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ARTÍCULO

Employability profiles: The case of a Spanish university

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Abstract: The traditional role of Higher Education Institutions (HEIs) as providers of knowledge and research, has been extended worldwide in the last decades, by adding the labour market orientation as an additional new key element in their policy strategies. This article proposes a Principal Component Analysis and a logit model to measure the influence of some factors that critically affect the employability odds on a sample of European Higher Education (HE) graduates, and hence to measure the quality of the HE degrees from the point of view of the employability. Five main profiles emerge: Information Technology expertise, standardized workers, proactive workers skills, community managers and vocational dissatisfaction.

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Resumen: El papel tradicional de las Instituciones de Educación Superior como proveedoras de conocimiento e investigación se ha extendido a todo el mundo en las últimas décadas. A la misión original de formación se ha incorporado la de orientación al mercado laboral como un nuevo elemento clave de las estrategias políticas. Este artículo propone un análisis de componentes principales y un modelo logit para medir la influencia de algunos factores que afectan de forma decisiva a la probabilidad de encontrar un empleo. En el análisis se utiliza una muestra de graduados europeos de Educación Superior, y se presentan las titulaciones universitarias más demandadas desde el punto de vista de la empleabilidad. En la investigación se obtienen cinco perfiles principales: expertos en Tecnología de la Información, trabajadores estándar, trabajadores proactivos, community managers e insatisfacción vocacional.

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1. Introduction

The traditional role of Higher Education Institutions (HEIs) as providers of knowledge and research, has been extended worldwide in the last decades, by adding the labour market orientation as an additional new key element in their policy strategies (Grotowska, Wincenciak and Gajderovicz, 2015). This process is closely related with the current obsolescence of knowledge, which happens in shorter time periods, and thus creates the need of life-long learning (LLL) environments in the workplace for all Higher Education (HE) graduates (Knight, 1998). These LLL spaces keep them receptive on conceptual, scientific and technologic changes along their labour paths (International Labour Organisation, 2014).

These assumptions have important implications for the governance of HEIs and for the quality assessment of HE degrees: regarding the analysis of their employability traits (Storen and Amodt, 2010), and with respect to the ability of graduates to get an initial job, to maintain it, or to get a new one (employability according (Hillage and Pollard, 1998).

This article identifies critical factors affecting the employability of the HE graduates for a sample of a middle-sized European public university. The goal is to define profiles affecting the recruitment odds, useful to define clear policy lines for the HEIs planners. The items obtained ("IT expertise", "standardized workers", "proactive workers skills", "community managers" and "vocational dissatisfaction") are closer to supra-curricular psychological identities (Harvey, 2001; Holmes, 2001), rather than to the technical competencies acquired during the studies.

The analysis provides useful outcomes and new perspectives in order to explore the following research hypotheses: H1) people with improved IT skills, independently from their graduate degree ("IT expertise") are the most demanded in the labour market; H2) "standardized workers" have important recruitment chances; H3) "proactive workers skills" have slightly lower employability odds than the "standardized" profiles, except for highest scores; H4) "community managers" have poor levels of employability; H5) Employment crisis has a negative impact on graduate employment, and the impact increased throughout the observed period; H6) Health Sciences and Science, Technology, Engineering and Mathematics (STEM) are the knowledge fields with higher employability odds; and H7) Feminine gender is still penalized in graduates' labour market.

2. Background

The employability patterns of the HE graduates fit in the three main theoretical proposals currently explaining the demand of human capital and its relation with the labour market: i) the *human capital theory*, analyzing the individual investment in training, in order to improve the present and future productivity (Blaug, 1983; Mincer, 1974; Denison, 1970; Becker 1964); ii) the *screening hypothesis*, that prioritizes official certification and credentials, which could act as employability signals to be read by the labour market (Stiglitz 1975; Arrow 1973; Spence 1973); iii) and the *institutionalist theory* focused in the LLL efforts management (Doeringer and Piore 1985; Thurow 1975).

The European governance initiatives developed to match the employability expectations of the HE graduates with the reality of the labour market (Islam et al. 2015) receive institutional support within the European Higher Education Area (EHEA). This can be understood as the European policy environment of academic homogenization and improvement of the competitive advantages of HE courses (Neave and Veiga, 2012). The EHEA includes, as fundamental tasks, the search for mechanisms allowing the measure of quality in terms of employability, via surveys on labour market transition (Lenton, 2015).

