Employability skills of graduates: Insights from job advertisements

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Abstract

This paper examines online job advertisements to identify the type of skills and other attributes required for higher education graduates in European countries. The data were collected from European job websites in 2019 (n=1,752) for any country and occupation having a job offer requiring higher education. The empirical analysis starts with a fuzzy clustering to identify typical skill patterns required by employers. Six clusters emerge from the data; five can be labelled as adaptability skills, foreign languages, specific skills, work attributes, and managing skills. The remaining one is referred to as null cluster with no distinctive required skill. Subsequently, we examine the occupation and employment conditions associated with each fuzzy cluster. Despite the demand for graduates, the service and sales related occupations prevail in the null cluster. In other five well-defined clusters we find a mix of skills of some high-qualified occupations, and search for specific skills acquired through work experience.The findings raise the question about the assignment of graduates in less qualified occupations.

Keywords: Employability skills, higher education graduates, job advertisements, European countries, fuzzy clustering.

1. Introduction

Higher education institutions (HEIs) are being pressured to prepare graduates for the world of work and develop skills and other attributes that help to fit graduates to economic and labour market imperatives. Stakeholders from HEIs should then know those requirements to find appropriate responses, notably through the supply of particular courses. In recent decades researchers have devoted much attention to studying job requirements, especially through public information provided by employers. Job advertisements have an important role to play in this discovery. This paper contributes to this research by examining the contents of online job advertisements in Europe. The goal is to ascertain the qualifications, skills, and abilities required in occupations for which a job offer exists.

This method of exploring job advertisements has been applied in several studies, but mostly focusing on a single job, such as the CEO (Ahmed, 2005); an academic field, notably management (e.g. Bennett, 2002; Arcodia & Barker, 2002) or health (Messum, Wilkes and Jackson, 2011); and occupations that have been affected by technological change, the digital library (Choi & Rasmussen, 2009; Henricks & Henricks-Lepp, 2014). Kureková, Beblavý, Haita-Falah, and Thum-Thysen (2016) compared three countries and limited their study to low and medium level occupations, while Kennan, Cole, Willard, Wilson, and Marion (2006) compared skill requirements of a single job in Australia and the US. To the best of our knowledge, a comparison across European countries and occupations is still missing in the literature. In fact, Kureková *et al.* (2016) notes that comparative studies based on job advertisements are still scarce. Furthermore, Beblavý, Akgüc, Fabo, