

ONLINE PLATFORM AND TRAINING METHODOLOGY IN MOBIVET 2.0: THE OPTIMUM TOOL FOR SELF-DIRECTED LEARNERS AND TRAINERS IN VOCATIONAL EDUCATION AND TRAINING

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Abstract

The paper presents a summary of the activities and the results with an impact in vocational education and training from the implementation of the MOBIVET 2.0 project. The project envisaged that the future of teaching would rapidly vacate the classroom and become heavily involved in distance-learning using Multimedia/Internet. The revolution from the classroom lecturer's "talk and chalk" to independent Mobile E-Learning requires a completely new and different didactical approach. Education process gets more focused on the availability and mobility needs of the students and more adapted to the changes in technology, as mobile devices become more versatile, software changes every few months and the wireless transfer rates increase. This process requires new teaching methodologies, training of trainers to keep them updated and validation of the best practices in the educational field. An online Learning Management System was implemented, a wide range of devices were used, ranging from desktop computers, to laptops, tablets and smartphones (with different Operating Systems, browsers and screen sizes and resolutions) to develop and test a number of seven courses in different study areas. Teachers and students from vocational education and training (VET) were assisted in the process and this led to the development of a "VET Teachers manual in using Mobile Web 2.0 tools and applications in online training and tutoring", an "online training and tutoring methodology" and a "self-evaluation methodology", with step-by-step guidance for users. The technical testing and the piloting activities in the project revealed that by using mobile technologies in teaching, the availability of information increases and thus educational activities better serve their purpose for the students. Also, the use of laptops, smartphones and tablets was preferred by the participants over the desktop computers in a ratio of 3:1, thus emphasizing the need for mobility and information availability.

Key words: e-Learning, mobile learning, mobile devices, interactive mobile learning environment, distance learning in VET

INTRODUCTION

Many EU citizens constantly seek ways to improve their professional development to remain competitive on the ever-changing labour market. As a result the number of self-directed learners, seeking for long-term development of knowledge and skills, grows rapidly. The dynamics of this process transforms the formal and informal learning

into lifelong learning. But the self-directed learners set new requirements to lifelong learning: to be better, faster, cheaper and easily accessible.

They also need an immediate effective support and back up from online tutors when they need help to successfully continue their online self-guided training.

Today there is a critical need for new improved and more efficient teaching/training

methodologies and techniques that will shrink the gap between all participants in lifelong learning and will provide teachers and trainers with new knowledge and skills helping them to design and manage up-to-date online training and tutoring processes.

As the technologies of communication (exponential increase in mobile Internet bandwidth with 3G, 4G, 4G+ and the future 5G transfer technologies, increase in storage space, processing power), the devices (new mobile devices such as tablets and smartphones, with new sensors and new technologies for user interaction) and software technologies are changing at a very fast rate, educational institutions at European level are more and more interested in developing and expanding the currently available technologies in e-Learning field. New innovative training materials also require new training methodologies, as well as new ways to deliver the educational content to the target groups, considering the growing need of mobility, availability, information aggregation and very fast response times among both students and adults in the labour market.

The Digital Agenda for Europe (DAE) aims to reboot Europe's economy and help Europe's citizens and businesses to get the most out of digital technologies. [3,4] It is the first of seven flagships initiatives under Europe 2020, the EU's strategy to deliver smart sustainable and inclusive growth. Among the 7 key areas for further efforts to stimulate the conditions to create growth and jobs in Europe, the third key area focuses on improving the digital skills and jobs. [4]

DAE stated that Europe is suffering from a growing professional ICT skills shortage and a digital literacy deficit. Only one of the nine ICT applications companies present in the Financial Times Global 500 list is European; only four of the top 54 websites visited across Europe are of European origin. The international Web Sites, Wikipedia (San Diego, USA), Facebook (Harvard University, USA), Google (Stanford University, USA), Twitter (St. Louis, USA), Yahoo (Sunnyvale, USA), Moodle (Perth, Australia) and internet shopping sites, EBay (San Jose, USA),

Amazon (Seattle USA) are examples of interoperable applications which are all based on WEB2.0 Technologies.

