Evaluation report on piloting of innovative SBT and CBT applications

Lifelong Learning Programme

The evaluation report on testing of SBT and CBT pilot applications summarises the evaluation results and conclusions drawn from the realisation of the four simulator-supported training and e-learning pilot courses implemented in the framework of the ICT-DRV project. It focuses (a) on the further improvement of the developed/designed pilot courses in terms of the realisation of an optimum instructional design for the chosen course context within professional driver training and (b) and the deriving of conclusions for the ICT-DRV quality indicators to be based among others on the results of those piloting and evaluation activities.

A formative evaluation approach has been applied incl. consultations with experts, professional driver trainers and end users as well as trainers/ tutors involved into the implementation of the pilot courses. Evaluation has been conducted at three stages of pilot realisation: (1) directly after preparation of initial course outlines incl. first considerations on characteristics and needs of the target group as well as instructional design considerations (initial evaluation), (2) based on the developed/ designed course material and (3) during and after completion of the pilot testing; and additionally on an ongoing basis through peer and expert evaluation within the ICT-DRV project consortium.

The conclusions drawn from the testing activities touch among others the relevance of:
- work-based learning elements in the realisation of e-learning,
- the role of learning outcomes in decisions over the necessary complexity of the simulator,
- trainers and tutors qualifications in the realisation of e-learning and simulator training,
- supportive framework conditions for the realisation of e-learning and simulator training as well as
- the role of learning outcomes in decisions about the appropriateness and choice of learning technology within training.

All in all the evaluation results clearly underline the necessity to draw back to instructional design considerations in order to design training for professional drivers supported by learning technology as well as the need to combine different training and teaching methods (with and without the application of learning media) in order to appropriately address different kinds of learning outcomes in the most effective and learning-supportive way.

(1) Objectives of the evaluation activities

The ICT-DRV project realised four innovative technology-supported training designs for professional driver training that aimed to reflect on the instructional design necessary to address different kinds of learning outcomes and the target group "professional drivers" in the best possible way. The following courses have been realised:

- A simulator-supported training on "Defensive Driving" for lorry drivers under consideration of the 4C/ID model (realised by DEKRA, DE)
- A simulator-supported training on "Passenger Safety and Comfort" applying a group coaching approach accompanied by further instructional elements (realised by ITS, PL and AFT, FR)
- A simulator-supported training on "Defensive Driving" for bus drivers under consideration of different simulators with different levels of complexity (realised by TTS, FI)
- An e-learning-supported training on "Load Security" combining work-based learning and e-learning elements (realised by DEKRA, DE)

In order to continuously improve those pilot courses from the very beginning of their development and to draw conclusions from the piloting on a high quality integration of technology-supported training into professional driver qualification, the realisation of those pilot courses has been accompanied by an ongoing formative evaluation. This evaluation focused on the following aspects:

- Realisation of instructional design considerations such as learning outcomes to be achieves as well as target group characteristics and needs and the integration of those aspects into the actual instructional design of the course
- Interests and needs of professional drivers with regard to e-learning and simulator training
- Strength and weaknesses of technology-supported training in comparison to classical class-room-based training
- Opportunities and challenges of technology-supported education within professional driver qualification
- Indicators of quality in the context of technology-supported training for professional drivers

The evaluation results provide an additional source of information for the ICT-DRV quality indicators and policy recommendations on the integration of technology-supported training into professional driver training in general and into training related to EC Directive 2003/59 in particular.

(2) Methodical approach applied within evaluation

The accompanying pilot evaluation has been conducted at three crucial moments within the implementation of the ICT-DRV pilot courses. Those are:

- an initial evaluation after first instructional design considerations have been concluded,
- a progress evaluation after completion of preparatory work on the pilot course and
- a final evaluation throughout and after completion of the testing.

In addition a peer evaluation among the project consortium partners took place on a regular basis. The evaluations have been conducted involving experienced professional driver trainers (not

involved into the course realisation), potential and involved learners/drivers, the involved trainers/tutors and instructional design experts.

Initial evaluation

The initial evaluation has been based on a course outline prepared for each of the pilot courses. The course outline[1] contained information on the defined characteristics of the target group, the target groups' needs addressed with the pilot, the learning outcomes aspired within the pilot, first instructional design considerations and their rational, preliminary instructional design considerations with regard to the identified learners' needs and the aspired learning outcomes as well as preliminary considerations with regard to educational quality in the overall course design.

The evaluation of each pilot has been conducted by 4-5 experienced trainers not directly involved into the pilot development and in addition an instructional design expert. The following aspects have been focused on:

- needs of the target group addressed with the selected pilot
- learning outcomes defined for the pilot
- input on first didactical considerations with a special focus on the requirements of the aspired learning outcomes and the needs of the target group
- understanding of and consideration of quality aspects
- limitations, options and requirements of the CBT/SBT

A common set of basic interview/ evaluation questions have been prepared for this purpose.[2] The evaluation/ consultation has been realised by the partners implementing the pilot in question. The results have been directly integrated into the pilot development.

