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## **A MOOC FOR ENTREPRENEURSHIP EDUCATION, ADOPTING A CRITICAL TECHNOLOGY. AN EXPERIENCE CARRIED OUT AT THE DHITECH TECHNOLOGICAL DISTRICT IN APULIA (ITALY)**

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### **Abstract**

Training a group of graduate students based in Apulia (Italy) is part of a wider project, the Activating VINCENTE: “Innovating engineers/ Entrepreneurs specialised in Technological Entrepreneurship Ecosystems”, funded within the EU National Operational Plan, (PON02\_00563\_3470993). The main aim of the project is to create the specific profile of a high tech innovator and entrepreneur, specialised in defined areas of knowledge, endowed with skills and attitudes able to transform technology and/or research results in a new business model to create economic and social value (technological entrepreneurship)<sup>1</sup>. Within the above training course, LPS-Laboratory for Experimental Research (University Roma TRE) was in charge of teaching two modules, where the main task to be carried out by the in-training students was to devise an effective MOOC in Entrepreneurship education. The present contribution highlights the background at the basis of the specific training idea and describes the results of the inquiry carried out with the in-training graduate students, with the aim of reflecting in strengths and weaknesses of such innovative ways of carrying out open education.

### **Background and state of the art**

The project idea complies with various EU policies, for instance HORIZON 2020 “Implementing the Small Business Act: to promote entrepreneurship, strengthen SMEs and increase the efficient use of human resources”. In addition, this approach to innovation and entrepreneurship is in line with the view expressed in ‘Innovation Tomorrow’ by the European Commission and the “European Strategy for Smart, Sustainable, and Inclusive Growth”. Promotion of a networking approach, involving various stakeholders, especially from the entrepreneurial world, in Higher Education teaching and learning processes, will improve the Quality of Higher Education Impact (see Poce, 2010).

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<sup>1</sup> [http://dhitech.it/downloads/PON02\\_00673/Prot.n.73del\\_8.2.2013\\_Bando61borse.pdf](http://dhitech.it/downloads/PON02_00673/Prot.n.73del_8.2.2013_Bando61borse.pdf)

In “Entrepreneurship education at school in Europe” (EACEA, 2012, p.7) the following concept is underlined: “a dynamic economy, which is innovative and able to create the jobs that are needed, will require a greater number of young people who are willing and able to become entrepreneurs – young people who will launch and successfully develop their own commercial or social ventures [...] Entrepreneurship education is essential not only to shape the mind-sets of young people but also to provide the skills and knowledge that are central to developing an entrepreneurial culture”.

The project in-training students will benefit from creating the so called “knowledge triangle” of education, research and innovation and start strong links among higher educational institutions, research centres and industry. This project is meant to support the solution of the crucial problem of employment and self-employment, which is of key importance for industrial society and economy, nowadays.

The objective is to satisfy the following stakeholders’ needs:

- Universities needs to coordinate the efforts of the university sectors engaged in creation and exploitation of new opportunities derived from the partnership with enterprises. Bonn Declaration says: “HEIs – must build a university-enterprise cooperation strategy into their mission and institutional plan”.
- Business needs to cooperate with universities to be competitive, gaining from knowledge transfer in developing and delivering innovative products, and in training of skilled human resource.
- Policy makers need to create partnership of universities and business to provide an innovation engine to boost competitiveness and to support the development of a knowledge-based economy.

These objectives will be prosecuted employing technologically advanced tools that will be devised for the project itself. Teaching and learning activity in fact will be carried out also in e-learning environments specifically “adapted”, according to the aims of the project.

The project promotes the development and implementation of an interactive model for innovation where the starting schemes are supporting each other, and where fundamental research questions arise facing practical issues. Within this context, innovative processes are more and more characterised by interactive cycles, by circular sequences, where phases and components of different fields are involved at the same time. Disciplinary fields are characterised by an ever growing so called “cross-fertilization”, researchers and enterprises tend to engage on complementary and integrated research paths. This new model for innovation implies a deep change in the actions and role of the subjects traditionally at the centre of innovative processes: the turning key to assure competitive growth in an economic system based on knowledge becomes the stable and deep interaction among enterprises, universities and governing institutions. The action of the three subjects involved is visualised as the “Triple Helix” one, where interactive relations among the spheres are constantly created, and act complementary and continuously, almost one playing the role of the other,

without, anyway, putting out of sight their own specific “mission”. Within the above scenario, one of the most important scholars of the topic, Henry Etzkowitz, speaks of “innovation in innovation”, to describe how innovation is not only the development of new products, but should also qualify as the creation of new forms of relation among the three spheres composing the triple helix model. Now, Universities are more and more called to develop a new function, that of directly contributing to the economic and social development of society.

