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## **TECHNICAL INNOVATION IN BLENDED LEARNING: AN EU PROJECT ON CONTINUOUS VOCATIONAL EDUCATION USING MULTIPLE DEVICES**

*Peter Mazohl, University of Technology Vienna, Austria, Ebba Ossiannilsson, Swedish Association for Distance Education, Sweden, Harald Makl, Pedagogical University College, Austria*

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### **Introduction**

This ERASMUS+ project Technology Innovations in Blended Learning (TIBL) is a two-year project (2017-2019), aiming to develop high level continuous vocational education and training (C-VET) courses for training performed in formal and in non-formal C-VET education. These courses use blended learning (Adams Becker et al., 2017; Bates, 2015, Bates, 2016, 2017; Christensen, Horn, & Staker, 2013, Daniel, 2016; Christensen Institute, 2015; Ossiannilsson, 2017; Taylor, 2013) as a technology enhanced method and focus on the use of multiple devices, such as Smartphones and Tablets (used by the trainees in their everyday life) to develop professional competencies that will close the expectation gap between trainees and companies. The innovative approach in this project embraces the implementation of a trainee-focused pedagogical framework based on heutagogy (Blaschke & Hase, 2016; Hase & Kenyon, 2000), the development of an all-encompassing quality enhancement framework (including also the pedagogy approach), and the exploitation of various technical equipment (the multiple devices). The project is complementary to a Grundtvig Multilateral project by transferring the theoretical developed outputs to a practical implementation in a different (but similar) educational sector.

The partners of the project combine knowledge and experience from VET training institutions with the research and innovation potential of universities. In addition, a national organization for distance education is a partner.

The partners in the project are:

- The Fundación Escuelas Profesionales Sagrada Familia (SAFA), who also is the coordinator
- The European Foundation for Quality in Blended Learning (EFQBL), is a VET and trainers' education organization
- The Università Degli Studi Di Roma La Sapienza, DigiLab, specialized in multi devices
- The University of Aveiro that are specialized in innovation in technology enhanced training and the related pedagogy; and

- The Swedish Association for Distance Education (SADE), who are experts in distance learning and quality enhancement frameworks.

The pedagogical framework includes as a new pedagogical approach the trainees view. The team focuses on the real needs, based from the current state of the art of literature, and proved by the feedback of the trainees of the pilot courses. The framework will combine active learning, micro learning, especially in the distance learning, and the use of multimedia, especially interactive videos (Peters, 2007). This approach is even described by Bergmann et al. (2017). Sung et al. (2016) mentioned that qualitative analyses of the use of multiple devices are still missing. Within the project currently used devices were analysed, and a list of features, mainly technic-based, were identified. This study is the bases of the development of multimedia-based material which will be able to be used on all multiple devices during the training. The study impacts as well into the implemented features of the Moodle (Moodle, 2018) platform which is used for the distance learning. The pre-decision has been made to use HTML5 as a page description language which is delivered by Moodle as a standard (Moodle, 2016). Quality related concerns are focused and based on the European Association of Distance Teaching Universities (EADTU) E-xcellence benchmarking tool (Roswell, Kear, Williams, et al., 2016; Ossiannilsson, Williams, Camillari, & Brown, 2015). In addition, current European frameworks are used as the Open Education framework (Inamorato dos Santos et al., 2016) and the DigComp2.0 for Citizen, and the DigCompEdu 2.0 framework (Redecker & Punie, 2017). The project has also its foundation in the outlines and trends of the fourth industrial revolution described by Schwab (2016) and the UNESCO guidelines for Education for all (UNESCO, 2015a; 2015b).

## **Aims of the project**

The project aims to develop C-VET training courses for training performed in formal and in non-formal C-VET education. C-VET in this context means continuous (or further) education of people working in a specific profession (Ng, Lam, Ng, & Lai, 2017). These courses use blended learning as a technology enhanced method and focus on the use of multiple devices, provide two frameworks (for the pedagogical training approach and the necessary quality enhancement) and supply trainers and training organisations in course creation by a special web-based tool. Three main aims will be addressed in the TIBL project, which all are based on principles defined in the call of the European Commission 2017 (European Commission, 2016), which are (a) enhancing access to training and qualifications for all, (b) Open and innovative practices in a digital era, and (c) equality for trainers and trainees.

