Online Scientific Volunteering: the technological immersion for the co-construction of knowledge, employability, entrepreneurship and innovation in a logic of inclusion

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Abstract

"We all have something to learn and something to share" is the motto of this project, through which we aim to assess the impact of a multilingual platform which combines and makes the most of the potentials of digital environments and favours inclusion, in the co-construction of knowledge in learning/practice, in employability, entrepreneurism and innovation.

In this article we will introduce an ongoing project which is founded on the principle of openness to the research community. Its philosophy is *Online Scientific Volunteering* for the co-construction of knowledge about learning best practices. The platform that will emerge from the project will be open access. The academic community, whether national or international, can contribute with content and knowledge to the platform, through interaction and discussions around relevant and emerging topics. The community may also exploit, without encumbrance, the contents of the platform for their own benefit. This way students and scientific expertise can share in a common knowledge space, and together build a comprehensive knowledge base.

Keywords: e-learning; e-portfolio; online scientific volunteering; social networks; virtual worlds.

1. Introduction

"We all have something to learn and something to share" is the motto of this project, through which we aim to assess the impact of a multilingual platform which combines and makes the most of the potentials of digital environments and favours inclusion, in the co-construction of knowledge in learning/practice, in employability, entrepreneurism and innovation.

Addressing:

1) Availability, reality, technical resources and know-how, in the dimensions referred to, of the five Higher Education (HE) Portuguese institutions (the Universities of Aveiro, Évora, Aberta, Trás-os-Montes e Alto Douro and Instituto Politécnico de Santarém), one foundation (FCCN), one institution (LABELEC) involved through their forty two

members with diversified profiles, making up a pluri, multi and interdisciplinary team;

2) The national measures set down in The Portuguese Government's Technological Plan – entrepreneurism and innovation, creativity in learning, distance learning and changes in society;

3) The European Commission's determination to define 2011 as the European Year of Volunteering and foreseeing how it fits in to the International Year for Cooperatives 2012 (declared by the United Nations), *Online Scientific Volunteering* was identified. A practice which is still new to us and which be a constant, at least throughout the length of this Project, as a privileged means of (re)construction and assessment of the referred to platform, making the most of the potentials of the hybrid work spaces – from the real to the virtual.

So, in a voluntary cooperative and/or collaborative way, an online space will be (re)created in Portuguese, English and Spanish, which brings together e-learning environments, virtual worlds, social networks, e-portfolios and, for the first time, FabLabs. It is hoped that the act of living together with and within this space, innovative in the integration (and juxtaposition) already mentioned, will promote the building of knowledge, namely, the exploration of e-contents, converted from the classroom learning format to the e-learning; through interaction with the most diverse participants, in learning communities, which it is hoped will develop in reality into communities of practice; by making the most of the FabLabs, laboratories for digital production where ideas can be tried out and inventions can be turned into reality, and by the creation of reflexive e-portfolios which could be seen as instruments of (self)assessment not only for learning, but as instruments at the service of (self)forming regulating assessment for learning. We highlight that the FabLabs, understood to be a cooperative of conception and achievement, appealing to development and creativity, can also be strong allies in the development of entrepreneurial skills and innovation. The e-portfolios could also serve for employability purposes.

Such a platform, with the various shells mentioned, which could each (individually or in a partnership) materialize according to their interests, needs and possibilities, allows the monitoring of the student throughout their academic or professional life, whether it is at the initial stage of getting a job or in maintaining it, contributing to their personal and professional development. There will also be an attempt to adapt the environment in a way that it can also serve individuals with special needs, within the logic of true inclusion. In all these aspects there lies the innovation of this project, guided by the main questions:

1) How and which technologies is it necessary to transfer which will allow the (re)creation of a multilingual environment which will make the most of e-learning potentials, virtual worlds, social networks, e-portfolios and FabLabs which can be used by individuals even if they have special needs?

2) What will the impact be of a platform in the co-construction of knowledge, employability, entrepreneurship and innovation?