Universities, as well as the other subjects producing knowledge, are ever more seen as economic growth makers: universities are no more ivory towers and new entrepreneurial skills are going to characterise their nature.

In the above mentioned “Triple helix” model, more and more importance is given to university world ability of acting as an interlocutory subject with enterprises, together with the ability to guarantee a suitable valuing of research results, in terms of new patents and entrepreneurial initiatives.

Moreover, in the “Triple Helix” model, universities address a fundamental role, elevating their action to the one of the other spheres involved, thus matching their basic role of knowledge producers to that of a subject directly involved in the promotion of innovation. Last but not least also the State, and, more generally, all governing institutions are going to address a new a more up-to-date role.

In the “Triple Helix” model governing institutions being them central, local or regional, do not play anymore only the role of financially supporting other subjects’ research activity, but are more and more subjects that draft the rules of the game and assure their respect, encouraging deep and systemic relations among enterprises and universities, aiming at realising the best context conditions needed to enhance innovation abilities of any country where the above actions are taking place. The cooperation to be created and made effective is not a closed circle, but it is openly connected to the outer realities and favours the contextual realisation of an effective open education.

Activating VINCENTE is a training project supported by DHitech, technological district, a consortium born within the scientific research framework programme agreement signed in 2005 by the Italian Ministry to the Treasury, the Ministry for Education and Research and the Region Apulia local authority. The DHitech is considered one of the most consolidated district in the field of Private-Public research, training and technological transfer, working in two main areas of action such as advanced materials and nano-technologies and e-business management. The above consortium is a non profit company and aims at building investment attractiveness in high tech fields, through scientific and technological excellence. Partners are public entities such as CNR (National Centre for Research and the University of Salento) and private ones, such as Engineering SpA Company and ST Microelectronics SrL.

## **The LPS – Laboratory for Experimental Pedagogy (University Roma TRE) – experience**

Within the above Activating VINCENTE training project, researchers from LPS (Laboratory for Experimental Pedagogy – University Roma TRE) were in charge of teaching two modules to the graduate students participating in the initiative: Development of Online Cooperative Environments and Models, Processes and Systems For Online Learning Communities. Main learning objective of the modules was to acquire skills in the field of Internet entrepreneurship and, in particular, students were asked to devise an effective MOOC on the subject of Entrepreneurship education. The first sections of the modules were devoted to theoretical aspects regarding entrepreneurship education itself and how to build a successful MOOC, then, students were divided in groups and each group had to carry out, writing cooperatively online (Google Doc), one project work, taking into consideration the following points:

- Needs analysis;
- General and specific objectives of the MOOC to be devised;
- Specific learning objectives in the MOOC and Prerequisites;
- Description of the enrolling students profile;
- Methodology and tools;
- Activities – Educational sections;
- Time Schedule/ costs of the project;
- Promotion and marketing of the MOOC;
- Expected results and definition of the skills to be acquired at the end of the course.

The model adopted to make in training students work has been tested in other research activities (Poce et al., 2010; 2011; 2012) and it is based on the idea that, to be effective, educational technology must be thought and designed following well established schemes and structures, a part from being the result of experimentation and research of its impact on learning outcomes.

Among the various activities, in-training students were asked to answer to some questions about online education, with particular reference to cooperative learning. The questionnaire has been realised with Google Docs<sup>2</sup> and it included open ended and multiple choice questions. The results obtained enabled the research group to reflect on certain issues related to the design of online learning environments, such as MOOCs, in order to make them more and more effective and successful. Some results are given below.

First of all, the research group looked for information useful to describe the profile of the in-training students, who, as the graphics below describe, were all graduate, mostly male and aged between 26 and 32.

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<sup>2</sup> Questionnaire is available at <https://docs.google.com/forms/d/1S21apRIhPD5vcA3QGGLsEoo-IMAm5TkKay3qFiym5k0/>

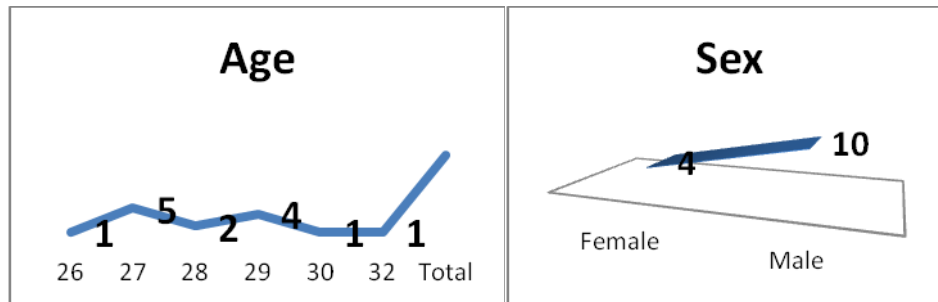


Figure 1-2. Age and sex (14 students)

