



**Fostering Innovation Skills as Key Competences for improving
Employability of PhDs in SMEs**

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1. **ABSTRACT:** In recent decades, higher education institutions have expanded at the doctoral level. However, studies show that most doctorate holders work in the public sector and particularly in higher education institutions, with few exceptions in Europe. iSkills project induces the employability opportunities of doctoral holders in European SMEs by developing an e-assessment methodology (immersive game) that can be implemented at formal, no formal and informal learning contexts.
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sector and particularly in higher education institutions, with few exceptions in Europe. iSkills project induces the employability opportunities of doctoral holders in European SMEs by developing an e-assessment methodology (immersive game) that can be implemented at formal, no formal and informal learning contexts.

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4. DEVELOPMENT:

Introduction

iSkills - Fostering Innovation Skills as Key Competences for improving Employability of PhDs in SMEs is a project financed by the Transversal Actions (Key Activity 3 - Information and Communication Technologies) under the Lifelong Learning Programme from the European Commission (project no. 543128-LLP-1-2013-1-ES-KA3-KA3MP).

Between November 2013 to October 2015, this project will be carried out by eight institutions from five countries in the European Union, namely: Spain (Fundación General Universidad de Granada Empresa - as project coordinator -; EMOTOOLS S.L.; ScienTer CID), Finland (Aalto University School of Arts, Design and Architecture, Western Finland Design Centre MUOVA), Germany (NTL Neue Technologien Und

Lermen e.V.), Portugal (Advancis Business Services Lda.) and Greece (Militos Emerging Technologies and Services; Crystal Clear Soft - CCS).

This project intends to contribute to the development of innovation skills of PhD students and doctoral holders by developing an e-assessment methodology (immersive game) that can be implemented at formal, no formal and informal learning contexts.

The idea of the project was based on the partners' experience with university students and graduates, business context and consultancy, which clearly identified a gap in the innovation skills in PhD students and doctoral holders that limit their opportunities of employability in the private sector as well as the lack of ICT based innovative learning and assessment methods to effectively deliver innovation skills at formal, no formal and informal contexts.

Thus, a common framework will identify and organize skills that PhD students and researchers need to acquire to promote their innovative talent in SMEs, promoting the exchange of innovative pedagogies based on ICT to foster each one of these skills for innovation.



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Innovation skills

Countries have long recognized that education and skills of the labour force are the underpinnings of innovation. Learning, employability skills and the so-called "transversal skills" are increasingly important to contribute to organizations' innovation performance, but not the only topics to consider as need to be complemented with innovation skills that put more emphasis on creativity and continuous improvement skills, risk-taking skills, relationship building skills and implementation skills.

Innovation skills can be defined as the set of abilities, proficiencies, competences or attributes that contribute to the implementation, transference and management of new products, processes, marketing methods, or organizational methods in the workplace (OECD, 2011). Actually, according to the OECD (2011), the issue of identifying a targeted group of "skills for innovation" remains.

The low level of innovation skills of high qualified individuals and the difficulties of SMEs to recruit qualified and suitable human capital are today common concerns for all European countries as it has been recognised in European Commission communications.

Employability of doctorate holders in SMEs

In the last 10 years, Portugal, Spain and Greece experienced the highest growth of the doctoral degrees in Europe (OECD, 2010). However, the transfer of PhDs to the business sector is still very low in these countries. Contrary, European countries such as Finland, Belgium and Germany have the highest level of employability of doctoral holders (OECD, 2009) and more balanced distribution of PhDs between higher education institutions and business contexts (OECD, 2010).

These data prove that although there has been an important growth in the rate of doctoral degrees in Europe, the capacity of labour market to incorporate them is reducing. As main contractors of doctorate holders, Universities and the academic context in general were reached by the current economic crises forcing a straight reduction of resources.

SMEs can contribute to prevent the waste of high qualified human resources at the same time that improve their competitiveness in the global economy. In fact, SMEs play a key-role in most economies, in that they constitute the largest business block and provide the bulk of employment. However, despite doctorate holders count with high level of technical knowledge that allow them to become good researchers in the academy context, they lack many innovation skills demanded by firms to be competitive (such as managerial and entrepreneurial skills).



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ICT based assessment and innovation skills

E-assessment or ICT based assessment is a field with widely researches in US and Canada but that still needs to be explored in Europe, especially more advanced forms of e-assessment methodologies such as immersive games. Immersive games for learning are defined as "applications using the characteristics of video and computer games to create engaging and immersive learning experiences for delivering specified learning goals, outcomes and experiences" (Freitas, 2006); related or synonymous terms include educational games, video games, serious games, game based learning and instructional games.

As an innovative pedagogical method, e-assessment or ICT based assessment methodologies allows learners to develop a set of skills in virtual environment that properly retracts real life conditions. "Embedding learning and assessment into computer simulations, virtual laboratories and games takes the learning process even further by enabling students to develop their scientific enquiry, analysis, interpretation and reflexion skills in a real-life contexts" (EC Working Document, 2012).

Although there are evidences of a growing trend towards curricula based on transversal competences across European higher education institutions, changes to curricula have not totally consider assessment methodologies yet.

iSkills - Objectives and main results

iSkills aims ultimately to contribute to the development of innovation skills of PhD students and doctoral holders by developing an e-assessment methodology (immersive game) that can be implemented at formal, no formal and informal learning contexts in order to promote the employability opportunities of these individuals in SMEs and, finally, to contribute to the effective implementation, transference and management of innovation processes in these organizations.

Discussion and Conclusions

Some of the most common strategies and policies to improve labour markets responsiveness in Higher Education area include the use of workplace training components, the involvement of employers and unions in curriculum development, the exchange of trainers and teachers between Higher Education Institutions and industry and the strengthening career services within Universities to promote knowledge about scientific careers with a business orientation. However, this seems to be short, answering to high indices of doctorate holders and low indices of their employability.



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Thus, there has been made many advances in the definition and implementation of frameworks of transversal competences (such as the European e-Competences Framework, SHL Universal Competence Framework, Dublin Descriptors, EU Framework of Key Competences for Lifelong Learning, the European ESCO framework, etc), though Europe still lacks an agreed framework of specific skills for innovation in SMEs that can be applied to any level of education and training.

Therefore, improvements with the referred agents - HEIs, SMEs and doctoral holders - should be performed as the current situation can be considerably improved, by acting in two main directions: answering to the mismatch between doctorate holders actual skills and SMEs needs; and, the purpose of SMEs to improve their productivity and competitiveness as result of the improvement of the innovation abilities of their human capital.

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