Progress evaluation

The progress evaluation has been realised after the major pilot course elements have been developed in order to receive a last evaluation input on their development before launching into the testing phase of the pilot courses. Again experienced trainers and instructional design experts have been consulted for this purpose. They have been presented with the developed course material and provided feedback on the following aspects:

- Consideration of defined learning outcomes in the pilot material and outline
- Consideration of specific needs/ characteristics of the target group
- Limitations, options and requirements of the e-learning and simulator training course
- Appropriateness of methods and methodical approach
- Addressing of often expressed scepticism and criticism towards e-learning and simulator training by different actors
- Understanding of and consideration of quality aspects

Also for this evaluation a common set of basic questions has been used and extended based on the evaluation needs of each pilot course.[3] The evaluation results have, as far as possible, still be integrated into the course material before testing. Results not integrated directly have been

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[1] See annex for the initial outline template.
[2] See annex for the complete initial evaluation instructions.
[3] See annex for complete progress evaluation instructions.

integrated into the final course evaluation and to the extent possible into the final pilot course review.

Final evaluation

The final evaluation has been realised as far as possible throughout and after completion of the pilot course testing. It involved the trainers involved into the testing and the participating drivers/learners in the course testing. The evaluation focused on the same aspects as the progress evaluation and has been realised based on a basic set of questions for all pilot courses[4]. The results have been, as far as possible, integrated into the course material and documented in the report at hand.

(3) Pilot applications realised and evaluated

As outlined above the evaluation included the four ICT-DRV pilot courses realised in the framework of the ICT-DRV project. In order to provide a complete picture of the overall evaluation activities those are shortly introduced again:

A simulator-supported training on "Defensive Driving" for lorry drivers under consideration of the 4C/ID model (realised by DEKRA, DE)

The ICT-DRV pilot course on defensive driving focused on the question: How to embed and make best use of the simulator within a comprehensive training concept that goes beyond pure coaching on the simulators but uses the simulator as a training tool to reach concrete learning outcomes.

After looking deeper into the characteristics of the target group and the learning outcomes to be aspired, the well researched and tested 4C/ID Model appeared to be a very promising instructional design approach to realise such training and to reach the pre-defined learning outcomes with the support of the simulator. Based on this model a 3-day training course has been developed that included

(1) the elaboration and discussion of the theoretical training elements based on "theory drives" on the simulator that have been specifically designed in order to derive the relevant theoretical contents on different levels of complexity from them,
(2) small group-coaching sessions on the simulator spread over the whole 3 days and with increasing complexity,
(3) small group sessions practicing the screening of the surrounding traffic and further parameters,
(4) final complex test drives implemented in an overall group session with joined debriefing and on the highest level of complexity.

All in all there have been seven levels of complexity applied throughout the training course: the two lowest levels in a rural area, two levels in an industrial area, two levels in an urban area and a final level with the highest level of complexity.

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[4] See annex for the complete instructions on the final evaluation.

A simulator-supported training on "Passenger Safety and Comfort" applying a group coaching approach accompanied by further instructional elements (realised by ITS, PL and AFT, FR)

While safety is a concern most professional driver encounter during their training – continuous or initial – comfort assurance appears to be less widely tackled for an unexplained reason. ITS and AFT have chosen to place these two notions at the center of this piloting endeavor entitled "*Passenger safety and comfort assurance training for professional bus drivers*" in order to test a simulator course aiming at testing the efficiency of training focusing on transfer of knowledge and skills. This addresses significant shortages in recently implemented methodologies. The featured course was designed using learning outcomes approach which is consistent with European Qualifications Framework.

The course was conducted according to the following schedule:

1. Presentation of the course introduction material
2. Adaptation drive on the driving simulator
3. First part of the driving simulator training - taking relevant exercises in order to provide the initial assessment of trainee's skills
4. Discussion on performance of a trainee, presentation of the relevant course material
5. Second part of the driving simulator training – providing the exercises in order to assess the progress in overall performance
6. Presentation of the final results to the trainee, extended review regarding his/her improvement
7. Provision of follow up material to foster learning, taking into account the overall results

The whole training curriculum was based on *Gagnès' Nine Events of Instructions*, one of the most efficient frameworks used in technology-based training design. This approach allows for having a regular flow of information and feedback all along its duration while at the same time recalling prior knowledge and thus speeding up the process of mobilization of learners' pre-acquired abilities.

A simulator-supported training on "Defensive Driving" for bus drivers under consideration of different simulators with different levels of complexity (realised by TTS, FI)

The main objective of this course was to increase awareness of professional drivers for the fundamental principles of defensive driving and learn how to avoid dangerous situations, which can be aspired in advance. In addition, the course aimed for a practical approach to defensive driving learning and teaching. The training program was expected to create clear mind-maps for urban and rural environment, where bus drivers will do their daily work. Testing methods were: instructor-led theoretical learning in the classroom, trainer-led simulator training tasks, independent peer learning, as well as learning how other students are driving in the driving simulator and independent learning in low-end simulators. The pilot course was carried out by three different groups.

In the pilot course two high-end driving simulators as well as four low-end driving simulators have been used. Considerations about the strengths of different simulators have been taken into

consideration: versatility and performance ability, or usage in feedback. The simulator supports the use of such substances and exercises, which are meant to learn a new way to work, or in which the learner can reflect on own actions.

The simulator also provides a lot of different measurements of driving performance, such as the equipment option cameras. They are used to examine the drivers' attention to the attachment (e.g. where to the drivers' gaze is directed in the murky/dark when driving and when meeting another vehicle). Mixing of high-complexity and low-complexity simulators has been tested in this pilot course. The high-complexity driving simulator has been anticipated to be well suitable in order to train vehicle controls and adjustments while the low-complexity simulator appeared more suitable for all other training where control of the vehicle does not play a central role.

