer input or conducting research activities). The subsequent synchronous training session is classroom-based, be it virtual or physical, and devoted to clarifying questions, discussing and reflecting the self-study session and applying the learning content by means of different methods.

The advantage is that the precious and rare synchronous learning time is not "wasted" on pure trainer input that can quite easily be acquired by the learners both individually and in an asynchronous manner. Instead, the joint learning sessions are used for what they can offer best: social learning, discussion, reflection and clarifying questions and difficulties.

	Advantages	✓ Trainers can focus on practical issues = quality improvement. ✓ Get the most out of the valuable time with the trainer. ✓ Promotes the transfer of learning into practice. ✓ High flexibility in terms of individual learning speed and timing.
	Disadvantages	- High effort for the preparation of the learning material. - Relatively high demands on learners' self-learning skills. - Potential for solidification of mistakes if wrong learning contents or misunderstandings are not clarified.
	Transfer effort	⇨ High

3.4 Virtual classroom training (100% synchronous)

This virtual training format is most similar to classic classroom-based approaches, but the learners and trainers meet not in a physical but a virtual classroom. This form of training takes place in a virtual meeting room, in which learners and trainers are connected via meeting software such as Zoom, Teams, etc. The training setting is similar to a classroom-type setting, with the exception that learners and trainers are in different locations. The trainer can use various tools for presentation, documentation and visualisation, such as PowerPoint presentations, virtual whiteboards or flipcharts. However, unlike in real classrooms, learners cannot learn on the same object (such as workshop materials, experiments, etc.), complicating the delivery of certain practical training contents. However, with a bit of creativity

and flexibility and the use of increasingly interactive and useful virtual training tools (refer to our Inventory for inspiration), a lot of training content can be transferred into the virtual world.

Despite the similarities to traditional face-to-face training approaches, it is important to understand and consider that traditional training concepts cannot simply be transferred one-to-one to the virtual world. Even though the transfer effort is a lot lower than in other formats, this training format still requires a certain amount of transfer effort to adapt to the specific requirements of the virtual world. For example, concentration levels can diminish more quickly than in physical classrooms, so more breaks and activating methods should be integrated. Also, a significant amount of the social aspects of learning and training are lost; for example, breaks are spent alone in front of the computer, instead of eating together and exchanging small talk. By applying social learning and activating training methods, trainers can respond to this by allowing for more social exchange and movement within the training elements.

Virtual classroom training is one of the most applied forms of virtual learning according to the interview feedback from our respondents across Europe. This is because existing concepts for face-to-face training in the classroom were moved to the virtual classroom quickly. The success therefore results from the ease of adaptation. Our respondents' feedback about this training format was overall positive. They considered virtual classroom training as very useful because it gives many possibilities to vary the courses and to accompany the students closely. However, there was also some negative feedback from trainers. However, this seems to have been mostly the case where training, particularly highly frontal training and teaching such as lectures, was merely shifted into the virtual world. This led to high cases of dropouts and very little interaction.

One respondent's comment sums this trend up very nicely: "When the 100% synchronous virtual classroom training does not change from the face-to-face training and when it is only about passing on knowledge, it does not work at all. Students drop out quickly, cheat a lot, unplug the camera and do other things. They need a rhythm."

Advantages	✓ Strongly resembles a natural classroom environment, hence offering great potential for transfer. ✓ A lot of direct interaction between the learners and the trainer, so there is a high level of learning control. ✓ The transfer effort is comparatively low.
Disadvantages	- Depending on the variety of the training methods, long training programmes may be difficult for learners to follow in this format. - Reduced learning times and more breaks due to reduced attention span. - There may be unforeseen technical difficulties, which require flexible trainer response in case of technical (and other) difficulties.
Transfer effort	⇨ Low

3.5 Virtual classroom training (synchronous) with synchronous break-out sessions (either group sessions or self-study sessions)

A full or even half-day in a virtual meeting room can be a considerable burden for learners, both physically and mentally. Thus, breaking up training sessions is recommended by integrating additional elements, such as break-out sessions. Smaller groups can work on specific tasks or discuss particular issues and questions. Other elements can be self-study phases, in which learners can turn away from the screen for a moment. Such self-study phases can include reading texts and completing pre-set tasks. Depending on the learning content, trainers can also get more creative and integrate more activity-oriented self-study elements.

Such additional elements need to be well prepared and linked to the training content of the live session.

Advantages	✓ Balance between on-screen and off-screen learning is possible. ✓ Extends the attention span of learners. ✓ Offers potential for better integration and transfer of training content.
Disadvantages	- Learners must have some self-learning skills and a minimum level of motivation to learn about the specific topic. - The additional elements must be well-prepared, integrated and accompanied. - A technical infrastructure for implementation is required.
Transfer effort	⇨ **Low to medium**

3.6 Blended formats (100% digital synchronous and asynchronous learning)

Any of the above-listed training formats can be combined in order to create blended training formats that combine synchronous and asynchronous elements. This can be done following the flipped classroom approach or different rhythms. Mixing and matching elements of the above-listed training formats offers potential for better learner engagement, practice transfer and retention of learning content but must be thought through didactically not to confuse learners or become arbitrary. Blended learning formats have a multitude of advantages. It is possible to reduce some of the disadvantages of a given design by blending it with another one. For example, the low level of learner interaction of e-learning formats can be addressed by blended learning concepts that include regular synchronous training sessions, such as VC (virtual classroom) workshops for reflection and practice transfer. In this way, it is also possible to include didactically proven methods such as project-oriented learning or work-based learning.

It is also possible and proven to integrate guided work-based learning in blended learning approaches successfully. This enhances reflection, integration and practice transfer of training contents. If learners are working full- or part-time, setting work-based learning tasks can help them apply training contents to practice immediately. In such approaches, it is important to allow for sufficient reflection of the work-based assignments.

Blended learning formats were also among the most frequently mentioned personal experiences in our surveys. However, in contrast to live sessions in the virtual classroom, the implementation is usually more complex. For self-paced sessions, trainers need to work more intensively on their materials to adapt them for asynchronous self-paced elements. Nevertheless, among the trainers surveyed, this is by far the most popular and successful format: "Mixing forms works best. If necessary, [the trainer] is able to support the student/groups of students and remains aware of the necessary support measures or the need for additional material."

According to most trainers, blended formats combine the advantages of both worlds: the commitment and learning control of a face-to-face event and the flexibility of self-learning elements.

