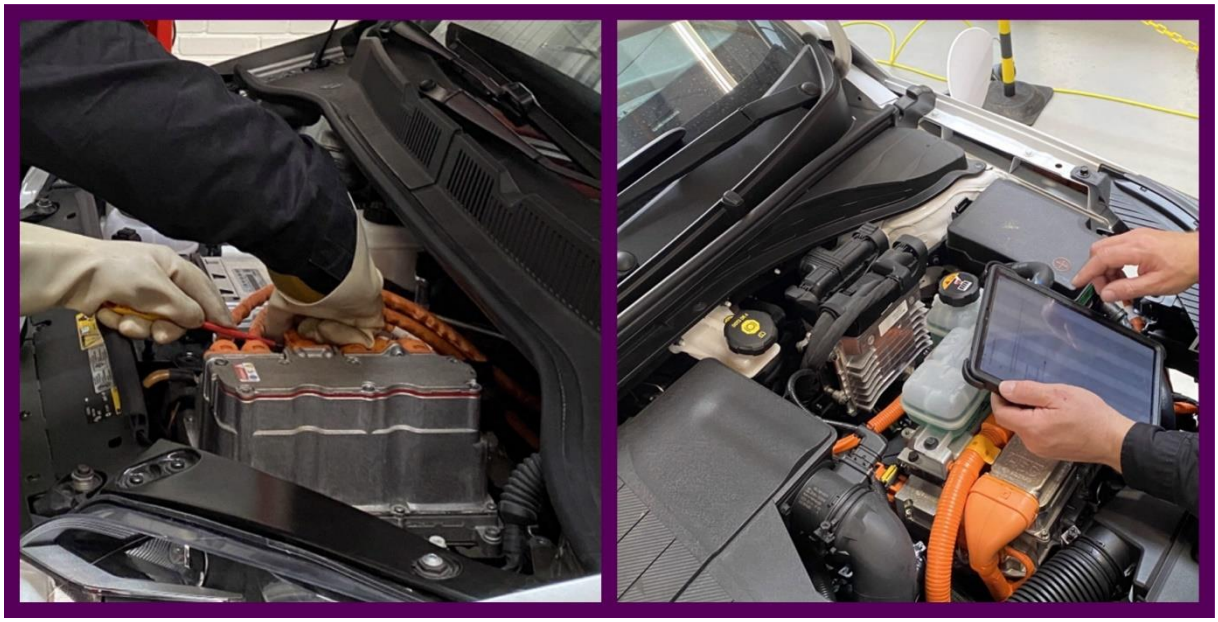
Erasmus+

Handbook

New digital teaching and training practices in e-vehicle VET



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IO.1 – Handbook with main pedagogical and didactic aspects for the digital and virtual education and training, focused on the needs of e-vehicle teaching staff

Foreword

Digital and virtual education and training (e-learning) facilitates your teaching by allowing you to offer studies and training visualisation that enable the learners to learn what you require regardless of time and place using a computer, smartphone, or tablet. E-learning often allows a combination of photography, graphics, video, text, and sound. The learner studies the material and typically performs various exercises in the form of task and problem solving or reflect the activity for which the intended knowledge and skills are taught.

E-learning that is distributed via a learning platform / Learning Management System (LMS) organizes the contact with the learner and you can control content, tasks, and evaluation. Learning platforms give both the learners and the teacher an opportunity for direct follow-up of the educational and training results. The digital format creates an opportunity to develop an automated adapted learning where the content, approach, and pace of study also gives the learner chances to deepen, repeat, and control their learning outside the classroom.

Digital and virtual education and training reinforce the ability of education and training institutions to provide high quality, including digital education and of building capacity to implement online, blended, and distance teaching and learning; to develop digital pedagogical competencies of educators, enabling them to deliver inclusive digital education; and to develop and/or use quality digital content produced by them self and such as online resources and tools. E-learning also makes teaching less vulnerable to crises such as Covid, while digitalisation is advancing rapidly in many areas, not least in the automotive sector as well.

This handbook contains a theoretical section and a practical one, with a focus on using of self-produced digital learning and training materials and furthermore how to design and generate these materials.

This handbook targets with its hints and tips on teachers, instructors, and company mentors on their way of developing and implementing of digital learning and training concepts as well as the creation and production of digital learning and training materials.