These surveying tasks, in the European HEIs, are usually performed in two phases: first in the form of a transition-to-labour-market survey (like the one used for this study), on the basis of the European Union Labour Force Survey (EU-LFS) (Eurostat, 2015), aiming to compute occupation rates, satisfaction, and traits of the process of performing job positions for the first time (McGuinness and Sloane, 2011; Schomburg and Teichler, 2007); the second phase, once HEIs policy makers have clarified the labour market features, usually comes in the form of the assessment of professional competencies, with standard methodologies (OECD, 2008; Gonzalez and Wagenaar, 2003) or using another alternative approaches (Harvey, 2001; Holmes, 2001).

In the methodological space existing between the analysis of the transition to the labour market, and the generic competencies (soft skills) assessment, lays out the aim of this article: the determination of the employability profiles. This concept advances from the statistical information about the first employability experiences, to a pre-generic competencies assessment. The outcomes are presented in the form of employability profiles, which are short labels useful to develop HEIs governance strategies, able to describe characteristics of the transition to the labour market on a given HE graduates' population.

Not only for individuals, the characterization of employability has become a priority target for the European Union HEIs policy makers. As an example, the "Careers after Higher Education: a European Research Study" (CHEERS) survey can be quoted (Schomburg and Teichler, 2007): a wide project (nearly 40,000 questionnaires collected) on the quality of the first job experiences of European HE graduates. The subsequent REFLEX project (McGuinness and Sloane, 2011) also interviewed nearly a new cohort of 36,000 graduates. Results of both projects have been feeding multiple researching programmes, including the research presented here.

The theoretical existence of factors favouring or harming employability are (heterogeneously) established since the seminal works of Rothwell and Arnold (2007), Fugate, Kinicki and Ashforth (2004), Mora, García-Montalvo and García-Aracil (2000), Kirschenbaum and Mano-Negrin (1999) and Hillage and Pollard (1998).

The empirical exploration of what these profiles are, using surveys on labour market transition, can be highlighted in the works of Humburg and Van der Velden (2015), Blom and Saeki (2011), Hennemann and Liefner (2010), Mason, Williams and Cranmer (2009), Moreau and Leathwood (2007), Cole, Rubin, Field and Giles (2007) and the Centre for Higher Education Research and Information (CHERI, 2002). All of these works deploy an approach to employabi-

lity, using the complete set of variables obtained, without any attempt of multivariate aggregation treatment.

The studies explicitly using segmentation methodologies (Principal Component Analysis -PCA-, Exploratory or Confirmatory Factor Analysis) in order to determine the employability profiles on graduates, are still in an initial and heterogeneous methodological stage. It can be mentioned as the main attempts made until now, and as key references for the elaboration of this research, the works of Husain, Mustapha, Malik and Mokhtar (2014), Dacre-Pool and Qualter (2013), Ho and Hung (2008), Berntson, Näswall and Sverke (2008), Rothwell, Herbert and Rothwell (2008) and Szamosi (2006).

3. Methodology

Sample design

The database used for this research has been obtained from the survey on labour market transition that the University of La Coruña performs yearly to its graduates, on the basis of the CHEERS/REFLEX methodological specifications (Schomburg and Teichler, 2007; McGuinness and Sloane, 2011).

The graduates who have finished their HE studies two years before the interview (Schomburg and Teichler, 2007) are the universe (table 1), i.e. the individuals actively searching jobs, or performing some first employment attempts (Hillage and Pollard, 1998). See table 1

Table 1. Sample composition: graduates population (N) and graduates interviewed (n) by gender and knowledge field

	Total		Year of graduation*									
			2006		2007		2008		2009		2010	
	N	n	N	n	N	n	N	n	N	n	N	n
All courses												
Men	5,864	3,369	1,159	583	1,214	648	1,107	703	1,157	690	1,227	745
Women	8,338	4,683	1,759	804	1,706	871	1,503	990	1,698	1,013	1,672	1,005
$\%^{women}_{men}$	142%	139%	152%	138%	141%	134%	136%	141%	147%	147%	136%	135%
Total	14,202	**8,052**	2,918	1,387	2,920	1,519	2,610	1,693	2,855	1,703	2,899	1,750
Health Sciences												
Men	637	334	134	53	133	60	105	65	130	67	135	89
Women	1,407	903	317	160	242	142	266	215	295	183	287	203
$\%^{women}_{men}$	221%	270%	237%	302%	182%	237%	253%	331%	227%	273%	213%	228%
Total	2,044	1,237	451	213	375	202	371	280	425	250	422	292
Empirical Sciences (biology and chemistry)												
Men	148	98	34	18	34	18	24	17	30	24	26	21
Women	343	220	71	39	75	39	73	47	69	53	55	42
$\%^{women}_{men}$	232%	224%	209%	217%	221%	217%	304%	276%	230%	221%	212%	200%
Total	491	318	105	57	109	57	97	64	99	77	81	63
Social Sciences												
Men	1,679	835	375	157	333	161	312	162	333	181	326	174
Women	4,394	2,303	958	405	924	461	790	483	860	491	862	463
	262%	276%	255%	258%	277%	286%	253%	298%	258%	271%	264%	266%
Total	6,073	3,138	1,333	562	1,257	622	1,102	645	1,193	672	1,188	637
Humanities												
Men	129	94	20	13	24	16	39	32	19	15	27	18
Women	455	311	92	47	97	57	80	61	94	76	92	70
	353%	331%	460%	362%	404%	356%	205%	191%	495%	507%	341%	389%
Total	584	405	112	60	121	73	119	93	113	91	119	88
STEM												
Men	3,271	2,008	596	342	690	393	627	427	645	403	713	443
Women	1,739	946	321	153	368	172	294	184	380	210	376	227
	53%	47%	54%	45%	53%	44%	47%	43%	59%	52%	53%	51%
Total	5,010	2,954	917	495	1,058	565	921	611	1,025	613	1,089	670