An e-learning-supported training on "Load Security" combining work-based learning and e-learning elements (realised by DEKRA, DE)

Praxis-orientation and e-learning seem to be non-combinable at the first glance but in fact they are an indispensable match when implementing effective e-learning for professional drivers. This has been the key finding of the ICT-DRV e-learning pilot course on load security for experienced drivers.

Already the first analysis of learners' characteristics and needs clearly showed that pure e-learning would not be effective in order to reach the learning outcomes defined with regard to the load security topic. Therefore a blended learning approach – being a combination between e-learning, work-based learning and tutoring – has been applied in order to make best use of each approaches benefits for this distance learning training course. The ICT-DRV e-learning course on load security, therefore, follows six implementation steps based on Gagnés Nine Events of Instruction:

(1)   Introduction into the course (paper based) and first go through the overall e-learning material
(2)   Initial tutoring with the course tutor (either face-to-face or via phone) in order to start the actual learning in the distance learning course
(3)   Self-study of the provided e-learning material
(4)   Guided learning alongside work with regular praxis tasks to be implemented at the workplace
(5)   Final tutoring in order to evaluate the course attendance and check if the learning outcomes have been achieved
(6)   Provision of follow up material to foster learning and further transfer to the workplace

The e-learning material has been prepared to allow the drivers to add, skip and/or adjust course elements based on their individual prior abilities. Just as the prior learning also the practical work of professional drivers differs strongly. While the basic contents of the course remain the same (in order to ensure a common minimum content of the course) the praxis-tasks have been designed in order to be adaptable to the learners' prior abilities and the different working context of the drivers. If necessary, it is even possible to use an individual set of praxis-tasks for a learner or a group of learners in order to make the course as relevant as possible for the learners' practical work.

Praxis transfer is a key challenge for training in general. Especially the development of skills and competences often requires practical training elements difficult to realise within e-learning. For this purpose the course received a strong work-based learning component by introducing the praxis tasks that are implemented by the learners in their daily work in order to apply their knowledge and foster the development of skills and competences. Just as the overall course also this part is tutor facilitated in order to overcome difficulties with regard to learning strategies and self-motivation. Tutoring is in general a very important part of the overall course and is realised in at least two fixed tutor contacts.

The overall course is based on the so called "learning outcomes approach". This approach shifts the focus away from time spend in training towards reaching of a common minimum standard of knowledge, skills and competences being a fundamental requirement for the recognition of non-class-room-based courses. The ICT-DRV pilot course makes use of this opportunity and integrates a dialogue-based evaluation into the final course tutoring based on a common interview guideline incl. indicators to measure the reaching of this minimum standard. In such a way e-learning can become a reliable training method also in the context of the driver CPC implementation.

(4) Results of pilot evaluation

During the realisation of the different evaluation steps described above a number of focal points have been identified with regard to the application of e-learning and simulator training in the specific contexts of the realised training pilots but beyond this for the realisation of simulator training and e-learning in general.

Evaluation results of the simulator training pilots

The limitation of simulator training to very concrete aspects of driving such as „defensive driving" and „passanger safety and comfort" within the pilots has been pointed out as crucial in order to realise a successful simulator training. This appeared to be especially important in order to provide driving scenarios addressing the crucial aspects of the chosen topic in the most appropriate way but also additional training and training material necessary to complement the actual simulator training. Especially the clear and strong interrelation between simulator training and urgently necessary accompanying training measures (for instance through accompanying self-study material or actual training elements) has been evaluated as crucial within the design of simulator training. Also different levels of prior learning and already achieved learning steps need to be considered in this regard. Generally the quality of simulator training appears to be highly dependent on the quality of the accompanying training elements. Stand-alone simulator trainings without further training have been evaluated as being only in very rare situations of vocation-oriented professional driver training the best choice of method. The way of combining theory and practice based on the simulator experience as the starting point for theoretical learning as well as group coaching on the simulator as a source for learning beyond the own simulator drives have been evaluated as crucial parts of simulator training concept. Both trainers and learners have been enthusiastic about the results of the training that clearly exceeded all expectations.

At the same time it appeared crucial to reflect very critical what needs and aspired learning outcomes can be addressed/ reached with simulator training as such and what elements (of the overall topic addressed with the training) needs to be addressed with different training means in order to create the best possible learning environment. This clearly underlines the need for instructional design considerations when designing simulator-supported training.

But also the design and selection of driving scenarios proofed to be an essential element for the successful realisation of simulator training. They need to be on the one hand appropriate in order to reach the aspired learning outcomes and therefore contain the appropriate elements for learning. On the other hand they need to be adjusted or adjustable to the individual learning prerequisites of the learner and to their individual learning needs. The evaluation also suggested that learning could be increased when the scenarios' road network is even adjusted to the practical work environment by for instance replicating the drivers usually used road network such as already the case in large customer owned simulator centers. But this has not been further investigated within ICT-DRV.

At the same time the evaluation revealed that the simulators' potential to go into deeper acquisition of certain driving behavior needs to be paid special attention. Very often the simulator training is primarily used in order to raise awareness for instance for the fuel saving potential related to the application of eco-driving rules but does not go into actual practicing of the related behavior. However, simulator training entails the chance to specifically practice this behavior in order to internalize the relevant behavior and/or gain confidence in mastering a specific situation for instance through the application of repetition exercises. This, however, requires additional considerations regarding the necessary simulator complexity for this kind of exercises that require a certain amount of individual training time on a simulator.