Advantages	✓ Offers highest didactical potential by mixing and matching training formats and integrating methods best suited to learners' learning objectives. ✓ Offers great potential for transfer. ✓ Offers a high level for knowledge transfer, competence development and generally retention and transfer of training content. ✓ Allows for reducing disadvantages of certain formats by combining them with those that have opposite effects.
Disadvantages	- Often a high to very high preparation, implementation and evaluation effort for trainers. - Work-based or project-oriented learning requires certain framework conditions that cannot always be guaranteed in a training group and raise the threshold for participation and inclusiveness of training measures. - Requires a high level of didactic, methodological and sometimes technical skills from the trainer. - Requires the learners to show a high level of engagement and commitment.
Transfer effort	⇨ **High to very high**

3.7 Blended formats (digital training and face-to-face training)

There is learning content that sometimes needs to be learned or applied in a face-to-face setting while other parts of the learning can be moved to digital training. This blended format allows to split the learning process into both environments, digital and face-to-face. It is important to clarify beforehand why a certain part of the learning should be moved to digital training or should be implemented as face-to-face teaching. For example, if practical hands-on assignments, motion sequences or a high level of synchronous learner interaction are necessary, this requires a face-to-face setting. On the contrary, for content that can be conducted through self-study, there is no need for face-to-face training.

A certain amount of adaptation is necessary to ensure the training is valuable and pleasant for the on-site as well as the digital parts and feels like one entity that builds upon each other. The trainer needs to reflect the entire training session and its methodological composition for both parts of the training

and its specifics (e.g. which work assignment or method is best suited for face-to-face or for the digital training and enhances the learning outcome?). The structure and sequence of the training formats should be clearly communicated to the participants.

Advantages	✓ Offers high didactical potential by combining training formats and integrating methods best suited to learners' learning objectives. ✓ Possibility to activate participants and raise motivation and learners' engagement for digital training during or before face-to-face training. ✓ Offers great potential for transfer. ✓ Offers a high level for knowledge transfer, competence development and generally retention and transfer of training content. ✓ Allows for reducing disadvantages of certain formats by combining them with those that have opposite effects.
Disadvantages	- Requires good preparation and some adaptation of the training programme and methods. - Requires a certain level of didactic, methodological skills from the trainer. - Sometimes requires higher self-learning competences and motivation from learners during digital training.
Transfer effort	⇨ Low to medium

3.8 Blended formats (one part of the learners in the classroom, the other part online at the same time)

Sometimes, particularly during the pandemic, framework conditions can require a part of the learning group to be outside the physical classroom and follow the training remotely. Using virtual meeting technology can enable this, but it requires a certain amount of flexibility, transfer of the training delivered by the trainer, and a very reliable technology environment and advanced hardware.

A certain amount of adaptation is necessary to ensure the training is valuable and pleasant for the on-site and remote participants. Here are some examples of why this is the case: For example, the trainer must reflect the entire training session and its methodological delivery for potential obstacles and disruptions. The trainer must demonstrate sensitive and flexible moderation skills to include remote participants in the on-site training sessions. Practical implementation has shown that more interactive methods are challenging to follow if on-site participants are not equipped with the necessary hardware such as microphones which is challenging to guarantee in practice. In some cases, it might be necessary to consider how to integrate remote participants into group activities and discussions or devise special activities for them. In addition, trainers should allow more time to deliver the training, as technical difficulties, listening problems, and resulting repetitions and clarifications can cause significant delays.

Advantages	✓ Possibility to include participants who are not on-site for many reasons. ✓ Opportunity to retain the benefits of face-to-face learning for a max. of participants without excluding learners who cannot be on-site.

Disadvantages

- Requires advanced, sensitive and very flexible moderation skills from the trainer.
- Requires an advanced and extremely reliable technology environment, including both advanced hardware and highly reliable internet connection.
- Reduces flexibility of methods and communication in the classroom on-site.
- Requires a significant amount of concentration and attention on behalf of the remote learners.
- Requires some adaptation of the training programme and methods.

Transfer effort ⇨ **Low to medium**

3.9 100% face-to-face training using digital tools

The pandemic forced trainers and learners into the virtual world, meaning that great learning progress was made on both sides regarding creativity and technical competence for integrating virtual training tools and methods. At the same time, a multitude of good, creative, affordable, interactive, sometimes gamified and didactically sound training and communication tools have been developed. Why should we abandon those tools and skills when we return to 100% face-to-face training?

We are convinced that we neither need nor should abandon the continuum of resources that were developed during the past two years. On the contrary, we can use them to enrich face-to-face learning, for example, by including gamified virtual training tools in the classroom. Why not ask your participants to pull out their phones and let them reflect on their prior knowledge by means of a Kahoot quiz at the beginning of a new unit? Virtual escape rooms can also be played in groups on-site and are often much easier to prepare and implement than their non-virtual counterparts.

Advantages

- ✓ Possibility to activate participants and raise training attractiveness by including interactive and gamified virtual elements into face-to-face training.
- ✓ Often, the effort to prepare, implement and evaluate is a lot lower than when using non-virtual equivalents.
- ✓ Increases learner motivation and retention of training content.

Disadvantages

- Requires a certain level of technological competence on behalf of the trainer and the participants.
- Requires a certain level of openness to try out new things on behalf of the trainer and the participants.
- Requires technical hardware that may not always be present.

Transfer effort ⇨ **Low to medium**

4. Transferring face-to-face training into the virtual world: A step-by-step guide

We recommend taking into consideration the following instructions for transferring face-to-face training into the virtual world. To foster an easy-to-follow step by step approach, we have divided them into three different aspects:

1. Your specific target group characteristics.
2. Your specific training content and the corresponding learning outcomes to be achieved.

   Both points serve as a foundation for taking the right decisions regarding the virtual training concept. Everything that is not done or thought through regarding these two points in future virtual training will backfire when implemented. Even the best plans do not work out when the format is not adapted to its target or the delivered content.

3. Based on the above, decisions can be made about the design of the training by means of different training concepts and methods.

4.1 Target group analysis

When considering your specific target groups' needs, it is crucial to determine the level of learning autonomy of your learning group and consequently how much control and support the learners require on behalf of the trainer. This is the basis for fundamental decisions regarding the design of virtual training. It should not be taken for granted that all learners are able to learn autonomously with self-learning materials.

Therefore, your decision regarding the design and format of your training should depend – in large parts - on your learners' self-learning competence.

Self-learning competence depends significantly on two crucial components:

1. Learning motivation for the specific topic covered in the training at hand.
2. Learning competence of the learner, i.e., the ability to independently acquire knowledge, reflect on it and transfer it.

This means that learners who have a high level of learning competence will not necessarily be able to apply their learning competence to a specific training programme if they have no personal interest in the subject matter. Raising the learners' interest and curiosity is thus the key for the trainer.

To summarise:

→ A high level of learning competence can only partially compensate for a lack of motivation.

→ But high motivation can overcome a deficit in learning competence up to a certain point.

→ The topic at hand is always the decisive factor!

Concerning learning motivation, especially when it comes to digital learning, it is essential to familiarise yourself with the difference between extrinsic and intrinsic motivation. A brief excursion on learning motivation:

Extrinsic motivation is driven by external factors such as achieving positive consequences or avoiding negative consequences. Thus, it depends on external factors. An example of this could be a training programme that learners participate in to increase their opportunities for promotion or better pay.