For this purpose, the project will be structured into three main stages:

1) Carry out the lifting of technologies which can be incorporated into the platform which has been referred to and ways of making it a reality, so as to allow the desired objectives to be achieved;

2) Explore the platform with HE students in ongoing academic studies, just about to leave (at the employability stage) and/or already in a work situation;

3) Assess the impact of such an exploration in the co-construction of knowledge, employability, entrepreneurship and innovation.

With the research to be developed we expect to have an impact on teaching and learning research in the HE environment, as well as the conditions which foster the interoperability of digital tools within a network and promote inter-comprehension, social inclusion, free access to knowledge, employability, entrepreneurism and innovation. At the same time, it is hoped that there will be a reflection about the experience of volunteering between institutions and

partners with such diverse purposes and profiles as those who have committed themselves to taking up such an appealing challenge.

2. Literature Review

The society in which we live today is a network and is connected to a network. The number of digital tools which are available allow one to interact with partners/agents, share ideas, create links, search for information, acquire knowledge – (re)create what already exists and move on with the new, with innovations. As Zorrinho states, *"without learning, neither creativity nor Innovation can occur. When we can combine the two, then Changes in Society occur"* (Zorrinho, 2009). Web 2.0 can play a very important role in these changes. They are intuitive and of free access, available at any time and space and allow one to dare to innovate.

Different contents and contexts arise: a connective knowledge (Downes, 2005) is shared which permits an active and sustained *learnovation* (Zorrinho, 2009), fundamental in a society where learning is growing exponentially and changing substantially, which implies the need to deal with ever-changing challenges. In this perspective, *"connections that enable us to learn more are more important than our current state of knowing"* (Siemens, 2005). One third of the World's population, especially young people and students, are interconnected. They were born, grew up and live in a digital era, citizens with their own particular skills of a multimodal society within a network. They are individuals who are capable of, with ease and in a natural way, carrying out various tasks at the same time (multitasking). They are fully integrated into a *"world of fast context-switching"* (Brown, 2002). With Web 2.0, users will have

> *"immersive Web sites with flash quickly followed combined with ubiquitous communication via IM and IRC chat (…) the exponential growth of self publishing, blogs and wikis (…) the massive sharing social network communities of flickr and YouTube in sync with the explosion of portals containing all the above in services such as MySpace, Yahoo and MSN" (Hayes, 2006).*

From mere re-collectors of information (Web 1.0), they become active and reactive users. They also have at their disposal "virtual environments in which we meet as avatars, interact as 3D moving objects that takes sharing, cocreation and communication to the next, predictable level" (Hayes, 2006). We have entered the era of the collaborative Web in real time (Web 3.0), where "humans become more linked together (…) more networked (…) internet has no limits or borders" (Veen & Vrakking, 2006). It is inevitable that the teaching, learning and research process is strongly influenced by this context. Not only is the (re)acquisition and (re)(co)construction of knowledge fundamental, but so are:

1) the nimble use of technological tools;
2) the mobility and flexibility in spaces and time;
3) the development of transversal skills such as, creativity, innovation and entrepreneurship.

E- learning mechanisms, virtual worlds, networks and, in particular, FabLabs and e-portfolios can be strong allies in the achievement of these objectives. The e-learning format presents us with an opportunity for any student to have access, on-line, to contents of quality, relying on its entirety on a mixed model of learning. On the one hand, making the most of the opportunity open to peer to peer teaching collaboration (students can share resources, exchange ideas, discuss topics, go through an almost continuous assessment, do exams); on the other hand, have access to multiple digital spaces (Barbas, 2010a).

Collaborative and cooperative work is a crucial for well-balanced activities. In order to build up student competences and give them skills to have success in a networked society, new ways of interaction and assessment have to be developed. Networking tools, virtual worlds and massively multiplayer games can be used in diverse activities. Those collaborative

virtual worlds give users the opportunity to communicate, collaborate, interact, explore, role-play, and experience situations in first person and in a safe and controlled way (Loureiro & Bettencourt, 2011).

