

Digital.VET: an innovative approach for teaching and training

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1. Introduction on context and motivation about Digital.VET

The significant changes that took place in the past decades and the big challenges posed at national and international level by the globalisation, the redefinition of the capital-labour relation and the technological revolution are bringing about a radical change of the economic, socio-political and cultural structures in European countries. VET (Vocational Education and Training) reforms (New Skills Agenda for Europe 2016) and labour market reforms have started a process aimed at filling the gap between demand and supply of competences. The demand of competences, in fact, is affected by factors requiring the constant adjustment of production and training processes as well as the greater connection between education/training system and enterprises. VET teachers must think about the training objectives required by the present innovations, taking into account the present cultural dynamic aspects and meet the students' needs by using adaptable teaching strategies, which can develop skills for inclusive participation and work independence. Digital training, included in national programmes, is essential in order to ensure effective training practices for the current VET system which is undergoing organizational and methodological change. The needs analysis carried out in early 2019 by each partner in its own territorial context has shown that out of 180 VET teachers/trainers belonging to both the private and the public sector, 91% stated that they have a poor knowledge of digital and immersive teaching methods and/or do not know how to use them effectively.

The project Digital.VET supports the objectives set out in national and European strategies for applying ICT (Information and Communication Technologies) to VET systems through teachers/trainers training. Its overall objective is to create a partnership among VET system operators aimed at the development of systematic approaches and of opportunities for the professional growth of VET teachers/trainers based on the development and innovation of education and training methods which are digital, open, innovative and effective. The partnership is made up of 5 VET and 1 IT organisations and has been implemented in 5 European countries: Poland, Italy, Portugal, Slovenia and Spain. It improves the technical knowledge as well as the expertise of VET teachers/trainers about the use of innovative and digital teaching methods by creating training pathways, training staff event and VET qualification which comply with EQF (European Qualifications Framework), ECVET (European Credit system for Vocational Education and Training) and EQAVET (European Quality Assurance Reference Framework for VET) European tools of recognition and transparency.

It has been based on the research carried out in partner countries, concerning best practices of

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flipped/mobile/virtual and augmented reality learning applied to VET sector, which have then be made available in a multilingual handbook (IO1); moreover, the job analysis set out the competence profile of experts in digital and immersive teaching in VET systems (IO2). Another important output of the project is the e-learning course for expert in digital and immersive teaching in VET systems (IO3). Starting from the definition of the training plan/curriculum, the teaching materials and resources have been developed and made available on a platform, which we have developed in the form of written texts, audiovisuals, images and support material. The goal of the course is to make teachers acquire technical knowledge and teaching skills related to a teaching model based on the use of digital, mobile, virtual and augmented tools. Final outputs have been the creation of iDid (IO4), namely an application for virtual and augmented reality teaching that have been available on App Store and Google Play, and the pathway for the assessment and self-assessment of the VET teachers and trainers who adopt digital and immersive teaching methodologies (IO5).

2. E-learning anti-elusive platform

The goal of IO3 is the creation of an e-learning course, with a duration of 60 hours at least, which has been based on the learning outcomes related to the competence units that have been outlined in the profile of the VET teachers and trainers who adopt digital and immersive teaching methodologies (IO2). Starting from the definition of the training plan/curriculum, the teaching materials and resources have been developed and made available on a platform, which we have developed in the form of written texts, audiovisuals, images and support material to go into detail. The required output is an on-line platform, where all the training materials can be uploaded and made available. The platform have been realised according to modern responsive and cross-platform standards. It have to be accessible on Windows, Linux and Mac operating systems. No additional software is required than a modern browser and, of course, an Internet connection. At the end of the course, a certificate will be issued to each participant to attest the success of the learning course.

The custom made Digital.VET e-learning platform was developed in order to provide the e-learning course for expert in digital and immersive teaching in VET systems, based on the training material made during the project. The goal of the course is to make teachers acquire technical knowledge and teaching skills related to a teaching model based on the use of digital, mobile, virtual and augmented tools. Trainers can upload their courses thanks to an easy content manage system (CMS) and also take the other courses uploaded by all the enrolled trainers. The e-learning platform is fully available on the website at the address <https://www.digitalvethub.com/fad>. On the platform there is the course developed during the project divided in three main modules, some of them are split in more learning units. Each learning unit is made up of a number of topics that is given by the number of hours of the learning. At the moment the course is provided in English and in the national languages of the partners.