Especially in such a wider (more repetition-focused) application context of the simulator but also within individualized coaching the evaluation results suggest further tools and applications in order to automatise evaluation of the drivers performance on the simulator ideally even connected with further computer-based training elements in order to facilitate learning in the most efficient and individualized way possible. This also goes along with the learners' need to experiences and recognise success with regard to his/her improvement of results and/or abilities.

Besides those aspects on complementary training approaches, scenario design and feedback provision also the trainer competences have been evaluated to be a key aspect with regard to learning success and training quality in the context of simulator training. This refers on the one hand to competences with regard to providing training with a simulation and therefore a technology-supported training design compared to regular real-life training. On the other hand this entails competences with regard to organizing and moderating group debriefing sessions that have been evaluated to be the heart of simulator training. The moderation of such debriefing sessions but also other related training elements (being far away from lecturing and regular class-room training) proofed to be very demanding for the trainers but also to have major emphasis on the learning outcome. This kind of training changes the role of the trainer to the one of a moderator and facilitator that requires outstanding moderation, subject-related and media competences from the trainers.

Especially from the side of the trainers the necessity of more interaction and exchange between developers and trainers has been raised as a key aspect for quality improvement and in relation to all the aspects mentioned above. This aspect, however, became obsolete when simulators have been

applied that allowed for a wide spectrum of flexibility and adaptability through the trainers themselves because it was possible to create fit-for-purpose scenarios as instructionally required for the realisation of the training.

Although the instructionally improved ICT-DRV pilot trainings have been very well received by trainers and learners equally and have been considered as clearly beneficial with regard to reaching of excellent learning outcomes, the evaluation also revealed that such elaborated courses might be difficult to sell because they are more cost intensive for the customer than regular courses that are currently offered.

Evaluation results of the e-learning pilot

One of the key evaluation results appearing through all evaluation steps in a consistent manner is that the learning environment needs to be a very simple and intuitive tool adaptable to low ICT skills of the target group. Especially in the final evaluation the application of such a simple and intuitive approach with regard to the online learning environment has been highly appreciated by the pilot participant. Similarly also the presentation of the learning material in rather small bits and pieces (learning elements) has been highlighted as fundamental in order to accommodate the learning environment to the learners characteristics. This has been further stressed by applying primarily resources with an emphasis on visual elements that illustrate the learning content in a very practical way.

The original course outline introduced video calls or similar internet-based communication tools which has not been evaluated as practical. Instead regular phone calls, e-mail and chat-like applications have been applied within the piloting in order to ensure communication between learner and tutor. Also here very simple ways of communication have been evaluated as more valuable than technically advanced solutions.

Surprisingly the originally suspected difficulty with regard to internet and computer access did not appear to be a major difficulty because all pilot participants had regular access to the internet and to computers and/or smartphones. Of course the pilot only involved learners who volunteered to participate in such a training format and showed also a good level of media competence to work with such electronic learning facilities. However, a downloadable application also available offline would have been appreciated as more handy than a pure online version in order to work with the material also when no internet connection is available. Nevertheless, further investigation would be necessary in order to research differences in the national situations because in the particular case of ICT-DRV the concerns regarding internet access primarily resulted from evaluations in Hungary and Spain while the primarily German pilot group did not experience this difficulty.

The following of an e-learning course has been evaluated as an often difficult task for the pilot target group because of missing abilities with regard to learning strategies, self-motivation, self-organisation and self-evaluation. The tutor involvement with fixed and flexible tutor contacts as well as other kinds of contacts between training institution and learner have been underlined by the evaluation results as crucial for a successful course realisation. The tutor becomes in this way a learning facilitator and coach rather than a trainer who delivers the training content which also results into a fundamental shift in the trainer role within this kind of training. Just as within simulator

training also here the tutors' competences to guide and coach learners facilitated though media contribute significantly to the learning outcomes but require a partially complementary but also different set of competences (with regard to learning with media and other aspects) and self-concept from the involved trainers.

The very heterogeneous nature of professional drivers' prior abilities is a key challenge within continuous training. The piloting therefore underlined the necessity to provide the opportunity to add, skip and/or adjust course elements based on the learners' prior abilities. This approach is strongly supported by the application of the EQFs learning outcomes approach because this approach moves the focus away from time spend in training (as currently part of the legal requirements for periodic/ continuous training of professional drivers) and to the reaching of a common minimum standard allowing for an adjustment of the course content. Similarly also the work reality of professional drivers differs strongly in some fields of professional driving which requires a high adaptability of the course to those differing work realities. This adaptability has been one of the key features of the pilot course that have been highly appreciated by trainers and pilot participants likewise. At the same time course' adaptability to prior abilities and to the learners work reality proofed to strongly support the transfer of learning into praxis usually being a key challenge for the realisation of training in general within professional driver qualification.

The praxis transfer and its requirements on a computer-based distance learning environment have been a major point of discussion throughout all evaluation steps that resulted into the design of a blended learning course making best use of the benefits resulting from e-learning and those usually associated with work-based learning. Although this approach proofed to be challenging in the realisation due to the unfamiliar training setting and the missing direct learning guidance by a trainer, it resulted into a highly appreciated training design because of the strong practical component. This nevertheless required strong guidance and support by the tutor in order to familiarise the learners with this approach and to implement it properly. It is therefore an approach that is not directly adapted by the target group but requires additional efforts with regard to its introduction and application. However, also other approaches than the one applied within the ICT-DRV pilot that are less demanding with regard to learner support on the distance (such as combinations between e-learning and practical face-to-face/ on-side training or coaching) are conceivable and equally promising with regard to the outcomes of learning.