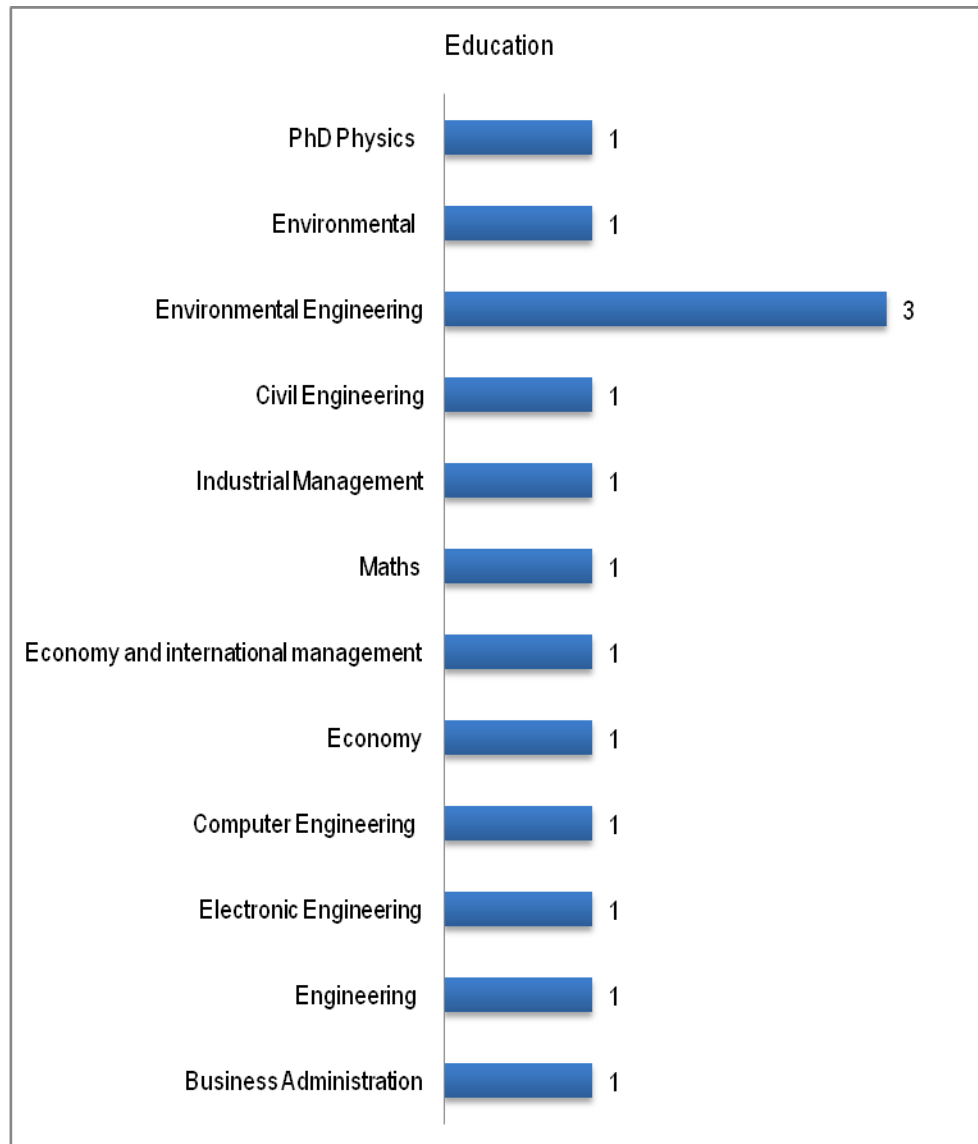


Figure 3. Education

As regards education, most of the in-training students are engineers with different areas of specialisation: from business administration to computer science.

The inquiry aim was essentially to understand what the interviewees thought about the differences between a face-to-face course and an online one. The results highlighted that they

do not consider the two learning situations so different in themselves, showing that attending an online course has become culturally accepted. The difference, if any, is noted when it comes to learning assessment and the data presented below demonstrate that online assessment is felt as more objective and less biased by physical presence, that would harm, according to the in-training students, the results in terms of validity and reliability.