Social networks permit the contact and connection between diverse opinions, nodes or sources of specialized information, allowing a greater interactivity and making the exchange of information and learning continuous and natural, inscribed in a connectivist (Siemens, 2005) matrix suited to a digital era.

The FabLabs put themselves forward as laboratories for digital production (Palma, 2010), available to all citizens. It comes from the motto: "Just do it", promoting the opportunity to each citizen to realize their dream. They can be found across all continents. In Portugal, at the moment, the only one available is FabLabEDP[1].

An e-portfolio is a hybrid space which can promote the introduction, development and reflection of every citizen (Barbas 2010b). It tries to question different representations of the citizen which aim to

1) put together a set of data for assessment
2) have a personalized space for personal development
3) have a tool for introductions to employability
4) create life histories produced with the technical resources of Machinima (used in Second Life®) and make use of the publication of e-contents, respecting the DublinCore methods.

It is in this context that this project is set, advocating the exploration of a platform which aims to be accessible to all, with whatever characteristics, in whatever space and time.

3. Methodology

In a broad sense, there are two basic reasons for the research to be developed and which also form part of the basis of the project being presented: there is an intrinsic need to grow and to know more and more – *"Homo sapiens' compulsive need for growth* [and there are many] *issues and subjects about which we have incomplete knowledge"* (Remenyi *et al*, 1998).

In the specific case of this research, we set off from, on the one hand, the recognized importance, also in the educational field, of employability, entrepreneurship and innovation and the virtual environments in today's interconnected world. On the other hand, we set off from the lack of a multilingual platform which integrates e-learning mechanisms, virtual worlds, social networks, e-portfolios and, most importantly, the underlying concept of the FabLabs and the lack of knowledge about their impact in the co-construction of knowledge, employability, entrepreneurship and innovation, also by users with special needs.

So, it is important to study which are the most suitable technologies that can be transferred, understand which conditions will strengthen its interoperability with a view to the creation of the platform and explore it as student-users in HE at a (pre)employment stage; and assess the total effect of that investigation within the dimensions mentioned.

To do so, we care counting on the on-line volunteering of experts, consultants and assessors. In fact and namely at the following levels:

1) e-Portfolios: CIDTFF – Universidade de Aveiro in partnership with Instituto Politécnico de Santarém developed and implemented an online platform which is aimed at the integration and availability of digital contents for employability and social inclusion[2]; the Instituto Politécnico de Santarém's Centro de Competência TIC of Escola

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Superior de Educação developed and implemented a repository of educational e-portfolios[3].

2) e-Learning: Universidade de Évora and Instituto Politécnico de Santarém worked in partnership on the construction of an e-learning platform[4]; FCCN has resources available (physical and human) appropriated for the promotion and registration of information online and, more recently, digital capture Kits, which can serve teaching and, in a creative and innovative way, learning itself, employability and entrepreneurship; in Portugal, Universidade Aberta is, per excellence, the institution with the most experience in the field of distance learning.

3) Social networks: all institutions favour this space as a means of communication and interaction.

4) FabLabs: EDP has the only fast prototype installations in Portugal (EDP, Universidade de Aveiro and Instituto Politécnico de Santarém are founding members of APLFD).

5) Entrepreneuship and Innovation – Universidade de Évora and Instituto Politécnico de Santarém have already demonstrated they have mastered this area. Several national awards were achieved, namely at Poliempreende contest, with the projects Moebius[5], Fluids_ID[6] and Seniors at Second Life®[7]

6) Virtual Worlds – Universidade de Aveiro[8], Universidade de Trás-os-Montes e Alto Douro[9] [10]and Instituto Politécnico de Santarém [11] [12] move within their own Second Life® spaces.