Similarly the evaluation also showed that such a distance learning course strongly requires the cooperation and support of employers because learners need to be given the necessary time and opportunity to follow the course and in the case of the pilot instructional design even implement parts of the course work-based which proofed to be challenging due to time pressure in general and insufficient opportunity to realise practical work assignments in the context of regular daily work. A question that remains in this context after realisation of the e-learning pilot course refers to working and resting time provisions and how time spend with training can be integrated here.

The assessment and documentation of learning realised as a guideline-based interviews according to the aspired learning outcomes has been evaluated as very positive from learners as well as tutors/ trainers. While a regular test has been rated as difficult by the pilot participants, the interview approach has in most cases not even been recognised as a "test" by the learners but rather as a regular conversation with the tutor. However, the performance based feedback has been strongly supported by the learners because they received a documentation of their knowledge, skills and

competences which has also been perceived as an appreciation of their individual learning and efforts put into the course participation. This applies similarly to the tutors who appreciated the application of a well structured interview guideline clearly as beneficial for the learners as well as for themselves in order to realise this interview. Also this part of the course design proofed to be very demanding with regard to the competences of the tutor in order to implement this test interview and also evaluate it with the learner in an appropriate and learning progress oriented way. However, trainers, tutor and participants considered it as regrettable that the course is not formally recognised because the course participation has been perceived as very beneficial for the learners.

Of course also the e-learning pilot evaluation revealed and confirmed a number of challenges. This includes challenges resulting from a low level of motivation of learners for learning in a rather formalised way. In the case of the pilots this has been a major challenge because also no incentives were possible due to missing opportunities to recognise this training formally. But also self-motivation and time pressure have been challenging within the piloting.

Similarly the theoretical background learning elements of the training primarily delivered via the online learning platform received at the first step little attention by the learners and required additional prompting in order to be used as a source of learning. However, it needs to be questioned if this is a weakness of the distance learning approach, of the specific prototype material used or a general issue with regard to the target groups preferences and attitude towards theory input independently of the distance learning approach. The evaluation results especially from the trainer side rather suggest this to be a general difficulty with regard to awareness for the necessity of theoretical background information among professional drivers.

Finally the piloting showed that the pilot course design requires relatively high tutoring efforts. Which leads to a similar challenge with regard to selling a more cost-intensive course as already described with regard to the ID improved simulator training courses. In order to find a good balance between learning effectiveness and financial considerations, alternative models for instance combining e-learning and on-side group training might lead to a more efficient ratio in this regard without loosing the benefits of e-learning and work-based learning elements and under consideration of the learners characteristics and learning needs.

(5) Conclusions drawn from pilot evaluation for quality considerations on e-learning and simulator training within professional driver qualification

The conclusions that can be drawn from the testing activities with regard to quality considerations on e-learning and simulator training within professional driver qualification touch among others the relevance of:

- work-based learning elements in the realisation of e-learning,
- the role of learning outcomes in decisions over the necessary complexity of the simulator,
- trainer and tutor competences in the realisation of e-learning and simulator training,
- supportive framework conditions for the realisation of e-learning and simulator training as well as
- the role of learning outcomes in decisions about the appropriateness and choice of learning technology within training.

As outlined above e-learning and simulator training require a complementary set of trainer competences with regard to working with learning technology in general but assign also a new role to the trainer that does not longer focus on providing and presenting expertise but rather on facilitation and moderation of learning processes. Especially in the context of e-learning the task of delivering facts, figures and further theoretical background knowledge is taken over by the technology while the trainers major role is to support self-learning of the learners, facilitate learning in a media-based environment and provide coaching to the learner. Similarly also the role of a simulator trainer shifts away from the provision of theoretical knowledge to the one of a moderator of group and individual learning processes. At the same time also requirements on the subject-related expertise of the trainers increase strongly because they are taking over the tasks of a coach who delivers his/her expertise just in time and without a predefined set of contents for a session. In this way the application of learning technology requires the reconsideration of the knowledge, skills and competences to be required from a trainer in order to facilitate such learning technology supported learning processes. This is especially relevant because trainer competences – not only within technology-supported training but within training in general – proof to be a fundamental contribution to the successful implementation of training.

In order to reach transfer of learning from a learning environment to work praxis a supportive work environment in terms of work conditions that support the application of learning outcomes also in praxis is indispensible regardless of the kind of training (with or without technology-support). However, this requirement even increases when it comes to learning taking place on the distance and close to or at the work place or has a strong praxis component as the case within simulator training. The necessary framework conditions such as time and infrastructure (including the applicable legal framework which is a special aspect with regard to the professional driver occupation) for learning are fundamental in order to implement e-learning on the distance. At the same time praxis also needs to provide a supportive environment in order practically apply newly gained knowledge, skills and competences. As mentioned before this is a topic applying to every kind of training but it became especially evident in the context of the ICT-DRV pilot courses. Also relevant in the context of supportive framework conditions is the formal recognition (incl. a supportive and quality focused legal regulation) of especially e-learning courses but also simulator courses primarily due to motivational aspects.