Intrinsic motivation refers to the desire or intention to perform a certain action, e.g., to complete an e-learning course, because the action itself is considered interesting or attractive. For the design of successful digital training, it is therefore important and possible to arouse the learners' curiosity and interest. When learners are intrinsically motivated, learning itself is perceived as a fulfilling and rewarding activity. An example of this are courses on creative and leisure-related topics, such as those offered in adult evening classes, which are booked purely out of personal interest.

But how can teachers remotely determine student motivation?

Firstly, analysing the target group and the learning content at hand can provide good indicators about how motivated learners will be in relation to a specific training. Secondly, a lack of motivation can, to an extent, be addressed by designing training programmes in an activating, interactive, communicative and gamified way. There are a number of tools and methods that can be applied to make a training more entertaining. The e-ManTRA Inventory can provide you with inspirational good practice examples in this context.

Thus, both learning competence and learning motivation are important factors for analysing your target group. What else should you take into account?

We have categorised five aspects to be considered:

- **Motivation for the subject,**
- **Previous knowledge /experience,**
- **Media literacy,**
- **Hardware and software availability,**
- **The habit of learning independently.**

The first one, **motivation for the subject**, is crucial and has already been outlined in the previous paragraph. The lower the motivation, the more control and support will be needed on behalf of the training design. If the motivation is moderate, it is possible to allow for more self-directed learning as this may also raise interest and motivation. In this case, some courage to allow for more self-determination on behalf of the learners may be rewarded.

Prior knowledge/experience:

- Learners who are entirely new to a subject and have little prior knowledge often need more guidance and support to help them become proficient in the matter, i.e., a high level of control in the form of close supervision or a classic virtual classroom setting.
- Watch out for heuristics and misconceptions that creep in with a lot of practical experience; these can often be better detected and eliminated in direct interaction between learner and teacher.
- Good prior knowledge facilitates self-directed learning because the learner already knows the domain and can build on the prior knowledge, for example, to ask the right questions or to pursue them.

- Think very carefully about how much and what kind of prior knowledge you are dealing with. Can the learners rely on their prior knowledge to build on, or is it something that can become problematic?

Media or digital literacy:

- How confident is your target audience in the use of digital forms of interaction, e.g., text chats, video chats, forums, social media, etc.?
- How frequently and confidently do learners use the internet? Can they judge source quality?
- Are they familiar with virtual meeting tools? Which ones specifically?
- How proficient are your learners in texting or reading?
- Do your learners use headsets regularly, are they used to working on a computer?
- Include these points in your planning!

Hardware and software availability:

- Do your learners have PCs, laptops or other end devices that they can use to edit texts and answer questions?
- Do they prefer using mobile devices that are not necessarily suitable for text entry?
- Does the company/training provider restrict the installation of programmes on their devices?
- How stable is their internet connection?
- If the learners are supposed to work with certain software, do they have access? If not, how can access be achieved?

The habit of learning independently: The habit to learn/work independently should also be considered. Groups of learners who are accustomed to working independently will feel very constrained by a strongly instructor-led structure, while others will need more support and guidance to find their way along the training pathway.

Nevertheless, you won't always be able to accommodate all of these characteristics in a virtual learning setting, and certainly not at an individual level. It is important to be aware of them and to be able to make conscious decisions in one direction or the other.

4.2 Analysis of the learning content

The next step is to perform a thorough analysis of the learning content. There are several types of learning outcomes, which differ in the way they are delivered:

The European Qualifications Framework (EQF), for example, distinguishes between “knowledge,” “skills” and “competencies.”

Knowledge

In the context of the EQF, knowledge is described as theory and/or factual knowledge. Knowledge can be easily transferred through self-directed learning, but if learners have little motivation or experience with self-learning, a live stream session is an alternative. Flipped classroom concepts also offer good opportunities to let learners acquire knowledge independently and later on reflect it in the group.

Skills

In the context of the EQF, skills are described as cognitive skills (using logical, intuitive, and creative thinking) and practical skills (dexterity and use of methods, materials, tools, and instruments). Skills can

be best acquired through exercises embedded in learning tasks, but they need to be well prepared and debriefed by the instructor. Practical skills may prove difficult to convey in the virtual classroom.

Competencies

In the context of the EQF, competence is described in terms of assuming responsibility and independence. This content can be addressed in the live stream sessions led by the trainer just as it is in the real classroom. Competencies can also indirectly be favoured through more autonomous learning formats.

It is essential that this classification is made when designing the training in order to ensure that the appropriate formats and methods are selected later.

The next step we suggest thinking about is **learning objectives and learning outcomes. Learning objectives** concern the trainer's perspective and ask what the designed training aims to achieve. **Learning outcomes** concern the learners' perspective and indicate what they should be able to do afterwards. They are based on practical work processes and tasks.

Describing learning objectives and outcomes in detail is essential for the design of the training course. The orientation of learning outcomes has implications in terms of requirements for content, choice of methods and implementation! Meaningful, specific and well-formulated learning objectives are essential for communication with all those involved in the learning process. Furthermore, learning objectives form the basis for selecting training methods in hybrid learning formats to evaluate learning programmes and create exams and tests.

The distinction between learning objectives and learning outcomes is significant, even if we use both terms synonymously in practice.

How to define the learning objectives for virtual training?

1. Define which work processes form the basis of your topic.

2. Which concrete competencies within the work process are to be promoted?

3. Definition of competencies to be imparted into detailed learning objectives.

This serves the operationalisation and thus the concrete usability of the learning objective description for the conception of a training. This is necessary because a description of competencies is still far too general to specify what concretely needs to be trained.

4.3 Selecting the appropriate format

The requirement of the intended learning outcome determines the choice of training method. As a general guideline:

Knowledge can usually be imparted through individual, self-directed learning units. Especially if learners have low learning motivation or little experience in independent learning, the trainer can present the content in a live learning unit. Flipped classroom concepts offer the possibility for reflection and transfer.

For **cognitive learning objectives**, it makes sense to work with exercises embedded in learning tasks. These need to be well prepared (e.g., done independently as part of self-learning elements) and then followed up with a trainer.

Affective learning objectives that emphasize a feeling, an emotion, or a degree of acceptance or rejection, are the most difficult part. They can be addressed in live stream sessions as well as in the classroom. Sometimes it also takes intensive training sessions aimed at experiential learning to achieve such learning objectives. This is where a lot of effort is needed!

Achieving **psycho-motor learning objectives** mostly requires hands-on training directly on the object in question. In some cases, virtual learning experiences also come into question and VR / AR concepts may come in handy.

This is where all previous considerations regarding the target group, content and learning objectives merge to determine the formats, methods, and media to be used, considering all general conditions.

To ease this difficult decision for teachers and trainers, we have developed the e-ManTRA Inventory: The goal is to facilitate the process of transferring training from face-to-face instruction to the virtual classroom on a well-founded best practice basis and to provide suitable formats, methods and tools.

4.4 Considerations regarding framework conditions

Learning times and breaks

Why are breaks so important for learning success?

Learning is a very complex process in which neurophysical processes are set in motion and different brain areas interact. This requires a lot of energy, which is why permanent learning without loss of concentration is not possible. Even adults and skilled learners can rarely work with concentration for more than 30 minutes at a time. Learning in intervals helps the brain to process information better and more effectively.

