THE ADOPTION OF MOBILE LEARNING IN A TRADITIONAL TRAINING ENVIRONMENT: THE C95-CHALLENGE PROJECT EXPERIENCE

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ABSTRACT

Within the C95-Challenge Erasmus+ project, mobile learning technologies are adopted and tested for bus and truck drivers training according to the EU 2003/59/EC Directive.
Different kinds of training contents are developed in the form of interactive slides, hyper-videos, interactive quizzes and delivered on mobile devices. Existing apps and games are also considered to learn specific topics. The preliminary results from the target users involved in pre-pilot testing are positive: both trainers and drivers recognise the potential of these new learning technologies and understand the added value in terms of easy access to resources, mobile fruition, reduction of time, no need to move to a specific place for the training, engagement of the interactive material, flexibility in the training path. Users also identify some issues and provide interesting suggestions for future improvements.

KEYWORDS

Mobile learning, C95, drivers training, hyper-video, interactive slides.

1. INTRODUCTION

In the road transport sector, truck and bus drivers are constantly challenged with new rules and regulations. For this reason initial qualification and periodic training of drivers play an important role. However it is difficult to engage the drivers in systematic on-location training. The drivers' work situation requires flexible solutions, which do not force the training activity to occur in a specific place and time. Within this context, the C95-Challenge Erasmus+ project aims to explore new possibilities of offering the training required by the EU 2003/59/EC Directive to target groups, based on mobile learning and gamification. Both these technologies have a considerable potential in providing innovative training solutions. They can enhance the engagement and motivation of the target group, bringing the training provision closer to the labour market.

In particular, mobile learning offers a number of advantages (Mehdipour & Zerehkafi 2013) compared to traditional learning approaches; the most peculiar one is the ability to learn anywhere and at anytime using mobile devices. For example, drivers could review the rules to load properly their truck just before the loading procedures or refresh their knowledge about driving or working time. Other benefits of mobile learning include the relatively low cost of technologies, new options for multimedia content creation and delivery, the flexibility of content creation and sharing, the support for continuous and situated learning, the support for communication and collaboration, the availability of additional technologies such location based and augmented reality tools that can provide an added-value (Hamilton 2016, Catenazzi & Sommaruga 2013). In addition, the use of mobile technologies in combination with traditional in-class training has proven to be an effective instructional approach for intance in the context of a flipped classroom (Hwang et al. 2015).

Digital gaming and gamification have demonstrated powerful ways of engaging students in new forms of training provisions; however "there is no once-size-fits-all model for the successful gamification of a class" (Stott & Carman 2013); the choice of how to integrate gamification strongly depends on the context.

Exploiting the potential of these technologies, the C95-Challenge project intends to propose new solutions to improve the training experience of bus and truck drivers. The core activity of the project consists

of the creation of the C95-Challenge Training path with the associated training material and the definition of a methodology to create and access this material.

This paper will mainly focus on the training material produced for the first pre-pilot training of the drivers using different kinds of technologies. Preliminary evaluation results are also described.

2. INNOVATIVE LEARNING TECHNOLOGIES FOR DRIVERS' TRAINING: INTERACTIVE SLIDES AND HYPER-VIDEO

This phase was preceded by an extensive background evaluation on drivers needs in partner countries and a deep analysis of the most appropriate technologies in order to train bus and truck drivers according to the results of the user need analysis and the project requirement.

The state of the art emerged from the technological research shows a great potential of the considered technologies for the drivers' training that has not yet expressed in the transport sector. In particular, a number of apps and digital resources have been identified which can be used for drivers training. Most of them are made for a generic public but could also be useful in the design of a training course based on the EU 2003/59 Directive. Concrete examples are those apps that monitor fuel economy and provide real-time traffic and road information, or apps that help to calculate the number of lashings necessary for safe transport or for cargo loading optimization.

Although these resources (apps, game, etc.) can be very useful, they are not enough to completely satisfy the training objectives of the C95 project; there is the need to produce additional didactic material. At this purpose the technological review identified a large number of generic tools. The choice of the most appropriate technologies to produce new learning material was guided by a number of requirements. A basic requirement, mainly from the trainer point of view, is the ability to reuse existing content, typically slides. A lot of work and investment was dedicated to the creation of this content to be used in face to face lessons, which could represent a valuable starting point. From the learners' point of view, an important need is to be engaged and motivated, and to be able to use the training material not only during the lesson in the classroom but also outside of it for autonomous learning, especially when they are on the move.

Therefore we took the decision to make existing slides more interactive, by enriching them with other multimedia material, and making them available in a format that can be easly used on different devices. The objective was to have complete, self-contained and multiplatform material, in the form of web learning resources available on the web via any browser.