Complementary to those framework conditions especially instructional design considerations proofed to be of major relevance in order to work on quality improvement within simulator training and e-learning from a learning perspective. A milestone in this regard is the definition of learning objectives/ aspired learning outcomes to be achieved with a concrete course (this equally applies of course also to classical training approaches that likewise profit from such an approach). The learning outcomes approach of the European Qualifications Framework comes in handy at this point because it requires the definition of knowledge, skills and competences associated with a certain qualification and at the same time aims to ensure connectivity of individual learning elements to a wider vocational certificate. But in the context of instructional design the definition of learning objectives / aspired learning outcomes builds the basis for all following design decisions that also include

decisions about the appropriateness of certain methods in order to reach the aspired learning outcomes. In this way the learning outcomes approach strongly facilitates the development of quality within training because it helps to come to decisions what kind of method is necessary in order to reach certain learning outcomes.

In the context of the ICT-DRV pilot courses this led for instance to the complementary application of a work-based learning approach in order to enable reaching of the defined and necessary learning outcomes to act competently in a practical situation, while theoretical background information has been sufficiently addressed through the application of online learning resources. However, the integration of a work-based learning component can be postulated to be generally a very important, if not even indispensible, training component in the context of e-learning for professional drivers. The term "work-based learning" is used as learning in the context of the workplace, in settings simulating the workplace or off workplace with learning tasks directly applied in the workplace and reflected upon training (CEDEFOP, 2014). The evaluation results clearly show that pure e-learning in terms of study of learning material does rarely sufficiently address the characteristics of the target group "professional drivers" because a strong practical component is necessary in order to reach and engage the target group into training and is rather unlikely to address a whole set of abilities usually associated with the professional driver vocation. Nevertheless, also the postulation of such a work-based learning component needs to be reflected based on the set of learning outcomes to be achieved in order to design an appropriate learning environment.

Similarly the defined learning outcomes let in the case of simulator training to the design decision to integrate additional training elements complementary to the simulator training in order to address the whole set of aspired learning outcomes. It can therefore be concluded that the application of learning technology (as well as any other training methods) needs to clearly correspond with the learning outcomes aspired and needs to be appropriate in order to reach the aspired learning outcomes, solve a certain competence-based problem and/or address the learners' characteristics properly. This will mostly lead to a mixture of different methods to be applied in order to reach a certain set of learning outcomes rather than pure e-learning or simulator training.

Similarly, also the choice of simulator in order to address certain learning objective needs to be taken into consideration regarding its appropriateness for reaching certain learning outcomes. Especially when considering that simulator training is a very cost intensive training that also requires major considerations in terms of costs and benefits. Both ICT-DRV pilots on defensive driving illustrate clearly training purposes for which a top-of-the-range simulator is indispensible but also training elements that can equally be implemented with a less complex simulator such as the case for repetition exercises in order to internalize a certain behavior or practice. Only in this way the full potential of a top-of-the-range simulator as well as other types of simulators as a training tool can optimally be used and leads to a clear improvement of the training and learning process of the learners. In this way the surplus of simulator use within training can be identified and used in order to optimise training for professional drivers. However, further learning-oriented research is certainly beneficial in order to elaborate in more detail what kind of simulator with what level of complexity is appropriate in order to address certain learning objectives effectively and efficiently.

All in all the evaluation results clearly underline the necessity to draw back to instructional design considerations as well as to apply a learning outcome oriented approach to training in order to design training for professional drivers supported by learning technology and to appropriately address training and learning needs of professional drivers within such training settings in the most effective and learning-supportive way.

References:

- CEDEFOP (2014). *Work-based learning in CVET in Europe: policies and governance*. Available at: http://www.cedefop.europa.eu/en/events-and-projects/events/designing-implementing-and-supporting-effective-work-based-learning (30/01/2015)

Annexes:

- Initial outline template
- Initial evaluation instructions
- Progress and final evaluation instructions

Initial outline WP3 pilot
[Short title of pilot]

prepared by:
with contributions from:
▫ Xxx

WP 03 ▫ del: 04-07 ▫ last update: xxx
contact: [pls insert your e-mail here], www.project-ictdrv.eu

(Working) Title of the pilot:

Implementing partners:

Specification of target group:

Target groups' needs addressed with the pilot:

Learning outcomes (EQF-approach) aspired with the pilot:

First instructional design considerations and their rational:

Preliminary consideration of the target groups needs with regard to the instructional design:

Preliminary consideration of the aspired learning outcomes with regard to the instructional design:

Lifelong Learning Programme

Preliminary considerations with regard to educational quality within SBT/CBT application:

Sources to build on within the realisation of the pilot:

List of references:

Annexes:

For further information on the project please consult:

www.project-ictdrv.eu

For further information on the paper please contact:

Implementation of initial evaluation

In order to implement the initial pilot evaluation you are asked to discuss your initial pilot considerations (see template for initial pilot outline) with 4-5 experienced trainers active in the field of your pilot course. Those trainers can come from your own or other organisations. You are free and invited to involve further evaluators such as experienced drivers, in-company tutors or employers for specific elements of the outline such as the target group needs and characteristics or the aspired learning outcomes.

Please present the evaluators with your initial plans for the pilot and ask for their feedback on a number of evaluation questions (see below). You are free to decide if you want to implement the consultations individually or in a group, face2face or by phone/skype, in writing or in interview style.