In this context, 7 organisations (2 universities, 2 training centres and 3 learning innovations oriented SMEs) from 7 countries (Bulgaria, Germany, Greece, Malta, Romania, Slovakia and Spain) joined efforts in implementing the project called "Mobile Web 2.0 e-Training for Vocational Education Trainers - MOBIVET 2.0" (LLP/LDV/MT/ TOI/02/2012). This project aims at filling the online training gap between the self-directed learners and VET trainers by developing mobile e-learning 2.0 knowledge and skills of the trainers, thus turning them from in-class trainers to skilled online tutors (e-tutors). In this way the project offers a strong support for current and further development of innovative Web 2.0-based tutoring methodologies, pedagogy approaches and practices, thus improving lifelong learning in EU. [7]

The findings and the conclusions of the Fourth report on vocational training research in Europe: modernizing vocational education and training (CEDEFOP) [2] include the following facts:

- 42% of the EU population indicated participation in lifelong learning activities;
- one fifth of the population of the EU refers to computer-based training when engaging in lifelong learning;
- only 4.5% of the population attended formal education/training courses;
- informal workplace self-learning is a key element for Continuous Professional Development (CPD);
- only a fifth of companies trained more than half their employees using e-learning;
- there is an unsatisfactory supply of e-learning materials adapted to the specific needs of organizations, and a general preference for more informal training tools.

MATERIALS AND METHODS

MOBIVET 2.0 project is using e-Learning materials and innovative methods as effective tools to broaden the e-skills and competencies of European VET practitioners (teachers,

trainers and tutors) and helps to develop adequate online training practices for effective distance tutoring of lifelong self-learning activities at the workplace and while being mobile, without time and distance barriers.

The first step was to create the educational framework based on the innovative results from four other successfully implemented projects: DeInTRA (reports, guidelines and toolkits for overcoming barriers and gaps for the implementation of innovative training methodologies) [1], CareIn (a learning environment based on Web 2.0 technologies used to teach health and care assistance workers) [5], MENUET (4 interactive e-books compatible with tablets and smartphones in fields of Web-Design, Open Distance Learning, Environment Protection and e-Commerce; one authoring tool for developing learning materials using Web 2.0 technologies; one toolkit to publish online and manage course assessments; one Learning Management System (LMS) platform; one guide on how to use e-books/e-textbooks effectively in teaching and learning) [10] and RESNET (methodologies and reports on developing and testing practices for effectively conducting and managing distance learning activities) [9].

Due to the advances in digital technologies, it is now possible to integrate multiple media into single educational applications. Multimedia applications on CD-ROMs and websites may incorporate text, pictures, audio, graphics, animations, simulations, full-motion

videos and links to other software or websites, thus greatly enriching the learning experience. In order to overcome the fact that a significant portion of learning is taking place outside of formal training providers - schools, colleges and universities, mobile devices are used to deliver content to learners.

New multimedia learning materials formats and new hardware devices require the development of new skills and methodologies of teaching and targeting trainers. An integrated method to overcome difficulties in the training of trainers was used in a course on how to develop interactive materials for their students by using actual mobile devices while attending the course. Another key important factor was to split the whole course into smaller modules and deliver them one by one, introducing each technology, followed by examples, in a constructive manner.

Another issue considered consisted in developing a common format in order to ensure a cross-platform compatibility with browsers and devices. Two important technologies were used to this purpose: HTML 5 and Adobe Flash, each with its advantages and disadvantages. The next step was to test the content developed by using each of these two technologies on multiple browsers (Internet Explorer, Firefox, Safari, Chrome, Opera). During the technical testing phase, there were assessed the interactivity with objects, the correct display of information on the screens, the ergonomics and portability aspects.



Fig. 1. Platform content delivery mechanisms depending on the web and mobile web (tablets and smart phones) browsers [6]

The e-learning content was tested on both desktop and laptop web browsers running on Linux and Windows Operating Systems, with LCD screen resolutions ranging from 1280 x 720 to 1366 x 768, as well as on mobile devices (both tablets and smartphones) from 4.5' to 10.1', running Android and IOS Operating Systems.

Regarding the creation of the content, the following work-flow was used: Analysis of the written course, creation of the learning material scenario (script), design and creation of the visual materials, content development and programming, integration of the content into the platform, technical evaluation of the functionalities of the multimedia objects, scientific evaluation of the content and publishing the content online.

As regarding the LMS (Learning Management System) used, Moodle was the solution chosen as the best fit, following a technical market survey and considering the series of advantages: simplicity in use for teachers and students, compatibility with a large number of learning content formats and devices, good scalability and because it is open-source, free to use and the most popular open-source e-Learning environment with over a million users in 2010 [8,11].

There are also activities in the project focusing on evaluating teaching methods by using mobile devices from both the teachers' and the students' perspectives. To this purpose, test beds were organized in partners' countries with piloting activities for 7 courses developed in the project: "e-learning practices in VET", "Applying social media in VET", "Web 2.0-based Mobile Technology in VET", "Emotional Intelligence in the Workplace", "The Green Office", "Intercultural Skills", and "Leadership Skills".

