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E-learning, employability and entrepreneurship: approaches from the economic framework

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E-learning, employability and entrepreneurship: Approaches from the economic framework

CONTENTS

INTRODUCTION

E-LEARNING, EMPLOYABILITY AND ENTREPRENEURSHIP: APPROACHES FROM THE ECONOMIC FRAMEWORK

E-learning has become consolidated as an increasingly used method to train workers, managers and entrepreneurs. However, unlike face-to-face training, the models developed to evaluate the economic dimensions of virtual learning environments, in particular those associated with online training for employment and entrepreneurship, are rather scarce. In order to expand available research in this field, this special issue presents five articles whose main research objective is to analyse of the economic dimensions of e-learning. In particular, the research focuses on the effect that vocational training exerts on the employability and entrepreneurship conditions of the workforce.

The first study, conducted by Juan Francisco Martínez-Cerdá, a student on the e-learning doctoral programme at the Open University of Catalonia (UOC) and the lecturer Joan Torrent-Sellens (UOC), analyses the skills acquired via e-learning programmes that may help to improve the careers of European workers. The main objective of the paper is to make clear that there is a set of digital skills and e-skills that are developed through educational systems based on e-learning, which have broad applicability to the employability of European workers. In a more specific way, it appears that the comprehensive development of certain digital and e-skills —especially media content handling, flexibility and organisation— by these workers is one of the most useful factors for their professional development, through the transition to a new job with the same or higher security than the job in the previous year.

The second study, conducted by the lecturers Francesc Saigí-Rubió (UOC) and Inés González-González (University of Washington), analyses the importance of virtual communities of practice in the healthcare field. It is an account of an experience of how training and professional interaction can help to improve the outcomes of work in health services. The paper aims to examine the benefits that the use of virtual communities of practice offers professionals in the healthcare field. Conceptually, communities of practice are supported by the theory of situated learning, which highlights the importance of the professional environment and interaction with colleagues in the development of practical learning. In some professional areas, this way of creating and sharing knowledge has become a common practice. The intensive use of ICTs enables virtual communities of practice to be formed. Through them, the process of collaborative knowledge construction is faster, more efficient and participatory. Also, the set of benefits from the use of virtual communities of practice is wide and diverse, reaching all the members of the community, on both personal and general levels, as well as the organisations where the members of the community undertake their professional activities.

The third study, conducted by the lecturers Inés González-González (University of Washington) and Ana Isabel Jiménez-Zarco (UOC), analyses new business models associated with the MOOC phenomenon. MOOCs are a recent phenomenon that has drawn considerable media attention to the world of e-learning since the most prestigious US universities —and subsequently many others— began offering them. In the last ten years, the changes that have occurred since the emergence of Web 2.0, with the development of Open Social Learning and the rise of OpenCourseWare, have given rise to the MOOC phenomenon.

Initially, and as part of the OpenCourseWare movement, MOOCs came into being with the vocation of opening up knowledge to the people, with knowledge being understood as a good asset of humanity. The paper presents a descriptive overview of the MOOC movement from its beginnings to the different business models that are being proposed.

The fourth study, conducted by the lecturers Joan Torrent-Sellens (UOC), Pilar Ficapal-Cusí (UOC) and Joan Boada-Grau (Rovira i Virgili University [URV]) reports on the design and validation of a scale for measuring the quality of e-learning in training for employment. Through a questionnaire survey of 5,265 people who took part in an e-learning training programme developed in 2009 by the Catalan Occupation Service (SOC) and the UOC, the study makes two main contributions. First, the authors describe the design of an 18-item scale. Second, the study analyses the factorial structure and psychometric properties of that scale. Three factors from the exploratory factor analysis, namely competencies developed, applicability of training and satisfaction with the pedagogical design, explain 71.5% of cumulative variance. The total scale reliability is 0.94. The paper provides new evidence in the specific field of e-learning vocational training specifically for the unemployed, as well as new dimensions such as the structure and the pedagogical design of the programme. The analysis of a new edition of the programme in 2012 reveals the usefulness of e-learning for the unemployed with fewer formal qualifications.

And lastly, the fifth study, conducted by the lecturers Mònica Cerdán-Chiscano (Autonomous University of Barcelona [UAB]) and Ana Isabel Jiménez-Zarco (UOC) analyses the role of e-learning in the development of entrepreneurial competencies in business accelerators. A new agent has recently emerged within the context of university-based entrepreneurship; that of business accelerators. The main of aim of these is to support the growth of spin-offs and raise rates of return for universities on their transfer agreements. This new agent has become consolidated because of the traditional incubators' inability to deal with the diversity of their firms or network with innovative agents of the system. Some of the most frequently used instruments to improve the growth capacity of spin-offs are training pathways for the entrepreneurial team delivered via e-learning. By analysing an experience of business management training (management and commerce), mentoring and financial assistance for innovation via e-learning at the UAB Research Park, this article shows that there has been a 14% increase in the annual turnover of the spin-offs concerned.

The five articles provide new evidence of the effect that e-learning has on the employability and entrepreneurship conditions of the workforce. The first article underscores the usefulness of e-learning in the development of skills that help to ensure job stability among European workers. The second article highlights the importance of virtual communities of practice for the development of professional practice and organisational dynamics in the healthcare field. The third article presents new business models underpinning the MOOC phenomenon. The fourth article reports on the design and validation of a scale for measuring the quality of e-learning in training for employment. And lastly, the fifth article analyses the effect of e-learning on the development of entrepreneurial competencies in firms located in business accelerators. They all open the door to future research and emphasise the need to carry on analysing the economic dimensions of e-learning.

On behalf of all the authors in this issue, I would firstly like to thank the eLearn Center for the opportunity to publish these studies, and secondly to congratulate it on the incorporation of the economic dimension of analysis into its extensive experience of e-learning research. We hope that the readers of this issue will find this new dimension of analysis useful.

Joan Torrent-Sellens
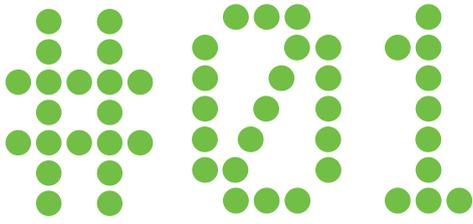
E-LEARNING, E-SKILLS AND EMPLOYABILITY: FIRST EVIDENCE IN EUROPEAN COUNTRIES

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E-learning, e-skills and employability: first evidence in European countries

ABSTRACT

The main objective of this article is to make clear that there is a set of e-skills developed through e-learning that is broadly applicable to the employability of European workers. More specifically, it appears that the great development of certain e-skills – handling online content, flexibility, organization, etc. – thanks to online learning is one of the most useful factors in the professional development of students through the transition to a new job with the same or greater security than the job they held the previous year. To carry out the study, different official European statistics databases related to employment, e-skills and the usage of e-learning systems have been analysed, finding relationships that establish links between e-learning and the professional improvement of employees.

KEYWORDS

e-learning, e-skills, employability, workers, Europe.

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INTRODUCTION

In Europe, lifelong learning is one of the most important activities in all States, as the importance and need for the employability of citizens is widely recognised (Badescu & Loi, 2010), even more so in an economic and social context which, in recent years, has been more than uncertain. European countries therefore face different challenges in relation to having to improve the training and qualifications of their citizens.

In this sense, for example, different situations in terms of levels of completion of compulsory secondary education can be observed in European countries. also In addition, it is detected that adult participation in actions relating to lifelong learning is very variable (Boateng, 2009) and clearly unsatisfactory in most European countries. While in 2004, 9.1% of people aged between 25 and 64 were involved in lifelong learning, it is notable that this figure has risen only minimally a decade later, as in 2013 this was true for only 10.5% of this population.

In this respect, certain countries in South-East Europe present barriers to the participation of adults in lifelong learning due to cultural, structural and socio-economic characteristics (Zarifis, 2012) and great differences between the few socio-demographic barriers for lifelong learning in the countries of Northern Europe and major barriers in Southern and Eastern Europe can clearly be seen (Róbert, Sagi & Balogh, 2011).

In this context, some countries offer education based on open and distance learning (Kocanova, Paolini & Borodankova, 2011) that is clearly related to e-learning methodologies, allowing the development of e-skills aligned with the e-Skills for the 21st Century Initiative provided in 2007 by the European Commission, the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions (European Commission, 2007).

These e-skills existing in people, which were assessed as insufficient in 2010 (Husing & Korte, 2010) and are acquired by students in e-learning systems, must match those demanded by the labour market of the 21st century (Levy, 2010) in order to set as factors that cause the desire to acquire these skills by workers (Desjardins & Rubenson, 2011) and thanks to lifelong learning systems.

Given this situation, it is necessary to study whether there is any relationship between the development of these e-skills, so necessary for the development of employment (Pouliakas, 2013), through e-learning systems.

HYPOTHESIS AND METHODOLOGY

Currently, and according to data published by Eurostat, the European population has a high level of e-skills in the use of Internet. For example, using data from 2013, 67% of the total European population had sent or received emails, 59% had sought information on goods and services by Internet, 42% had used e-banking and 38% had purchased online in the 3 months prior to the period of conducting the survey.

In this respect, it is notable that the development of e-skills can help people prepare better for involvement in lifelong learning (Loureiro, Messias & Barbas, 2012). At the same time, it is understood that the application of methodologies based on e-learning helps with the development information skills that are valid in the information society Europe is immersed in (Van de Vord, 2010; Jun & Pow, 2011).

Given all the above, two research questions can be defined, with their corresponding working hypothesis, to be checked later with the corresponding data analysis on different indicators obtained from Eurostat for 28 European countries:

❯ **Q1:** Is the variable e-learning important for providing a simplified representation of different variables related to employment,

educational level and e-skills for 2007 and 2013?

❯ **H1:** E-learning is just as important for international comparisons as other indicators related to employment, education and e-skills.

❯ **Q2:** Compared with other variables related to education and e-skills, does e-learning help to obtain a better approximation of

Table 1. Indicators of Eurostat related to employment, education and e-skills selected and used

FIELD	FACTOR	INDICATOR
Employment	Employment	Employment
	Working	Transition from unemployed person to employed person
	Security	Transition to the same or higher employment security as previous year
	E-search	Internet use: job search or sending an application
Education	Tertiary	Tertiary educational attainment
	Lifelong Learning	Participation rate in education and training (last 4 weeks)
	E-learning	Individuals who have used the Internet for e-learning: • Individuals who have used the Internet in the last 3 months for doing an online course (of any subject) • Individuals who have used the Internet in the last 3 months for looking for information about education, training or course offers
E-skills	E-skills	E-skills: • Internet use: sending/receiving e-mails • Internet use: finding information about goods and services • Internet use: seeking health information • Internet use: travel and accommodation services • Internet use: Internet banking • Last online purchase: in the last 3 months • Internet use: selling goods or services • Internet use: telephoning or video calls • Internet use: playing/downloading games, images, films or music • Internet use: downloading software • Internet use: reading/downloading online newspapers/news • Internet use: listening to web radio and/or watching web TV • Internet use: obtaining information from public authorities web sites (last 12 months) • Internet use: downloading official forms (last 12 months) • Internet use: sending filled-in forms (last 12 months) • Internet use: interaction with public authorities (last 12 months) • Internet use: uploading self-created content to any website to be shared
	Media Literacy	General Media Literacy Assessment

the function of the employment security in Germany, a country with a good performance during the economic crisis suffered at European level over the period 2007-2013?

❯ **H2.**There is a positive linear relationship between employment, education, e-learning and e-skills in European countries.

To carry out the analysis of the relationships between employment, education and e-skills factors, two statistical techniques are used. Firstly, a principal component analysis (PCA), for finding relationships between employment, education and e-skills, and, secondly, a linear regression analysis between employment security and tertiary educational level, on one hand, and e-learning, e-skills and media literacy levels, on the other.

Along these lines, the following indicators are used for analysing the period 2007-2013 (table 1):

The set of 28 European countries taken into account is as follows: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia,

Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

RESULTS

To answer Q1, statistical data from Eurostat is analysed using a principal component analysis (PCA) performed on all variables in Table 1 for the 28 countries considered and taken into account both year 2007 and 2013. Thus, an x-y plane is obtained with the following weights for the two principal components found (table 2):

As can be seen in the charts below, two sets of variables are clearly distinguishable in 2007: firstly, and associated with the horizontal axis, the set of variables related to education and e-skills; and secondly, and on the vertical axis, two variables in the employment, security and working fields. Thus, it is detected that e-learning behaves similarly to the e-skills factor (figure 1).