$\%^{women}_{men}$ = %((women/men)-1); ■ *Column maximum values,* □ *Column minimum values; Source: own elaboration*

Descriptive analysis

The definition of the questionnaire variables permits to make operative and measurable the basic problems of the transition from higher education to labour market, taking into account the final goal of characterizing the probability of being working (which is identified, in this research, with the employability odds). The final items have been chosen according to the methodological requirements of the CHEERS/REFLEX survey (table 2), i.e., seeking the possibilities for developing comparison studies with respect other European HEIs. See table 2.

PCA and logit model: a joint use proposal

In order to obtain the employability profiles, a PCA is performed on the set of independent variables. After the segmentation, a set of new standardized inputs is obtained, summarizing the content of the independent ones and computed using Factor Score Analysis (FSA) techniques. These new standardized factors can be used, subsequently, as inputs of a model explaining the probability of being employed (Humburg and Van der Velden, 2015; Riess, 2015; Di Stefano, Zhu and Mindrila, 2009) according to these new factors (profiles).

Table 2. Employability survey variables

i	*Xi*	Values	*E[Xi]*	*σ [Xi]*
		control variables		
*	W	{1=”currently working”, 0=”Not currently working”}	0.643	0.479
1	women	{1=”woman”, 0=”man”}	0.580	0.493
2	field[1]	{1=”Knowledge Field: Health Sciences”, 0=”other knowledge fields”}	0.154	0.361
3	field[2]	{1=”Knowledge Field: Experimental Sciences”, 0=”other knowledge fields”}	0.040	0.195
4	field[3]	{1=”Knowledge Field: Social Sciences”, 0=”other knowledge fields”}	0.390	0.488
5	field[4]	{1=”Knowledge Field: Humanities”, 0=”other knowledge fields”}	0.050	0.219
6	field[5]	{1=”Knowledge Field: STEM”, 0=”other knowledge fields}	0.367	0.482
7	g06	{1=”2006 graduates”, 0=”other years of graduation”}	0.172	0.378
8	g07	{1=”2007 graduates”, 0=”other years of graduation”}	0.189	0.391
9	g08	{1=”2008 graduates”, 0=”other years of graduation”}	0.210	0.408
10	g09	{1=”2009 graduates”, 0=”other years of graduation”}	0.212	0.408
11	g10	{1=”2010 graduates”, 0=”other years of graduation”}	0.217	0.412
		independent variables		
12	voc	{1=”Motivation for degree choosing: vocation”, 0=”other motivations”}	0.583	0.493
18	sat	{1=” satisfaction: wouldn’t choose higher education”, 0=” satisfaction: would choose same degree, or wouldn’t choose same degree, or wouldn’t study in same university”}	0.032	0.175
19	add	{1=”additional training after finishing degree (Ph.D., M.Sc., MOOC*, etc.)”,0=” not additional training after finishing degree”}	0.709	0.454
20	ITwo	{IT skills: word processor}ĩ{1=”null”, ..., 3=“ medium”, ..., 5=”very good”}	4.130	0.810
21	ITsp	{IT skills: spreadsheet}ĩ{1=”null”, ..., 3=“ medium”, ..., 5=”very good”}	3.280	1.143
22	ITda	{IT skills: database}ĩ{1=”null”, ..., 3=“medium”, ..., 5=”very good”}	2.660	1.217
23	ITin	{IT skills: Internet abilities}ĩ{1=”null”, ..., 3=“medium”, ..., 5=”very good”}	4.570	0.646
24	ITso	{IT skills: specialized software }ĩ{1=”null”, ..., 3=“medium”, ..., 5=”very good”}	3.090	1.416
25	ITpr	{IT skills: programming languages}ĩ{1=”null”, ..., 3=“,medium”, ..., 5=”very good”}	1.750	1.191
26	eng	{1=”English lang. proficiency: ‘medium-good’”,0=” English language proficiency: ‘poor’”}	0.810	0.392
27	Jhou	{priority at job: work hours}ĩ{1=”null”,…,7=”maximum”}	5.970	1.079
28	Jopp	{priority at job: promotion opportunity}ĩ{1=”null”, …,7=”maximum”}	6.270	1.020
29	Jsta	{priority at job: stability}ĩ{1=”null”,…,7=”maximum”}	5.830	1.018
30	Jwag	{priority at job: wage}ĩ{1=”null”,…,7=”maximum”}	5.410	1.244
31	Jhol	{priority at job: wide holidays}ĩ{1=”null”,…,7=”maximum”}	6.040	1.073
32	Jper	{priority at job: interpersonal contacts}ĩ{1=”null”, …,7=”maximum”}	6.260	0.973
33	Jbos	{priority at job: aid and orientation from managers}ĩ{1=”null”,…,7=”maximum”}	6.180	0.912
34	Jini	{priority at job: initiative opportunities}ĩ{1=”null”,…,7=”maximum”}	0.583	0.493
		α-Cronbach — Complete questionnaire	0.606	
		α-Cronbach — EFA variables	0.677	