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1 Theoretical Aspects

1.1 Learning and training processes in digital and virtual spaces

Digital and virtual learning and training is merely the introduction of a new technology in the education of the learners. An educational technology is nothing on its own only in the context with a specific content (learning outcomes) and a pedagogical and didactical method is it able to add a new dimension education.

1.1.1 Approaches and concepts in digital and virtual learning and training processes

In the following paragraphs we have defined a number of pedagogical and didactic approaches that layers the foundation of the concept for learning and training both physical and virtual.

1.1.1.1 "Responsibility for one's own learning"

"Responsibility for one's own learning" as a concept is seen in connection with the shift from talking about teaching to talking about learning. The shift is related to a distancing from the concept of teaching, where knowledge, values or motives are transferred from teacher to learner, while the concept of learning indicates that the learner himself actively constructs knowledge, values and motives. It follows from this view that no one can teach anyone anything. In other words, the learners themselves must take «responsibility» for their learning.

In the pedagogical theory of "responsibility for one's own learning", the focus is on the difference between self- and foreign control of learning and thus a desire for learning to become an act of will in the learner. To want to learn and to be able to learn has thus become the key criterion in teaching.

In the description of pedagogy, it is essential to distinguish between, on the one hand, teaching as an interaction between persons and, on the other hand, the learner's development, learning and formation. Teaching aims to create the best possible framework for learners' learning. The teaching is linked to different expectations about learning and education - there is a plan with the teaching. The definition implies that teaching is intentional and targeted, that there is always a content in teaching and a desire for a content in learners' learning and finally that teaching entails teacher and learner roles and teacher-learner relationships, with a built-in asymmetry. But just because learners are taught, they do not necessarily learn anything, just as children and young people can learn in contexts other than teaching.

1.1.1.2 "Learning by Doing" – Work Based Learning (WBL) – integration of theoretical education in practical training

"I believe that the school must represent present life-life as real and vital to the child as that which he carries on in the home, in the neighbourhood, or on the playground." John Dewey (My Pedagogic Creed)

Learning by doing refers to a theory of education developed by American philosopher John

Dewey. It's a hands-on approach to learning, meaning learners must interact with their environment to adapt and learn.

Learning by Doing follows the principle of not explaining in a lengthy manner but involving the learners immediately. First, the learning task must be explained and important aspects are pointed out or shown on the real object. Impulses are set up from the teacher or mentor and the participants are motivated for the learning or training task. Afterwards, the learners themselves become active. Support from the teacher or mentor only if necessary. Also allow mistakes and see them as an opportunity to learn from them. The basic principle of "trial and error" applies. The limits of self-employment only lie where the safety of the learners is endangered.

With this principle, it is generally important to provide constructive and partnership-based support and to provide feedback. As a result, success should always set in! It is important to reflection one's own experiences from the learning process: either alone, in a small group or with the teacher or mentor.