Table 2. Weight of factors after principal component analysis (PCA)

FACTOR	2007		2013	
	PC1	PC2	PC1	PC2
Employment	0.78	0.28	0.64	0.61
Tertiary	0.70	0.07	0.67	0.11
Working	0.14	0.85	0.36	0.68
Security	0.06	0.87	-0.09	0.87
E-search	0.92	0.00	0.91	0.11
Lifelong Learning	0.91	0.04	0.85	0.34
E-learning	0.91	0.11	0.85	-0.10
E-skills	0.92	0.25	0.90	0.36
Media literacy	0.89	0.13	0.79	0.34

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Figure 1. Principal Component Analysis (PCA) axes. 2007
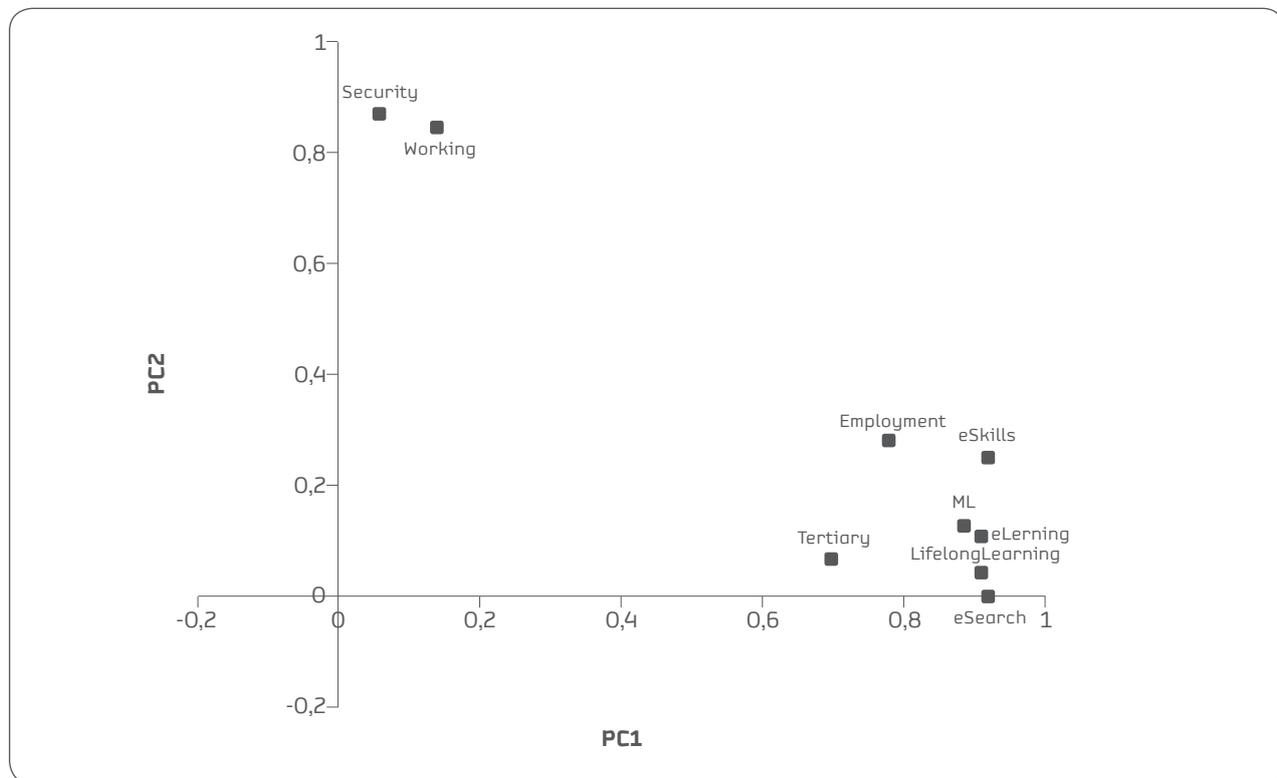
Regarding the situation for 2013, more variation is observed in the weight of the factors obtained by Principal Component Analysis (PCA). On one hand, the employment and working factors move away from their positions in 2007, approaching one other. A similar situation exists for the e-learning factor. On the other hand, other variables undergo few changes and their weight values remain nearer to those mentioned above (figure 2).

If an analysis is carried out by countries, according to the two PCA axes obtained for 2007, wide variation is observed, although the situation in the countries of Northern Europe, which always have values on the horizontal axis, is clear. It is very interesting to see that Germany and the UK are close together (figure 3).

Regarding the coordinates of the countries on the PCA axes for 2013, it is found that the countries of Northern Europe maintain their positive values for the PCA horizontal axis, and that Germany and the UK have very different values to those previously analysed, as do Greece, Latvia and Spain (figure 4).

With all this, and taking into account the coordinates of the e-learning factor on the PCA axes, it can be stated that the e-learning factor is very useful to reduce the size of the dimensions needed to study countries. Specifically, thanks to the e-learning and security factors, the position of a country can be represented in a simplified way, reducing the original number of nine variables related to employment, education and e-skills.Regarding Q2, this can be analysed taking into account the following data analysis performed with linear regression in Germany, and for the period 2007-2013 (table 3).

As can be detected, the best approach is Model V (R^2 is the greatest, and its p-value is also

Figure 2. Principal Component Analysis (PCA) axes. 2013
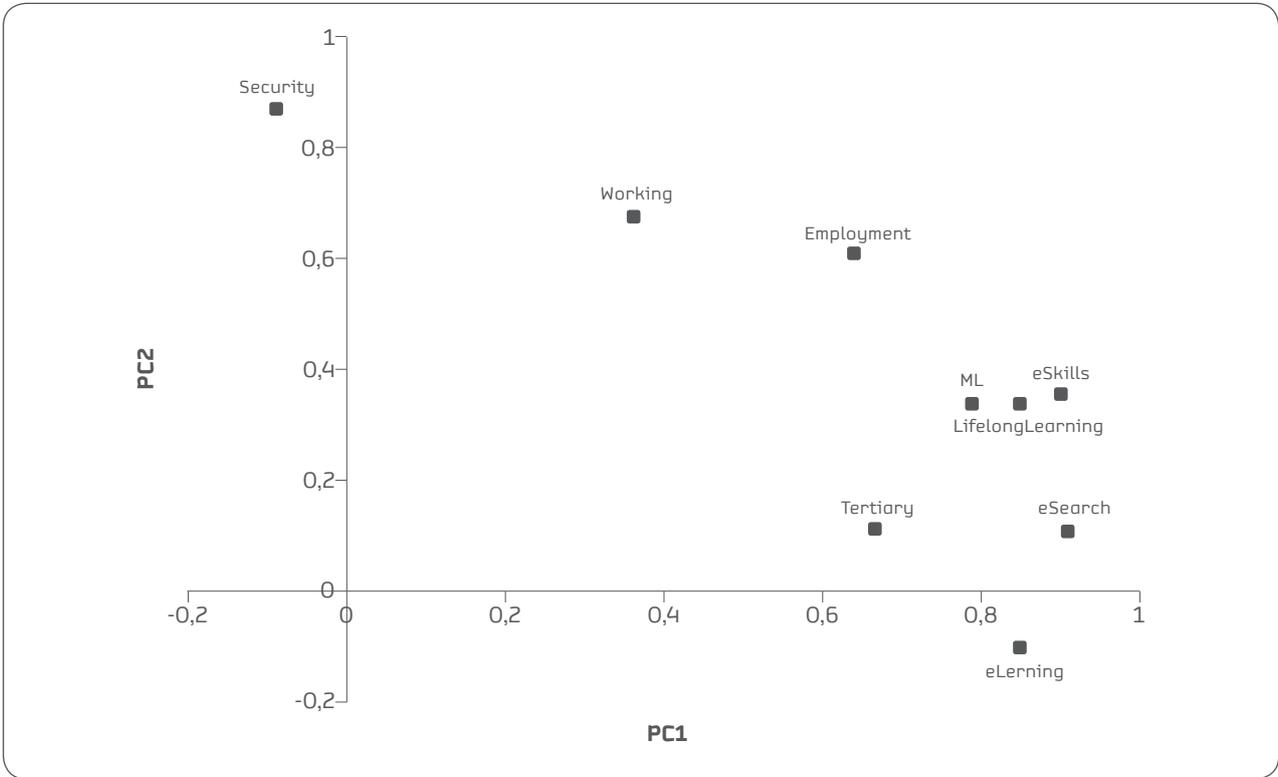
Figure 3. Countries and PCA coordinates, 2007
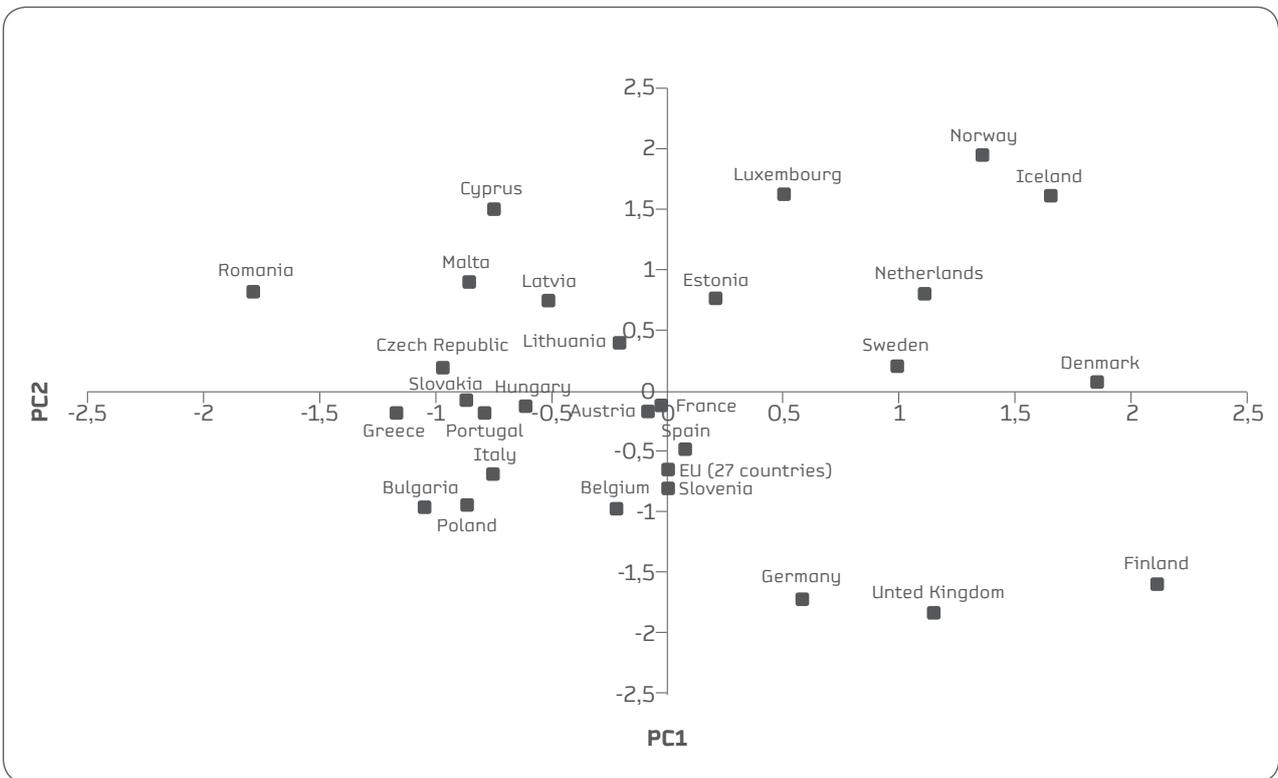
Figure 4. Countries and PCA coordinates, 2013
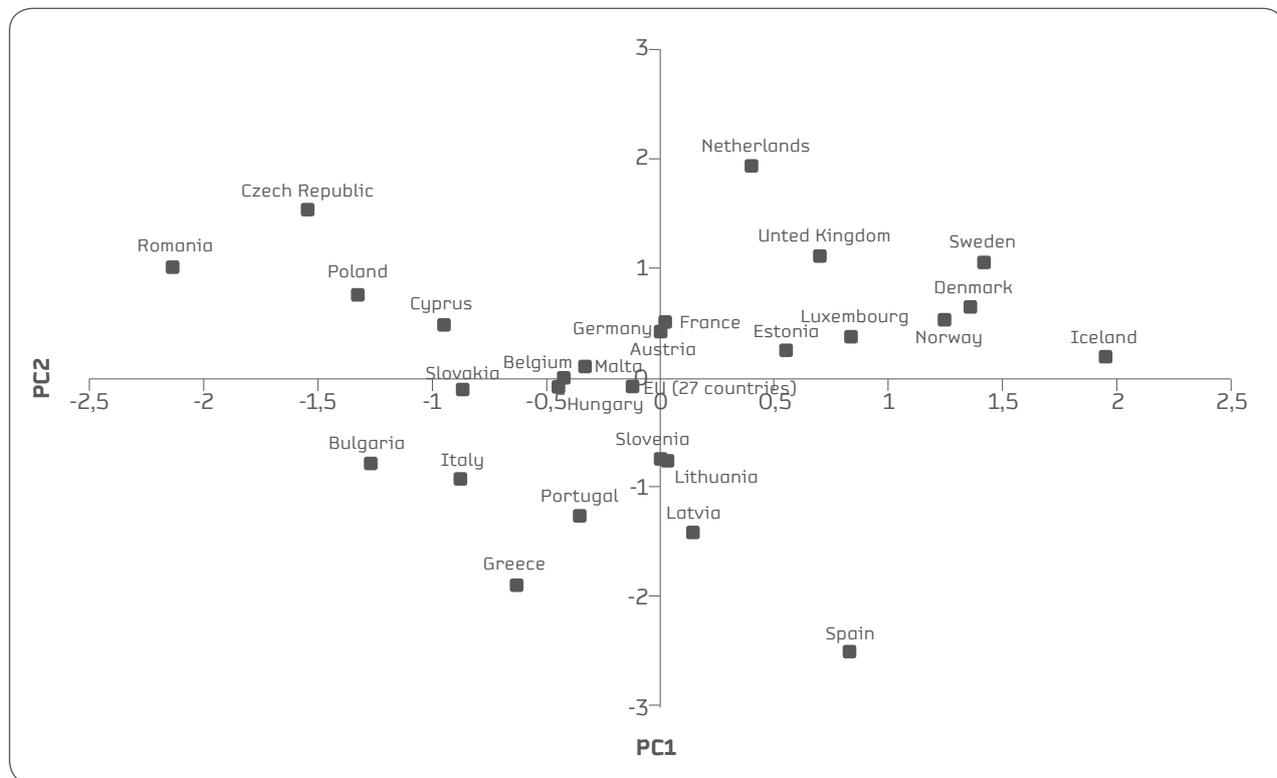
the lowest), based on e-learning. Thus, it is observed that the level of existing e-learning is a very good indicator which greatly simplifies the process for estimating job security in Germany.