** Massive Open Online Course. Source: UDC Employability Survey, own elaboration*

The PCA methodology builds groups of variables highly intra-correlated and little inter-correlated. For this methodological stage, the attempts made, in the specific field of employability analysis, of Husain et al. (2014), Blom and Saeki (2011), Rothwell et al. (2008), Rothwell and Arnold (2007), and Szamosi (2006), have been taken into account.

The specification of the PCA can be summarized as a calculus of loadings r_{ij} and error terms $(\varepsilon_1,\ldots,\varepsilon_p)$ that, for the factors $F_1,\ldots, F_k$ searched, verify:

$$COV(X_m,X_n)=COV(\sum_{i=1}^{k} r_{mi}F_i+\varepsilon_m,\sum_{i=1}^{k} r_{ni}F_i+\varepsilon_n)=\ldots=\sum_{i=1}^{k} r_{mi}r_{in}=$$

$$RR^t+Id.\begin{pmatrix} VAR(\varepsilon_1) \\ \ldots \\ VAR(\varepsilon_p) \end{pmatrix} \quad (1)$$

with $F_1 \oplus \ldots \oplus F_k$

After obtaining each factor, a binomial logit model can be proposed in order to compute odds for "W=1"="be currently working"~"employability" (Humburg and Van der Velden, 2015). According to the nomenclature chosen for this study, the basic formulation can be presented as:

$$P(W=1)=\frac{e^{\beta_0+\sum_{i\in I}\beta_i X_i+\sum_{j=1}^{k}\beta_j F_j}}{1+e^{\beta_0+\sum_{i\in I}\beta_i X_i+\sum_{j=1}^{k}\beta_j F_j}} \quad (2)$$

With the factor scores computed for the 8,052 graduates present in the sample, the influence of control and factor variables over employability of graduates is determined using (2) model.

Table 3. Loadings p() in rotated components

		p(F1)	p(F2)	p(F3)	p(F4)	p(F5)
F1="IT expertise"	ITpr	0.734	-0.103	0.06	-0.015	-0,039
	ITso	0.696	-0.003	-0.067	0.108	-0,101
	ITsp	0.675	0.062	-0.108	0.307	0,150
	ITda	0.645	0.035	0.05	0.254	0,066
F2="proactive workers skills"	Jbos	0.012	0.831	0.072	-0.045	-0,030
	Jini	0.018	0.756	0.141	0.054	-0,077
	Jper	-0.016	0.722	0.152	-0.044	-0,070
	Jopp	0.044	0.424	0.335	0.156	0,137
F3="standardized workers"	Jhol	0.001	0.186	0.778	-0.052	-0,040
	Jwag	-0.038	0.174	0.761	0.044	0,031
	Jhou	0.050	0.046	0.719	-0.031	-0,043
	Jsta	-0.151	0.395	0.436	0.091	0,116
F4="community managers"	ITwo	0.376	0.118	-0.012	0.651	0,049
	ITin	0.234	0.068	0.049	0.646	-0,039
	add	-0.346	-0.058	-0.036	0.497	-0,194
	eng	0.122	-0.034	0.011	0.455	0,014
F5=" vocational dissatisfaction"	sat	-0.118	-0.003	-0.008	0.119	0.765
	voc	-0.142	0.074	-0.017	0.196	-0.595
eigenvalues		3.073	2.685	1.310	1.140	1.024
% explained variance		17.072	14.915	7.276	6.335	5.688
% accumulated variance		17.072	31.987	39.263	45.599	51.286
Solving conditions	Goodness of fit				Registries included	7,808
					Determinant[COV(Xm,Xn)]	0.043
					Kaiser-Meyer-Olkin adequacy measure	0.769
		Bartlett sphericity's test			Chi2	24,522.10
					Degrees of freedom	153
					Sig.	0,001
					Obtained components	5