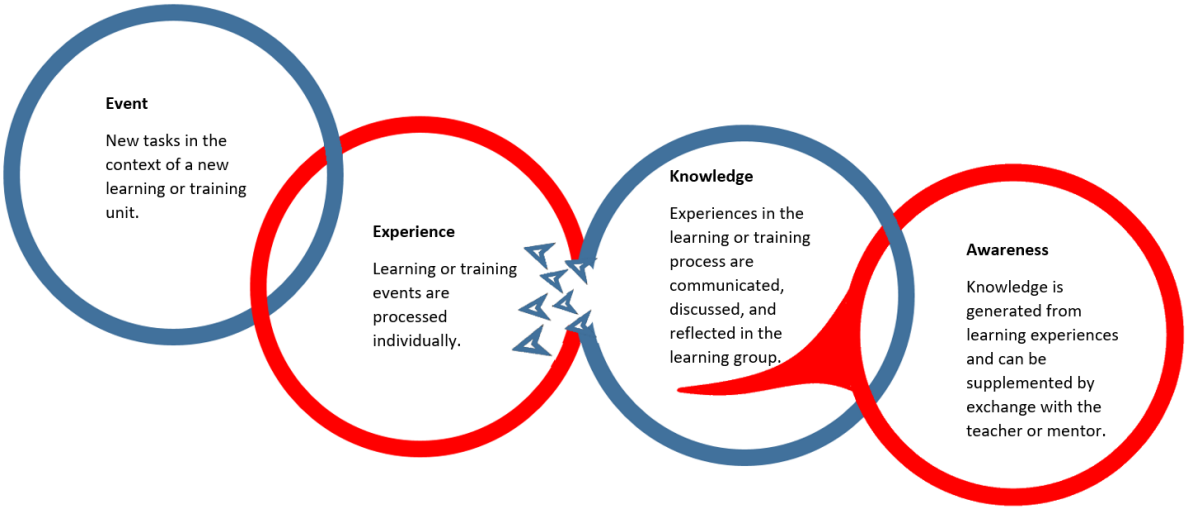

Illustration adapted from https://ausbildung.ppoe.at/mod/wiki/view.php?pageid=32

The graphic illustrates the process of turning impressions and experiences into experiences, experiences and finally insights. Not all impressions automatically become insights! Learning success is greater when it is reflected, discussed, and compared with existing knowledge. In this way, experiences can be processed mentally and emotionally, and important conclusions can be drawn. These make it possible to fall back on what you have learned later in similar situations.

The help of the learners to draw the right conclusions from the experience. It is important that the learners are accompanied in the phase of reflection. Through active participation, a significant contribution will be made to the transfer of what has been learned. Learning by Doing is an open-ended learning process. The teacher or mentor sets a goal that the learner should implement. At the end of the learning process, each learner will take away different experiences and insights from the concrete learning situation.

1.1.1.3 Project oriented learning

Project-based training is a learner-centred pedagogy that involves a dynamic classroom approach in which it is believed that learners acquire a deeper knowledge through active exploration of real-world challenges and problems. This pedagogic approach also find it roots and first conception from John Dewey.

Learners learn about a subject by working for an extended period to investigate and respond to a complex question, challenge, or problem. It is a style of active learning and inquiry-based learning. Project based learning contrasts with paper-based, rote memorization, or teacher-led instruction that presents established facts or portrays a smooth path to knowledge by instead posing questions, problems or scenarios.

1.1.1.4 The concept of "Hybrid Learning"

The terms "hybrid learning", "blended learning", "technology-mediated instruction", "web-enhanced instruction", and "mixed-mode instruction" are often used interchangeably, but common for all these terms is an approach to education that combines online educational materials and opportunities for interaction online with traditional place-based classroom methods. It requires the physical presence of both teacher and learner, with some elements of learner control over time, place, path, or pace. While learners still attend "brick-and-mortar" schools with a teacher present, face-to-face classroom practices are combined with computer-mediated activities regarding content and delivery.

1.1.1.5 The concept of Flipped Classroom

Flipped Learning can be described as a technology-supported approach to teaching, where learners' active learning is at the centre.

The terms Flipped Learning and Flipped Classroom are interchangeably used in practice. Both concepts cover teaching and training with the use of short videos to convey the academic content and the instructions learners usually receive in class. Once the videos are viewed and the supporting questions are answered before teaching, the classroom can be used for learner-centred learning activities. Watching the video first brings the learner into contact with the content in a safe environment. After understanding the content, the learner can adapt it in a practical environment, like the garage.

When it succeeds in flipping the teaching, it is characterized by active learners who are tuned in to what is to happen and a teacher who mostly acts as a tutor. At CELF we have been involved with Flipped Learning for several years. This reflects the experiences we have had.

One of the believes of Flipped Learning is that the hard work must take place in the classes where the teacher can support and help.

1.1.2 Learning Management Systems (LMS)

Learning management systems support the educational processes in e-learning and help to manage the learning materials and user data. They enable the learning processes and the communication between the participants to be organized. With the help of LMS, courses can

be created, learning content uploaded and communication tools activated.
Learning management systems work web-based and are characterized by the following functions:

- User administration
- Course management
- Allocation of rights
- Provision of differentiated communication methods
- Networkable presentation of learning content, learning objects and supplementary media

The diagram below ideally illustrates the architecture of an LMS. This structure, modelled on a conventional school, is therefore also used in the digital learning environment.