CONCLUSION AND IMPLICATIONS FOR E-LEARNING

The research was begun with a view to discerning whether there is a relationship between the e-learning and employment and education and e-skills factors in Europe. Data analysis has helped to prove that e-learning can be one of the most valid factors for helping

simplify the number of dimensions for studying the employment, education and e-skills situation in 28 countries and for the period 2007-2013. Furthermore, it has been observed that the level of e-learning can become one of the two axes for representing the factors in the countries studied on the coordinates axes.

We have also analysed the possibility of establishing a formula based on the e-learning factor to estimate job security in Germany, a country which, unlike the majority of Europe, has maintained good economic results during the period of economic crisis between 2007 and 2013. Thus, the importance of e-learning in aspects related to professional development and employability has been demonstrated.

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Table 3. Linear regression analysis in Germany, 2007-2013

VARIABLE	COEFFICIENT	STD. ERROR	T VALUE	PR(>|T|)	R²	F-STATISTIC	P-VALUE
Model I		$Y_{Security} = \beta_0 + \beta_{Tertiary} X_{Tertiary} + \beta_{e\text{-}Learning} X_{e\text{-}Learning} + \beta_{e\text{-}Skills} X_{e\text{-}Skills} + \beta_{ML} X_{ML} + \varepsilon$					
B_0	63.56297	5.01111	12.68400	0.00616*	98.01%		
$B_{Tertiary}$	0.59299	0.38010	1.56000	0.25910			
$B_{e\text{-}Learning}$	0.11978	0.14000	0.88000	0.47165		24.64	0.03939
$B_{e\text{-}Skills}$	-0.08968	0.16983	-0.52800	0.65000	Adjusted		
B_{ML}	0.10511	0.13764	0.76400	0.52484	R² = 94.04%		
Model II		$Y_{Security} = \beta_0 + \beta_{Tertiary} X_{Tertiary} + \beta_{e\text{-}Skills} X_{e\text{-}Skills} + \beta_{ML} X_{ML} + \varepsilon$					
B_0	62.10371	4.54763	13.65600	0.000849***	97.24%		
$B_{Tertiary}$	0.60108	0.36543	1.64500	0.19854		35.24	0.007720
$B_{e\text{-}Skills}$	-0.02593	0.14772	-0.17600	0.87183			
B_{ML}	0.11626	0.13180	0.88200	0.44269	Adjusted R² = 94.48%		
Model III		$Y_{Security} = \beta_0 + \beta_{Tertiary} X_{Tertiary} + \beta_{e\text{-}Skills} X_{e\text{-}Skills} + \varepsilon$					
B_0	64.17065	3.78778	16.94100	0.0000712***	96.53%		
$B_{Tertiary}$	0.77262	0.30068	2.57000	0.062˙		55.55	0.001208
$B_{e\text{-}Skills}$	-0.01812	0.14331	-0.12600	0.90500	Adjusted R² = 94.79%		
Model IV		$Y_{Security} = \beta_0 + \beta_{Tertiary} X_{Tertiary} + \beta_{e\text{-}Learning} X_{e\text{-}Learning} + \beta_{e\text{-}Skills} X_{e\text{-}Skills} + \varepsilon$					
B_0	65.53243	3.98697	16.43700	0.00049***	97.43%		
$B_{Tertiary}$	0.74612	0.29964	2.49000	0.08848˙		37.92	0.006937
$B_{e\text{-}Learning}$	0.12934	0.12576	1.02900	0.37938			
$B_{e\text{-}Skills}$	-0.08777	0.15758	-0.55700	0.61639	Adjusted R² = 94.86%		
Model V		$Y_{Security} = \beta_0 + \beta_{Tertiary} X_{Tertiary} + \beta_{e\text{-}Learning} X_{e\text{-}Learning} + \varepsilon$					
B_0	66.79248	2.98656	22.36400	0.0000237***	97.17%		
$B_{Tertiary}$	0.60625	0.14871	4.07700	0.0151*		68.55	0.0008036
$B_{e\text{-}Learning}$	0.09924	0.10330	0.96100	0.39110	Adjusted R² = 95.75%		
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '˙' 0.1 ' '							

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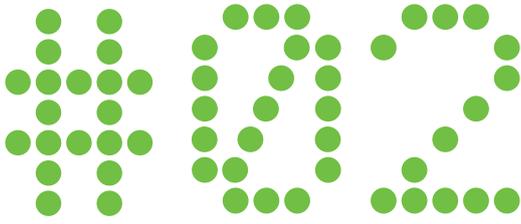
COOPERATIVE LEARNING ENVIRONMENTS: VIRTUAL COMMUNITIES OF PRACTICE IN THE HEALTHCARE SECTOR

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ABSTRACT

This paper aims to examine the benefits the use of virtual communities of practice (VCoP) provides to professionals in the healthcare field. Conceptually, communities of practice (CoP) are supported by the Theory of Situated Learning, which highlights the importance of the professional environment and interaction with colleagues in the development of a practical learning.

In some professional areas, this way of creating and sharing knowledge has become a common practice. The intensive use of information and communication technologies (ICTs) has allowed VCoP to develop. With them, the process of collaborative knowledge construction is faster, more efficient and participatory. The set of benefits from the use of VCoP is also broad and diversified, reaching all the members of the community, both on a personal and general level, as well as the organisations where the members of the community carry out their professional activities at both management and performance levels.

KEYWORDS

Virtual communities of practices, collaborative learning, healthcare sector

INTRODUCTION

Based on situated learning theory, in which
professional learning occurs through practical
participation and interaction with colleagues,
the term Communities of Practice (CoP) has
evolved over time to refer to groups of people
who share a concern or a problem and who
come together to interact, learn and create
a sense of identity, and, in the process, build,
share knowledge and solve problems (Wenger,
1998).

In the business sector, CoPs have earned
recognition due that their capacity to foster
the professional development of the individual,
as well as improve the business outcome for the
organisation. Based on these claimed benefits
of CoPs in the business sector, the creation of
CoPs is being promoted in other professional
fields such as the healthcare sector.

Initially, CoPs in the health sector have been
used as a tool to drive knowledge management.
But this use also makes it possible to obtain
other benefits relative to the improvement of:
(a) professional practice efficiency and efficacy
(Diaz-Chao et al., 2014); and (b) healthcare
organisational performance. Furthermore, it is
recognised that CoPs have benefits in the social
sphere, as a consequence of the increased
social knowledge of the members, creating
a people network in which there is a certain
level of trust. In some places, the creation of
CoPs is based on the use of ICTs so that the
development of virtual environments not only
helps the communication and the collaborative
exchange of information/knowledge
(Ranmuthugala et all., 2010) but also offers
a potential solution to geographical spread
(Norman and Huerta, 2006) and helps overcome
the isolation experienced by healthcare
professionals (Rolls et al., 2008).

The wide range of benefits offered by CoPs
to the healthcare sector, particularly Virtual
Communities of Practices (VCoP), points to the
need for a deep analysis of this phenomenon.
This paper therefore begins by showing that,
in the healthcare sector, knowledge plays
a strategic role in companies' growth and
survival. Subsequently, we define the concepts
of community of practice and virtual community,
establishing the similarities and differences
between them. We conclude the background
section identifying the main benefits of
using VCoP for healthcare professionals and
healthcare organisations, as well as showing
some empirical data obtained from the
analysis of a Spanish VCoP. The final section
presents the main conclusions obtained of the
analysis as well as the principal research lines
proposed.

KNOWLEDGE MANAGEMENT IN HEALTHCARE ORGANISATIONS

In today's society, knowledge is a strategic
resource for organisations, and, for that
reason, its management process has
generated great interest among academics
and professionals. Alicea-Rivera (2011)
recognises that knowledge management
has become a key element in the business
environment. The central idea behind this new
approach is, therefore, the need to motivate
organisations to generate knowledge and
information and to allow employee access to
these databases and application for immediate
use. In some situations, organisations need
a constant flow of knowledge. Hence they
have to intensify their search for strategies
that can improve the processes of knowledge
creation, acquisition and transfer (Ramalho
et al., 2010). This is particularly relevant
in health institutions because they are
knowledge-based organisations in which all
the processes that add value and meaning to
the institution and give it an identity depend
on the knowledge of their professionals.

Academic literature has defined knowledge management from various theoretical perspectives: strategic, technological and cultural or behavioural (Alicea-Rivera, 2011). For example, Peyman et al. (2006) and Syrme (1997) define knowledge management from a strategic perspective and show knowledge as a productive asset. Meanwhile, Pan and Scarbrough (1999) and O'Dell and Jackson (1998) introduce the technological perspective, showing that, through knowledge management, organisations can transfer the right knowledge to right people at the right time. Finally, Nonaka and Takeuchi (1995), and more recently other authors such as Bock et al., (2005), use the concept *organisational knowledge* instead of knowledge management to define the capacity of the company to create new knowledge and distribute it throughout the organisation. This definition implies the active intervention of the human resources in the knowledge management process. Recent research in confirm the importance of these three dimensions of knowledge management (Alicea-Rivera, 2011). Thus, as a systematic process, knowledge management involves finding, selecting, organising, extracting and presenting information in a way that enhances the understanding of a specific area of interest to members of an organisation (Payman et al., 2006). Furthermore, as Nie (2012) and Pan and Scarbrough (1999), among others, point out, knowledge management is an integrative process where: (a) information management, technology and human resources converge; (b) implementation aims to improve the processes with the greatest impact, and improve the exploitation of knowledge in terms of processes, and (c) there is distribution throughout the organisation, based on the intensive use of networks and technologies.

In the context of health institutions, the existence of a large pool of intellectual capital, which accumulates in the organisation of

the institution, and without which they could not perform their function (Rammuthugala et al., 2011). The problem lies in the lack of mechanisms to facilitate the identification of that great intangible asset that allows the effectiveness and efficiency of the organisation to be increased. In addition, usually no strategies to facilitate the institution use the experience of all its members and use it to change, improve, adapt and innovate continuously designing.

On the other hand, is seen as knowledge management on learning-or training-continued its main tool. The management of an intangible asset which, like knowledge, is able to generate value for the organisation, is determined by how individuals capture, structure and transmit knowledge both inside and outside the organisation. And although two individuals sharing the same data may have different ways of acquiring and transmitting knowledge, because of their previous experiences and to the way they process knowledge (mental models), they will never have the same tendencies for action, or identical states of knowledge (Long et al., 2014; Godwin et al., 2004).