Humans are not computers that can be filled with information indefinitely. There are limits to the power of our memory. Humans must first process new information, link it, place it in new contexts, gain experience, and make mistakes in order to generate knowledge and learn effectively.

Be careful when transferring to the virtual classroom! Virtual training often cannot be implemented in the same way as classroom training in terms of timing.

When designing virtual training/ e-learning

For a 1-day face-to-face training, 2 days should be scheduled in the virtual classroom. By including individual learning assignments that reflect the learning content, you simply reduce the online time and at the same time create enough space for rest, reflection and individual learning needs:

- Always plan break times according to pedagogical needs: breaks also provide a framework for training. Thus, breaks conclude a specific learning subject or activity.
- Plan a sufficient number of breaks: A (short) break should be scheduled at least every 45 minutes. Shorter intervals are, of course, possible.
- Plan enough time for breaks: Every 90 minutes of learning time should be followed by a break of at least 15 minutes!
- Define clear break times in the training schedule: Your designed training schedule provides clear orientation and helps with the implementation of breaks.

Slow learning

Time is precious. That is why it is tempting to learn as many topics as possible in as little time as possible. From a didactic point of view, however, it is worthwhile to enable learners to learn slowly and continuously.

The following didactic measures can be implemented to promote slow and more effective learning:

- Distributed learning means that content is not dealt with in a block but is distributed over different phases. Self-learning tasks in e-learning should also be distributed over time rather than in one piece.
- Tests can be used not only as a means of assessing performance, but also to promote recall. Tests can encourage active recall of knowledge from long-term memory better than repeated reception of content. In addition, tests actively challenge and address gaps in knowledge. It is important that learners receive feedback on their test. Tests can be formulated in such a way that they link what has been learned at different points in time and thus specifically support the transfer from one content area to another.
- Generation effect: People remember knowledge more easily if they have worked it out themselves, for example, as a solution to a problem. The challenge in the training context is to formulate problems that are concise in terms of content and enable learners to work out the solutions themselves, focusing on what is relevant in the content.

Zoom fatigue

Studies prove what you have probably already noticed yourself: spending a lot of time in virtual meetings leads to fatigue. This phenomenon has been coined 'zoom fatigue' and is accompanied by symptoms such as increased forgetfulness and low attention. In virtual courses, trainers and learners can be equally affected.

Zoom fatigue is described as a feeling of increased effort or fatigue to the point of exhaustion associated with virtual meetings. Accompanying symptoms are often also lower attention, higher forgetfulness, impatience and physical fatigue. The reason is visual overload and monotony. To mitigate these, the following measures can be considered:

- Include training elements or intervals where learners can switch off their camera.
- An informal start and working in small groups create a good working atmosphere so that any irritations can be addressed quickly.
- Use the chat as an opportunity to give feedback.
- Include training phases or elements where learners can leave the meeting platform, turn away from the screen and even move.
- Arrange more breaks and shorter meetings.
- In training, a variety of methods is a good way to vary the learning situation.

Another reason for Zoom fatigue is the lack of interaction in the virtual classroom. Passivity promotes fatigue. Countermeasures are:

- Encourage learners to get to know each other, e.g., through icebreaker activities.
- Invite plenary interaction and tasks in pairs and small groups.
- Set up virtual coffee breaks as opportunities for voluntary, informal conversations.
- Include activating and / or gamified training sequences.

- Offer asynchronous elements such as videos or podcasts as an alternative to longer lectures, e.g., with guiding questions for reflection.
- Establish mentoring concepts for longer continuing education courses.

5. The role of the trainer/learning guide

Almost everyone knows this: lecturers provide a monologue from which the participants learn nothing because they are bored. Both the lecturer and the participants are wasting their time. But what exactly is going wrong?

With the transfer of training to the virtual space, it is not enough to simply move lectures from the classroom to the camera. The attention span and motivation of learners work differently in distance learning. Instead of long lectures, learners should be enabled to learn in a self-organised way.

Will trainers soon be superfluous? No! But their **role is changing**.

As learners take an active and trainers a more passive role in the learning process - this is where learning process facilitators or **learning guides** come into play! The main task of learning guides is to support and motivate learners individually in their learning processes. They provide structure and guidance and help learners reflect.

Ensure the target audiences' basic digital skills.

The basic prerequisite for implementing online teaching and learning is that the trainer and the learners have adequate basic digital skills.

Make learning agreements with learners tailored to their individual needs and goals. Be open to suggestions and inspire learners to design their own learning paths.

Based on the learning agreement, you can provide individual tasks that optimally accompany the learners on their learning path. Give them to the learners to work on independently (or in groups). Act as an observer, providing support as needed and always answer questions. This also includes anticipating when learners may need help before they realise it themselves.

Observe and assess the learning situation continuously.

You should only intervene if the learners have exhausted all possible solutions on their own and are not making any progress. If they run into difficulty, provide impulses to find the correct way rather than showing it. The goal is to activate experience-based learning mechanisms that help to avoid similar mistakes in the future.

Check the status of the learning process.

Regular interim and evaluation discussions are constructive because they show the current status of the learning process. You can also address hurdles and find solutions. If necessary, you can also adjust the agreed learning path.

Document the learning process.

Even though documenting individual steps in the learning process often seems tedious, it allows the learner to differentiate between productive and less successful learning efforts and to take them into account more specifically in future work assignments. The learner should document the approach to learning and reflect on the explicit outcome.

To help the learners with this reflection and identify the acquired knowledge as well as knowledge gaps, the e-ManTRA repertory contains an interesting method called "The blind zone".

Monitor the learners' attendance.

When teaching online, instructors can benefit from the monitoring data available. This means that they can easily check how many days a student has been absent from the virtual learning environment; then they can quickly react and check the status of that student and determine why he/she is having difficulty following the course.

Control and evaluate the learning success.

Learning objectives should always be formulated in a concrete, measurable and observable way. Thus, the design of a test that checks a concrete learning objective depends strongly on the components of the learning objective. The same applies in principle to evaluation: I need to know exactly where I wanted to go with the training in order to evaluate at the end whether I actually achieved the goal.

6. Online training from the learners' perspective

6.1 What are the main problems learners face when learning virtually?

In addition to the survey with teachers and trainers, the e-ManTRA project team also carried out a survey with learners to find out more about their experiences of digital training/learning during the Covid-19 pandemic, to identify their needs and be able to better support them in the use of digital training. A quantitative questionnaire and qualitative interviews were conducted with 178 learners in EQF level 5 trainings for transport managers from our six partner countries (Finland, France, Germany, Romania, Spain and Sweden). The results show that students mainly faced the following difficulties:

- 63% complained about technical problems (especially poor internet connection) and teachers' difficulties in using digital tools.
- 43% criticised the lack of practice in distance learning.
- 40% expressed the difficulty in setting up group work at a distance.
- 25% had to work in an unsuitable environment (shared room, no quiet place, no desk, etc.).
- 25% felt a lack of interaction.
- 17% even said that they had a feeling of loneliness.
- 14% explained that they had organisational difficulties: the lack of a structured framework in the organisation of lessons and difficulties in notetaking and comprehension, etc.