In Romania, the evaluation survey was carried out online, during a period of two months. For the students' evaluation, there were 210 registered participants, with a gender distribution of 52% male and 48% female students and with 86% of the students over 18 years old. For the teachers' evaluation, there were 100 registered participants, with a gender distribution of 66% male and 33%

female teachers and with a majority of 67% of the students over 40 years old.

RESULTS AND DISCUSSIONS

Courses content format

The results of evaluating the best fit new technologies for content development indicated HTML 5 (a markup language for structuring and presenting content for the World Wide Web and a core technology of the Internet) with CSS 3 (Cascading Style Sheets - a style sheet language used for describing the presentation semantics (the look and formatting) of a document written in a markup language) and JQUERY (a multi-browser JavaScript library designed to simplify the client-side scripting of HTML).

For the eBooks format of the courses, a very nice instrument that was used and was very well received and appreciated by both teachers and students, is called *PageFlip*.

The Learning Management System platform

The flexible layout elements offered by the Moodle platform helped to organize the learning content depending on the course/teachers/ students needs. Also it offered the advantage of interface responsiveness (adapt the displayed contents depending on the screen size and resolution of the device used to access the platform, without having to publish the learning content multiple times). Other useful modules, available since version 2.x that were used, include:

People: This block contains a link to the list of participants enrolled in the course.

Activities: Lists and allows navigation between the different activities available in your course (e.g., Forums, Quizzes, and Assignments).

Recent Activities: Shows participants updates since they last accessed the course.

Search Forums: Allows the user to search the course's forums for a specific word or phrase.

Navigation Block: It appears on every page of the site. It contains an expanding tree menu which includes My Home, Site Pages, My Profile and Courses.

Latest News: Displays recent posts made to the News Forum.

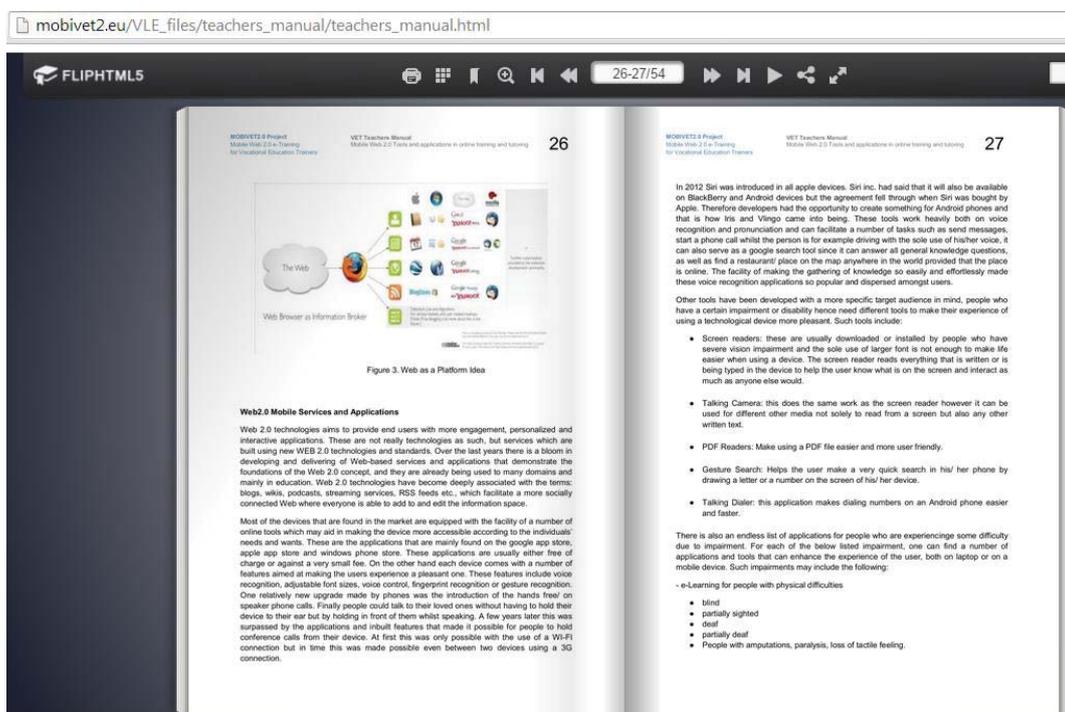


Fig. 2. Using PageFlip instrument in HTML 5 to view the contents of an e-book

Upcoming Events: Displays upcoming events in the course, particularly ending dates associated with assignments and quizzes.