Source: Own elaboration

4. Employability profiles

PCA phase

The table 3 present the values obtained after solving (1). The goodness-of-fit (GOF) parameters obtained show correct values, i.e. Det[COV(Xm,Xn)]¹0, KMO=0.769 and Bartlett's sphericity test "H_0:COV(X_n,X_m)=Id" is significant. The loadings can be ordered from higher to lower absolute value, and linearly transformed according to the *varimax* method with Kaiser rotation. The criteria followed to choose the minimum weight in each factor, avoiding *cross-loading* issues, is the one commonly accepted: only absolute values higher than 0.4 (Matsunaga, 2010; Costello and Osborne, 2011). With the variables used in the PCA, the algorithm explains successfully a 51.286% of the variance, hence yielding five coherent profiles. See table 3.

The first factor F_1 gathers together "IT skills: programming languages", "IT skills: specialized software", "IT skills: spreadsheet" and "IT skills: database" (high level of expertise in computer skills). The aggregation of these variables means that in the hinterland labour market, these skills act synergically. The FSA performed, using regression method, produces scores for F_1 with 0 mean and a typical deviation that is proportional to the correlation between estimated scores and r_{ij} coefficients in (1). A clear example of the way in which FSA works can be shown when computing the average score for this profile, and disaggregating it by knowledge field: the maximum mean value is obtained, as it was expected, for STEM degrees who can signal or certify (*screening* hypothesis) these specific competencies with a magnitude of F_1=.6444, followed, by far, by knowledge fields which perform with lower intensities in those very sectoral IT skills: Experimental Sciences (-.2736), Social Sciences (-.2986), Humanities (-.4013) and Health Sciences (-.5843). These considerations make feasible the labelling of this profile as "IT expertise".

The second factor F_2 joins only job priorities for the interviewed: "aid and orientation from managers", "initiative opportunities", "interpersonal contacts" and "promotion chances". The third factor F_3 also achieves significance only in job priority variables, but in this case, the PCA gathers "holidays", "wage", "work hours" and "contractual stability". The semantic difference between the two sets is clear: the F_3 profile contains the standard topics of a common employment relationship (Leede et al. 2007; Harvey, 1999), so this profile can be labelled as "standardized worker"; on the other hand, high scores in F_2 profile, fit with the *proactive worker model* of Grant and Ashford (2008), i.e. they are workers full of initiative, who seek lifelong learning environments rich in information flows coming from the hierarchies or from the inner production chain, so this F_2 profile can be labelled as "proactive worker skills". Muffels and Wilthagen (2013), Boeri, Conde-Ruiz and Galasso (2012), Viebrock and Clasen (2009) and Wilthagen and Tros (2004) analyze the current European *Flexicurity* labour market environment, precisely in terms of the instability of the F_3 ("standardized") variables and the appreciation of the F_2 ("proactively") profiles in the European employers.

The fourth factor F_4 recognizes as highly intra-correlated, the two remaining IT skills ("word processor" and "internet navigating"), the "additional training after finishing degree (PhD, MSc, MOOC, etc.)", and the "over the average English language proficiency level". This profile suggest a graduate without great expertise in programming, but who uses as a recruitment signal, good abilities of internet exploration and capacities for generating and managing hypertext contents in social networks and blogs. Their additional training after graduation and their over the average English language proficiency are used as the main tools for everyday work. One of the most-demanded abilities in the current labour market emerges here (Smith, Rainie, Shneiderman and Himelboim, 2014; McWilliam, 2012; Kane, Fichman, Gallaugher and Glaser, 2009; Owyang, 2007), labelled as the "community manager" profile.

Fifth and last factor F_5 has been labelled as "vocational dissatisfaction". It's made of "satisfaction level: wouldn't choose higher education" and "motivation for degree choosing: vocation" variables. In this case, these traits express a negative perception of the training acquired in the university by the graduates who, however, started their studies vocationally. It they choose again, they would probably have coursed post-secondary non-tertiary professional training, obtaining more final satisfaction (OECD, 2016; Larrauri, Laskibar, Uraga and Gómez, 2015).

