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FutureDRV

Evaluation Report

of the FutureDRV Learning Solutions

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Background

FutureDRV Learning Solutions (IO2) objectives was to develop a method, a suitable work task and visualise a future technology suitable for supporting the current workforce in order to keep up with the changing and increasing qualification requirements.

The learning solutions should address learning outcomes new to the current workforce taking up trends within learning and adapting those to the characteristics of drivers.

These learning solutions were developed as pilots; showing how future competence-building could work within this vocational field.

This report summarises the selection process of suitable driver tasks, training content and technical tools for the two pilots. It also includes a presentation of the training content and how the evaluation was set up, including the result of evaluation and reflection about the results.

Notice that the developed training solutions are just pilot versions, every market and training instructor need to make sure that the pilot content are correct and suitable for the actual purpose and that training follows the local laws and regulations.

Selection of Pilot Content

From the ProfDRV profile and the initial IO1 research results, the current professional driver role, future technical trends and future training needs could be seen. From a list of 150 driver tasks of today, a "most wanted list" of future driver tasks was produced. The list below suggests the tasks that still will be very important in 2035.

Professional Driver Tasks suitable as pilots:

TASK	FUTURE IMPORTANCE	ADVANCED PRODUCTION	MASS TRAINING CAPABILITY
Handling the vehicle (on road driving)	HIGH	HIGH	LOW
Safe Driving	HIGH	HIGH	LOW
EcoDriving (and environmental)	MEDIUM	HIGH	LOW
Managing accidents	LOW	HIGH	MEDIUM
(Checking the trucks readiness) Checklist	LOW	LOW	MEDIUM

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Evaluation Report on the
FutureDRV Learning Solutions

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of the European Union

2/13
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Driver Communication	MEDIUM	LOW	HIGH
Loading and Unloading	MEDIUM	HIGH	MEDIUM
Plan a trip	LOW	LOW	MEDIUM
Healthy lifestyle	LOW	HIGH	LOW
Labor Safety	MEDIUM	LOW	HIGH
Electric Trucks	LOW	LOW	HIGH
Autonomous Trucks	LOW	LOW	HIGH

When choosing suitable tasks, three aspects were considered:

First of all, the future importance of the training content (for operators) was rated. For example, even if handling and driving is of great interest for fleet owners today, the training needs will decrease with the introduction of autonomous trucks.

Secondly, the technology level of production was estimated and two complexity levels were visualized: A basic, simple training production, and one technically advanced production.

Thirdly, the possibilities for maximized mass training was considered:

It was decided that the content of the pilots should be of high, or at least medium, relevance for drivers in the future. Furthermore, the pilots should have a high, or medium, possibility of mass training capability. It was also decided that the pilots should be made in two different technology levels: one simple technical solution and one technically advanced production.

These three aspects gave us three possible driver competences – Driver Communication, Loading and Unloading and Labour safety. Due to differences in European regulations, labour safety was dropped. Hence, the chosen tasks were the following.

Professional Driver Communications Skills

How to act responsively towards colleagues, employer, customers and authorities. In the future, drivers with social skills and smarter appearance will be more interesting, showing responsibility, attitude and on-the road-behaviour as a professional driver.

Cargo Securing Skills

Check a loaded trailer and make sure correct load securing is made. Calculate and identify unsatisfying strapping methods and damaged tools.

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Benefits with this training content:

Both pilot's training content have benefits:

- Content will still be important for a long time ahead

- Experts state a wide use of this training area in the future (large target group)

- Easy to do market/operator adaptions on content

Project partners agreed that both applications are really valuable tools ready for widely use, especially by driving instructors.

Selection of Pilot Training Approach:

When choosing a training method approach, a gamification approach was selected - a gamification module with a scoring system for increased motivation.

Experts evaluation in IO1 showed that this method isn't very popular among instructors. Therefore, it was of extra interest to use this innovative approach in the pilots. By using a scoring system and a storytelling setup, the goal was to measure learning results compared to traditional driver training.

Here´s a short presentation of the two pedagogical scopes:

ProLoader

This training should support individual learning by drivers to repeat how to calculate sufficient load securing. You should be able to pass the levels in the game quite easily, but you have to try it several times to get full scores on all the exercises, this should attract both novice and experienced drivers.

It should also support usage in classrooms as a motivating competition to finish a cargo securing training in a fun way. The driver should also have the possibility to do repetitive training afterwards.