Please use the input and feedback received from the evaluators in your further pilot implementation in between now and our next project meeting in February 2014 and send a comprehensive documentation (initial pilot outline, summary of overall feedback and input received from evaluators – pls summarise answers to every question separately, short information about evaluators) also to Claudia at the latest **by 15 October 2013**.

Catalogue of evaluation questions

- How would you evaluate the defined needs and characteristics of the target group in the context of our piloting course? If applicable, what would you modify or add in order to consider the relevant needs/ characteristics of professional drivers sufficiently for the implementation of our pilot course?

- The defined learning outcomes are supposed to lead the overall design of the course. Do you consider the defined learning outcomes as appropriate? Would you suggest modifications or additions?

- Based on your experience, do you believe that the preliminary considerations on the course implementation (didactical considerations) are appropriate in order to:
  _meet the learning needs of the professional drivers,
  _address professional drivers characteristics and
  _reach – under consideration of the defined characteristics – the aspired learning outcomes?

If not, please propose modifications and additions! Please feel free to make also further or alternative suggestions for improvement.

- What are from your point of view indicators for quality in such a S/CBT course and how do you see these indicators realised in our initial outline? Where do you see potential for quality improvement in our plans for the pilot course?

- What are, from your point of view, the limitations of such a technology supported course in the context of professional driver training? Where do you see options and potential? What requirements need to be fulfilled from your point of view in order to implement such a technology supported course successfully?

- Do you have further suggestions for improvement or further development of our piloting course?

Annexes:

(1)	Introduction for evaluators

For further information on the project please consult:	For further information on the paper please contact:
www.project-ictdrv.eu	Claudia.Ball@dekra.com

Annex 1: Introduction for Evaluators

Dear Evaluator,

thank you for supporting us in the development of computer- and simulator-based training concepts for professional drivers. We are developing these concepts in the framework of the European project ICT-DRV (www.project-ictdrv.eu) which aims to determine conditions and quality criteria under which computer- and simulator-based training can enrich professional driver training in Europe. It is one of our major tasks within the project to develop technology-supported training concepts based on instructional design principles that foster learning in theory and practice and can be considered to generate an added value for professional driver training.

We are among others working on a computer-/simulator-based training on the topic of "xxx". We structured our first ideas and analysis results for this course in an outline and ask you for your input and feedback on these first ideas. The outline provides information on the aspired learning outcomes, the identified needs and characteristics of the target group and the planned course design. Please have a look at our outline and feel free to ask for further information or clarification.

We are very much looking forward to your thoughts about our plans and would, therefore, appreciate if you could answer the following questions on our outline:

- *… <<insert evaluation questions from above>>*

In order to provide your feedback please be so kind to shortly summarise your notes in writing and send them at the latest by xxx to xxx.

Or: In order to collect your feedback we would like to invite you to a meeting, we'll be in touch to fix a suitable date.

Or: In order to collect your feedback we would like to call you and go through the questions together with your. We'll be in touch to fix a suitable date.

Thank you very much for your support. Please also let us know if we may inform you regularly about the progress of our project and if we may approach you later on again in order to further evaluate our piloting courses in the framework of ICT-DRV.

Best regards,

Implementation of progress/final pilot evaluation

In order to implement the progress/final pilot evaluation you are asked to

- discuss your overall pilot material with **4-5 experienced trainers** active in the field of your pilot course (this can also be the trainers implementing the course but if so, this should be done prior to the pilot implementation). Those trainers can come from your own or other organisations. You are free and invited to involve further evaluators such as experienced drivers, in-company tutors or employers for specific elements of the course such as the target group needs and characteristics or the aspired learning outcomes.

- conduct an evaluation with your **pilot participants** and the **trainers** implementing the pilot after completion of the pilot course.

<u>Evaluation with experienced trainers and others not involved into the pilot implementation</u>

Please present the evaluators with your overall pilot material (incl. relevant elements of the initial outline such as the aspired learning outcomes) and ask for their feedback on a number of evaluation questions (see below). You are free to decide if you want to implement the consultations individually or in a group, face2face or by phone/skype, in writing or in interview style.

Catalogue of evaluation questions:

- How would you evaluate the integration/ addressing of the target groups needs and characteristics in the course material introduced to you?

- To what extend to you consider the presented course material as appropriate in order to reach the aspired learning outcomes of the course (see initial outline)? Why?

- What are from your point of view indicators for quality in such a S/CBT course and how do you see these indicators realised in the pilot course material presented to you? Where do you see potential for quality improvement in the course material?

- What are, from your point of view, the limitations of such a technology supported course in the context of professional driver training? Where do you see options and potential? What requirements need to be fulfilled from your point of view in order to implement such a technology supported course successfully?

Lifelong
Learning
Programme

- Do you have further suggestions for improvement or further development of our piloting course?

- *(Please add further question based on your individual course design, if applicable!)*

Evaluation with pilot participants

Please ask for the feedback of the pilot participants on a number of evaluation questions (see below) after completion of the course. You are free to decide if you want to implement the evaluation individually in writing, face2face or by phone. However, interviews on the phone or face2face are clearly recommended!

Catalogue of evaluation questions:

- Looking back at the pilot course you just attended, what did you like, what did you dislike?

- What do you expect from a computer-based distance learning/ simulator-based course for professional drivers? Did this course meet your expectations? Why?

- What makes a technology-supported training course such as the one you attended attractive to you? Did our pilot course meet those criteria? Why?

- Compared with a regular class-room based training course, where do you see strength and weaknesses of the kind of pilot course you participated in?