Logit model phase

The coefficients obtained and the GOF information (value of 0.123 in pseudo-R^2 and rejection of Hosmer-Lemeshow test with p-value of 0.5924) allow the extraction of some hypothesis to work with. The measure of $P(W=1/\Omega_{E[X_i]})$=66.87% can be considered as a mean threshold of the average employability odds, taking all the explanatory variables with average values (see table 4).

In the light of the obtained results, seven hypotheses can be drawn about the employability odds of the sample's graduates: four on each profile and three additional ones on the behaviour of control variables:

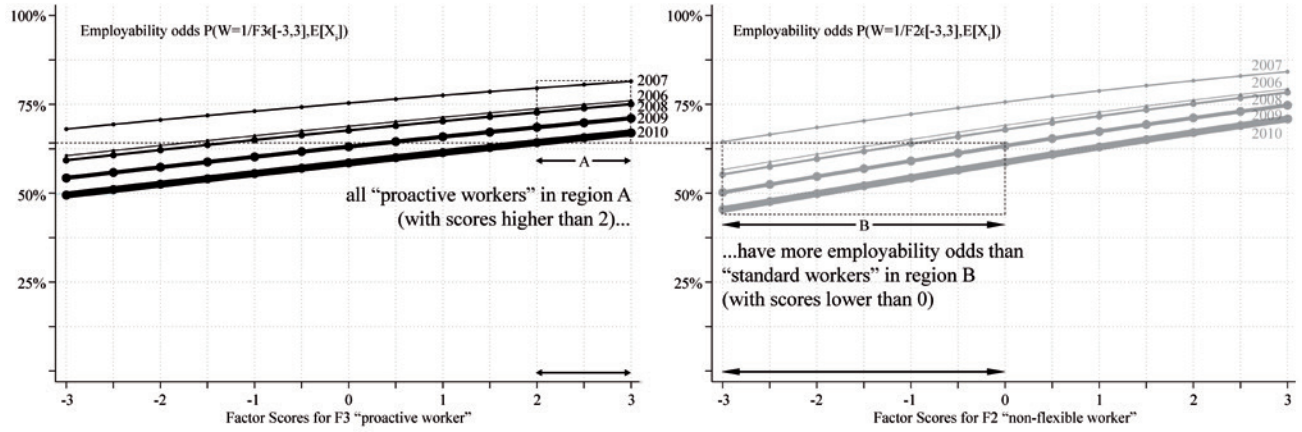
H1: "IT expertise" are the most demanded graduates

"IT expertise" (F_1 profile) have the highest influence in employability (ß=0.362), and a graduate with high IT expertise, located for example, in the percentile 95 (F_1^{P95}=1.90), has very high employability odds $P(W=1/F_1^{P95}, \Omega_{X_i \neq F1\ E[X_i]})$=79.99%. This hypothesis suggests the transcendence of designing, transversally or via specific curriculum modules, training policies in IT skills, even for non-STEM degrees.

H2: "standardized workers" still have important recruitment chances

This F_3 profile appears as the second with higher influence in the employment odds (ß=0.179). So, for a graduate high scored in this factor (F_3^{P95}=1.40) the employability chances are $P(T=1/\ F3^{P95}, \Omega_{X_i \neq F3\ \ E[X_i]})$=73.86%. This confirms that graduates who prioritize holidays, wage, working hours and stability still have a place in Spanish graduates job market.

Figure 1. Logit model results: probability of being working according to "proactive worker skills" or "standardized worker" values and year of graduation



Source: Own elaboration

Table 4. Logit model coefficients (control variables + factors)

	ß	Std. Err.	z	P>|z|
d2006	***0.449	0.082	5.5	0,001
d2007	***0.778	0.081	9.55	0,001
d2008	***0.396	0.074	5.35	0,001
d2009	***0.193	0.073	2.65	0.008
d2010	(reference category)			
women	**-0.112	0.056	-2	0.046
field1	***0.388	0.089	4.35	0,001
field2	*-0.222	0.130	-1.71	0.088
field3	***-0.299	0.067	-4.48	0,001
field4	***-0.435	0.119	-3.65	0,001
field5	(reference category)			
F1 (IT expertise)	***0.362	0.030	11.91	0,001
F2 (proactive workers)	***0.121	0.025	4.84	0,001
F3 (standardized workers)	***0.179	0.025	7.17	0,001
F4 (community managers)	***-0.330	0.027	-12.27	0,001
F5 (vocational dissatisfaction)	**0.057	0.025	2.29	0.022
constant	***0.507	0.067	7.56	0,001
			Data included in analysis	7,808
			Lost data	244
			Total	8,052
	Goodness of fit		Convergence steps	11
Resolution conditions			-2 Log Likelihood step 10	9,353.75
			Cox & Snell pseudo-R^2	0.09
			Nagelkerke (Cragg&Uhler's) pseudo-R^2	0.124
	Hosmer-Lemeshow test		Covariate patterns	7,781
			$Chi^2(7766)$	7,736.26
			Sig.	0.5924
		Sensitivity P(+/T=1)		89.08%

****Sig.>0.99; ** Sig.>0.95; * Sig.>0.90. Source: Own elaboration*

This F_2 profile is the third showing bigger elasticity (ß=0.121). For a very proactive graduate (F_2^{95}=1.19), working odds are P(W=1/ F_2^{95},$\Omega_{X_i \neq F2}\, E[X_i]$)=69%.