The knowledge and skills that health care institutions need to provide value are mostly found inside the organisations themselves. Both organisations and the professionals who work in them therefore favour the development of structures and processes that support (Barnett et al, 2013): (1) the identification and exchange of existing knowledge within the institution, (2) the creation of new knowledge and learning, based on collaborative work (Long et al, 2014; Gabbay and Le May, 2009). This is especially important due that the constant need to have an updated and pluridiciplinar knowledge lack of resources and institutions to carry out (Rammuthugala et al., 2011).

COMMUNITY OF PRACTICE: CONCEPT, SCOPE AND ENVIRONMENT (PHYSICAL OR VIRTUAL)

CoP arise in a context where there is a significant difference between what *should be done* in daily practice and what *is actually done*. At a formal level, there are manuals, and formal procedures that explain how professional practice should be. But, in daily practice, these manuals are considered too abstract and unhelpful when it comes to how to proceed and act in a complex situation.

People who form a CoP are linked to the development of common, recurrent and stable practice over time. This activity is the reason why the CoP is created, and based on it discussed and learned. (Wenger and Snyder, 2000). But unlike formal learning processes, the issues discussed in the CoP are those that are significant at a particular time for members of the CoP. They are discussed in practical ways, which means experience is a key element in the construction of knowledge

WHAT IS A COP?

Formally, the term CoP was proposed by Lave and Wenger in 1991. They showed that learning is more than acquiring knowledge; it involves a complex relationship between novice and expert, peripheral participation in practices, being socialised into the practice and developing an identity within the practice community (Wenger, 1998; Cox, 2005). More recently, the concept has been refined by Wenger to extend beyond the novice-expert relationship by focusing more on the interaction between individuals and the participation of people who are engaged in creating and sharing knowledge (Wenger et al., 2002; Li et al., 2009). In this sense, a CoP is described as an informal group bound together by a common interest or passion. Wenger (1998) suggests that there are signs indicating that a CoP has been formed. These signs include: sustained mutual relations; ways of communicating and sharing information that are facilitated by common understanding that might be unique to the CoP; forms of practice that assume shared implicit knowledge of process and procedures as well as a sense of "how things are going"; a sense of membership that has arisen from experiences of working together, and development of identifiable practice styles that are unique to the CoP. Egan and Jaye (2009), and Wenger (2009) identify three elements that define the characteristics of CoPs: he domain, is the area of shared inquire and "creates common ground and as sense of identity". It inspires members to contribute and participate, guides their learning and gives meaning to their actions. In fact, it is the element that makes possible mutual engagement among the members of the community (Egan and Jaye, 2009). Wenger et al, (2002) show how a domain it is not purely an area of interest; it is a key issue, problem or goal that members share. This is not fixed and may evolve with the CoP.

The community is the group of people who interact, learn together, build relationships, and, in the process, develop a sense of belonging and mutual commitment. Individuals become a community by interacting regularly in relationships in their domain. Interactions must have continuity and members need not necessarily work together on a day-to-day basis, nor do they have to be from the same profession or organisation (Ranmuthugala et al., 2011). However, these different professions or origins are no obstacle to community members having a sense of belonging or connection between them. It is through process of alignment that the identity and enterprise of the larger group can become part of the identity of participation in CoPs (Long et al., 2014; Godwin et al., 2004).

Alignment in this sense (Wenger, 1998) shares similarities with the notion of professional socialisation, which has been defined as the gradual development and identification with a profession along with an accompanying to the professional body (Egan and Jaye, 2009).

Based on this practice, the community creates a shared repertoire of resources which include normative, roles, behaviour and routines, tools, discourses, values and practices that may be both formal and informal (Egan and Jaye, 2009). Individuals acquire norms, discourses and other aspects of occupational culture over time, by processes which implicitly add meaning to what are explicitly interpreted as routine activities. In this sense, Eraut (2000) notes that implicit knowledge can be powerful and may override explicit knowledge, particularly as novices develop expertise.

SCOPE OF COP

The concept of *community of practice* is based on the premise that learning can be treated as a collaborative process. That idea is supported by constructivist theory, which shows how learning, as well as being a cognitive process developed by the individual, also has a social dimension (Duffy and Cunningham, 1996).

CoPs have become widespread in all areas of our society; However, CoP is not a concept used in all organisations. They are known by various names, such as learning networks, thematic groups, or tech clubs (Wenger, 2010). In addition, while they all have the three elements of a domain, a community, and a practice, they come in a variety of forms. Some are quite small while others are very large, often with a core group and many peripheral members. Some are local and some cover the globe. Some meet mainly face-to-face, some mostly online. Some are within an organisation and some include members from various organisations. Some are

formally recognised, often supported with a budget; and some are completely informal and even invisible (Barton and Tusting, 2005).

CoP have been around for as long as human beings have learned together. At home, at work, at school, in our hobbies, we all belong to CoP, and usually more than one. People become members of CoPs through various trajectories, which include peripheral trajectories that might never lead to full participation and inbound trajectories that offer the prospect of full participation (Egan and Jaye, 2009).

In fact, CoP are everywhere. They are a familiar experience - so familiar perhaps that they often escapes our attention. Yet, when they are given a name and brought into focus, they become a perspective that can help us understand our world better. In particular, they allow us to see past more obvious formal structures such as organisations, classrooms, or nations, and perceive the structures defined by engagement in practice and the informal learning that comes with it.

The CoP concept has found a number of practical applications in business, organisational design, government, education, professional associations, development projects, and civic life. However, it has been in business field where this concept has been studied with greatest interest. In this sense, the identification of business performance outcomes, as well as the evaluation of CoP as a collaborative learning tool, are the most import research areas.

In the area of business, CoP are promoted as drivers of knowledge management and as a mechanism for sharing tacit knowledge, sparking innovation and reducing the learning curve for new staff, as well as a means of creating social capital and adding organisational value (Lesser and Stock, 2001). Clearly, they provide a means for knowledge to

cross boundaries, generate and manage a body
of knowledge for members to draw on, promote
standardisation of practice and innovate and
create breakthrough ideas, knowledge and
practices (Ranmuthugala, et al., 2011).

THE COP ENVIRONMENT: PHYSICAL VERSUS VIRTUAL ENVIRONMENTS

The intensive use of ICT, has encouraged the
development of communities of practice in
the virtual environment (VCoP). These arise
as a space for conversation and knowledge
sharing and a learning environment. A VCoP
is a community of practice in which the links
and relationships take place not in a physical
space, but in a virtual space, like the Internet
(Ramalho et al., 2010)

Physical and virtual communities have a high
degree of similarity. However, the choice of
one knowledge management model or another
depends on the problem to be solved or the
circumstances in which community members
are involved. According to Lathean and Le May
(2002) and Cook-Craig and Sabah (2009), some
of the distinguishing features to be taken into
account when deciding on the right model for
achieving a specific goal, should be as follows
(see table 1).

Table 1. Features and differences between physical
and virtual communities

PHYSICAL COMMUNITY	VIRTUAL COMMUNITY
· Includes passive participants · There is a single focus of interest · The rules of mark issues outside the group · Low renewing members	· Includes only active participants · Have multiple conversations · The group sets the rules · Constant renewal of members

Source: Lathean and Le May (2002) and Cook-Craig and
Sabah (2009)

Face-to-face and virtual communities are
complementary concepts; social VCoPs are
therefore an indispensable complement
to communities of practice, where new
technologies act as a tool to improve results
(Wenger, 1998).

VCOP BENEFITS AT HEALTHCARE ORGANISATIONS

In recent years there has been a great interest
in knowing about the benefits that VCoP offer
their users. In this sense, Chan et al (2009),
among others, show how: (a) there are different
kinds, (b) they affect various agents and (c)
they influence different levels of developed
activity

Concerning their nature, Wenger et al. (2002)
show that VCoPs offer not only tangible assets,
such as professional skills and business
outcomes, but also intangible assets, such
as relationships between people, a sense of
belonging and professional identity, as well as
the creation of intellectual and relational or
social capital. However, it is clear that being
able to share and co-create knowledge is the
main objective of VCoP in healthcare. In fact,
it could be said that this is the reason for the
community, making it possible to solve existing
problems, both individually and collectively,
in the short term. Meanwhile, in the long term,
they involve an increase of intellectual capital
available (Alicea-Rivera, 2011).

Meanwhile, the real scope of the benefits
is high. Considering the beneficiary, it is
possible to identify three types of benefits:
individual, community and organisational
benefits (Fontaine and Millen, 2004). Also, it
shows how the impact of VCoP is different
for people than for organisations. Regarding
individuals, VCoP affect both the professional
activity and personal lives of those individuals.
Furthermore, membership of the VCoP also

affects the way relationships are established at a group level (Adams et al., 2012; Barnett et al., 2014). In relation to organisations, the impact consists of four levels: activities, output, value and business results (Berraies and Chaher, 2014; Chandler and Fry, 2009; Chang et al., 2009) Milne and Lalonde, 2007; Zboralski et al., 2006).

Ranmuthugala et al., (2011) show that VCoP supports practitioners in changing practice, implementing evidence-based practice or enhancing performance. Among others, Jiwa et al., 2009) and Ramalho et al., (2010) show that this can reduce diagnosis time or establish new treatments and protocols in emergency situations. Long et al. (2014) VCoP makes it possible to generate ideas for new services, practices and products. Communities of practice address complex dilemmas, such as improving quality and safeguarding high standards of care by fostering an environment for clinical care (Fung-Kee et al., 2008; Jiwa et al., 2009).

Concerning healthcare organisations, Lesser and Storck (2001) state that the benefits obtained are: improved productivity and the delivery of high-quality care in financially constrained contexts. The authors therefore show that health institutions have carried out excellent benchmarking and look to other industries for strategies – such as the promotion and fostering of VCoP – to improve organisational performance.

Finally, concerning the community that belongs to the VCoP, Fang and Chui (2006) show evidence that the emotional links between community members grow as more knowledge is shared between them. The relationship can be so intense that community members can create a sense of belonging and identity through shared activity and purpose (Adan et al., 2012; Wenger, 1998). This is particularly relevant in the professional field and highlights the

role of VCOP as a tool to alleviate the degree of isolation experienced by the healthcare professionals. Barnett et al., 2014) and Rolls et al.,(2008), among others, show that changes in training from hospital to general practice can contribute to the development of different types of isolation, which, in turn, lead to a reduction in knowledge sharing (Cooper and Kurland, 2002); less intention to work in rural areas, and changes of career choice (Willians et al., 2001).

These claims have led to VCoP being promoted in healthcare as a tool for enhancing knowledge, improving practice and, in general, increase individual and organisational performance (Le May, 2009). Nevertheless, the real and bigger challenge in fostering a VCoP is the need to continuously supply knowledge, i.e., the willingness to continue knowledge-sharing. Most scholars dealing with this issue in relation to VCoPs have focused on diverse perspectives in order to explain what encourages VCoP members to voluntarily and continuously help one another through continuous knowledge-sharing.

CONCLUSIONS AND FUTURE RESEARCH LINES

The knowledge society has promoted a change of scene as far as the culture of knowledge is concerned. This is summarised in the enhancement of exchange among peers in a system where the value created is not dependent on hours worked, but rather on knowledge provided. The premium is for quality over quantity, which means it is necessary to organise overall time efficiency criteria. In addition, the workplace is irrelevant, as the technology eliminates barriers of space and time, while access to resources and the development of collaborative processes becomes possible. Finally, at this time of innovation, experience is, for the first time,

a tool for improving worker efficiency by allowing: (a) a reduction in the time required to solve problems; (b) an increase in the level of flexibility; (c) improved collaboration with other agents.

In this context, communities of practice provide a useful model for knowledge management of healthcare organisations and also a mechanism that facilitates and promotes a new way of working and learning based on collaborative work and the use of collective intelligence. If the virtual component is incorporated into the communities, this increases the benefits as much as the type of agents that perceive.

People, communities and organisations receive tangible and intangible benefits from participation in VCoPs. Fontaine and Millen (2004) report three benefits: individual benefits (skills, and know-how, personal productivity, job satisfaction, personal reputation and sense of belonging); community benefits (knowledge sharing, expertise and resources, collaboration, consensus, problem-solving and trust between members), and organisational benefits (operational efficiency, cost savings on service or sales, speed of service or product, and employee retention). Zboralski et al., (2006) reported participation outputs including knowledge effects (knowledge externalisation, preservation, documentation and distribution); business performance effects (improved business process, enhanced productivity, and innovation-enhancing effects) and socialisation effects (collective sense of ownership and common language).