Another consideration was that for some learning objectives, in addition to slides, an effective training technology is video (Giannakos et al. 2014). The pedagogical impact of video can be summarized by three key concepts: interactivity with content, engagement, and knowledge transfer and memory (Greenberg and Zanetis 2012). In the project context, videos can be useful to practically show "how-to" procedures: for instance how to drive in an ecological way, or how to safely tie down goods on a truck. They can be used in the classroom as well as at distance, on desktop as well as mobile devices.

As for slides, the video content can be enriched with other elements such as active points, notes, links to external resources, including texts, images, audios/videos, quizzes or web pages, creating the so-called hyper-video. In addition, to allow direct access to specific parts, a hyper-video can be chunked into chapters, inserting a sort of visible landmarks which facilitates jumping to specific parts.

Finally, in order to increase motivation and engagement, quizzes were also considered for self evaluation purposes.

In conclusion, the most promising approach to produce learning material to drivers is found to be through interactive slides, hyper-videos and quizzes, which can be used on any device, and in particular on mobile devices such as tablet.

Once identified the delivery technologies for training material, the next step was the production of the training content based on a common training path defined among the partner countries. This path consists of 5 modules. For each module some samples were produced.

The process of content creation was the result of a collaborative work by the different partners. The interactive content production was not a trivial activity, due to the need for extra data each author had to add to her/his own content in order to make it interactive. Different actors were involved in the process with a different role and expertise: authors of the basic content (content providers), ICT technologists, people

responsible for the translation. A common methodology was necessary in order to explain the authors how to provide the basic content. This methodology was also required because of the heterogeneity of the team and the fact that content authors were not ICT technology experts.

For instance in order to create an interactive video, content authors have to provide a video, indicate the different video chapters, identify active points in the video and the associated action (e.g. show a text, an image, another video, show a quiz), and for each action they have to provide the necessary material. In order to produce interactive slides, content authors have to provide slides, enriched with other material: audio or video narration, quizzes, videos, links, etc.

The basic contents were first produced in English, and then translated in the different partnership languages: German, Italian, Polish and Spanish. Figure 1 shows an example of interactive slide on *ecodrive* of module 1, while figure 2 shows an interactive video on *tie-down of goods* of module 3.

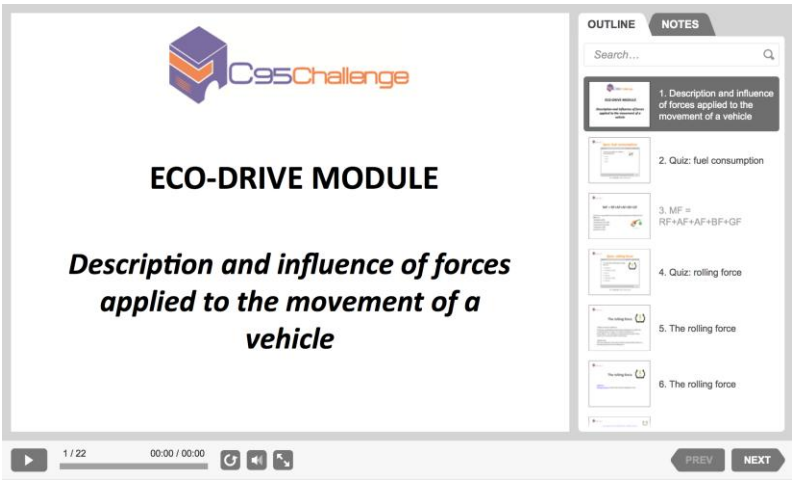

Figure 1. Interactive slides

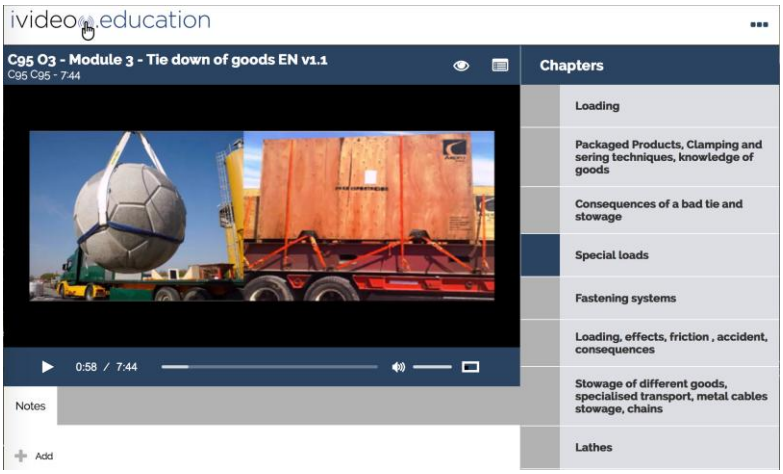

Figure 2. An interactive video

With respect to the choice of technologies, the iVideo hyper-video platform developed at IUFFP (www.ivideo.education) was chosen as the editor and player tool to produce hyper-videos for the features it provides. Other tools, such as vidzor (http://vidzor.com/), videopath (https://videopath.com/) or other mentioned by Borovoy (2014), were considered valuable for our purposes; however they have not been selected mainly to avoid dependency on third party services.