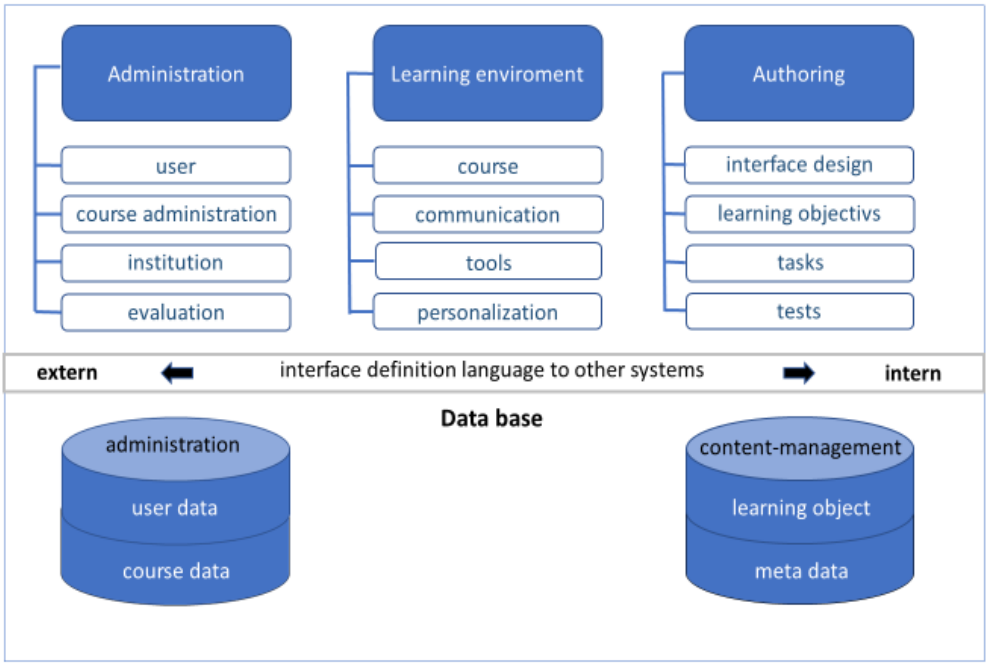

Illustration by Schulmeister (https://www.e-teaching.org/technik/distribution/lernmanagementsysteme/index_html)

Feed-up, Feedback, and Feedforward

The feedback to the learners is information given by the teacher/mentor on the learning performance. In the broadest sense it´s an actual – nominal – gap that shows what the learner should be able to do and what he or she has achieved in the test. The teacher/mentor can support learners through effective feedback in the educational process.
There are three possible forms of feedback:

- ***Feed-up:*** What is the intended goal? (learning intention, goals, success criteria)
- ***Feedback:*** How far is the learner from the goal? (actual-nominal-comparison)
- ***Feed forward:*** What are the next steps on the way to the goal?

Often, learners “only” feedback on their learning performance. For a meaningful feedback, answers to all three questions listed above should be given.

The feedback process is divided into four stages or plane of references:

1. Task: feedback, on whether the learner has solved the task (evaluative feedback)

- the learner receives this type of feedback very often
- this type supports the learning process when the task is less complex and the learner knows exactly what the feedback is about, e.g., in the case of a true/wrong task
- this type of feedback isn´t suitable for complex tasks, e.g., a written report

2. Process: feedback on the learning process (informative feedback)

- for more complex tasks, the feedback on the learning process is more helpful for learners
- it reflects whether you have carried out all the associated steps while processing the tasks and applied the correct solution strategies
- the learners receive feedback as to whether their approach to solving the task was effective

3. Self-regulation: feedback on self-regulation

- is helpful when learners already know the process of working on tasks
- in the feedback, the learner receives information on how he/she has monitored, controlled, and designed the previous learning process

4. Self: personal evaluation

- this is about the assessment of the entire personality of the learner
- this type of feedback isn´t always ability to learning, as learner feel “threatened” in their self-confidence when they receive critical feedback. There can be problems with the processing of negative assessments.

At the beginning of a learning area or training assignment, the feedback on the plane of reference no.1 “tasks” is helpful for learners. Feedback for advanced learners at the “process” and “self-regulation” levels lead to a deeper understanding of the learning content or the training task.

Dynamic flow learning - “Just in time” based education

Based on the above-described concepts we need to have a new didactic discourse in digital teaching where the learner’s experience is that all the knowledge the learner needs to be able to learn must be available "Just in time" – regardless of which profession the learning should take place. For example, the learner does not have to wait for a mathematics hour to solve the math in his / her assignment in the workshop. The necessary knowledge in mathematics must therefore be obtained precisely when it is needed.

By being dynamic (just in time), the learner can be kept in a flow around his/her learning. The learner will find that learning flows together and makes sense. They will find that they can do tasks that can really be completed and evaluated. Through the work of dynamic Flow teaching, the learner will have the opportunity to achieve optimum learning tailored to his or her own learning style, to be as skilled as possible. The learner is responsible for his or her

own learning progression and learning depth. The learner is not dependent on the latency of other learners.