6.2 How can trainers/training providers support their learners in the virtual world of training?

Even though the role of teachers has evolved to become more of a mentor than an instructor, their guidance during the learning process is still crucial to the success of learners. Therefore, when planning digital courses, it is important to ensure that there is sufficient interaction between teachers and learners.

Moreover, the survey we conducted among learners did not only highlight difficulties but also detected good practice and showed that in response to the various difficulties, both teachers and learners were able to adapt and find suitable solutions (for more ideas, please also have a look at our Inventory with methods and tools for successful distance training):

Difficulties	Solutions
Technical problems / teachers' difficulties in using digital tools	Both learners and teachers should be trained on how to use online tools.
Lack of practice	Good practice for the teacher to support the learners: ▪ Lectures in online courses carry a high risk of loss of motivation and concentration. They are suitable for imparting theoretical knowledge but not for putting it into practice. Teachers should use complementary methods such as case studies or role plays to

	motivate learners and ensure the link between theory and work-related application.
Difficulty in setting up group work at a distance	Good practice for the teacher to support the learners: ▪ The teachers can support the learners by providing them with collaborative working methods: a shared workspace (e.g. Google drive, …) and a clear work plan including the definition of the work to do, the distribution of roles within the working group, deadlines for each working step/contribution, meetings, collaborative and individual working times, etc. To help learners developing this work plan, the teacher could provide a template or example. ▪ If necessary, a group leader can be defined ▪ In the case of longer working group assignments, the teacher should be in contact regularly with the groups to monitor the progress and intervene in case of difficulties.
Unsuitable work environment	Advice that teachers can give to the learners: ▪ It is important to create a quiet and comfortable space to work, if possible, in a separate room. ▪ All distractions should be avoided. Smartphones or other digital devices and televisions should be switched off. Even without checking messages/notifications, the constant ringing disturbs concentration.
Lack of interaction / feeling of loneliness	Good practice for the teacher to support the learners: ▪ In remote learning, teachers should use methods fostering interaction between learners. Students from all the participating countries mentioned this, with 34% of them considering it a priority for improving distance learning. ▪ The importance of continuous and, as far as possible, individualised pedagogical support seems to be another essential aspect. The use of digital devices makes it possible to monitor students' completion of learning activities and previous tasks. Close monitoring facilitates the organisation of work and the diagnosis of potential difficulties or motivational problems and encourages learners to participate actively in educational activities. ▪ Online tutoring has already been proved to be a convenient method to foster interaction between trainers and learners. Moreover, the increase in 1to1 tutoring thanks to private chats or video calls can contribute to closing the gap between face-to-face and distance learning.

	▪ The value of feedback in online learning environments is enormous. With no in-class discussions, no revisions and no traditional assessment methods, feedback is essential for students to find out whether or not they are on track in their learning process. In addition, teachers' comments on students' productions, tests or presentations should be detailed enough to allow students to identify strengths and weaknesses in their learning and to make further progress. ▪ Provide IT support so that learners can be trained to use the digital tools that are new to them. The more learners are familiar with the digital tools, the more interaction there will be between them, closing the gap between distance and face-to-face learning. Advice that teachers can give to the learners: ▪ Create chat groups, working groups, and peer networks via social media such as Facebook or WhatsApp is a good way to reduce the feeling of loneliness and increase interaction with fellow learners.
Organisational difficulties	Good practice for the teacher to support the learners: ▪ Modification of course organisation: change of timetables, shorter sessions, more breaks, etc. ▪ Recording of lessons so that learners can revise the content. ▪ Note taking difficulties: divide the task among learners to reduce their workload and share responsibilities or ask them to prepare materials that you could then share with the rest of the class. Advice that teachers can give to the learners: ▪ Establish a daily routine: timetables, scheduling, studying hours, free time, etc. ▪ Use apps to organise work and create lists (such as Google Keep) can be very useful. ▪ Staying “active” while listening, i.e. it is highly recommended that students take notes (active listening) during online classes. ▪ Combining digital learning with physical activity, hydration and a varied daily routine enhances concentration and motivation.

Besides teaching, the role of the teacher in distance learning is also to animate: Elicit reactions, provide multiple opportunities to intervene at the microphone, challenge participants individually or collectively, etc. Building a positive relationship with distance learners encourages their active participation in the virtual classroom and their engagement in learning activities. Our student survey found that the more minimal and controlled the student interventions, the less stimulating and engaging the course.

6.3 Best practice for learners to cope with online and distance learning

In addition to these guidelines for teachers and trainers, the e-ManTRA project also developed a best practice guide for students in EQF level 5 transport manager trainings to adapt to online/distance learning.

You can download this guide here to share it with your learners.

7. Inclusion in the virtual world

Being faced with increasingly heterogeneous learners and learning needs, trainers are confronted with the need to consider aspects of inclusion not only in face-to-face training but also in virtual training formats. However, the topic is too complex to provide you with comprehensive guidelines of how to consider aspects of inclusion in your training or to give you step-by-step guidelines of how to implement inclusive training for various specific learning needs. Instead, we aim to raise awareness of this issue, its related aspects and invite you to generally approach training from the starting point of your target group and their specific needs, and to remain sensitive, open and flexible in order to accommodate individual learning needs.

Inclusion is a broad concept. Inclusive learning does not only touch issues of accessibility to learning but it aims to respond widely to realities of diversity in our society, the acknowledgement that these aspects of diversity impact a learner's ability to learn and participate in training and the general desire to shape the training we provide to best suit the learning needs of the people we work with.

Some aspects of diversity that can impact learning: age, gender, ethnicity, (dis)ability, socio-economic background, native language, individual learning types, income, prior knowledge, employment, care obligations, mobility, accommodation, access to technology… and many more. What is your response when you read this list? Are these aspects you regularly reflect upon when you think about your learners' needs? Or is this the first time that you gave thought to how mobility or accommodation might impact your learners' ability to participate in training? Do you even agree with such a broad approach to inclusive learning? You can spend a few minutes thinking about examples you may have come across in your experience as a trainer or that you can think up for each of these aspects of diversity?

What do these considerations mean for planning virtual training? First and foremost, virtual training is not simply about technology and access thereto, but – like any other form of training – it is about learning. Hence, your reflections regarding inclusive learning should be the same, but in addition, some specific considerations might come on top:

- What about access to technology?

  These considerations should definitely include the access to end devices your learners have. Does every learner have a functioning end device at their disposal at all times? Do they have to share end devices? Do they have a smartphone and the corresponding technological possibilities for documenting their learning processes? Does every learner have a stable internet connection at home? Do they have a printer, etc.?

  Training offers should take the technological framework of learners into account.

- What about learning remotely?

  Are your learners learning from home? What are their framework conditions for learning there? Do they have a room or quiet workplace to concentrate? Do they have social obligations to fulfil that prevent them from learning? ~~Do they learn at work?~~ What are their framework conditions?