The Intellectual outcomes for the project Technology Innovations in Blended Learning (TIBL) are:

- Pilot courses, developed and implemented in formal and non-formal C-Vet (continuous vocational education and training).
- A toolbox for trainers completed by a MOOC to assist trainers in course creation.
- A transferability and evaluation guide to enable the use of the findings also in other educational fields.

## **Addressed target groups**

The project addresses several defined direct and indirect target groups, which are:

- Trainees involved in continuous vocational education (C-VET) both in formal education and non-formal).
- Trainers responsible for courses in C-VET.
- Training organizations developing courses for C-VET.
- Small and media enterprises (SMEs) interested in innovating their internal further education.
- Decision makers, involved in training, and companies, which care for continuous professional development (CPD) for their staff.

## **Method**

The used methods for this project followed a classical way with systematic literature reviews on current international research and trends within the areas of the scope of the project. In addition to that, learners' needs, according to the target groups will be identified, and analysed. The consortium is using the new developed digital competence frame of the European Commission, the DigiComp 2.0 (2018); and Dig CompEdu (Redecker & Punie, 2017) and focus on the described key competences from three different areas, which are Communication and Collaboration, Digital content creation, and problem solving. The project is in its initial phase; hence all references cannot be cited in the scientific way in this proposal, references are listed to explain our theoretical approach.

## **Results**

The project is very much in its initial stage; however, the first initial findings and results are available. Initial results cover the development of the training considerations (based on the pedagogical state of the art), a study about the use of multiple devices for the training, mainly in the distance phase, the structure of the first pilot course, and a preliminary design outline for the MOOC, and the Toolbox, which will be developed throughout the project. The quality framework was also identified and implemented as well as the concerns of digital competences.

### ***The concerns of multiple devices***

The project is based on the principle that learners use their own devices. This covers the complete range of digital devices, starting with personal computers (for example in offices), laptops, notebooks, tablets, or smartphones. The consortium developed a strategy to deliver the courses in an interactive and multimedia-based way supplying the learners best. This needs several restrictions, for example for the use of smartphones due to the small displays and the resulting problems with interactive multimedia-based content. All proposed and used tools can be used free or are licensed under a CC license.

### ***Used frameworks for course development and course quality***

The project uses two frameworks developed in the European Community. These are the Excellence (framework for course development developed by the European Association of Distance Teaching Universities) (Ossiannilsson, Williams, Camilleri, & Brown, 2015; Roswell, Kear, Williams, Ossiannilsson, et al., 2016). This framework offers guidelines to management, curriculum design, course design, course delivery, and the support of staff as for students as well. This framework was originally developed for higher education but is adapted to VET education by the consortium. The other one is the DigiComp2.0 framework, briefly described below.

### ***The digital competence framework***

The DigiComp 2.0 framework was developed by the Joint Research Center (JRC), the science hub of the European Commission (JRC, 2018). It describes the necessary digital competences for European citizens (DigComp, 2017). As all people from the target groups (trainees, trainers, and finally the stakeholders from the small and media enterprises (SMEs) are in this group the consortium refers to this framework in all cases dealing with digital competence (Geetika & Venkatraman, 2017). This is for example the digital content creation (for trainers' trainers) but as well the information and data literacy (for trainees). All the considerations of digital competences are collected in the MOOC (for trainers) and used for the course creation. Even the DigCompEdu framework by JRC (Redecker & Punie, 2017) will be used.

### ***Pedagogical and training framework***

The development of a pedagogical framework best fitting to employed C-VET learners has been done by the consortium. This framework is published at the webpage as a first result (as an Open Educational Resource OER) and can be downloaded for free. When the EDEN conference is in June 2018 we are about to have some more results to present.