The learner will also experience a teaching that is differentiated, scaffolding[1] and can be adapted to his/her learning style. This is due, among other things, to the new close relationship that can be achieved to the teacher by the fact that the teacher is no longer a catheter teacher but is a consultant/facilitator and thus can work with the individual learner even give sole education If there is a need for it.

Learning progress control / measurements

In the digital imparting of learning content, the possibilities of personal feedback are limited. For this reason, learning progress control plays an important function in the learning and training process. The learning progress control is a two-sided assessment (by the learner and the teacher/mentor) in relation to specific training task or learning content. The assessment refers to the quality of the implementation and based on the expectations placed on the learner, having regard to the current level of training and knowledge.

The assessment can be made on the basis of a scale with five levels.

1 = expectation unfulfilled
2 = expectation partially fulfilled
3 = expectations mostly fulfilled
4 = expectations fulfilled
5 = expectations exceeded

If there are significant discrepancies between the self-assessment of the learner and the assessment of the teacher/mentor, a clarifying discussion should be held for the purpose of alignment the self-image and external image. On the one hand, the teacher presents his or her expectations and the requirements of the learning or training assignment. On the other hand, the learner is given the opportunity to express his own perception of the circumstance. The goal of the discussion should be to build a consensus.

Conditional progression

One of the major advances with the use of an LMS is that the teacher can build the above-described learning progress control/measurements directly into the LMS with the use of conditional progression. This means that the learners mostly complete a specific action (e.g. assignment, test, read specific documents etc.) before completing one section of a course and opening up the next section. By integration conditional progression in a course in an LMS we reduce the risk that the learner experiences learning gaps, and thereby increasing the chance that they can't progress successfully on their learning path. At the same time the teacher assures (if the course is built the right way) that the learner has achieved the appropriate knowledge, skills, and competences of that specific section of the course.

[1] https://www.edglossary.org/scaffolding/

1.1.3 Learning outcomes – holistic (competence end goals) or modular (knowledge, skills, and competences)

The recognition of learning outcomes achieved is one of the premises in the Bologna process and the modularisation of VET is a central element in the European educational process (Bruges-Copenhagen process). Acquired competences/qualifications and their (international) comparability should contribute to improving transparency. Associated with this is a fundamental paradigm shift in the educational process. This means that the transfer of knowledge, which was previously controlled by the teacher or mentor, will be converted to the acquisition of comprehensive competencies of the learners.

With the modularisation of educational content, the following goals are achieved:

- Vertical and horizontal permeability of the educational system
- Comparability of acquired skills
- Development of professional skills
- Crediting of formal, non-formal and informal competences
- Fast adjustment of the curricula to changes in the affected areas of activity
- Support of personal profile formation through options

Learning and training modules are units with a defined content and time, that can be made up of various courses. They are focused on the acquisition of occupational competences and skills. Modules are usually individually certifiable qualifications, but they are always a part of the holistic training. The acquired partial qualifications do not replace the final examination in VET, when there is one.

1.1.4 Legal requirements in preparation and utilization digital learning materials and digital learning management systems

Copyright plays a special role in the creation and utilization of digital learning materials. It regulates those materials protected by copyright may only be used with the explicit consent of the author, e.g., through licence contract. This includes, e.g., texts, photos and films, music, software, data bases, etc.

Open content documents and open software are also work that are protected by copyright. The rights holders allow third parties very extensive usage rights through so-called creative commons licence (CC) or open content licences without concluding individual agreements. The utilization is also free of charge. One of the best-known open content projects is Wikipedia, the encyclopaedia. In the educational sector, digital learning materials are disposable as public licences, also called as Open Educational Resources (OER). A public educational resource may be copied, posted on the internet and passed without the rights holder´s permission to ask or purchase a licence for this. A big advantage is that the learning content can be individualised, optimised, further developed and freely shared.

Exception: The distribution of printed learning materials that were created with the help of OER.

In Europe, the Netherlands are taking a leading role in the field of the OER strategy with the

national programme “Wikiwijs”. The United States are a leader in OER outside of Europe.
In addition to copyrights and licence rights, the following have to also be observed when preparation and utilization self-created learning materials:

Personal rights, here especially the right to one´s own picture. In general, permission must be obtained from each person (preferably in writing) before their picture is taken and published/used.