Bearing in mind the purpose and objectives outlined in this project, an essentially qualitative methodology was opted for (although quantitative dimensions are not ruled out), of a descriptive, analytical and interpretative nature, developing in a context of reflexive practice or even of investigation-action. Some cases in particular will be studied within, or not, more extended groups or classes, within the logic of a tapering effect.

We can state, through the specialist literature that *"the influence of qualitative methods in the study of various educational questions is becoming greater and greater"* (Denzi & Lincoln, 1994), which reinforces the choice made. Qualitative research *"is a method which deals with, in an interpretative and natural way, in its natural environment, the object being studied"* (Carmo & Ferreira, 1998). In addition, *"it postulates a global, phenomenological, inductive, structuralistic, subjective conception, which is geared towards the process"* (Bogdan & Biklen, 1994). In this specific case, we aim to get to know, characterize and question the comprehension of the reality represented in the specific innovative digital documents: e-learning, virtual worlds, social networks, e-portfolios and FabLabs in the domain of social inclusion. From an ontological point of view, the reality of these hyper-documents will be dealt with by the study of the diversity of support, in a multiple look at the same object. From an epistemological dimension, we take on the role of investigator-participant.

The research will also take on a certain exploratory nature due to the scarcity of work centred on the object of study of this project. In fact, as well as trying to respond to the formulated

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[3] http://eportefolio.ese.ipsantarem.pt/repe/

[4] e-raízes.redes - http://eraizes.ipsantarem.pt/

[5] Moebius - http://alunos.ese.ipsantarem.pt/mecm/g5/index.php?option=com_contentandview=articleandid=51andItemid=1

[6] Fluids_ID - http://w3.ese.ipsantarem.pt/fluidsid

[7] Seniors at Second Life® - http://www.oribatejo.pt/2010/09/seniores-no-second-life

[8] SecondUA - http://maps.secondlife.com/secondlife/Universidade%20de%20Aveiro/116/123/38

[9] UTAD - http://maps.secondlife.com/secondlife/UTAD/250/207/38

[10] VITAProject - http://maps.secondlife.com/secondlife/Vita%20Project/94/49/26

[11] SLESES - http://maps.secondlife.com/secondlife/Sleses/42/219/24

[12] Educação e Inovação - http://maps.secondlife.com/secondlife/Educacao%20e%20Inovacao/145/240/53

questions, we hope to study in-depth, the phenomenon in question and to raise many other questions which could also contribute to the evolution of knowledge in this area.

In terms of investigative design, three main stages are considered:

1) Create a multilingual platform which brings together various interconnected environments and which can be used by people with special needs.

   1.1) at an e-learning level, we foresee

   1.1.1) creating support structures for the construction of contents;

   1.1.2) creating mechanisms for the sharing of contents (knowledge base);

   1.1.3) (re)constructing contents in a Workshop format;

   1.2) at a virtual worlds level

   1.2.1) identifying pedagogic potentials;

   1.2.2) identifying employability potentials;

   1.3) at a social networks level

   1.3.1) identifying pedagogic potentials;

   1.3.2) identifying employability potentials;

   1.4) at an e-portfolio level

   1.4.1) identifying employability potentials;

   1.4.2) implementing the FLUIDS_ID platform

   1.5) at a FabLabs level

   1.5.1) identifying pedagogic potentials;

   1.5.2) identifying employability potentials;

   1.6) at an availability level

   1.6.1) reformulating the method of sharing and accessing the contents and the platform

2) Exploring the platform with students in higher education in (pre)employment.

   2.1.) developing strategies which promote the development of personal, professional business and social skills;

   2.2.) make the fabric of business aware of the tools we have available, in the sense of the qualitative increase of the recruitment processes and selection of human resources.

3) Assess its impact at the level of:

   3.1.) co-constructing knowledge – namely by identifying and systemizing the criteria and indicators collected of (meta)reflections elaborated by lecturers and students;

   3.2.) employability – namely by establishing criteria and indicators which companies and Higher Education institutions have to negotiate, turning to international studies in this area;

   3.3.) entrepreneurship and innovation – namely, also, by establishing criteria and indicators which assess both constructs which have to be negotiated, bearing in mind the (i) context, the (ii) external stakeholders (mainly companies) and (iii) Higher Education Institutions.