Obviously, the use of VCoP is widespread as a tool for improving knowledge and clinical practice, increasing individual and organisational performance (Le May, 2009). However, the biggest challenge is getting the VCoP to provide knowledge continuously; in other words, achieving a continuous exchange of knowledge among community members. In this sense, most of the studies in relation to VCoP have focused on the different perspectives in order to explain how VCoP encourage members to volunteer and help each other continuously through continuous knowledge exchange.

Among future research lines, it can highlight those focusing on the analysis of the degree of user satisfaction with VCoP in such diverse aspects as: (a) the partnership between community members; (b) the quality and usefulness of the knowledge created, or (c) benefits of belonging to the community. Another line of interest also setting the research agenda in relation to VCoP examines the relationship of the virtual community with the institution in which the individual operates. The possibility of integrating virtual communities as a tool for organisational self-management; the synergies between the VCoP and the institution, and the analysis of the results at organisational and management level are among the aspects to be considered in the development of future research.

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COOPERATIVE LEARNING ENVIRONMENTS: VIRTUAL COMMUNITIES OF PRACTICE IN THE HEALTHCARE SECTOR   #02

24

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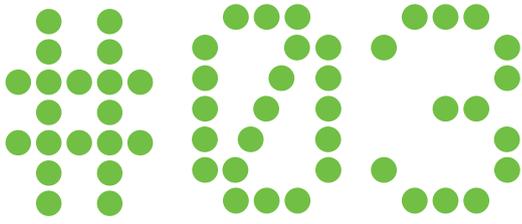
THE MOOC PHENOMENON: THE CURRENT SITUATION AND AN ALTERNATIVE BUSINESS MODEL

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The MOOC phenomenon:
the current situation and an
alternative business model

ABSTRACT

Massive Open Online Courses (MOOCs) are a recent phenomenon that has achieved great media impact in the world of e-learning since the most prestigious US universities, and subsequently many others, became involved in them. In the last ten years changes that have occurred since the emergence of the Web 2.0, with the development of Open Social Learning (OSL) and the rise of OpenCourseWare (OER), leading to the MOOC phenomenon. Initially, and as part of this OER movement, MOOC began with the intention of providing open knowledge to people, with the understanding that it should be an asset to humanity (UNESCO 2012). In this paper we present a descriptive overview of the MOOC movement from its beginnings to the different business models being proposed.

KEYWORDS

e-learning, MOOC, Business model.

26

INTRODUCTION

Massive online courses, known the acronym MOOC (Massive Open Online Courses), are a recent phenomenon that is raising a great deal of expectation. Few technological innovations have achieved the impact and interest one of this one. For example, Coursera – the main MOOC provider - currently has 9,2 million users. This explains why MOOCs have been considered, in the informative and scientific literature, as a revolution with great potential for the educational and academic world (Bouchard, 2011; Aguaded, Vazquez-Cano & Sevillano 2013).

Although according to various sources the first MOOC was said to have been "Connectivism and Connective Knowledge" by George Siemens and Stephen Downes of the University of Manitoba (Canada) in August 2008, lasting 12 weeks and with approximately 2,300 students, other course prerequisites may also to be considered as MOOCs, such as: (1) "From NAND to Tetris: Building a Modern Computer from First Principles" by David Wiley (2007) of the Utah State University (USA) and (2). "EC & I 831: Social Media & Open Education" by Alec Couros, University of Regina (Canada) in January 2008, with about 200 students enrolled for the first course becoming 350 from the general public for the second one. However, the term MOOC really started to mean something in October 2011, when Sebastian Thrun and Peter Norvig of Stanford University launched the course "Introduction to Artificial Intelligence" for people from all over the world, with more than 160,000 registered, achieving "massive" status for the first time.

In November 2012, the New York Times published an article entitled "The Year of the MOOC" (Pappano, 2012) which stated that 2012 had been the year of MOOCs. Certainly, that year alone, more than a dozen initiatives to offer MOOCs were founded or strengthened, for example, Coursera, Edx, iTunes U, Miriada X,

Udacity, among others. In this context, is clear that MOOCs have become established and are a very interesting resource for serving the growing unmet demand for training among the general public. In fact, in the last decade, universities have gradually become market oriented. And although universities have adapted to business demand, firms continue to emphasise that professionals coming out of educational institutions are still not meeting all the needs required by companies, which is leading them to consider using MOOCs as company training.

HISTORY OF MOOCS

MOOC: ORIGINS

Undoubtedly, the birth of the MOOC allows the mass audience – regardless of geographical or time distances – to have free access to a wide variety of quality knowledge. But what caused the emergence of MOOC? To answer this question, we must link the MOOC phenomenon to new scenarios that have taken place at the beginning of the 21st century.

The development of the information society and the use of information and communication technologies (ICT) have influenced leading terms like: *e-commerce, e-business, e-government and e-administrations*, and in education they have given rise to new methods and learning opportunities through the development of e-learning. The rise of e-learning has promoted the development of technological tools such as the Learning Management Systems (LMS) with the aim of responding to an urgent demand for online education and, on the other hand, a model that satisfies a new student profile that needs to balance working and personal life with studies. In this context, LMS have been the dominant platforms and have come to confuse technology with the underlying pedagogical

model (Gil & Dominguez, 2012). Currently, due to the Web 2.0 phenomenon, based on the application of Web 2.0 tools (blogs, wikis, podcast, social networks, etc.) to the processes of e-learning, LMS have declined due to their closed models in favour of open and participatory models such as Open Social Learning (OSL).

In this respect, it must be emphasised that in 1999 the Massachusetts Institute of Technology (MIT) launched its project MIT OCW (OpenCourseWare), known in Spain by the acronym OER (Open Educational Resources). This project was an electronic publishing initiative intended, in principle, to create space to allow the inclusion of teaching materials for its courses which can, at the same time, be freely consulted by students and self-learners around the world. So, although they started slowly, OCW took hold in 2001 when MIT announced that it gave free and open access to its materials and training programs. This idea was so applauded and, today, many universities around the world have added to this movement and have their own space to publish their teaching materials. OCW has much in common with the MOOCs because it provides learning material to the user, but it has one significant difference: OCW learning is individual while MOOC learning is not (Martín Gonzalez and Garcia, 2013).

Therefore, according to DeWaard, Abajian, Gallagher, Hogue, Keskin, Koutropoulos and Rodriguez (2011), MOOCs appear as the last stage in the evolution of e-learning (e.g. mobiMOOC experience). In this sense, it is not a new concept to define MOOCs as a disruptive landmark (Christensen and Overdorf, 2000; Skiba, 2012; Barber, Donnelly, Rizvi and Summers, 2013), with all that implies, even adding nuances to tone down such consideration (Conole, 2013: 17).

WHAT IS A MOOC?

The term MOOC was coined in 2008 by Dave Cormier and Brian Alexander to describe the course called "Connectivism and Connective Knowledge" by George Siemens and Stephen Downes. It is a very recent term in a constant process of transformation which hinders a precise definition. Establishing a common definition is always tricky when trying to define a recent term that is in constant transformation. In fact, John Hennessy, president of Stanford, describes the MOOC phenomenon as a "tsunami". Currently, the term with greatest emphasis that has now broken into the field of higher education via the Internet is the definition based on its acronym MOOC: massive, open, online courses (Johnson, Adams, Cummins, Estrada, Freeman and Ludgate, 2013; Rodriguez, 2012).

According to Castaño and Cabero (2013, 89) for a course can be considered a MOOC, it must have the following distinctive features:

- ❯ An educational resource that has some resemblance to a traditional class.
- ❯ Start date and a finish date.
- ❯ Assessment mechanisms.
- ❯ Online.
- ❯ Free to use.
- ❯ Open access through the website and no admission criteria.
- ❯ Large-scale interactive participation on a large-scale of hundreds of students.

De la Torre (2013) notes that MOOC lead us to recognise the significance of informal learning in our society, as there is more and more important in the labour market: your ability to do new things and things that you are able to prove.

Therefore, despite the fact that it is a constantly evolving concept, all definitions agree that a MOOC is an online course aimed at

large- scale interactive participation and open access via the web. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for the students, professors, and TAs (Teaching Assistants) (Wikipedia 2012).

From the viewpoint of "Open" aspect, at the moment it should be noted that platforms offering MOOCs are increasing. The main English-speaking platforms are: Coursera, EdX and Udacity and, in the Latin American field, Miriadax and RedunX. Their importance lies in the high figures and the "MOOCs rising" infographic from an article by Nature News emphasises this (see figure 1).

It is worth mentioning that, with regard to the various aspects involved in MOOCs, consensus was still not reached (Chamberlin and Parish, 2011). Quite the contrary, in fact. For example, there is a debate on the issues

such as classification (Baggaley, 2013), their role in Higher Education (Sandeena, 2013), accreditation (Eaton, 2012), e-learning or blended learning (Bruff, Fisher, McEwen and Smith, 2013), and others.

CLASSIFYING MOOCS

MOOCs are presented with a variety of organisations and designs, involving different views about the objectives, methods and expected results. In this respect, Clark (2013) identified eight types, based on pedagogy:

- ❯ **transferMOOCs:** transfer MOOCs literally take existing courses and decant them into a MOOC platform.
- ❯ **madeMOOCs:** made MOOCs tend to be more innovative in their use of video, avoiding talking heads in favour of Khan Academy or Udacity hands-on board sequences. They also tend to have more of a formal, quality-driven

Figure 1. Impact on Higher Education. Infographic taken from: "MOOCs Rising" (Nature News)
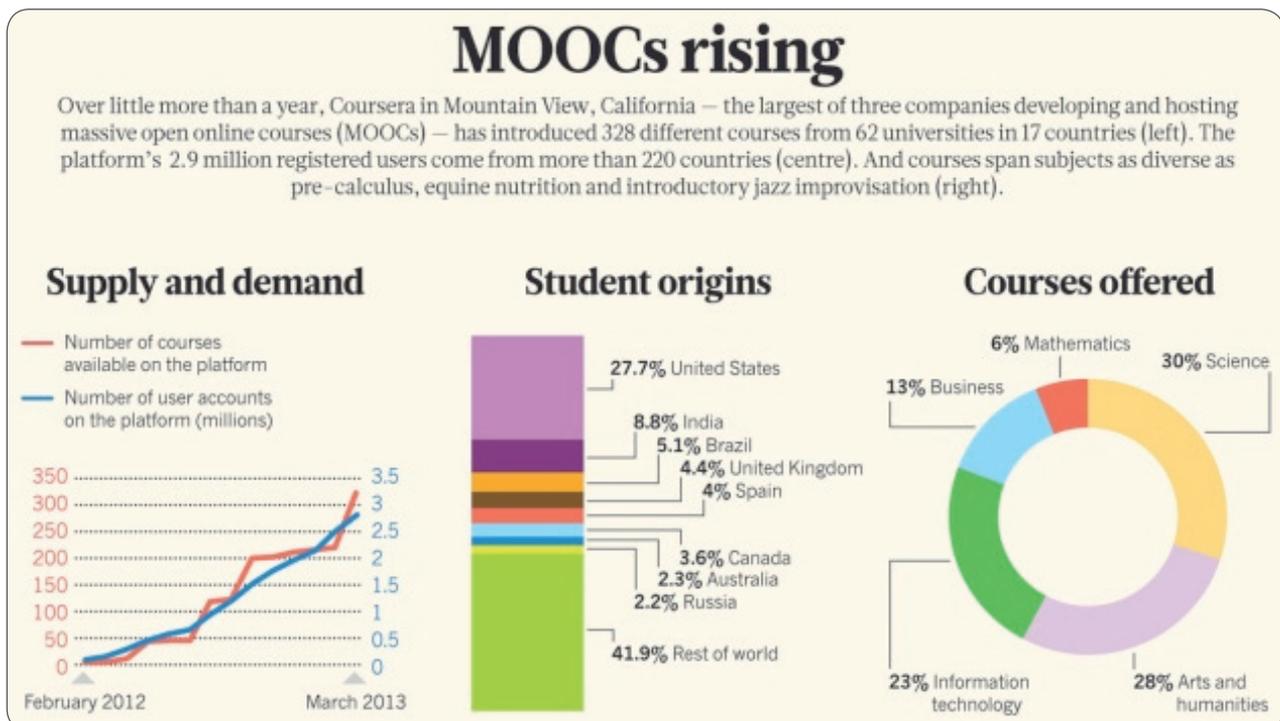
approach to the creation of material and more crafted, challenging assignments, problem-solving and various levels of sophisticated software-driven interactive experiences. Peer work and peer assessment is used to cope with the high student-teacher ratios.