Considering the outcomes of the model for the different years of graduation, along the F_3 and F_2 scores (figure 2) two remarkable effects emerge. In first place, since 2007, the less working experience (closer year of graduation) the lower are the employment odds. And secondly, not every "proactive workers skills" has lower employment odds than the "basic" ones: in the figure, very proactive workers (graduates in region A) achieve better recruitment chances than the "standardized workers" located in regions low-scored (zone B).

H4: "community managers" still have poor levels of employability

The F_4 profile shows a negative influence on employability (ß=-0.330), that must constitute a cause of concern for HEIs policy planners. For a graduate high scored in these skills, chances of employability are P(W=1/F4^{P95}=1.36,$\Omega_{X_i \neq F2}\, E[X_i]$)=56.21%.

This is probably related with the still very poor penetration of internet marketing initiatives in Spanish companies (Chakravorti, Tunnard and Chaturvedi, 2015; Mora et al., 2000), an issue affecting to content uploaders and graduates with high expertise in social media, who still do not find greater job opportunities, due to the strong lack of internet marketing and innovation strategies in the regional industries (Navarro and Humanes, 2012).

H5: Employment crisis has affected to the graduates increasingly

Employability odds decrease as closer the interviewed are to the last year analyzed, which constitutes an additional evidence of the Spain's severe labour market crisis. The calculation of the employability odds, restricted to have been graduated in any of the years analyzed (taking the rest of variables with average values), yields:

$P(^{W=1}/_{g06=1,g07=0,g08=0,g09=0,g10=0,\ \Omega_{i\neq1,i\notin\{8\&\ 12\}}E[X_i]})$= 69.05%

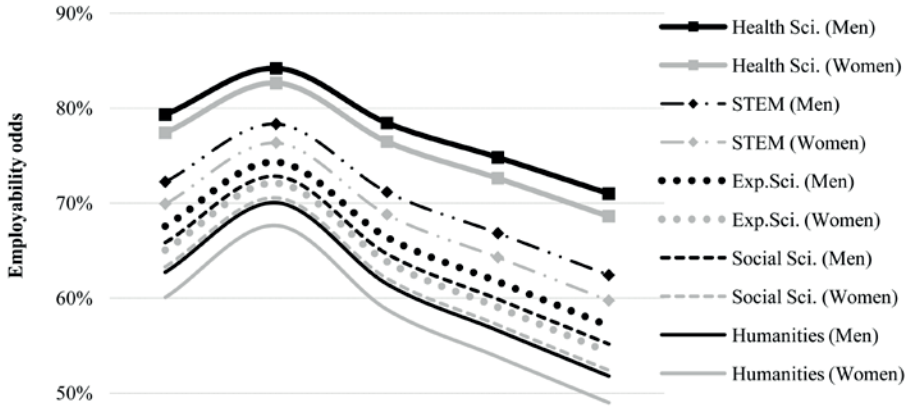
$P(^{W=1}/_{g06=0,g07=1,g08=0,g09=0,g10=0,\ \Omega_{i\neq1,i\notin\{8\&\ 12\}}E[X_i]})$= 75.60%

$P(^{W=1}/_{g06=0,g07=0,g08=1,g09=0,g10=0,\ \Omega_{i\neq1,i\notin\{8\&\ 12\}}E[X_i]})$= 67.91%

$P(^{W=1}/_{g06=0,g07=0,g08=0,g09=1,g10=0,\ \Omega_{i\neq1,i\notin\{8\&\ 12\}}E[X_i]})$= 63.33%

$P(^{W=1}/_{g06=0,g07=0,g08=0,g09=0,g10=1,\ \Omega_{i\neq1,i\notin\{8\&\ 12\}}E[X_i]})$= 58.75%

Figure 2. Logit model results: probability of being working according to gender and knowledge field (assuming the rest of dependent variables with average values)