Concerning interactive slides and quizzes, the Ispring Suite (http://www.ispringsolutions.com/ispring-suite) was used for its interesting features: easy integration with PowerPoint, video lectures, interactive assessment, narration, portable cross-platform output, etc.

3. PRELIMINARY RESULTS FROM DRIVERS

Pre-pilot courses were organised in partner countries in order to test methodologies, contents and tools. Pre-pilot with drivers is the first step of the testing process that includes three phases: Pre-Pilot with Drivers, Fine Tuning for Trainers and Fine Tuning for Drivers.

During this first piloting phase, that was conducted in Autumn 2015, 44 drivers were involved in the different partner countries. The pre-pilot session had a duration of 8 hours.

The first part of the testing was focused on the Training Path created by C95-Challenge Project. Feedback and impressions were collected from drivers about the contents and their pertinence through questionnaires and interviews. The participants were requested to highlight how this training path met their needs and how it could be improved. The validation of the training path is the basis for future improvements and creation of additional educational contents.

The second part, more relevant in the context of this paper, was dedicated to the exploration of the interactive material produced by the partnership. After a brief description of the materials and the modules which the materials refer to, the drivers were asked to access online materials produced and test it autonomously. The session was planned in order to simulate an autonomous learning outside the class. The trainer was a facilitator and supported the trainees to solve the problems encountered.

The preliminary results of the pre-pilot with drivers show that the approach to the interactive material was something natural for the drivers involved. Although there were several 50+ trainees, the interaction with digital contents did not generate additional obstacles and problems. The use of mobile devices was considered a daily activity and was not perceived as a problem.

The use of mobile technologies in drivers' training was considered very useful and engaging. The motivation and interest of the participants are definitely increased. Most of the participants already experienced the problems related to the periodical training and were very motivated to use in future the methodology tested.

The participants highlighted, as positive aspects, the interactivity of the materials and the possibility to access them in a quick and easy way. The system is intuitive and makes the learning easier, confirming the choice of a simple and clean design for a direct access.

Drivers also identified some linguistic and minor technical problems that will be solved by updating the material and by providing suggestions for using the digital resources on the most appropriated devices and Internet connections.

The preliminary results are very encouraging but a comprehensive evaluation of the products can be done at the end of the entire piloting phase (Pre-Pilot with drivers, Fine Tuning for Trainers and Fine Tuning for Drivers).

4. CONCLUSION

Within the C95-Challenge project, mobile learning technologies and methodologies were used and tested for drivers training. Although these technologies are already in use in several contexts, the main innovation element of this experience is their application in a sector, the transport area, where they are not traditionally employed.

Different kinds of training contents were developed and delivered mainly in the form of hyper-video and interactive slides. Both approaches present a main learning content, respectively a video or a slide presentation, enriched with additional material such as text, images, audio/video, quizzes, games and links to other contents. In addition, interactive quizzes were created and different games and apps identified and considered to learn specific topics.

At this stage of the project development, some preliminary results are already available. In general both trainers and drivers recognize the potential of these new learning technologies for drivers training and understand the added value in terms of easy access to resources, mobile fruition, reduction of time and need to move to a specific place for the training, engagement of the interactive material, flexibility in the training path, information retrieval tools. However some difficulties were also experienced both in the production and use of the training material. During the production phase, the content authors had difficulty in providing good

quality material to produce the interactive slides and videos; the authoring tools are available but it was hard to fully exploit their potential.

During the pre-pilot test with drivers additional findings emerged. The methodology adopted seems very effective in order to improve the motivation of the drivers in attending the training. After the testing most of the participants declared to have improved their knowledge and to be interested in using this approach in the future. The materials have to be designed in order to minimize technical problems, improve usability and avoid language problems. The interactivity is the key factor for the success of this approach and should be enhanced through apps, games, quizzes and multimedia materials.

Feedback and findings emerged in this pre-pilot phase are currently considered to improve the interactive material for the next evaluation phase.

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