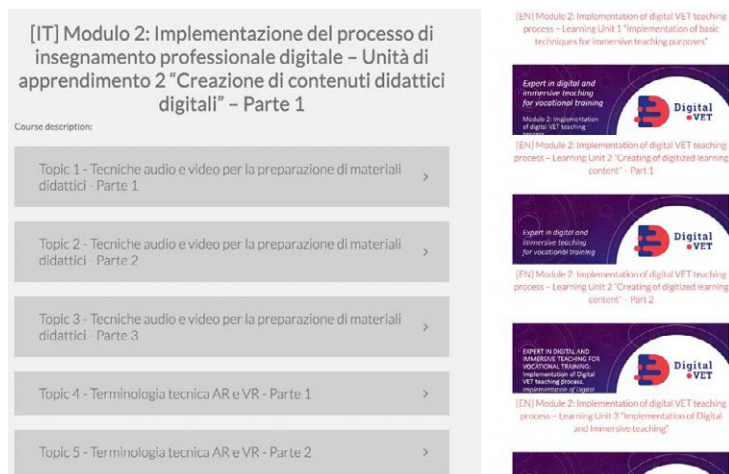


Figure 1. Screenshot of e-learning platform

Within the platform was developed a «personal area». In this section trainers can start to experiment with new technologies such as virtual reality (VR) and augmented reality (AR). Each trainer can upload 360 degrees videos and watch it in an immersive way using a cardboard or they can create ARTags associated to images, videos, GIFs that can be visualized by the provided scanner using mobile devices equipped with camera.

3. iDid application solution: app for digital and immersive teaching

The goal of IO4 was the creation of a mobile app for immersive teaching. iDid, is a hybrid cross-platform app accessible from personal computers (desktop, laptop) and mobile devices (available for Android and iOS mobile operating systems). Using the app, VET teachers and trainers are supported in the creation of training contents using virtual and augmented reality and digital technologies.

iDid app is a great breakthrough in the learning field thanks to the power of “i”nnovation, “i”nteraction and “i”mmersion. iDid app allows VET teachers and trainers to:

- Create, visualize and manage courses and training material;
- Upload virtual reality assets by using 360 degrees videos and making them accessible by the use of a cardboard that turns the smartphone into a viewer;
- Upload multimedia assets (images, videos, GIFs, texts) and managing and sharing of ARTags;
- Turn the smartphone into an AR scanner by the use of camera and printed ARTags;
- Manage a community-based system for sharing information and digital courses among teachers with the use of a Virtual Hub. The Virtual Hub allow the search of specific courses and the creation of a personal library by putting like in the favorite courses. As result, it is possible to set up a competition among trainers awarding the most ‘liked’ contents.

The first output produced is an app for Android and iOS smartphones. The app is available on the store of the corresponding operating system (Google Play for Android, App Store for iOS). The app is available in English and also in all partner's languages. There is no need to sign up to use the app: a guest user can navigate in the Digital Hub in order to discover the courses provided by VET trainers and download the materials. As guest user is possible to use the AR scanner using the central button in the bottom menu. When a user chooses a course a main page is showed. In the main page of the course, we can find a cover image, the title of the course and the description. Then, all the digital assets are presented. We can have different kinds of digital assets attached to the

course: documents such as PDF, AR content with the ARTag associated and VR content then can be showed using the smartphone.