### ***Course concept for non-formal education***

With the umbrella organisation of the Sakralenergetiker in Austria the new training course implemented as a blended learning training was designed. In this course, all the relevant findings, frameworks, and innovations are used to create a modern C-VET (and as a follow up additional VET courses for the education and training of Sakralenergetiker. This profession is part of medical care and human therapy.

The project is expected to gain feedback of real VET learners involved in blended learning courses using multiple devices. This feedback is used as an outcome to the development of the trainers' toolbox. This toolbox will hopefully merge practical use and inhomogeneous technical devices (Sung et al., 2016) as well as the expectation gap (mentioned in the beginning) The specific proposal for training methods like the use of multimedia content, interactive videos based on micro learning will bring a better training environment and motivate the trainees in their working life and conditions.

## Conclusion

The first initial results point into the direction that the use of technical devices is standard in VET learning and humans expect to use it for their learning. For the course as such, it is difficult to estimate in an inhomogeneous group which devices to be used. The course creator must care for an overlapping average of the provided material covering all used multiple devices.

The use and the adoption of existing frameworks enables a high flexibility, uses knowledge and experience transfer from other European projects, but leads to an independent but well-fitting development of technology enhanced VET trainings.

The initial research even points to that the technical features are due to both the devices, as such but also to the used operating system. The used learning platform Moodle basically delivers content in a HTML 5 format which is displayed at all devices offering standard tools to display the content. Further research and tests are thus necessary to define precisely which material can be delivered and used by all devices. Other findings are the time factor in the learning process. Time must be used efficiently by VET learners. The use of multimedia in combination of workplace based micro-learning seems to be a promising approach. Following the approach of flipped learning for vocational and professional education and training (VPET) some considerations of Bergman will impact to the project, for example the use of multimedia based micro-learning or interactive videos.

## References

1. Adams Becker, S., Cummins, M., Davis, A., Freeman, A., Hall Giesinger, C., & Ananthanarayanan, V. (2017). *NMC horizon report: 2017 higher education edition*. Austin, Texas: The New Media Consortium.
2. Bates, T. (2015). Teaching in a digital age: Guidelines for designing teaching and learning for a digital age. [Blog post]. Retrieved from <https://opentextbc.ca/teachinginadigitalage/>
3. Bates, T. (2016). Are you ready for blended learning? [Blog post]. Retrieved from <https://www.tonybates.ca/tag/blended-learning/>
4. Bates, T. (2017). What is online learning? Seeking definition [Blog post]. Retrieved from <https://www.tonybates.ca/category/teaching-and-learning/blended-learning-teaching-and-learning/>
5. Bergmann, J., Smith, S. T., & Clair, E. (2017). *Flipped learning 3.0. The operating system for the future of talent development* (1<sup>st</sup> ed.). Irvine, CA: FL Global Publishing
6. Beetham, H. (2014). *Students expectations and experiences of the digital environment*. Retrieved from <https://digitalstudent.jiscinvolve.org/wp/files/2014/06/Outcomes-from-Glasgow1.pdf>
7. Blaschke, L. M., & Hase, St. (2016). Heutagogy. A Holistic Framework for Creating Twenty-First-Century Self-determined Learners. In Gros, B., Kinshuk, M., (Eds.), *The*