Year of graduation

	2006	2007	2008	2009	2010
Health Sci. (Men)	79.31%	84.19%	78.43%	74.80%	70.99%
Health Sci. (Women)	77.41%	82.64%	76.47%	72.62%	68.62%
STEM (Men)	72.23%	78.32%	71.15%	66.82%	62.41%
STEM (Women)	69.92%	76.35%	68.79%	64.28%	59.73%
Exp.Sci. (Men)	67.57%	74.32%	66.39%	61.73%	57.07%
Exp.Sci. (Women)	65.05%	72.11%	63.84%	59.04%	54.30%
Social Sci. (Men)	65.85%	72.82%	64.65%	59.89%	55.17%
Social Sci. (Women)	63.28%	70.53%	62.04%	57.16%	52.38%
Humanities (Men)	62.74%	70.05%	61.49%	56.59%	51.80%
Humanities (Women)	60.08%	67.64%	58.80%	53.81%	48.99%

Source: Own elaboration

Employability odds series shows, since 2007, an increasing negative impact in recruitment chances as the graduates account less time in active job seeking processes.

H6: Health Sciences and STEM are the knowledge fields with higher employability odds

Their recruitment rates, according to model (2) are 76.39% and 68.70%, respectively (taking the rest of variables with average values). Experimental Sciences (63.74%), Social Sciences (61.94%) and Humanities (58.69%) appear under the mean threshold for employability (66.87%) and hence, with lower recruitment rates.

H7: Feminine gender is still penalized in graduates' labour market

The *Glass Ceiling Effect* (Jackson and O'Callaghan, 2009) is present in the sample analyzed, yielding for the average women graduated in 2010
$P(W=1/women=1, d10=1, \Omega_{X_i \neq women,d10} E[X_i])=57.60\%$, and for men of the same course
$P(W=1/women=1, d10=1, \Omega_{X_i \neq women,d10} E[X_i])=60.32\%$.

If we compute employability odds by gender and year of graduation, we obtain the results contained in figure 1, showing an additional perspective of this gender gap in employability odds. The results confirm the decrease in employment along the years analyzed (H7). The difference between knowledge fields is also present in the entire sequence of graduation years, as well as the worst employment odds for women, reaching a maximum gap of 22% in 2010. See Figure 2.

5. Discussion and conclusions

This investigation develops a methodological approach for measuring the quality of the labour market transition process in a sample of Spanish HE graduates', analyzing which profiles favour or harm employability chances, and using a PCA for extracting the factors, and a logit model applied to the factor scores obtained.

These employability profiles can be located in the methodological space between the analysis of the HE graduates transition to labour market, and the generic competencies (soft skills) assessment. This research advances from the statistical information recovered during the first employability experiences, to a pre-generic competencies or employability-oriented curriculum assessment.

Four relevant employability profiles emerge from the analysis. In first place, the "IT expertise" appear, with the highest employability chances. Thus, a clear orientation for HEIs governance should be centred in boosting, via conventional curriculum or transversally, the IT skills in all degrees, key question not just for a successful recruitment, but also for improve worker's versatility, opening him new fields of innovative action.

Secondly, a difference emerges between two profiles with good employment perspectives: must HEIs policies promote "standardized workers" or "proactive worker skills" profiles? Question's not easy to solve: both factors contribute positively to employment, but employers seem to prefer "proactivity" only for high degrees of performance. So, if a candidate shows proactivity in its attitudinal profile, it should be in a very high degree to reach a successful recruitment. Hence HEIs planners and individuals should be cautious in the implementation of proactivity skills.

In third place, the community managers appear, not with strong programming/spreadsheet/database capabilities, but able to successfully manage internet contents, mainly in English language. They are affected by the low employability odds due to the lack of IT marketing strategies still persisting in the regional industries.

Other two important employability traits emerge from the hypothesis tested: the great impact of the crisis in the labour market, decreasing employability odds along the successive years; and finally, the gender gap still separate men from woman regarding employment odds, always penalizing the feminine employability, and without a significant reduction along the complete time series.

Spanish graduates' labour market, currently combines a strong *screening* component, using the official training received in HEIs as the main signalling device for Human Resources companies' teams, with an emerging *institutionalist* trait based on the importance of the hidden or employability-oriented curricula (generic and specific professional competencies not explicitly included in the academic path).

HEIs policy planners as well as individuals can introduce these profiles in their employability enhancing strategies. The HEIs institutions should take them as easy and strong guidelines for improving the labour market transition processes on the area of influence, not just by introducing

corrections in the transversal competence training strategy, but also allowing an accurate individual counselling during the studies, based on the employability profiles currently active in the hinterland's labour market. This could be useful for proactive psychologies or community manager preferences, which can be aware, by these methodologies, of their real employability odds. This question leads, perhaps, to the main limitation of this study, defining a pathway for future research: the necessity of extend this analysis to other European universities, in order to contrast whether the profiles required/rejected by employers are similar, or if there are still undetected employability traits.

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