  How can you accommodate your learners' framework conditions for learning remotely?

- What about the media competences and technological skills of your learners?

  How far can your learners handle the competencies required by your virtual training offers? Do they need introduction courses to learn how to handle the LMS? Do they need to acquaint

themselves with the meeting platform and its functions? Are they able to manage the tasks and documentation requirements? What about data protection and data security issues? Are they aware of protecting their own and fellow learners' personal information on the internet? Are they used to critically assess the value of online sources?

Consider if and in what form you have to train your learners' media competence and technological skills before they can engage in your virtual training offer.

- What about the learning competencies of your learners? What about self-learning competence, organisation and time management skills? What is their personal motivation for the training contents?

  This also includes issues such as learning motivation, personal competence such as self-organisation and problem-solving skills and much more. Your training format should be suited to the learners' competencies. Learners with low levels of self-learning competence require different forms and levels of scaffolding than learners who are used to learning and have a high level of motivation for the training contents at hand.

- What role does language competence play?

  What language skills do your learners have, and to which extent does this affect your training? For example, training content that would have been delivered orally and practically in a face-to-face environment should not be imparted in a highly theoretical and text-based virtual learning material. The aim should be to didactically match the methods and level of scaffolding that you would provide in a face-to-face setting in the virtual world.

- What about disability / physical impairment?

  Do any of your learners have any physical impairments that you need to consider? How can you implement this in your training material and the accessibility of the media used (e.g., font type and size used, etc.)?

- Individual learning styles

  How can you consider the needs of individual learning styles in a virtual environment? How can you provide a broad mix and match of methods in your training offer? How can you adapt your training materials to the needs of your learners (just one example, some studies suggest that 80% of digital learning materials are being printed out by the learners - this should be considered in the development of digital training materials)?

These are a few examples, and as an experienced trainer, you can probably produce many more aspects like these. Nevertheless, we hope that we could help raise your awareness of the need for inclusivity in training and that we gave you some ideas on how to make your training offers more inclusive.

8. And now?

The world of work must adapt to advancing digitalisation and the new technical possibilities. This includes not only the learning content, but also the learning methods in training. On the one hand, new specialist knowledge is needed; on the other hand, the focus is primarily on developing new competencies, as knowledge changes very quickly and new systems and technical possibilities are constantly emerging. The competencies that will be in particular demand in the future include:

- Systematic/creative/solution-oriented thinking
- Ability to abstract
- Self-organisation
- Communicative skills
- Willingness and ability to adapt

That is the reason why training is increasingly about fostering these competencies and enabling rapid information processing and implementation – even if the process of moving initial vocational training into the virtual classroom will continue for many years to come and may initially return to classic face-to-face training environments after the end of the corona pandemic, as the trainer survey results suggest.

In the field of continuous training, people are increasingly turning to online training. The advantages are undeniable: they reduce costs, offer enormous flexibility to the participant, and allow target groups of thousands of people at the same time and in any place on the planet. This saves time and is ecological. In addition, it increases accessibility to training for learners from sparsely populated regions. Moreover, you can monitor what participants are doing at any time, and they break the immobility and passivity of face-to-face training.

But virtual learning is not free from problems either. Online trainings contain their own peculiarities that can jeopardise (or limit) the success of the training. What are the known problems and open issues in transferring face-to-face training to the virtual classroom?

Problem No. 1: Online training is boring

Even if online training was intended to relieve the boredom of face-to-face training, this is unfortunately not always the case. Many virtual training programmes are not designed well.

Such courses are the reason many participants get bored with online training. This lack of motivation and involvement is among the top reasons virtual trainings fail. Participants are simply not interested and drop out of the course.

To avoid monotony, you need to ensure that the training is interactive, dynamic and entertaining. This is achieved by making it as descriptive and practical as possible and by including challenges, videos, storytelling, gamified solutions, simulations that also ensure practical application.

To prevent dropouts, it is worthwhile to create additional incentives: a competition among participants and the prospect of certification increase motivation.

Problem No. 2: Technical difficulties

This idea seems trivial, but technical problems range among the main obstacles of online training. Compatibility issues often arise (with operating systems, browsers or mobile devices), internet connections fail, or the participant does not know how to proceed. This quickly leads to frustration and

reduces learners' motivation, whose learning experience is interrupted, so they are likely to drop out of the training.

In this case, the trainer should first consider whether it is necessary (target group analysis!) to train the learners' media competence. When dealing with technology, there is always the possibility that something will not work. The internet connection can break down, operating systems or computers can crash, etc. Therefore, it is important to always have a plan B to be able to react appropriately in training when technical problems occur.

Problem No. 3: Learners want to talk to people

Very often, graduates of online courses give feedback that they found it demotivating not to have human contact, not to have an instructor available, or not to be able to exchange ideas with other course participants where they can clarify their questions directly or practice something with real tools.

One possible solution is to strengthen all face-to-face interactions within the online training experience. Combining virtual courses with live sessions and group work where training participants can discuss with each other and clarify their questions is very valuable and effective to mitigate this risk. It is essential that participants have a reference person to connect with. Evidence shows that blended learning strengthens the learning experience and increases the educational value of the training.

Problem No. 4: Lack of hands-on practice

It is scientifically proven that the best way to learn something is through practical application. Only with the help of the practical application, the things we do and try out, are we able to internalise and remember the content and skills we learn. However, in online courses, this part is often forgotten, and people focus exclusively on technical knowledge. This doesn't allow participants to practice thus not achieving the maximum potential of the learning process.

Also, some learning objectives – especially in the area of "skills" – are very difficult to teach virtually because practical experience (hand grips, haptics, sensory perceptions) is missing. Advanced teaching methods such as virtual or augmented reality supported lessons can replace this to some extent, but sometimes face-to-face training might just be the better alternative.

Simulators have been used for decades (for example, for airplane pilots or surgeons) to recreate real-life situations and provide direct practice and experience in a safe and controlled environment. You can solve this problem by including simulators in your training programme and ensuring that your participants put their new knowledge and skills into practice.

However, this solution is of limited use for public vocational training providers in initial training, as they often do not have the possibility to develop and integrate VR/AR scenarios for their training. In addition to the schools' lack of equipment, the learning content can only be implemented in VR/AR training to a limited extent.

When training transport managers, there is no need to learn specific manual gestures, hand grips, etc. However, instructors can provide simulation exercises, role-playing, etc. to learn professional skills.

Problem No. 5: Assessment, validation and certification

For all the advantages of training in the virtual classroom another problem arises – that of certification. How to ensure that learning processes can be monitored objectively and that learning outcomes can be assessed and certified in a transparent and regulated manner?

Assessment and evaluations of virtual training poses questions: How can it be determined beyond doubt whether the registered participants of a course and the actual participants are identical? Fraud is relatively easy. Can it be ruled out? And how can learning outcomes be verified at all?