- In case you already attended a class-room-based training course on a similar topic, how would you describe the differences between those two courses with regard to your learning, the courses relevance for your daily praxis and your motivation to attend a similar course again during and after course attendance?

- What else is from your point of view important in a computer-based distance learning/ simulator-based course for professional drivers? Has this been realised in our pilot course? Why? Where do you see potential for improvement in our course?

- What are, from your point of view, the limitations of such a technology supported course in the context of professional driver training? Where do you see options and potential? What requirements need to be fulfilled from your point of view in order to implement such a technology supported course successfully?

- Do you have further suggestions for improvement or further development of our piloting course?

- *(Please add further question based on your individual course design, if applicable?)*

Evaluation with pilot trainers

Please ask for the feedback of the trainers involved into the piloting on a number of evaluation questions (see below) after the implementation of the course. You are free to decide if you want to implement the consultations individually or in a group, face2face or by phone, in writing or in interview style.

Catalogue of evaluation questions:

- What experiences did you make with the pilot course material?

- How would you evaluate the integration/ addressing of the participants needs and characteristics in the course?

- To what extend do you consider the overall course as appropriate in order to reach the aspired learning outcomes of the course (see initial outline)? Why?

- Compared with a regular class-room based training course, where do you see strength and weaknesses of the kind of pilot course you just facilitated?

- How would you describe the differences between this pilot course and a regular class-room-based course on a similar topic with regard to the participants learning, the courses relevance for the participants daily praxis and their motivation to attend the course?

- What are from your point of view indicators for quality in such a S/CBT course and how do you see these indicators realised in the pilot course material presented to you? Where do you see potential for quality improvement in the course material?

- What are, from your point of view, the limitations of such a technology supported course in the context of professional driver training? Where do you see options and potential? What requirements need to be fulfilled from your point of view in order to implement such a technology supported course successfully?

- Do you have further suggestions for improvement or further development of our piloting course?

- *(Please add further question based on your individual course design, if applicable!)*

<u>What to do with the feedback?</u>

Please integrate the input and feedback received from the different groups of evaluators into your overall pilot documentation and use it in order to develop suggestions for the further improvement of the pilot course within the pilot documentation.

Furthermore please send a comprehensive summary of your progress/final evaluation (summary of overall feedback and input received from evaluators and participants – pls summarise answers to questions separately and provide short information about evaluators/participants) also to Claudia at the latest **by 01 September 2014**.

Annexes:

(1)   Introduction for (external) evaluators
(2)   Introduction for participants and pilot implementing trainers

For further information on the project please consult: For further information on the paper please contact:

www.project-ictdrv.eu   Claudia.Ball@dekra.com

Annex 1: Introduction for (external) Evaluators

Dear Evaluator,

thank you for supporting us in the development of computer- and simulator-based training concepts for professional drivers. We are developing these concepts in the framework of the European project ICT-DRV (www.project-ictdrv.eu) which aims to determine conditions and quality criteria under which computer- and simulator-based training can enrich professional driver training in Europe. It is one of our major tasks within the project to develop technology-supported training concepts based on instructional design principles that foster learning in theory and practice and can be considered to generate an added value for professional driver training.

We are among others realising a computer-/simulator-based training on the topic of "xxx" for which you find the training material enclosed. Please have a look at our course material and feel free to ask for further information or clarification.

We are very much looking forward to your thoughts about our pilot course and would, therefore, appreciate if you could answer the following questions on our outline:

- *… <<insert evaluation questions from above, if applicable, adjusted>>*

In order to provide your feedback please be so kind to shortly summarise your notes in writing and send them at the latest by xxx to xxx.

Or: In order to collect your feedback we would like to invite you to a meeting, we'll be in touch to fix a suitable date.

Or: In order to collect your feedback we would like to call/meet you and go through the questions together with your. We'll be in touch to fix a suitable date.

Thank you very much for your support. Please also let us know if we may inform you regularly about the progress of our project and if we may approach you later on again in order to further evaluate our piloting courses in the framework of ICT-DRV.

Best regards,

Annex 1: Introduction for Participant/ Piloting implementing Trainer

Dear Participant/ Dear Pilot Trainer,

thank you for supporting us in the development of computer- and simulator-based training concepts for professional drivers by participating in/ facilitating our pilot course. We are developing these pilot courses in the framework of the European project ICT-DRV (www.project-ictdrv.eu) which aims to determine conditions and quality criteria under which computer- and simulator-based training can enrich professional driver training in Europe. It is one of our major tasks within the project to develop technology-supported training concepts based on instructional design principles that foster learning in theory and practice and can be considered to generate an added value for professional driver training.

The course you participated in/ facilitated is one of four pilot courses that are currently tested and we are very much looking forward to your thoughts about it since you actually experienced one of our pilot courses. We would, therefore, appreciate if you could answer a number of questions after completion of the course./:

- *… <<insert evaluation questions from above, if applicable, adjusted or delete this part>>*

In order to provide your feedback please be so kind to shortly summarise your notes in writing and send them at the latest by xxx to xxx.

Or: In order to collect your feedback we would like to invite you to a short talk after completion of the course.

Or: In order to collect your feedback we would like to call/meet you and go through the questions together with your. We'll be in touch to fix a suitable date.

Thank you very much for your support. Please also let us know if we may inform you regularly about the progress of our project and if we may approach you later on again in order to further evaluate our piloting courses in the framework of ICT-DRV.

Best regards,