ProDriverCommunication

This training should support individual learning by drivers to assess their communicative skills. The course should have a narrative story in levels, which encourages the completion of all levels. The course should also support usage in classroom, where the teacher can present one challenging scenario and the group jointly discuss the issue and agree on an answer. To increase drivers' interest to do repetitive training, he or she should have access to the material afterwards and be able to compare his or her result with colleagues or friends.

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Furthermore, both pilots should also be an informal way to do a knowledge check on a driver. With this approach, a driver will evaluate his/her skills without a supervisor and can initiate a flipped classroom training where you seek relevant information and discuss areas where you don´t agree with others. This can also be seen as a way of increasing motivation to access knowledge.

Selection of Pilot Training Technology

In order to decide on what future oriented technologies to use, a list of technologies that can be used in training already today was made. This list was divided in 3 groups:

Technologies with bulky, expensive and complicated hardware in need of technicians, transports and support:

- Large driving simulators (heavy, expensive, need of technician)

- Touchscreens (not portable, expensive)

- Sensors - Truck manufacturer dependent, engine I/O (need of technician)

Technologies with complex hardware/software in need of a supervising technician during training.

- Personal Sensors - Health related (software installation)

- Portable Simulators (Laptop/Steering wheel etc.)

- Eye tracking Hardware (software installation, need of technician)

- Game controls/push buttons (software installation, need of technician)

- MR/VR Goggles (need of technician)

Mainstream technology/software that can be installed and used with some phone support if needed. this means that pilots can be used and tested throughout several European operators without expensive, complex logistics and technical assistance.

- QR codes (smartphones with camera)

- Augmented Reality on tablets/smartphones

- eLearning Apps - Software installation on computers/tablets

- Web based eLearning's

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5/13
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Heavy and complicated equipment was left out, especially full-scale driving simulators, since the future autonomous vehicles will make manual driving obsolete eventually. Also, in-vehicle sensors were excluded because the difficulties of simulating a training pilot with this technology.

When looking for the training technologies of tomorrow, focus was first at modern digital technologies like Virtual Reality, Mixed Reality and Augmented Reality. In the future these devices will be more effective, smaller, and cheaper. But, even if these gadgets seem futuristic, the technology is already available today and, in a way, not so futuristic in a pilot.

Early results from the IO1 evaluation showed that the training experts had mixed feelings about the high-tech use in training.

Evaluation showed that training instructors and professionals like to see training that can be carried out while working, in truck if possible. Some development has been made to use VR helmets while driving to simulate dangerous situations etc., but during a few upcoming years of autonomous transition, drivers will still have to be watching the road at all times.

Instructors of today use mostly classroom training, but the environmental end economic benefits of distance learning are becoming more important.

Considering that the transport business is developing slower than other sectors, in 15 years from now, we´ll still have drivers in cab, and they will still have to rest, thus being able to perform personal training when not behind the wheel. Transport companies investing in expensive specialized training gadgets is highly unlikely. Mobile training, carried out on a smartphone, should be a reachable vision.

Therefore, the chosen technologies for the two training pilots are not futuristic, or technologically advanced, but easy to distribute, mobile for effectiveness and ease of access – and something that is not used in driver training today: A web-based eLearning and a smartphone app.

Pilots Evaluation

15 professionals (instructors and training professionals) from 6 different markets: Sweden, UK, Austria, Germany, France, and the Netherlands, were asked to evaluated the two apps. The two pilots were distributed as two web-based trainings with instructions on how the pilots should be used in classroom, or individual training. The test subjects got 4 weeks during June 2019 to evaluate the apps and use it in training if possible. Afterwards, the instructors were asked to fill in an anonymous survey. (Results presented in Appendix 1)

The evaluation did not focus on the content of the courses, but primarily on how this type of education would work in training of professional drivers in 15-20 years from now.

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Evaluation Report on the
FutureDRV Learning Solutions

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6/13
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1. **Questions about ProLoader (Rate like this: Bad, Acceptable, OK, Very good, Fantastic)**

   • Training goal and content

   • Training method and appearance

   • Effectiveness (classroom training)

   • Effectiveness (self-study)

   • Training suitable for target group

   • Overall assessment

2. **Questions about ProComm (Rate like this: Bad, Acceptable, OK, Very good, Fantastic)**

   • Training goal and content

   • Training method and appearance

   • Training efficiency

   • Training suitable for target group

   • Overall assessment

For both applications:

3. Describe some good features with these training apps?

4. Describe some things that can be improved with these training apps?

5. Do you think these training methods reflect training methods of future driver training? (Motivate what app and why)

Evaluation Results

Summary of General Results:

All test subject provided both positive and negative feedback. In general, they liked the look and feel of the applications. Interesting enough, the acceptance for gamification was unexpectedly high. They agreed that the gamified training method should appeal to the target group.