❯ **synchMOOCs:** synchronous MOOCs have a fixed start date, tend to have fixed deadlines for assignments and assessments, and a clear end date.

❯ **asynchMOOCs:** without deadlines.

❯ **adaptiveMOOCs:** adaptive MOOCs use adaptive algorithms to present personalised learning experiences based on dynamic assessment and data gathering on the course and courses

❯ **groupMOOCs:** for small and specific groups.

❯ **connectivistMOOCS:** MOOC proposed by George Siemens and Stephen Downes.

❯ **miniMOOCSs:** This is more typical of commercial e-learning courses, which tend to be more intensive experiences that last for hours and days rather than weeks.

Nevertheless, the two most spread types of MOOC are: xMOOC and cMOOC (Department for Business, Innovation and Skills, 2013; Scopeo, 2013; Vázquez et al., 2013; Downes, 2012; Siemens, 2012; Hill, 2012).

xMOOCs emerged in 2011 and are the most popular courses. They tend to be university online education courses offered by MOOC platforms. According to Martí (2012), this type of MOOC has the largest number of students enrolled and is also the most discussed at educational level. They are characterised by the display of videos and small exercise tests. Coursera, Udacity and EdX are some examples of xMOOCs.

While, cMOOC was based on connectivist pedagogy by Siemens and Stephen George Downes and, therefore, the first MOOC held. They argue that learning is generated through exchange of information and participation in

co-teaching and through intense interaction provided by the technology (Scopeo, 2013). cMOOC are discursive communities which create knowledge together (Lugton, 2012). For Martí (2012), it is a model that is based on individuals and not institutions.

Several authors (Martí, 2012; Scopeo, 2013), extend this division with a model that could be considered as a hybrid of the previous two, and is focused on tasks, some authors have come to call the xMOOC (Cabrero, Llorente and Vázquez, 2014). Specifically, Martí (2012) establishes three main types of MOOC based on different aspects, such as content, network and tasks. Each type of MOOC provides these three aspects, but in each of them one aspect is dominant (Lane, 2012):

❯ **Network-based:** this was the case of the first MOOC. It does not focus on streaming content or skills acquisition, but rather on the relationships between participants on the courses. It is not possible to use traditional assessment in these courses.

❯ **Task-based:** emphasises the acquisition of certain skills and abilities in solving activities. Creating a community of learners is secondary.

❯ **Content-based:** the most important is the acquisition of content by doing different tasks. Creating a community of learners again unless the principal and a student can pass the course without relating to other students. They have a large number of students and therefore the use of traditional evaluation using multiple-choice exercises is very appropriate.

xMOOCs are postulated as a real business model because they may enhance the brand image of the university, as well as for course certifications to students. While the original purpose of these courses was to open education and free access to higher education to as many people as possible, people and

institutions have seen an opportunity to do business or make a profit. In a short time, several different platforms that offer courses of this nature have been developed and studies have been carried out to examine the potential impact on learner motivation, while different business models for MOOC have been described. This brings us to the next point.

MOOCS AS A BUSINESS MODEL: MAKING THE LEAP TO BUSINESS

There are numerous arguments for and against MOOCs, as reflected in the Wall Street Journal's 2013 survey of a set of experts in the area of MOOCs. One of the most negative motives is the high dropout rate, but, even so, it is necessary to have a business model for this educational model to persist. This formula, Social Learning, has free education as one of its essential premises. Currently, the challenge is to combine an attractive range of courses, which in turn serve as feedback for the institution's image, with a funding system to fulfil the above objectives (Vinander and Abuín, 2013).

The most prestigious universities in the world have been among those that have initiated and led this new formula of education. At this time, these are questioning how to increase the incremental associated costs (Cavanagh, 2013). To do this, several proposals have been raised: (1) collect a nominal tuition fee, (2) collect the certificates (3) making the leap to business.

The pioneer Sebastian Thurn has decided to solve the problem by contacting business to create MOOCs tailored to their needs. They are in its Udacity platform and certified by the companies. Coursera is also working along the same lines. Thus, companies that wish to may use a wide variety of courses in exchange for a financial sum (sponsorship), while the platform will be responsible for verifying and certifying

as appropriate. This is therefore an alternative business model that helps maintain the free initiative.

Initially, it might seem a little strange to think that a MOOC may be of interest to a company. However, as we shall see in this section, increasing numbers of companies are interested in this type of training product, for several reasons.

Traditionally, business training has come to be seen as a closed product for workers to study during working hours. Furthermore, the content generally was designed specifically for the company's needs, which resulted in a costly training. The problem is that, in the current situation, companies have limited resources for training. They are aware of the need to train their workers but they do not have the financial resources to pay for training, and cannot afford the loss of working hours to train their workers. It is in this context that virtual training is seen as a viable and attractive alternative because of: (1) the low cost, (2) the possibility of reconciling synchrony and asynchrony, (3) the fact that workers are not required to miss key times in their working days.

For this reason, a pedagogical model appropriate for the situation and reality of business environment is required. In this sense, MOOCs have a number of features that make them suitable for businesses: MOOCs allow continuous education and they make learning more dynamic and entertaining; in the MOOC working groups or peer collaboration (workers) can be created and worker training can be assessed in real time.

Thus, in March 2014, *El País* published an article entitled "Massive courses make the leap to businesses" (Blázquez, 2014) which said companies have discovered massive online courses as way of teaching "which is cheaper and more flexible than traditional teaching,

and establishes working relationships between workers from different companies, because the tests and exercises are corrected and discussed among all them".

CONCLUSIONS

The review carried out in this article brings us to different reflections. Although the MOOC phenomenon has been established since 2012, at the moment there is an ongoing debate on whether MOOCs are a fad or whether they can last with the current model. In other words, what is the future of MOOCs?

Without any doubt, the problem of financing MOOCs is the most recurrent and, in this sense, this article has considered, in an exploratory way, several solutions, such as the collection of certificates, although in our opinion it is necessary to consider MOOCs as an alternative business model, but they stand the basis of his teaching, and for this, one of the most appropriate means and which are beginning to take important into consideration is that MOOC adapt to the training needs of companies. As we have seen, EdX and Coursera are starting in this direction, and, in our opinion, it can have an positive effect not only to the benefit of educational institutions, promoting the survival of MOOCs, it can also improve their brand image, while positioning them better in the global market and visibility. Among future research lines, the different business models that may occur could be highlighted, along with the benefits for higher education.

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E-LEARNING, VOCATIONAL TRAINING AND EMPLOYABILITY FOR THE UNEMPLOYED: SURVEY DESIGN AND VALIDATION

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ABSTRACT

The paper analyses the effect of e-learning vocational training on the employability of the unemployed. Through a questionnaire survey of 5,265 people who took part in an e-learning training programme developed in 2009 by the Catalan Employment Service (SOC) and the Open University of Catalonia (UOC) to improve the employability of the unemployed, the study makes two main contributions. First, we describe the design of an 18-item scale. Second, the study analyses the factorial structure and psychometric properties of that scale. Three factors from the exploratory factor analysis, namely *competencies developed* (α_1=0.93), *applicability of training* (α_2=0.92) and *satisfaction with the pedagogical design* (α_3=0.90), explain 71.5% of cumulative variance. The total scale reliability is 0.94. The statistics obtained for the confirmatory factor analysis (CFI=0.94, NNFI=0.94, and RMSEA=0.08) indicate an acceptable fit of the proposed three-factor model (Chi-square=2.416, p=0.000). The coefficients of the estimates, all with values between 0.85 and 1.66, are significant at p<0.001. The study provides new evidence in the specific field of e-learning vocational training specifically for the unemployed, as well as new dimensions such as the structure and the pedagogical design of the programme. The analysis of a new edition of the programme in 2012 reveals the usefulness of e-learning for the unemployed with fewer formal qualifications.

KEYWORDS

e-learning, vocational training, unemployment, employability, satisfaction, psychometric evaluation.

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34

E-LEARNING, VOCATIONAL TRAINING AND EMPLOYABILITY #04
FOR THE UNEMPLOYED: SURVEY DESIGN AND VALIDATION

INTRODUCTION

E-learning has become consolidated as a method increasingly used for adults. The use of flexible and innovative distance learning methodologies, the intensive use of information and communication technologies (ICTs), and the acquisition of competencies in a collaborative and active learning environment are some of the factors explaining the considerable growth of e-learning in recent years (Andrews & Haythornthwaite, 2006).

Furthermore, within the context of active labour market policies, governments have, for some time now, allocated a substantial amount of resources to providing training programmes to improve the employability of the unemployed. In this respect, there is abundant literature evaluating the quality and effectiveness of training for employment programmes (Kirkpatrick, 1999; Mato & Cueto, 2008; Cueto & Mato, 2009; Rodríguez-Planas & Benus, 2010; Arellano, 2010). In general, the evidence suggests a medium and long-term positive impact of training for employment on the unemployed's perceptions and probabilities of re-employment, particularly among women.

However, unlike face-to-face training, the models developed to evaluate the factors of teaching quality and effectiveness in virtual learning environments, in particular those associated with online training for employment, are rather scarce. Focusing especially on the learning dimensions, they provide little evidence about the behaviour and outcome dimensions (Piccoli, Ahmad, & Ives, 2001; Ehlers, 2004; Zapata-Ros, 2005; Marcelo, 2005; De Miguel, 2006; Ehlers & Pawlowski, 2006; Casamayor, 2008). In this respect, available evidence suggests that quality in e-learning should take into account three dimensions. Firstly, learning resources: that is to say, support staff, teaching staff, learning materials and learning infrastructure. Secondly, learning processes: in other words,

needs assessment, recruitment, learning design, development and evaluation and the learning context. And, thirdly, learning outcomes, that is to say, an analysis of the effect of online training on the employability conditions of the learners.

In this respect, learner satisfaction has also become one of the most commonly used dimensions in evaluating the quality of online training (Wang, 2003; Sun, Tsai, Finger, Chen, & Yeh, 2008; Tejada, Ferrández, Jurado, Navío, & Ruiz, 2008; Marcelo, 2011). In general, the research conducted in this field has identified factors associated with the learning process and methodologies, although it also notes that the results should be supplemented with other qualitative data from an analysis of the design, the internal structure and the outcomes of a training programme. Since the available empirical evidence is still very limited, especially on large samples of the unemployed, in this paper we describe the design, validation and testing of an instrument/questionnaire on the quality of e-learning in training for the employability of the unemployed (Ficapal, Torrent, Boada, & Sánchez-García, 2013).

METHODOLOGY SECTION

The study employs a descriptive and inferential quantitative methodology in order to evaluate the effect of e-learning on a training for employment programme. The study sample comprises 5,265 people who took part in an online training for employment programme developed jointly by the Open University of Catalonia (UOC) and the Catalan Occupation Service (SOC) for the autonomous community of Catalonia in 2009. The training programme was organised into 55 courses, with 8 monthly editions (from May to December). In order to implement the programme, 784 virtual classrooms were created, 987 subjects leading to European Credit Transfer and Accumulation

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System (ECTS) credits were taught, and 23,140 training hours were completed, with a total of 27,764 enrolments or non-unique learners participating in the training programme. The programme content was divided into eight competency categories: i) digital competencies; ii) language competencies; iii) job search competencies; iv) information and communication management competencies; v) tourism competencies; vi) logistics and operations competencies; vii) business management competencies, and viii) social activity competencies.

The total number of unique learners (several voluntary enrolments per learner were permitted) participating in the training programme formed a population of 17,520. Through non-probability sampling, 5,265 people voluntarily responded to a confidential, non-anonymous, self-administered online questionnaire. The sample-to-population ratio was 30%, which, at a 95.5% confidence level in a case of maximum indetermination (p=q=50) and for the reference population, represents a sample error of +1.4%.