Trademark rights, play a role in e-learning when projects are well-known, written publications with the project name are published or third-party logos are used. This aspect only applies to a very limited extent to non-commercial e-learning projects in the educational sector.

Data protection law, must be observed when using e-learning platforms and digital learning materials. Especially in connection with using of personal data of teachers, mentors and learners, e.g. names, e-mail addresses, learning results, individual characteristics, etc.

Please note: Obtain written permission for use before creating lists/ addressable records with personal details of the participants in the learning group. The handling based on the General Data protection Regulation (GDPR; EU 2016/679). In addition, country-specific regulations can be enacted.

Learning platforms, e.g. Moodle, Ilias, individual school clouds, etc. helps to link provided learning materials (content management) with the course- and participants administration. In this way, target group-specific learning processes can be organised.

1.2 Requirements for application/using digital teaching and training materials

The increasing digitization of all areas of life and work enables almost inexhaustible access to information sources. The target-oriented use of gigantic amounts of data presents users with new challenges. Media competency and the willingness to lifelong learning, also in the area of vocational training, are indispensable. New forms of communication, cooperation and networking in the digital world are now part of daily routine. This opens up new ways for teachers and mentors to convey learning and training content. In addition to technical skills, media skills are now equally important for the learning and training staffs. Various qualification offers, handouts and self-learning platforms support the creation and the use of digital learning and training modules or -materials.

1.2.1 Notes on the selection of learning content and tasks in digital and virtual formats

Digital learning and training modules can be used by the target groups regardless of time and place. It can be adapted to current technical developments relatively quickly. A wide range of digital tools are now available for this, e.g. conectboard, learningapp, learningsnacks, mentimeter, padlet, quizacademy, slacks, trello etc. These applications can be use well when working with several person via a mobile device. Teachers and mentors can also create their own digital learning and training materials in a combination of explanatory texts, video clips, quiz elements and interactive modules.

Digital materials, e.g. open educational resources (https://en.unesco.org/themes/building-knowledge-societies/oer), can be used free of charge for imparting knowledge and skills without the required licenses.

1.2.2 Motivation the target groups to use digital materials of teaching/training

As with analog learning, rouse interest in the subject matter is the requirement for motivation in dealing with digital learning. The following rules have to be observed:

Clearly define the learning objectives

The motivation of learners is largely aroused by the learning and training content that is conveyed. Learners orientate themselves towards the benefits to be expected for them. This means that the more practice-oriented, digitally created learning content, the bigger is the acceptance by the target groups.

Create learning units with different levels of difficulty

The existing learning competences of the target group are different. If possible, design learning and training units/modules with different levels of difficulty. This will prevent the learners from being under or overstrained.

Explain the technical environment

Before using digital learning units, it´s important to familiarize the target group with the technical requirements and the handling of the learning platform being used.

Provide continuous feedback

Only when the target groups learn how they have solved their tasks are they motivated to continue working actively. The demonstration of improvement suggestions motivated the participants to do better next time. Feedback can be given between the teacher /mentor or within the learners (peer-feedback). Online tests or e-quizzes are capabilities for assessing performance with a feedback option.

Playful learning approaches

Playing is motivating and gives you the opportunity to measure your own performance. For example, collecting points (credits) or small rewards can be used as motivation incentives. When designing digital education units, images, graphics, short video clips, etc. push the attention of the learners.

Media selection

Reflect upon which digital tool/format or medium can be used to best convey the learning and training content. In a combination of different formats such as presentation, speech, video clip, online quiz, etc., different “learning types” can be motivated particularly well.

1.2.3 Assessment of the teaching/training staff digital abilities

First of all, it has to be clarified what digital competencies are. This includes the safe handling of hardware and software as well as knowledge of information technology (IT). Based on the Common European Framework of References for Languages (CEFR), the European Commission provides a grid for self-assessment of digital skills/competences, the

Digital Competence Framework for citizens (https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework). There are five areas assigned to three different levels.
The five areas include:

- Data processing
- Communication
- Creation of content
- Safety
- Problem solving

The three levels are divided into:

- Elementary
- Independently
- Competently

1.2.4 Promoting/strengthening the digital competences of teaching/training staff

Often, only used a limited number of the digital tools are available. The goal is to enhance the existing digital skills and competences of the target group. Here, the digital trends in the field of VET have to be taken into account. Acquisition digital skills or/and competences means dealing with terminology, understanding contexts and actively dealing with them yourself. The proven slogan “learning by doing” is also very relevant here. Self-created digital learning and training materials are a good way to acquire digital skills yourself. In the second part of the handbook you will find more practical information and instructions. One advantage of self-created digital training materials is that it can be independently updated, flexibly edited, shared with other teachers or learners and jointly used without worrying about copyright infringement. This flexibility gives teachers and mentors the option to apply new didactic concepts and pedagogical approaches/strategies. Some of them were presented in the first chapters of the handbook.