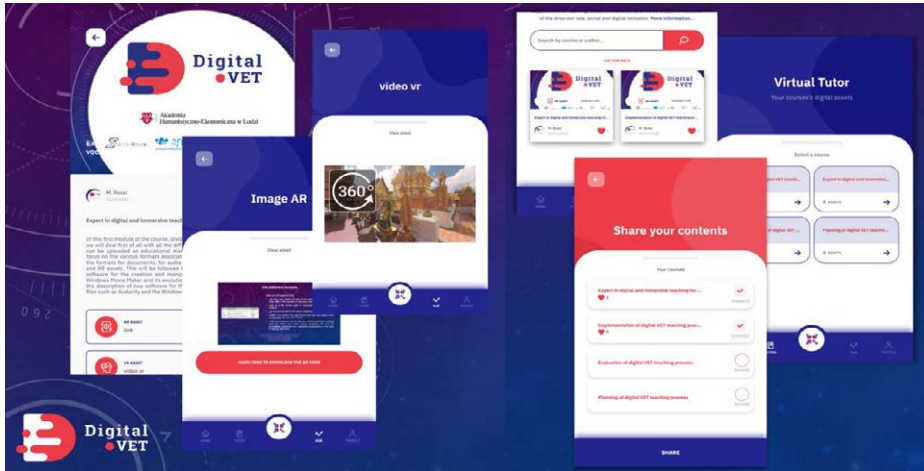


Figure 2. Examples of UI/UX of iDid

After the login, the tutor can view the «top contents» based on his/her likes. Tutor section, also, give the possibility to visualize and test the courses that are created from the tutor console. In this way, each tutor can check how other users can visualize his/her course after the sharing in the Digital Hub. Finally, the logged tutor can share his/her courses to make them public and available on the Digital Hub. Since it is a difficult work with large files for mobile devices, it is provided a tutor console for desktop access. This area can be used by teachers to create their courses and to upload all the digital materials created for the course. The console panel can be also used to manage all the courses created: it is possible to add new materials or edit the information provided within the course.

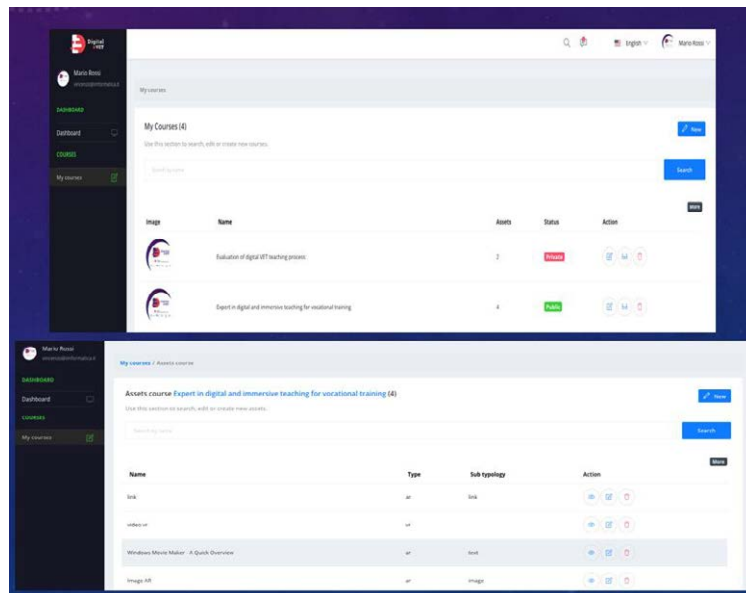


Figure 3. Screenshot of iDid tutor console

From the course page is also possible to manage all the assets such as AR, VR and other kind of documents.

In order to carry out knowledge transfer and testing of acquired skills an innovative paper board was created to experiment with the potentialities of the internet of things (2D barcode), AR tags and NFC (Near Field Communication) together with the iDid app.