Other positive answers were:

• Using individual digital training seem comfortable since it´s done at a suitable, individual pace.

• Applications were realistic and very motivating.

• It should be possible to use pilots as pre-training for the CPC.

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Evaluation Report on the
FutureDRV Learning Solutions

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7/13
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- Both pilots were considered suitable (and relevant) for today, and future, driver training.

Summary of Pilot 1: (ProLoader)

The application was considered hard to use without instructions. It also lacks training of basic skills so you still need a training instructor.

The lashing methods may be similar in European countries, but different tools are preferred in some countries and regulations differs too. Different markets have different legal restrictions that makes it impossible to use the same training throughout Europe

There are more than one calculating method and tables used for lashing. There should be a market adaption, or even easily: skip all tables and let the participant use relevant information available.

A remark was that the app should be able to visually show the actual outcome of a faulty loading in order to see the effect of a bad decision - in 3D.

Summary of Pilot 2: (ProComm)

The results showed that the respondents believed that ProComm communications training can also be used for other contents and tasks like Taxi driver training, Bus driver training etc.

Furthermore, they thought that the training content can, (and must) be market adapted. Markets do not have a common view on how to train driver communication. Different markets have different driver cultures and some countries have even different legal restrictions that makes it impossible to use the same training throughout Europe.

The application was considered difficult to use because of the large amount of text. Some people are having hard to read long texts and this application contain over 60 minutes of reading. A solution would be to record a narrator/speaker voice to increase usability.

It would also be a good idea to separate the 4 different training contents into 4 separate eLearning's. The training concept could still be the same, but a shorter gameplay, like 20 minutes would be more suitable to the target group.

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8/13
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Reflection/ Discussion:

About the result:

It seems to be a lack of consensus regarding future training needs. Training instructors are having a hard time visualizing the future of driver training and are generally skeptical to use gamification in driver training.

In the IO1 results showed that gamification was one of the least interesting methods for teaching drivers according to instructors, but in the IO2 evaluation we noticed a very positive view on the pilots after trying it. It might be that the gamification approach suffers from a bad understanding in combination with the unfortunate resemblance of childish games and apps.

Possible next step

Now, what can be improved -taking into consideration technical and societal developments within the next years? For the next step, an updated version 2.0, the following improvements are possible:

Long texts should be shortened or recorded by a speaker.

This would make it easier to access for people having problem with reading, people with cognitive disabilities but also increasing focus for an upcoming generation of drivers that is more used to consume information through video.

Apps should be prepared for use of people with

Instructions should be made shorter and easy to understand.

A working solution from the gaming industry can be to add instructions within gameplay so that you provide instructions into smaller notes during gameplay, on a "when needed-basis".

Shorter learning modules

Even if the app allows short periods of training, results show that training should be cut into smaller blocks. (This is also a current trend in eLearning, a.k.a. "Micro learnings") Both pilots were designed for short sessions, but training instructors used the training as something that should be done in one whole session. (like traditional training). In the future it would be great if training could be carried out even if you only have a minute!)

Instructors should be able to jump easily between different levels.

Especially for classroom training where you don't have time to go through all levels. The instructors would be able to start a discussion with one of the pilots, making it a group challenge and continue with a dialogue from there.

Reflections on ProLoader

One of the largest problems of app-based eLearning today would be the LMS (Learning management System) compatibility. There is a lack of common standards for connecting Android and iOS apps with LMS reporting. Today this makes it almost impossible for an

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FutureDRV Learning Solutions

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9/13
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instructor to invest in an eLearning module and get relevant data from it without technical expertise. The technical solutions will come, but not from the transport business, and only large operators and organisations will have the economy to run an LMS-based training with enough eLearning modules to cover several different training needs.

Test subjects asked for a way to simulate the actual outcome of a faulty loading scenario. (This is however a problem, since a majority of faulty loading does not always result in an accident)

The ProLoader is today limited to securing load with lashes or chains. The instructors see more use of this platform, e.g. load distribution, different trailer types and visualisation of a badly secured cargo. In just a few years, 3D graphics on smartphones will become more advanced because of increasing computing performance. We will also expect to see VR goggles that connects to smartphones for an immersed 3D-experience

Reflections on ProComm

Feedback from instructors tell us that the content scope was spot-on, but text in this training module was too long and people tend to lose interest. One suggestion was to use speaker voices to make it easier. The "3 answer choices", however would be time-consuming to listen to. The answering method could be improved by shorter text chunks, and dividing the levels into separate apps.