2 Practical aspects (Introduction)

The increase in e-mobility and the associated technological change in the vehicle industry pose new challenges for the vocational training. In the learning and training process, new knowledge and broad-based skills have to be imparted in a time manner. Digital/virtual learning and training materials can support the teaching and training staffs in the implementation process. In this part of the handbook, you will find practical tips for creating, and using self-recorded learning and explanatory videos.

2.1 Basis and requirements for creation and utilization of digital learning and training materials

Learning and explanatory videos are particularly suitable as digital components to support the imparting of theoretical syllabus and/or to illustrate work techniques and operation cycles.

2.1.1 Basis for creating digital learning and training materials

It has been proven useful to create a script and storyboard at the beginning of the production of the own video clips. You should orientate yourself on the basic structure of the “classic storyboard”. When designing the concept, the “three aspects” must be taken into account:

- WHAT
- HOW
- WHY

First, it must be clear, “WHAT” you want to convey to the learners with the video clip. The target group should feel addressed by the content of the product. The information must be relevant to the training. This ensures that the target group complete watches the video.
Once the content/thematic selection has been made, the next step is to clarify “HOW” the topic is conveyed in the video. The content must be explained and presented a simply and directly as possible. It´s important to address the learners with the content of the lesson or unit immediately. Don´t lose in detail but concentrate on the core information.
After determining the learning or training content and the chosen implementation, the reason should now be given, “WHY” exactly the selected method is used. There is some overlap between the “HOW” and “WHY”.

2.1.2 Selection, work steps, and hints for creating learning and explanatory videos

The didactic format (video clips created by teaching staff) in connection with the methodological objectives (digital processing and conveying of current learning and training content in the field of e-mobility) have an influence on the technology to be selected.

Here is an overview of some practical and relatively easily implementable techniques:

- Screen recording (especially suitable for beginners)
- Laying trick technique analogue or digital (suitable for beginners)
- Explanatory videos – teaching material in front of the camera or animated presentation
- Creative learner videos

In VET, learning and explanatory videos, also called micro, tutorial, or training videos, have proven themselves.
Here is some information about different types of explanatory videos:
Micro videos are used for brief instructions on a topic and have a maximum length/duration of 1 minute.
The ***tutorial video format*** is suitable for explaining a thematic priority or for illustrating a chronological sequence of work steps. These types of videos are around 2 to 10 minutes long. The integration of various didactic and methodical approaches such as direct instructions for carrying out a work order, the integration of graphs, interactive elements or quiz questions have been proven to be effective.
Training videos are particularly suitable to explain "learning and training content". Basically, they are like the tutorial videos. In case of training videos, recording from the real workplace, e.g., in the garage, interviews or thematically appropriate film material are also integrated. With this video format, content can be made interesting, which has a positive effect on the understanding and attention of the target group/user. A certain interaction is established between the learners and the teacher/mentor. The presenting person, e.g., the teacher or mentor is in the focus and imparts knowledge or demonstrates practical activities. Drawing created in parallel, e.g., on the board as well as prepared graphics support the explanations. In professional practice, the teaching staffs show the skills to be imparted on the real object, e.g., e-vehicle in the garage and with help of special tools and safety equipment. The skills to be taught, e.g., measurement of high-voltage components during shutdown and the initial operation are shown and explained here. Training videos can be implemented with simple technical requirements and without professional knowledge in the field of IT technology or film production.

<u>The following aspects should be considered:</u>
Choosing the ***right topic*** ensures that the target group is addressed effectively and the learning or training-relevant content is optimally conveyed. Not all learning and training content is suitable for implementation in video clips.
It is important to give ***clear instructions*** in the script and/or storyboard. Define learning and training aims clearly! Process the topic step by step. Use short and meaningful texts that don´t deviate from the topic.
Note the correct chronological sequence of the individual sections. A ***logical structure*** makes it easier for the user to understand comprehensibility and the understanding of complex

relationships. It is important to hide your own knowledge advantage on the topic and to put you in the shoes of the observer.