Content Area: The area where course resources and activities are placed students.

Settings Block: The settings block provides context-sensitive links to settings pages. The *Switch role to* link has also been moved to the Settings block.

Browsers

The results from testing the compatibility and the response times of different browsers indicated Chrome as the best browser for laptops and desktop computers and Safari for tablets running on IOS Operating System (v.6.1.x and newer).

Statistical analysis of the Evaluation Form about student attendants' perception regarding the MobiVET training courses revealed the fact that students have studied the course materials in proportion of 67% from their residences revealing the tendency towards self-learning, one of the main objectives of the project. The remaining percent of 33% of students studied the courses at school, one of

the reasons being the fact that MobiVET training courses offered students the possibility to receive guidance from their teachers. Even so, more than 90% of the students that studied from school indicated the fact that that they needed partial or no guidance from their teachers, contrariwise the small proportion of students that needed full guidance.

The perception of the students regarding the content of the courses revealed the following aspects: 71% of the students indicated that the content of the courses were clear enough to be understood, meanwhile 29% considered that the courses were very specific and easy to understand and none of the students found the courses difficult to understand.

As seen in the pie chart, 45% of the teachers are teaching in upper secondary education - theoretical profile high-schools, followed by a percent of 33% that are teaching in upper secondary education - technology profile high-schools.

In order to complete the information about students' perception over the MobiVET courses that they have studied, in the final part

of the Evaluation Form, the students were asked to give additional feedback and further suggestions in order to improve future training courses.

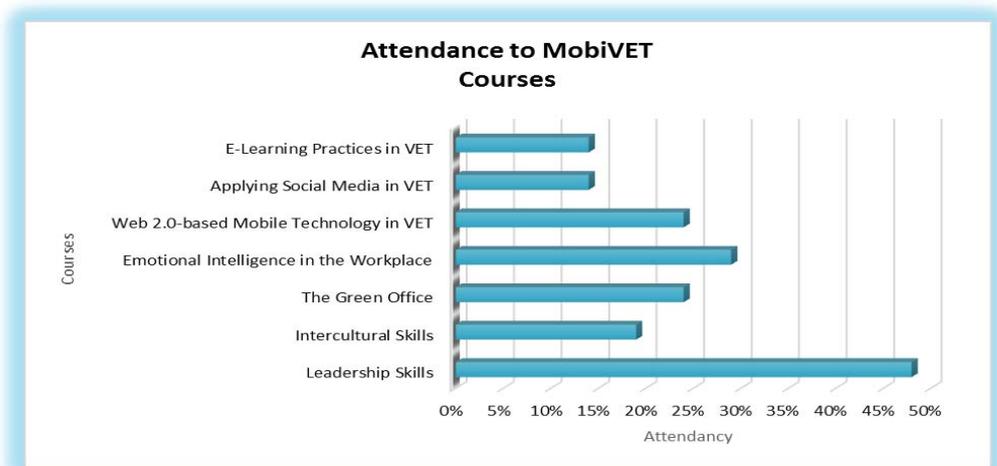


Fig. 3. Participants' (students) attendance to MobiVET Courses
 1.