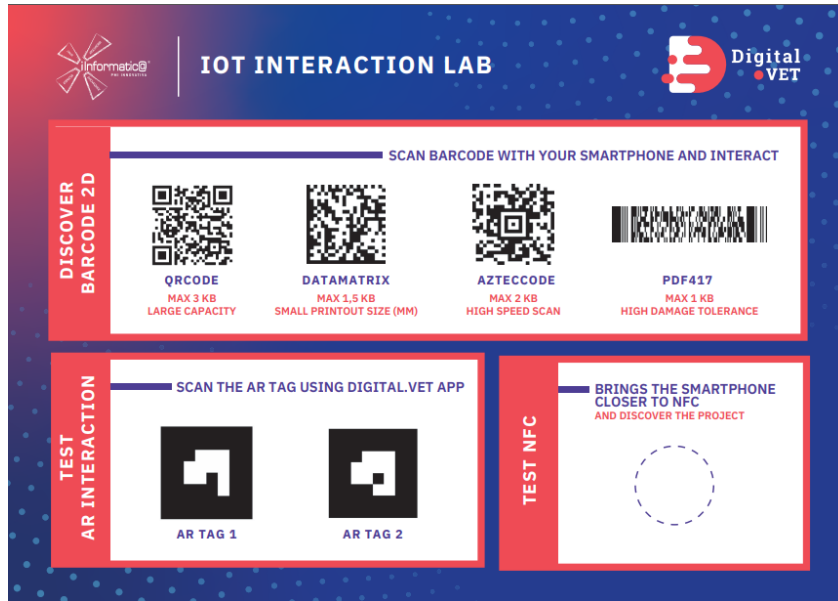


Figure 4. Screenshot of IoT Board for Interaction Lab

4. Nps survey on iDid

In order to understand the level of clarity and quality of the instrument created a questionnaire was organized and administered during the concluding event presenting the project to about 100 people, with a multifaceted and distributed age range (over 18), of training professionals, teachers, IT professionals, former teachers and staff employed in institutions in the area. The results were then evaluated in NPS (Net Promoter Score) terms to understand the "word of mouth" effect expected from the event presentation.

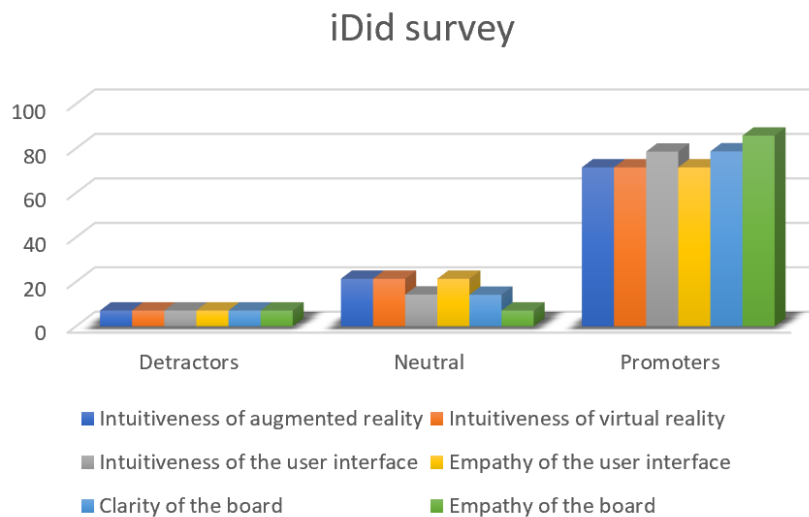


Figure 5. Data Analysis of iDid and board survey

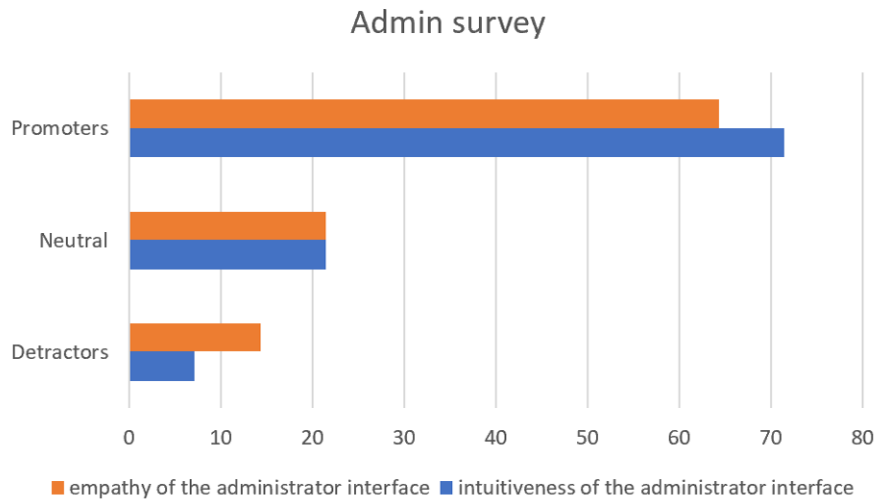


Figure 6. Data Analysis of admin survey

From the analysis of the data, it appears a nearly homogeneous behavior of detractors and promoters of the application in terms of the intuitiveness and empathic design (with NPS score above a score of 64) and of the board (NPS scoring above a score of 71.5). This confirms the good performance of the iDid application. Relative to the administrator dashboard, we note an NPS score in terms of intuitiveness of 64.4 while the empathy of the technical interface is lower than the user interface (50 versus 64.4).

5. Conclusion

This paper introduced the concept of training and the innovative lesson approach with the use of VR and AR technologies. Digital.VET opens a new path for flipping classroom approach and for a revolution in the teaching experience. We hope that this paper can be a guide to follow for the implementation of new training courses in our countries.

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