The ***right presentation speed*** is a decisive factor in determining the quality of the video. The correct speaking speed and auditability of the specified texts need to be checked by separate sound recording or sound checks. The text passages formulated in the storyboard prevent unwanted "stagnation" during the recording. Comment on complicated issues in more detail. Cover simple things short!

The ***target group*** should not be overwhelmed with the learning material or training content presented in the video. Too much information in a short period of time hampers the learner´s process of understanding. If necessary, create follow-up videos for individual details. The motto should be: "Less is more".

The ***right sound*** makes video interesting and engaging. Pay attention to the choice of words when creating the script. Describe the content to be conveyed factually. Don´t make any judgmental statements and avoid superlatives. Speaking clearly and naturally supports good intelligibility.

In addition to the content, good sound quality, visual language, and recording quality of the teacher or mentor who is in the focus as well the supplementary aids used are decisive for the success. For the "***fine-tuning"***, aspects such as adding screen recordings, subsequently adjusting the volume and adding effects and transitions can be considered. The use of free-based software supports the post-production process.

Some technical and practical notes:

The quality of the created video largely depends on the script, storyboard, and the available technical equipment, e.g., camera, lighting, and microphone.

Smartphone, digital camera, camcorder, an external directional microphone, tripod with video head (perhaps a Steadicam® for movement sequences), and sufficient lighting (if possible, LED lighting technology) are required at the recording location.

Furthermore, two persons are required as assistants for directing, recording, and sound technology as well as for necessary support work.

A computer with image processing software is required. Basic knowledge of the cutting technique is helpful for the digital post-processing.

Videos with practical content should be recorded in the workshop area. The authentic environment, e.g., garage and the work on the real object, e.g., e-vehicle support the training content to be conveyed.

When creating videos always consider the target audience that you want to achieve.

Try to keep the video short; 2 until 10 minutes are ideal.

Guidance: 130 written words (spoken text) corresponds to about one minute of video recording.

Concentrate on the essentials; take the time to think about what is important in the video clip. Always pay attention to the connection between topic and imparting/execution or problem solution.

Address the “target group“ and make the video clip simple and realistic. Always put the topic at the focus of the video.
Formulate clearly and unambiguously the calls to action, e.g. downloading an e-book or, a free demo version from vehicle manufacturers, etc.. Think about this when you are creating the script and storyboard. Avoid too many calls to action.

2.1.3 Access rights, invitation, sharing, presentation, and storage of digital learning and training materials

Digital learning and training materials need to be available for learners and teaching staffs as well as safely preserved from unauthorized access. All in the learning process involved partners should have access to the materials at any time. That means as well as disposability of the data as the software and hardware that is required for opening and using the materials. It is not very useful to have access to a data file but no legalised proprietary software for legal use.
The disposability of the digital learning and training material can be online or offline.
There are many online options. Various companies offer free or very keen online storage capabilities, where digital materials can be placed. By awarding of access rights users have comprehensive or restrictive admission to the data according to the special situation and needs. The invitation for accessing the materials comes digitally, too. Responses and answers to given tasks as well as queries could be exchanged by the way of these online storages. Examples for these online storages, which could also be called cloud storage, are Dropbox, Apple Cloud, Microsoft OneDrive, Strato, or NextCloud. You need to create an account and then these online cloud storages are ready to share materials.
Furthermore, there are state-operated online storages especially for educational institutions. So called “school clouds” are free of charge, very safe, and have huge storage space. But the access for people from outside of state education institutes is very limited and nearly impossible.
In addition to the mentioned free or commercial online storage the companies and training partners can establish their own online storage. Basic hardware is enough to get online. All you need is access to the internet and docking with a storage device, such as an external hard disk drive. As long as it is possible to maintain security and safety this is an inexpensive option for smaller utilisations.
Digital learning and training materials can also be used offline. Access, storage, distribution, and usage of the data is made by data storage devices, such as flash drives or external hard disk drives. DVDs or CDs are not very common anymore and should be avoided, especially because learners and users need to have media reading devices that became obsolete recently. Advantages of the offline versions are among others limited access, very high security, and low costs. Disadvantages are difficult distribution of these materials and the limited range of users.

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