The audit structure also depends on the type of course. Typically, a blended learning course has several assessment units throughout the course. For example, the first test can take place right after the first module. This test is especially important for the trainer to know how best to continue the course. In addition to the final test, intermediate tests can be included to check the content of the completed module. The main function of these tests is to consolidate the newly acquired knowledge.

The validity of the acquired certificates after the completion of the training is also difficult. The recognition of assessments in online training requires reliability and trust. In particular, international comparability depends heavily on the compatibility of the measurement instruments used by individual schools and training providers. Transparency and certainty in the test procedures used are necessary for this. Therefore, this issue still represents a problem area in the acceptance of virtual learning offers in training.

9. The Glossary

Term	Definition	Source
Assessment – online/ computer-based	An assessment that is conducted using a desktop computer, laptop, tablet or mobile device that is connected to the internet. Typically, the assessment is both delivered and marked by an algorithm included in the assessment software loaded on the device or hosted on a remote server. This term can also encompass automatic online assessment.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Asynchronous Learning	Learning that does not occur in the same place or at the same time for a whole cohort. Students can access resources and communicate at any time and are not restricted to accessing this learning at any specific time. Enables students to learn at their own pace in their own time.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Attitudes	Relatively stable tendency, acquired through experience, to react to people, groups, situations with certain feelings and behaviours.	
Augmented reality (AR)	Augmented reality is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information. In this way, augmented reality alters one's ongoing perception of a real-world environment, whereas virtual reality completely replaces the user's real-world environment with a simulated one. For the context of training, this means that AR overlays digital learning or teaching content onto the physical world.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Blended learning / hybrid learning	This refers to educational offerings that represent a combination of face-to-face learning scenarios such as a seminar day and virtual online learning settings such as webinars or tutorials. Blended learning offerings should be designed to make the most of the advantages of face-to-face events and online learning by using different methods and media from face-to-face and online learning arrangements to complement and build on each other to achieve the respective learning objective.	
Bring your own device (BYOD)	A term used to describe where students use their own devices to access digital resources to support learning activity.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Collaborative digital learning	An educational approach to learning that involves groups of learners working together, via digital means, to complete a task.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Competence	Ability to apply learning outcomes adequately in a defined context (education, work, personal or professional development) or Ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. Comment: competence is not limited to cognitive elements (involving the use of theory, concepts or tacit knowledge); it also encompasses functional aspects (including technical skills) as	https://www.cedefop.europa.eu/

	well as interpersonal attributes (e.g. social or organisational skills) and ethical values.	
Content management system (CMS) / Learning Content Management System (LCMS)	A content management system is an application that is used to consistently manage content (for example, documents, images, videos) and allow multiple contributors to create, edit and publish content. In the education context, we can speak of LCMS, which are training platforms, i.e. web-based software dedicated to the storage, organisation and distribution of educational content. It is only intended for the people in charge of managing the various contents. Learners do not have access to it.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Device	ICT tools such as smartphones, tablets, computers or certain connected objects.	
Digital learning	Digital learning expands the range of possibilities compared to e-learning. Whereas e-learning often offers a linear view of training ("I click on a button to access the next content"), digital learning encompasses different interactions that can be combined, whether digital or not. Among the most emblematic devices, we find video, which is very popular, but also all the playful devices (Serious Game, immersive reality) and social learning, which offers learning with and by others.	https://www.videolearning.fr/glossaire/digital-learning/
Digital literacy	An individual's ability to use digital information and relevant technologies to find, evaluate, create and communicate information. This type of literacy requires cognitive and technical skills.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Digital proctoring	A term to describe a form of invigilation for digital examinations. This can be done through the use of artificial intelligence (for instance, using face or voice recognition) or through using staff to proctor via a real-time video link. This can encompass the term online proctoring.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
e-learning	E-learning is a learning system that is organised at a distance and online, i.e. using IT tools (computer, tablet, smartphone). It consists of providing a learner or a group of learners with modules delivering educational content and including various interactions such as mini games and quizzes.	https://www.videolearning.fr/glossaire/e-learning/
e-learning modules	An e-learning module is a segment of an overall (digital) training course. It can vary in format, from interactive videos and quizzes to text rich modules or demonstrations. Ideally, it's best to incorporate a blend of different training module types to ensure you're catering for different learning styles and promoting learners engagement throughout.	
E-tutoring	E-tutoring refers to online-tutoring. The term online tutor includes any person undertaking a role to support and enable students to learn online effectively. Technology enables people to learn new things because it gives a range of different ways of communicating to students. The E-Tutor can help the students to go on in the established pedagogical orogression or to build their own progression and to optimise the way they learn or study.	http://edutechwiki.unige.ch/en

Feedback	Feedback is given to a learner concerning the quality of their learning and based on their work. The aim is to make the learner aware of the areas for improvement. It is also an opportunity for them to receive encouragement to maintain their motivation and commitment. This is an essential element for progress.	https://www.videolearning.fr/glossaire/feed-back/
Flipped learning / Flipped classroom	A pedagogical approach in which students use digital resources to acquire content, concepts, or theories related to learning outcomes. This happens outside of a physical space. Students are then invited into a virtual or physical space to articulate and discuss their findings, guided by teaching staff to ensure that knowledge gaps are filled and further questions are asked appropriately. This approach is intended to 'flip' the more didactic approach of lecture or tutorial-based instruction, followed by a more flexible approach to articulating what has been learned and asking further questions.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Formal learning	Learning that occurs in an organised and structured environment (such as in an education or training institution or on the job) and is explicitly designated as learning (in terms of objectives, time or resources). Formal learning is intentional from the learner's point of view.It typically leads to recognition or certification	https://www.cedefop.europa.eu/
Formats for training/learning	This term is used to describe different forms of learning. In other words, it is about how learning is organized, what structure and what framework it has. The main differences are whether learning is synchronous or asynchronous, whether learning is done alone or together, fully online/at a distance or in a hybrid setting and how flexible and autonomous the learners are, which technical resources are used, and the role and function of the tutor.	
Gamification (serious games)	Method of teaching using games principles to enhance learning and engagement. This often involves the application of game-design elements and principles in non-game contexts, for instance, a set of activities and processes to solve problems by using or applying the characteristics of game elements. In most of the cases, students will have a series of tasks to complete, which contribute to the achievement of an overall goal. The aim of this approach is to maximise students' enjoyment and engagement through capturing their interest and inspiring them to continue learning.	digitaleducation.lincoln.ac.uk
Guided learning	When a student is being taught, supervised or instructed by an assessor, tutor or another person who facilitates learning and development. Guided learning takes place whether both physically – onsite at a provider – or remotely via digital means.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Informal learning	Learning resulting from daily activities related to work, family or leisure. It is not organised or structured in terms of objectives, time or learning support. Informal learning is in most cases unintentional from the learner's perspective. The learner discovers new practices by himself or through other activitives/ learners.	https://www.cedefop.europa.eu/
Intrinsic and extrinsic motivation	Intrinsic motivation is related to the self-interest of each learner in engaging in a learning process. Extrinsic motivation is related to the	https://www.videolearning.fr/glossaire/motiva