In order to capture the effect of e-learning on training for employment, an evaluation scale was designed. We based the design on earlier studies into e-learning, among which are the inventories of e-learning course evaluation by learners (Marcelo, 2005; 2011), and on our own experience (Boada-Grau, 2009; 2011;

Table 1. Dimensions of the effect of e-learning on training for employment scale

DIMENSIONS	DESCRIPTION	ITEMS	VARIABLES AND VALUES
Competencies developed (COM)	Acquisition of generic competencies - instrumental, interpersonal and systemic - through the training process	1. Teamwork	Categorical (1 to 5)
		2. Leadership	Categorical (1 to 5)
		3. Time and task management	Categorical (1 to 5)
		4. Problem solving	Categorical (1 to 5)
		5. Decision making	Categorical (1 to 5)
		6. Creativity	Categorical (1 to 5)
		7. Analytical thinking	Categorical (1 to 5)
		8. Critical thinking	Categorical (1 to 5)
Applicability of training (AP)	Applicability of the training programme for improving employability	9. Change job/sector	Categorical (1 to 5)
		10. Look for a job	Categorical (1 to 5)
		11. Find a job	Categorical (1 to 5)
		12. Change profession	Categorical (1 to 5)
		13. Get better pay	Categorical (1 to 5)
Satisfaction with the pedagogical design (SAT)	Learners' level of satisfaction with the teaching/ learning process	14. Teaching materials	Categorical (1 to 5)
		15. Teaching staff	Categorical (1 to 5)
		16. Teaching/Learning methodology	Categorical (1 to 5)
		17. Virtual campus	Categorical (1 to 5)
		18. Secretariat	Categorical (1 to 5)

Source: self-created.

Boada, De Diego, De Llanos, & Vigil, 2011). The inventory is internally divided into three dimensions that aim to respond to the question about the training programme participants', and especially the unemployed's, level of satisfaction with the training actions carried out: *competencies developed* (COM), *applicability of training* (AP), and *satisfaction with the pedagogical design* (SAT). Table 1 summarises and describes the scale dimensions, as well as the items used and their values. In order to build the exploratory factor analysis structure and the reliability coefficients, the SPSS 17.0 program was used. For the confirmatory factor analysis, which allows the scale's parameters to be validated by the maximum likelihood method, the LISREL 8.8 program was used (Jöreskog & Sörbom, 2004).

RESULTS

The results obtained from the exploratory factor analysis suggested the existence of three evaluative factors of the effect of e-learning on training for employment (see Table 2). These three factors explained 71.5% of cumulative variance, with a satisfactory Kaiser-Meyer-Olkin index (KMO=0.73) and good results for Bartlett's sphericity test (Chi-square= 32,675.69 and p=0.000).

The first factor, which we have called *competencies developed*, obtains evidence about the skills that the learners acquired from the training programme. Thus, evidence is obtained about generic competencies of an instrumental nature (time and task management, problem solving, decision making and analytical thinking), of an interpersonal nature (teamwork and critical thinking) and of a systemic nature (leadership and creativity). The second factor is about the applicability, for employment, of the online training programme. We have called it *applicability of training*, and it refers to the opportunities created for the learners on the

programme to change job/sector, look for a job, find a job, change profession and obtain better pay. Finally, the third factor found is about the learners' level of satisfaction with the teaching/learning process. We have called it *satisfaction with the pedagogical design*, and it refers to the level of satisfaction with teaching materials, teaching staff, teaching/learning methodology, the virtual campus and the secretariat of the online training programme.

The reliability coefficients obtained for the three factors were high: $\alpha=0.93$ for the first factor, $\alpha=0.92$ for the second factor and $\alpha=0.90$ for the third factor. The reliability of the scale as a whole was 0.94. All of the sub-scales therefore had very acceptable levels of reliability, thus indicating the adequacy of an 18-item questionnaire for the proposed inventory.

The statistics obtained for the confirmatory factor analysis of the e-learning and employability scale (CFI=0.94; NNFI=0.94; RMSEA=0.08) indicated that the proposed three-factor model's goodness of fit was acceptable (Chi-square=2.416, p=0.000). The coefficients of the estimations made, all of which had values between 0.85 and 1.66, were significant at p<0.001.

DISCUSSION AND CONCLUSIONS

In conclusion, the psychometric properties and structure of the constructed scale's factors were shown to be suitable for identifying and evaluating the effect of e-learning on training for employment, particularly for the unemployed. The three dimensions found —*competencies developed*, *applicability of training* and *satisfaction with the pedagogical design*— are in keeping with classic evidence that evaluates the effect of training and with studies conducted in the field of training

Table 2. Exploratory factor analysis (saturation matrix) and confirmatory factor analysis (estimation matrix)

ITEMS	EXPLORATORY FACTOR ANALYSIS			CONFIRMATORY FACTOR ANALYSIS		
	F1	F2	F3	F1	F2	F3
1. Teamwork is the competency acquired	0.61			1.00***		
2. Leadership is the competency acquired	0.65			1.13***		
3. Time and task management is the competency acquired	0.75			1.05***		
4. Problem solving is the competency acquired	0.77			1.08***		
5. Decision making is the competency acquired	0.82			1.21***		
6. Creativity is the competency acquired	0.78			1.13***		
7. Analytical thinking is the competency acquired	0.82			1.15***		
8. Critical thinking is the competency acquired	0.81			1.14***		
9. The training will allow me to change job/sector		0.75			1.00***	
10. The training will allow me to look for a job		0.80			1.61***	
11. The training will help me find a job		0.84			1.63***	
12. The training will help me change profession		0.85			1.66***	
13. The training will help me get better pay		0.83			1.66***	
14. Level of satisfaction with the teaching materials			0.75			1.00***
15. Level of satisfaction with the teaching staff			0.76			0.94***
16. Level of satisfaction with the teaching/learning methodology			0.76			1.03***
17. Level of satisfaction with the virtual campus			0.79			0.87***
18. Level of satisfaction with the secretariat			0.76			0.85***
Statistics						
Total variance (%)	51.9	10.9	8.7			
Reliability coefficients (Cronbach's alpha)	0.93	0.92	0.90			
NNFI					0.94	
RFI					0.93	
IFI					0.94	
TLI					0.93	
CFI					0.94	
RMSEA					0.08	

Notes

F1: Competencies developed; F2: Applicability of training; F3: Satisfaction with the pedagogical design.
Confirmatory factor analysis: (***) = p<0.001

Source: self-created.

for employment. In addition, new evidence is provided in the specific field of online training for employment, mainly for the unemployed, as are new dimensions such as the structure and pedagogical design of the programme.

The limitations of the proposed scale will be the starting point for research that we intend to conduct in the future. Firstly, it will be necessary to check the validity of the findings obtained against other important dimensions in the field of evaluating training for employment delivered in e-learning mode. In particular, variance will be analysed to verify the association and statistical differences between the dimensions of the scale obtained and the learners' sociodemographic and personality

characteristics, academic performance, and changes effectively made in the level of the learners' employability. Secondly, and in this respect, the availability of similar information for 2012 will allow us to dynamically evaluate the structure of the scale and the results obtained, in particular the restrictions and opportunities of e-learning in training for employment at times of economic crisis. Thirdly and finally, the importance of having a psychometrically validated instrument to evaluate active public policies in support of employment should not be overlooked. Based on the three factors obtained, it will therefore be possible to perform evaluations, which to date are scarce, of the performance of public policies on online training for employment.

Table 3. Online training for employability scale and learners' sociodemographic characteristics. 2012 (*mean values of the scale and its factors*)

		COMPETENCIES DEVELOPED (F1)	APPLICABILITY OF TRAINING (F2)	SATISFACTION WITH THE PEDAGOGICAL DESIGN (F3)	SCALE
Gender	Male	2.93	2.48	3.67	3.03
	Female	3.04	2.48	3.81	3.11
Age	30 years or under	3.00	2.48	3.75	3.08
	31 to 40 years	2.96	2.47	3.73	3.06
	41 to 50 years	3.08	2.54	3.82	3.14
	51 years or over	2.96	2.36	3.78	3.03
Place of birth	Spain	2.98	2.44	3.76	3.06
	Outside Spain	3.17	2.80	3.80	3.25
Level of education	None	3.17	2.86	4.06	3.37
	Primary education	3.19	2.70	3.87	3.25
	Secondary education	3.12	2.60	3.85	3.19
	Vocational training	3.09	2.56	3.81	3.15
	University education (1st and 2nd cycles)	2.92	2.40	3.71	3.01
	University education (3rd cycle)	2.77	2.23	3.61	2.87

Source: self-created.

In fact, an initial analysis of the relationship between the factors obtained on the scale and some of the learners' sociodemographic characteristics for a new edition of the training programme in 2012 (representative sample of 7,680 learners) indicates higher perceived ratings of the programme among women, learners in the middle age range (41 to 50 year olds), and those born outside Spain having lower levels of education, which would suggest the usefulness of e-learning in training for employment to those with fewer formal qualifications (Table 3).

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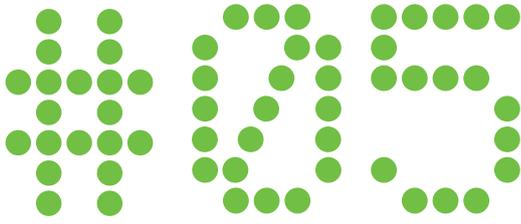
E-LEARNING AND ENTREPRENEURSHIP: BOOSTING SPIN-OFFS' SUCCESS THROUGH A PROCESS OF ACCELERATION

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ABSTRACT

A new agent has recently emerged within the context of university-based entrepreneurship: that of business accelerators. The main aim of these is to support the growth of spin-offs and raise rates of return for universities on their transfer agreements. This new agent has become consolidated because of the traditional incubators' inability to deal with the diversity of their firms or network with innovative agents of the system. Some of the most frequently used instruments to improve the growth capacity of spin-offs are training pathways for the entrepreneurial team delivered via e-learning.

By analysing an experience of business management training (management and commerce), mentoring and financial assistance for innovation via e-learning at the Autonomous University of Barcelona (UAB) Research Park, this article shows that there has been a 14% increase in the annual turnover of the spin-offs' concerned. Despite these good results, the nature and context of the research (case study) suggests the need to carry on researching into the effects of business growth pathways based on e-learning.

KEYWORDS

e-learning, entrepreneurship, spin-off, firm's success, business acceleration.

E-LEARNING AND ENTREPRENEURSHIP: BOOSTING SPIN-OFFS' #05 SUCCESS THROUGH A PROCESS OF ACCELERATION.

42

INTRODUCTION: FROM SPIN-OFF INCUBATION TO SPIN-OFF ACCELERATION

Business incubators emerged in the early 1980s to foster and drive the creation of firms in territories. Thus, the construction of buildings to house these new firms as well as training pathways to support the entrepreneur proliferated. Business incubation pathways entail the standardised provision of the key resources for business creation and growth, in particular, access to funding, networking and infrastructure.

Although the so-called science parks, which transfer the results of research conducted in universities, did not proliferate in Europe until the 2000s, the first spin-offs in the university area began to emerge in the United States in the 1980s, and evidence of that emergence is well documented. Within this context, the incubator model in American universities represents a pattern that is worth following because of its results in terms of generating quality work and firms. Based on the paradigmatic examples of Silicon Valley and Route 128, which are linked to prestigious universities like Stanford and MIT, university spin-offs have been part of the university landscape for decades and have been reference models for incubators in Europe and the rest of the world (Alistair et al., 1991; Roberts, 1991).

Over the past decade, Spanish universities have made a strong commitment to the creation of their own science parks. They constitute a perfect tool for achieving distinct yet complementary objectives: to foster dynamism and regional economic development by creating innovative firms and to drive the processes of dissemination and transfer of technology from universities to the business community (Calvo, 2008; Lofsten & Lindelof, 2003). Within this context, it is worth noting that the research results suggest that while science parks have proven themselves capable of generating new innovative firms, they are not renowned for their excellence in fostering business growth. Empirical evidence has shown that firms located in university incubators are not particularly good at networking with other agents of innovation through an intensive use of information and communication technologies (ICTs), which ends up weakening their growth.

Within this context, university spin-off accelerators have emerged in order to provide a response on two fronts at this point in time. First, in the current social and economic crisis, emphasis has been placed on the need for science parks to be self-funding and, consequently, on the importance of generating incubation programmes that add more value to spin-offs. Second, it has been shown that university spin-offs have little growth capacity, and this leads to lower rates of return for universities on their transfer agreements.

Within this context, it has also been pointed out that there is a need to conduct more in-depth research into the influence of science parks on universities (Link & Scott, 2003) and on national innovation systems (Link & Scott, 2007). The key can be found in creating a perfect environment for fostering competitiveness and a culture of innovation among the institutions forming part of it, thus favouring an exchange of technology and knowledge flows (Squicciarini, 2009). To do that, organisations need to share a geographical space or a series of common services to enable a considerable reduction in costs, although alone neither is enough. In addition, therefore, there need to be strong relationships between the various agents located at a park, laying the basis on which network creation and cooperation agreements can be established (Montoro et al., 2011). The origin and diverse nature of the spin-offs located at a park require support pathways that have higher value and which are capable of boosting business growth based on a firm's true situation.