In a near future, we will probably have AI capable of understanding the voice of the driver. This would give the possibility to do trainings like e.g. role-playing while driving. Instead of providing answers, the driver can have a conversation with a virtual customer and get a score depending on the outcome of the discussion. The next step would be a personal AI coach that can check your theoretical skills and plan your training accordingly, always at your side.

Conclusions

Future driver training will look a lot different from today's training: We´ll see organizational, technical and learning solutions that come together like pieces of puzzles in the transport segment for the next years:

The digital transformation of the transport segment has just started. Companies, stakeholders, and drivers will get more digitalized, it´s just nothing that we can do to stop it:

Unions and driver associations must advice stakeholders in decisions, and in good time, according to the time plan. First helping out with driver shortage, later on making sure that the drivers stay in the transport segment by introducing more training.

Economy will force **stakeholders** to efficiency, demanding trained drivers that are able and willing to grow as an employee and take on new working tasks and responsibilities as they appear.

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Evaluation Report on the
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10/13
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Young **drivers** with digital experiences will accept and drive the change from the workers side. If the training methods and technology are matched to the individual, the training content relevant and shape proud, next generation drivers – they will stay in transport business longer.

And most important of all – **the driver instructors** need to carry out the new master plan, starting today! For this group of professionals, it´s important to look forward even if no one else does. It´s necessary to start reshaping the training now (within legal boundaries)

This takes a lot of innovative skills and maybe it is possible to find ideas for driver training in other segments like sales, management, service and ICT – that have come a long way in training already.
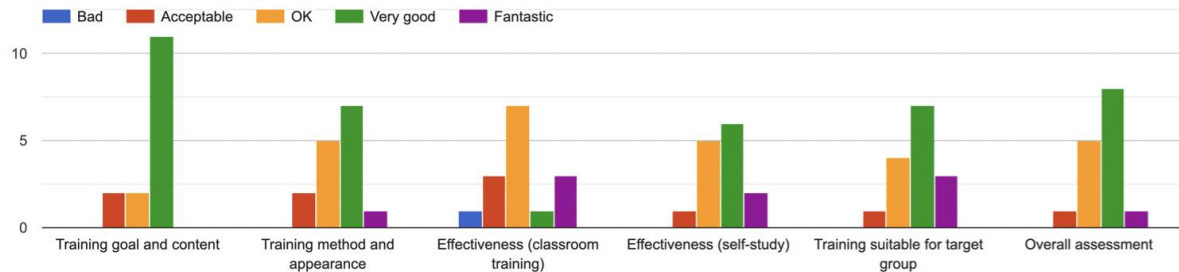
stage it

Questions about ProLoader

Questions about ProDriverCommunication

Describe some good features with these training apps

- Look and feel
- It appeals to target group
- Very good interaction capabilities (both apps)
- Great applications and convenient to use. ProComm: Good feedback from coach
- It's comfortable to do driver training at your own pace.
- These training apps are targeting industry-specific information with relevant issues. To a great extent they apply to both today's and future drivers.
- ProLoader: The need for a complete understanding in order to solve the challenges

Describe some things that can be improved with these training apps

- The story lines for the new day on the job
- Too much written text in Communication app, I suggest that the answers should be with spoken text as too much reading is involved. The load securing app is too complicated for self-learning purposes.
- Short learning units microlearning (ProComm)

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FutureDRV Learning Solutions*

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12/13
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- ProLoader: Less graphical quality when used on a PC browser
- **More training instructions**
- ProLoader: Somewhat hard to use on a small smartphone screen. It's probably better on larger tablets. It's still a great tool.
- ProLoader: Detailed instructions of what to look for (Though, the app was not in my native language)

Do you think these training methods reflect training methods of future driver training?

- If the contents change and the pages are easier to navigate
- Yes, communication app should be adjusted to target group as many level 2 students are illiterate or have weak reading skills.
- Yes absolutely. Both apps are very realistic and very motivated by the interaction.
- I think these apps are great together with classroom training, I'd like to see this as a pre- training for CPC.
- Yes, and future drivers will be more used to mobile games and gamification (than me)
- Yes, and it will be just as relevant for a long time to come...
- Educational materials are needed to increase your understanding of what is safe. Would be wonderful if the app could show what the consequence would be if you drive too fast in a curve with your faulty load securing) I also lack the feedback on what to look for if I did not get a full pot.

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