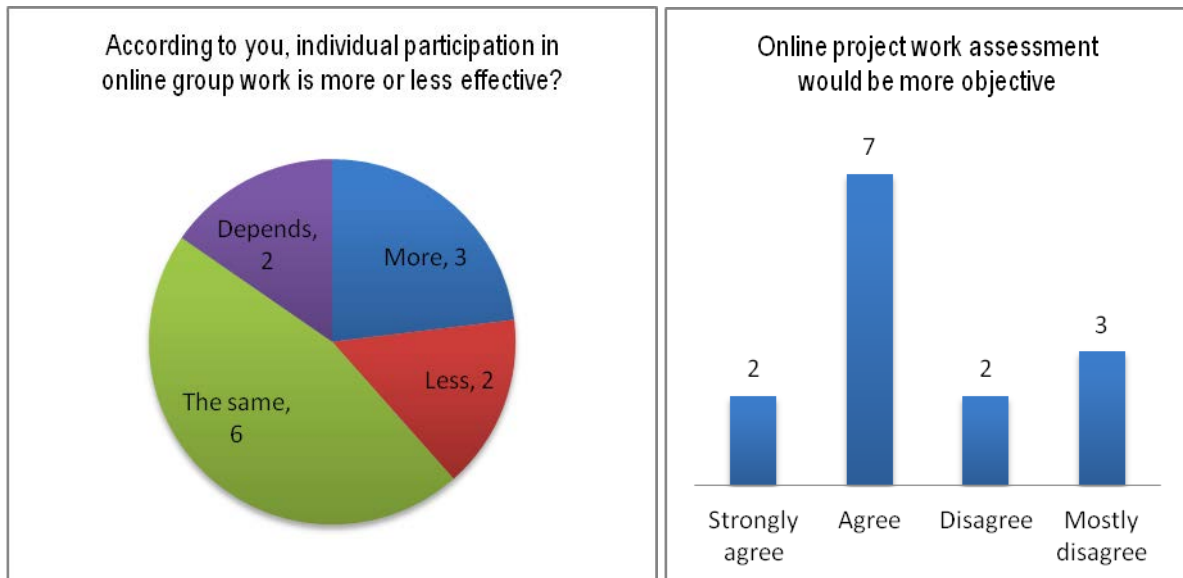


Figure 4-5. Self-evaluation of online project work

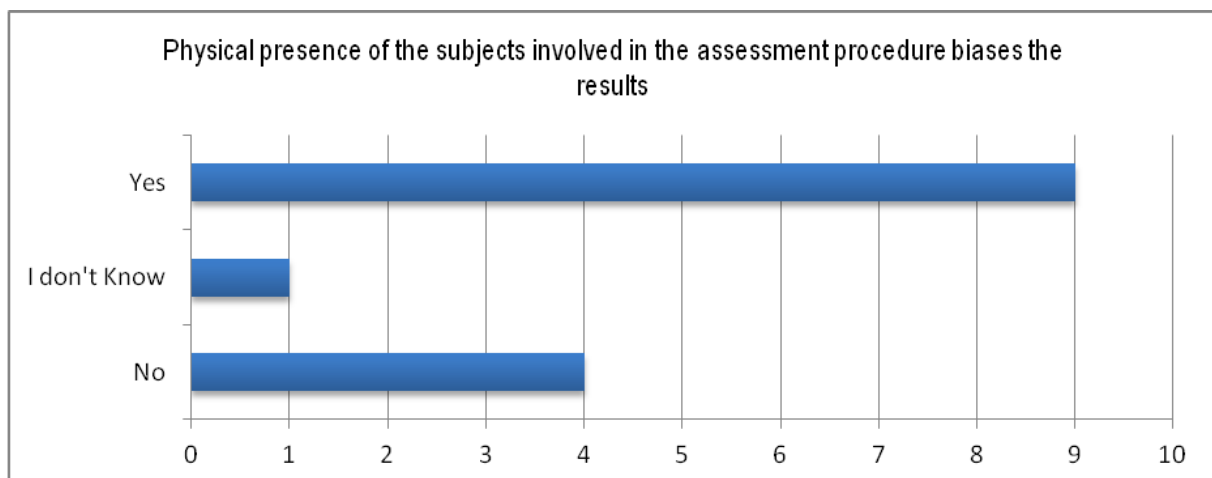


Figure 6. Physical presence of the subjects involved in the assessment procedure biases the results

Taking into consideration that online assessment is a key issue in teaching and learning online, such results give suggestions about the potential impact that online assessment could have on teaching and learning. Other results regarding students' project work on the design of MOOCs in entrepreneurship education will be presented later on.

## Final remarks

Other analysis have been carried out during the modules, both as regards online cooperative writing carried out by the in-training students devising their MOOCs, and the level of critical thinking skills reached after their learning experience. The results of such analyses represent material for a wider study to be issued in the next future by LPS research group involved in the present research.

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