#05 E-LEARNING AND ENTREPRENEURSHIP: BOOSTING SPIN-OFFS' SUCCESS THROUGH A PROCESS OF ACCELERATION.

43

E-LEARNING AND ENTREPRENEURSHIP: BOOSTING SPIN-OFFS'   #05
SUCCESS THROUGH A PROCESS OF ACCELERATION.

44

In Catalonia, there are currently 15 science and technology parks in university settings. They offer physical spaces and support pathways for business creation, as well as a whole range of financial and non-financial services to support the innovative entrepreneur. These support services are characterised by the fact that they are standardised and range from non-financial to financial support measures. Among the non-financial support measures are business plan writing and training day attendance, and among the financial ones is assistance with application processes to obtain public grants to create firms. At a time of deep recession, public authorities and universities are both aware of the importance of designing entrepreneur support pathways suited to a firm's true situation. This new situation builds a new context of relationship between spin-offs and a science park or university. That context is characterised by greater collaboration, which goes further than simply providing a firm with training or with business plan advice. In fact, it is based on collaboration and tailored work, innovation networks and involvement in a spin-off's decision making. The aim of this change of direction in the way that incubators act is to get the business growth pathways right because, until now, they have been somewhat generic and lacking in objectives set in advance.

One of the new instruments for accelerating the growth of university spin-offs is to train the entrepreneur using e-learning tools, which go further than simply offering entrepreneurial culture training (Sapienza et al., 2004). E-learning as a training tool in business accelerators is delivered within the incubators and represents a true ICT-supported learning process. Although it is necessary for the key resources for a spin-off's growth to be identified first, e-learning has generally been used to identify the resources that the entrepreneur needs, especially in the areas of specialised funding, direct access to investors, management and commerce training, and access to expert mentors in his or her business sector (Welsh et al., 2003).

Table 1. Incubation pathways: traditional incubators versus business accelerators

TRADITIONAL INCUBATOR PATHWAYS	BUSINESS ACCELERATOR PATHWAYS
Standardised services	Tailored services
Non-systematic networking with agents of innovation	Networking with strategic agents of innovation within the setting
The university is not represented at shareholders' meetings	The university is involved in the firm's decision making
Less involvement in business growth outcomes	Involvement in business growth outcomes estimated yearly in advance
Learning pathways for training without using ICTs	Intensive use of ICTs
Non-existence of contingency plans	Existence of contingency plans
Learning focus is centred on programme content	Learning focus is centred on development in the entrepreneur's training
Little assistance is given to the firm throughout the learning pathway	Mentoring and assistance are given to the firm throughout the learning pathway
Firms joining the incubation programme are not filtered	Firms joining the programme are filtered in accordance with clear growth potential criteria

Source: self-created.

Training pathways delivered via e-learning must have certain characteristics in order to ensure that they work properly. Specifically, 1) pre-selection of firms that have growth potential (scalable product and global potential); 2) networking with the main agents of innovation and with the support of ICTs; 3) a temporary nature: training pathways should not be any longer than one year; 4) quantifiable programme outcomes in terms of growth objectives (turnover and jobs created), and; 5) contingency plan (control and supervision) for the programme outcomes. Table 1 compares business support pathways in traditional incubators and in business accelerators, and the possibilities of e-learning as an instrument for business growth.

E-LEARNING USE IN ENTREPRENEUR TRAINING

E-learning has been defined as "a wide set of applications and processes, such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet, audio and video, satellite broadcast, interactive TV, and CD-ROM" (Kaplan-Leiserson, 2002). However, e-learning is not only about training and instruction, but also about learning that is tailored to the individual. E-learning is said to be "pedagogy empowered by digital technology" (Sharma, Ekundayo, & Neg, 2009).

Virtual learning, computer-based learning, virtual classroom, digital collaboration and networking are some of the terms that have been used to define learning that takes place online. The different terms point to a similarly conceived educational experience, where (a) the learner is distant from the tutor or instructor, (b) the learner uses some form of technology (usually a computer) to access the learning material, and (c) the learner uses technology to interact with the tutor or instructor and other learners, and the learners are provided with some form of support (Allen, Mabry, Mattrey, Bourhis, Titsworth, & Burrell, 2004).

One of the main benefits offered by e-learning is that it can be used to support distance learning through the use of wide area networks. This enables e-learning to be considered a form of flexible learning where just-in time learning is possible. Courses can be tailored to specific needs through either synchronous or asynchronous learning.

The characteristics of e-learning make it an excellent tool for use in business. At this level, e-learning has the potential to transform how and when employees learn. Learning can become more integrated with work and use shorter, more modular, just-in time delivery systems. E-learning delivers content through ICTs. Hence, organisations can use e-learning as a way of delivering training consistently to all employees; to update training content when necessary; to reduce the costs of travelling to external training facilities, and to provide employees with on-demand training, anytime and anywhere (Burgess & Russell, 2003).

E-learning, an instructional strategy for imparting required knowledge, skills and attitudes in organisations, is here to stay. Its viability, effectiveness and potential to return tangible benefits to organisations depend largely on how it is designed, delivered, and evaluated. Nowadays, some companies use e-learning in the training of ICT skills, and a growing number of businesses use e-learning in the training of business and soft skills. At Nestlé, for example, e-learning is used to train employees on communication, teamwork, and leadership skills ("Nestlé Widens Course Offers," 2004), and, at Bank of America, e-learning is the delivery mode of choice for interpersonal skills training (Dobbs, 2000). Some of the most common business and soft skills to be

#05 E-LEARNING AND ENTREPRENEURSHIP: BOOSTING SPIN-OFFS' SUCCESS THROUGH A PROCESS OF ACCELERATION.

45

E-LEARNING AND ENTREPRENEURSHIP: BOOSTING SPIN-OFFS' #05
SUCCESS THROUGH A PROCESS OF ACCELERATION.

46

taught via e-learning in organisations include management, leadership, communication, customer service, quality management, and human resources skills (Skillsoft, 2004).

David, Salleh, and Iahad (2012) show the positive relationship among ICTs, labour productivity and total factor productivity. Studies have also demonstrated a relationship between the prevalence of ICT at work and the rate of workplace learning. Knowledge and innovation are the keys to organisations' productivity, and e-learning is one of the most effective ways to share knowledge developed through innovation. In particular, e-learning offers small and medium-sized enterprises (SMEs) an unprecedented opportunity to improve their economic performance, and it is a potential solution to their development during the early stages of their lives.

Business training pathways delivered via e-learning are characterised by an intensive use of technology, especially digital technology. ICTs enable conditions to be created in order to obtain, access, organise, process, transmit and generally use information that is managed in educational contexts.

The use of ICTs in business growth support pathways represents an opportunity to network with the main international agents of innovation (public authorities, investors and business angels, financial entities, firms within a particular sector, clusters, and so on), thus providing a new firm with the necessary resources for growth in the global market. That is why financial and non-financial support measures, such as information, training, expert advice through mentoring, contact networks and access to investment, are focused on the project for growth.

Coll, Majós, Teresa, and Onrubia (2001) and Martí (2003) have characterised certain potentialities of ICTs, which change —or can

change— either the learning process or the mental functioning of the trainee when the latter is associated with content information whose support is based on the application of ICTs. The application of ICTs to business creation and growth support pathways helps to train the participant in several areas (Badia et al., 2005): 1) support for understanding the training activity; 2) learning planning, encouraging the entrepreneur's time planning regarding actions that enable the proposed objectives to be attained; 3) provision of content that the entrepreneur is able to acquire in a flexible way in terms of time, and support for knowledge construction; 4) communication and collaboration, which allow the entrepreneur to know when, where, how and to what extent the social and instructional interaction between him or her, the trainer and other learners will take place, and; 5) evaluation of progress on the training pathways. From the viewpoint of the evaluation of the entrepreneur's training, this type of educational help must enable the trainee to regularly find out what progress he or she has made in the learning process, what content he or she has properly learned, what aspects of his or her learning ought to be improved and how to properly construct his or her skills.

E-LEARNING USE IN SPIN-OFF GROWTH: PRELIMINARY EVIDENCE FROM THE AUTONOMOUS UNIVERSITY OF BARCELONA

Making a significant contribution to the development and competitiveness of firms has become a priority for universities. Besides teaching and research, establishing relationships of collaboration and transfer has become the latest mission of universities. Firms tend to collaborate with universities when seeking to attain three major types of objective: efficiency, learning or access

to knowledge, and adaptation to the setting (García Canal, 1993; Child & Faulkner, 1998). Within this context, it has been noted that firms establish collaborative arrangements with universities for six different reasons: financial, technological, strategic, educational, political and epistemological (Autio, Sapienza, & Almeida, 1996).

However, the potential of universities as a source of knowledge and technology creation and transfer, coupled with their entrepreneurial spirit, has taken the relationship with firms beyond cooperation. At the same time, universities can be service providers, cooperative partners in a project or competitors, thus bringing value to firms. They can do all of these things thanks to instruments that favour business growth: pathways delivered via e-learning in business accelerators, in which it is possible to determine a clear contribution to the value of firms that goes further than simply assisting with their creation. The university entrepreneur sees how the staff at a science park become jointly responsible for business growth, linking organisational functions of networking with the main agents of innovation, which until now have not been observed. Among others, the latter include support for commercial help, involvement in shareholders' meetings and support for negotiations with investors.

Although the results remain to be seen, we can already say that, with the use of e-learning, models that are more committed to business growth are being sought. And, within those models, universities, public authorities, investors, mentors and the main international agents of innovation come together in pursuit of a common objective: to train firms for growth. A summary of the results obtained from an e-learning experience for business growth at the Autonomous University of Barcelona (UAB) is given below.

Created in 2007 as a not-for-profit private foundation, the UAB Research Park is the hub through which three leading research entities operate: the UAB, the Spanish National Research Council (CSIC) and the Institute for Agri-Food Research and Technology of the Government of Catalonia (IRTA). Its aim is to improve knowledge and technology transfer between the university and firms.

The UAB Research Park is positioned as an instrument that facilitates the transfer of knowledge originating at the heart of the university. There are more than 30 research centres located at the UAB Research Park. Specifically, there are 2 environmental science centres, 10 social science centres, 5 biotechnology and biomedicine centres, 3 animal health and food technology centres, and 14 experimental science and technology centres. Business activities are carried out through 50 firms (spin-offs and start-ups), 65% of which belong to the technology sector.

One of the main activities of the UAB Research Park is the creation of firms, as one of the main channels for transferring knowledge to society and for providing qualified students with new employment opportunities.

In 2013, a business incubation support programme was set up, in which 12 spin-off firms took part in order to increase their business growth. The methodology used was a training programme that made an intensive use of ICTs. The activities it comprised were mentoring, training and searching for RD&I funding for businesses in the technology sector.

The action areas were the researcher' financial management and commercial training over a period of one year. The financial results suggest that those firms that had intensified their RD&I and innovation, secured funding through commercial banks or public/private grants and strengthened their commercial

#05 E-LEARNING AND ENTREPRENEURSHIP: BOOSTING SPIN-OFFS' SUCCESS THROUGH A PROCESS OF ACCELERATION.

47

teams have seen an average 14% growth in their annual turnover figures.

CONCLUSION AND DISCUSSION

At this time of social and economic crisis, when there is increasing pressure on university managers to seek better and more effective ways of managing resources, the business incubation model is being called into question, which is why new business incubation pathways are emerging. Business accelerators support business growth through new training pathways with or via the use of e-learning and networking.

These business accelerators emerge with a twofold objective. First, to offer growth solutions to firms and to increase returns to universities on spin-off transfer agreements. Second, in a global market where support for internationalisation and seeking out international financial instruments is relevant to the growth of firms, it is worth noting that, despite leading to the creation of more university spin-offs and skilled jobs, the observed outcomes of these incubation-stage promotional and educational practices applied in science parks have been modest in terms of their contribution to the business growth of the spin-offs located in them. In turn, this means that the income that universities earn from university-spin-off transfer agreements is not as high as expected.

As we have seen from the practical case mentioned, the implementation of new promotional practices based on e-learning can be effective in terms of business growth outcomes, especially when the training offered enables the acquisition of knowledge on market functioning or business management.

However, despite the benefits derived from e-learning, it is necessary to consider the existence of certain limitations that may affect the generalisation of the conclusions drawn in this work. First, the conclusions must be viewed with caution, as this is a case study and, as such, the results obtained are limited to the characteristics and circumstances of the institution where, and the moment when, the study was conducted. Second, it is necessary to highlight the diversity of spin-offs located in science parks. This suggests the need to further analyse the different typologies of firms located in science and technology parks, whether technology-based or otherwise.

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48

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49

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