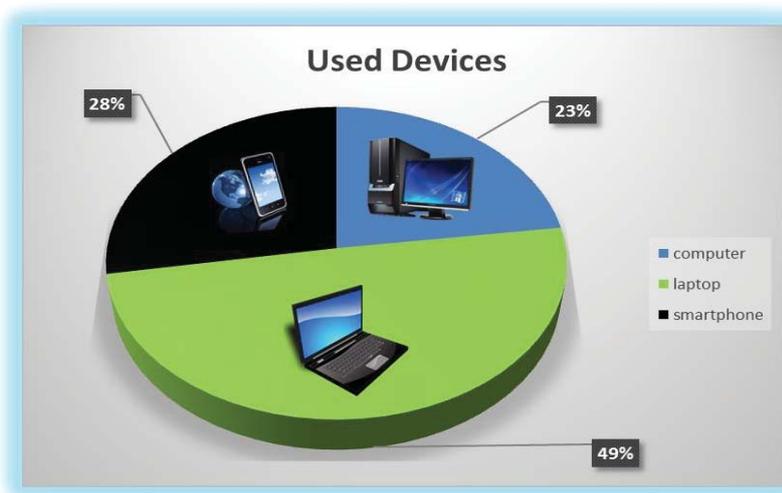


Fig. 4. Devices used to access courses by the students

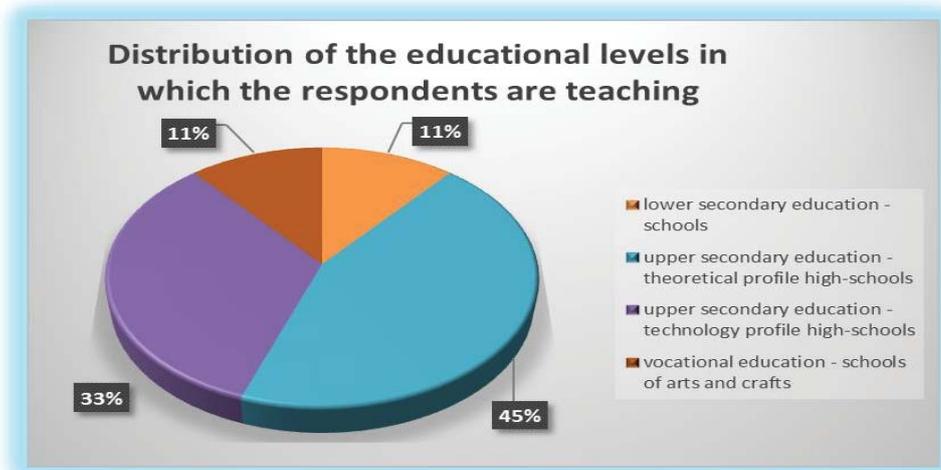


Fig. 5. Distribution of the educational levels in which the respondents (teachers) are teaching

With a majority of 52%, students declared that future courses should continue being structured and contented in the same way the ones that they have studied did, meanwhile the other 48% suggested the extension of the courses with further information and additional materials and none of the respondents indicated that the courses should reduce their size.

The information contained by the e-Handbook: "Guide to Using Web 2.0 Technologies in Training" was totally or fully unknown by teachers and helped them to become more familiar with mobile training technologies.

CONCLUSIONS

The Future will be led by Multimedia E-Books, which will seamlessly include all the functionalities currently offered by MOODLE, enabling Independent Mobile Learning for the pursuit of knowledge.

With totally automatic assessment, marking and grading, these interactive e-Books will be used by more and more people all over the world.

By using mobile technologies in teaching, the availability of information increases and thus educational activities better serve their purpose for the students.

Implementing such systems at a greater scale may encounter a small amount of resistance at first, associated with situational inertia and educational conservatism. But, if it is correctly correlated with the continuous advances in technology in the sense of adding educational value with the new interactive content, these issues can be easily overcome by stimulating the enthusiasm of new things and the expectations met by the utility of these new learning materials and methods.

In order to be able to keep up with the new technologies and trends, constant training programs must be developed and applied to trainers, who must continuously reinvent themselves.

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REFERENCES

- [1] Ciuca, V., Lincaru, C., Grecu, L., 2009, Innovative Methodologies in Lifelong Learning, DeInTRA Project "Cooperation for Innovative Training Methodologies Deployment in the European Labour Market". International Conference on Education and New Learning Technologies, July, 6-8, 2009 Barcelona, Spain and <http://www.deintra.eu>
- [2] Descy, P., Tessaring, M., 2008, (eds). Modernising vocational education and training: fourth report on vocational training research in Europe: background report, volume 3. Luxembourg: Publications Office, (Cedefop Reference series). http://www.cedefop.europa.eu/etv/Upload/Information_resources/Bookshop/567/3050_3_en.pdf
- [3] Digital Agenda for Europe, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, May 2010, http://ec.europa.eu/information_society/digital-agenda/documents/digital-agenda-communication-en.pdf
- [4] Digital Agenda for Europe <http://ec.europa.eu/digital-agenda/digital-agenda-europe>
- [5] Emotional Intelligence care in health and social assistance, <http://www.carein.eu>
- [6] Luminosity Studio – eLearning Authoring Solution, Collaborative and rapid eLearning authoring solution in HTML5 <http://www.cm-group.co.uk/products>
- [7] Mobile Web 2.0 e-Training for Vocational Education Trainers <http://www.mobivet2.eu>
- [8] Open-source Learning platform. Moodle.org, <http://moodle.org/>
- [9] RESNET 2008-2009, Project № 2008-1-SK1-LEO05-00227, Slovak University of Agriculture, <http://www.resnet-project.org>
- [10] The MENUET Project, Mobile E-Novative Use of E-learning Technologies (MENUET) <http://141.85.252.215/menuet>
- [11] The MENUET E-Book: "ODL techniques", <http://menuet.etcenter.ro>, 2010