	impact of external factors such as social pressure, getting a good grade, a prize, etc.	tion-intrinseque-et-extrinseque/
Learning management system (LMS)	Digital design and delivery platform – usually accessed using devices – which enables various methods of teaching and learning delivery to be used. Through an LMS, a provider can use different media, for example, video, podcasts or e-learning modules to support and enhance digital learning methods.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Learning outcome / learning attainments	Statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competences.	https://www.cedefop.europa.eu/
Learning/ training methods	This means didactic methods, facilitation approaches and aids that make learning more efficient. The goal of each learning method is to initiate a learning process that intensifies the engagement with the learning content and takes into account or positively influences the motivation to learn. The selection of the right learning methods is always based on the target group, i.e. the type of learner and the learning format.	
Media	Media are mediators and carriers of information and refer to all means of human communication. Examples of media are picture (starting with cave paintings), book and newspaper, but also leaflet and poster. In the modern age, radio, film and television were added and currently in the digital age, various forms of communication and publication on the Internet, as well as virtual reality and augmented reality.To transmit information, media use signs, especially symbols such as writing and speech or music.	
Microlearning	Small learning activities to demonstrate a specific skill or focus on a knowledge gap or term. Partly also the term segmented learning is used.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Mobile learning	The use of mobile devices (for example, phones or tablets) in teaching and learning activities. This term can encompass more traditional learning activities (such as reading digital versions of journals) or less traditional activities such as engaging in virtual simulations.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
MOOC (Massive Open Online Course)	A MOOC is an interactive online course, open to all. Learners have access to several online courses, but also to various interactive educational contents, such as videos or quizzes. Obtaining a diploma or certification is often seen as an additional service that the learner will have to pay for.	https://www.digiforma.com/definition/mooc/
Native app	It is a mobile application created specifically for each environment, Iphone or Android. In simple terms, these are applications that are downloaded and installed on a mobile phone.	https://www.videolearning.fr/glossaire/application-native-native-app/
Personalised learning	Personalised learning is an educational approach that aims to customise learning for each student's strengths, needs, skills and interests. Students can have a degree of choice in how they learn.	Glossary of Digital Terminology – Digital

		Education Support (lincoln.ac.uk)
Pre-requisites (Prior learning)	Pre-requisites are the minimum knowledge and skills required to be able to follow a course effectively.	
Qualification	An official record (certificate, diploma or degree) of achievement which recognises successful completion of education or training, or satisfactory performance in a test or examination; and/or the requirements for an individual to enter, or progress within an occupation.	https://www.cedefop.europa.eu/
Scaffolding	In the pedagogical-psychological context, scaffolding refers to the support of the learning process by providing an initial complete orientation basis in the form of instructions, food for thought, and other assistance. As soon as the learner is capable of working independently on a particular subtask, this 'scaffold' is gradually removed again.	wikipedia.org
SCORM (Sharable Content Object Reference Model)	SCORM is a standard file format for export and transfer e-learning courses created in the early 2000s by the company ADL (Advanced Distributed Learning). The objective of SCORM was to build a standard for indexing and sharing educational content used in distance learning. In particular, it takes into account: content management, the execution environment, communication with the LMS, the navigation model. It also enables to monitor the learner's progress on a distance learning module.	
Screen capture and screencast tools	Screen capture is software, which allows a screenshot to be taken. Screencast is a video recording of the screen on a person's device so that it can be shared with others. Audio or written explanatory commentary can be added.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Self-directed learning	A process in which students take the initiative to diagnose their learning needs, formulate learning goals, identify resources for learning, select and implement learning strategies, and evaluate learning outcomes.The role of the instructor shifts from being the 'sage on the stage' to the 'guide on the side' in a self-directed learning environment.	http://edutechwiki.unige.ch/
Synchronous learning	Learning that takes place with participants all engaging with material in real time, although not necessarily in the same place (for example, some students may participate onsite while others may participate remotely, both at the same time).	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Tools, digital	The term "digital tools" refers to applications - also called programs, and services - on the computer or laptop and apps on the smartphone or tablet that help to perform a specific activity, such as, for example, enabling location-independent work and also collaborative work on various projects. Tools therefore always fulfill one or more specific functions. In the learning context, these are in particular: Communication, visualization, storage and distribution of data, presentation.	

User experience (UX)	User experience in training is a term used to describe how learners feel during interaction with a functional tool, such as an e-learning device. This notion is used to make the act of learning more enjoyable.	https://www.videolearning.fr/glossaire/experience-utilisateur-user-experience-ux/
Validation (of learning outcomes)	Confirmation by a competent body that learning outcomes (knowledge, skills and/or competences) acquired by an individual in a formal, non-formal or informal setting have been assessed against predefined criteria and are compliant with the requirements of a validation standard. Validation typically leads to recognition.	www.cedefop.europa.eu
Virtual classroom	A digital environment provided through a virtual learning platform, which replicates the physical classroom in a virtual way, allowing tutors and students to communicate, interact and engage synchronously in teaching and learning activities.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Virtual Learning Environment (VLE)	A platform for supporting learning and teaching (particularly digital learning) and providing a space for learning resources. The precise functions and facility provided by each platform will vary and there will be options to customise and add packages depending on needs. In most cases, a VLE will, as a minimum, provide a repository for documentation (for example, programme/module information, timetables, policies and procedures), provide a message facility and support the submission of assessments and provision of feedback on assessed work.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Virtual Reality	Virtual reality (VR) provides a computer-generated 3D environment (including both computer graphics and 360-degree videos) that surrounds a user and responds to an individual's actions in a natural way, usually through immersive head-mounted displays (e.g. VR goggles). Gesture recognition or handheld controllers provide hand and body tracking, and haptic (or touch-sensitive) feedback may be incorporated. Room-based systems provide a 3D experience while moving around large areas, or they can be used with multiple participants.	https://www.gartner.com/en/information-technology/glossary
Virtual Training	Virtual training refers to training done in a virtual or simulated environment, or when the learner and the instructor are in separate locations. Virtual training can be done synchronously or asynchronously. Virtual training and virtual training environments are designed to simulate the traditional classroom or learning experience.	trainingindustry.com
Web-based training (WBT)	WBT is a special form of e-learning. WBT is understood as a further development of computer-based training (CBT) through the use of network-based services. In contrast to Computer Based Training, learning units are not distributed on a data carrier, but are accessed online from a web server using the Internet or intranet. The embedding in the net offers various further possibilities of communication and interaction of the learner with the fellow learners.	wikipedia.org

Webinar	A web-based learning or training activity, usually interactive, for example, an online workshop or seminar. Webinars take place synchronously using video conferencing software, with participants taking part digitally. Webinars may be recorded and made available as a video for asynchronous viewing.	Glossary of Digital Terminology – Digital Education Support (lincoln.ac.uk)
Work-based learning	Acquisition of knowledge and skills through carrying out – and reflecting on – tasks in a vocational context, either at the workplace (such as alterance training) or in a VET institution.	