- future of ubiquitous learning. Learning designs for emerging pedagogies* (pp. 25–40). Heidelberg: Springer (Lecture Notes in Educational Technology).
8. Christensen, C., Horn, M., & Staker, H. (2013). *Is K-12 blended learning disruptive? An introduction to the theory of hybrids*. Clayton Christensen's Institute for disruptive innovation.
  9. Christensen Institute (2015). *Blended learning definitions*. Retrieved from <https://www.christenseninstitute.org/blended-learning-definitions-and-models/>
  10. Daniel, J., (2016). Making sense of blended learning: Treasuring an older tradition or finding a better future? Contact North Contact Nord Research Associate [Blog post]. Retrieved from <https://teachonline.ca/sites/default/files/tools-trends/downloads/makingsenseofblended.pdf>
  11. DigComp (2017). Digital Competences Framework for Citizens. Retrieved from <https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework>
  12. EQAVET (n.d.). Quality Assurance reference framework. Retrieved from <http://www.eqavet.eu/qc/gns/home.aspx>
  13. European Commission (2016). *Erasmus+ Program guide*. Retrieved from [https://ec.europa.eu/programmes/erasmus-plus/sites/erasmusplus2/files/2017-erasmus-plus-programme-guide-v2\\_en.pdf](https://ec.europa.eu/programmes/erasmus-plus/sites/erasmusplus2/files/2017-erasmus-plus-programme-guide-v2_en.pdf)
  14. Geetika, M., & Venkatraman, A. (2017). "The great divide": skill gap between the employer's expectations and skills possessed by employees. *Industrial and Commercial Training*, 49(4), 175–182. doi: 10.1108/ICT-11-2016-0071
  15. Inamorato dos Santos, A., Punie, Y., & Castaño-Muñoz, J. (2016). *Opening up Education: A Support Framework for Higher Education Institutions*. JRC Science for Policy Report, EUR 27938 EN. doi:10.2791/293408
  16. Moodle (2016). Join The Conversation On New Moodle HTML5 Media Player and Standards. Retrieved from <https://www.moodlenews.com/2016/join-the-conversation-on-new-moodle-html5-media-player-and-standards/>
  17. Moodle (2018). Moodle. Retrieved from <https://moodle.org/>
  18. Ng, R. Y. K., Lam, R. Y. S., Ng, K. K., & Lai, I. K. W. (2017). Identifying the Needs of Flexible and Technology Enhanced Learning in Vocational and Professional Education and Training's (VPET) Workplaces. In Wai Kit Will Ma, Chi Keung Alex Chan, Kar-wai Tong, Heidi Fung, Cheuk Wai Rose Fong (Eds.), *New Ecology for Education -- Communication X Learning. HKAECT-AECT 2017 Summer International Research Symposium. 1<sup>st</sup> edition 2017*. Singapore: Springer Singapore.
  19. Ossiannilsson, E., Williams, K., Camilleri, A., & Brown, M. (2015). *Quality models in online and open education around the globe: State of the art and recommendation*. The ICDE report series. Oslo: The International Council for Open and Distance Education.

20. Ossiannilsson, E. (2017). *Blended learning, The state of nations*. Oslo: International Council for Open, and distance Education (ICDE). Retrieved from <https://icde.memberclicks.net/assets/RESOURCES/Blended Learning ICDE Insight Paper 2017 compressed.pdf>
21. Peters, K. (2007). m-Learning: Positioning educators for a mobile, connected future. *The International Review of Research in Open and Distributed Learning*, 8(2). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/350/894>
22. Redecker, C., & Punie, Y. (2017). *European framework for the digital competence for educators: The DigCompEdu*. Retrieved from <https://ec.europa.eu/jrc/en/publication/euro-scientific-and-technical-research-reports/european-framework-digital-competence-educators-digcompedu>
23. Roswell, J, Kear, K., Williams, K., Ossiannilsson, E., et al. (2016). *The European quality benchmark for online, open and flexible education*. The European Association of Distance Teaching Universities (EADTU). Retrieved from <http://e-xcellencelabel.eadtu.eu/>
24. Schwab, K. (2016). *The 4<sup>th</sup> industrial revolution*. Geneva: World Economic Forum.
25. Sung, Y., Chang, K., & Liu, T. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance. A meta-analysis and research synthesis. *Computers & Education*, 94, 252–275. doi: 10.1016/j.compedu.2015.11.008.
26. Taylor, M. (2013). *Optimizing Pedagogy for Blended Learning*, Weinberg College of Arts and Sciences. Retrieved from <https://web.madstudio.northwestern.edu/optimizing-pedagogy-for-blended-learning/>
27. UNESCO (2015a). *Education 2030 Framework for Action: Towards inclusive and equitable quality education and lifelong learning for all*. Paris: UNESCO.
28. UNESCO (2015b). *UNESCO and Education 2030: Framework for action and sustainability development goals4, SDG4*. Retrieved from <http://en.unesco.org/sdgs>

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