To achieve the objectives we have put forward, our sample will be made up of

1) at an early stage, lecturers and students in Higher Education belonging to the partners in this project;

2) at a second stage, we foresee widening this to the whole of Higher Education on an 'on request' basis from institutions, lecturers and students.

According to what we have set out, we believe that this is an innovative project with which we aim achieve, in a voluntary, cooperative and/or collaborative way, the following main results:

1) (re)create an online space in Portuguese, English, French and Spanish which combines e-learning environments, virtual worlds, social networks, FabLabs and e-portfolios;

2) promote the construction of knowledge, namely: through the exploration of e-contents, converted from a classroom to an e-learning format; through the interaction with the most diverse participants, in learning communities which it is hoped will develop into real practice communities; through making the most of FabLabs and the creation of reflexive e-portfolios which can take on the role of instruments of self-assessment, not just of the learning but as instruments serving as a regulating training (self)assessment regulator for learning.

4. Preliminary Results

The main project is ongoing, although some preliminary results were already achieved through the implementation and development of some of the outlined tasks. Students and Lecturers from Instituto Politécnico de Santarém were engaged into the project. The following ventures were implemented:

1) Web 2.Zero in Education: aims to provide ways and means to innovate in education, through Web 2.0 tools, its capabilities and applicability.

2) e-Raízes.Redes: it is an e-learning platform and falls into oriented reflections on a global scale action, these reflections aim to analyze the impact of technology and communication in the process of a civilizational change (social, political, economic, cultural trends in contemporary societies).

3) Digi_Zip_Zap: intends to be a bridge between students and web 2.0 tools available at Internet, giving solutions and presenting choices for a better integration in a networked society.

In order to develop and enhance students' and lecturers' ICT skills and competences, workshops and training sessions were prepared and lectured. Those sessions focused on the following tools:

1) Prezi: considered as an alternative to traditional presentations such as Powerpoint. With Prezi it is possible to create presentations more dynamic, nonlinear and communicatively, more persuasive and interesting.

2) Wordpress: the content management system Wordpress is used worldwide for both the professional and personal, distinguishing it by its great professionalism with an easy management.

3) Europass CV with integration on LinkedIn: Learn everything how to build your Curriculum Vitae to employability.

4) Facebook page with an integration of Life Stories: the "Life Stories" serve to show in a succinct way the various stages of our life, using digital formats.

5) Innovation and Entrepreneurship: entrepreneurs are those who seize opportunities, needs and resources, exploiting them to their advantage, creating new companies by transforming an idea into a new and more sophisticated product or service.

6) Moodle: this LMS (Learning Management System), because it's free and open source, is the base for our e-learning platform. It was adapted according with the previous identified needs, by adding specific modules in order to enhance students' and lecturers' e-learning experience.

5. Conclusions and further work

As mentioned previously the main project is ongoing. Some of the outlined measures were already implemented with positive outcomes. The e-learning platform has been implemented and is being tested through pilot subjects of a formal higher education course (at graduation and master levels). Teachers gathered and adapted contents in order to make them

available for distance learning contexts. Experts were invited to give their contributions for a shared and richer knowledge base. The collective intelligence has been rising and students are building their knowledge. Each student has their own personal learning environment made by collecting pieces from the available digital tools. By having the support of a back office team (made of IT expertises, tutors, advisors, volunteering scientific expertises), students can learn at a distance, according with their own needs and patterns. With an e-learning environment there are no physical or temporal restrictions or barriers.

We intend to expand the project offering a wider range of contents, in an e-learning format. Each subject or discipline made of several pieces or modules can be adapted – by adding or taking pieces. Each student can chose what pieces they are interested in and design their own course according with their interests and needs. Every piece is transversal and there so can be used or adapted to several areas of education.

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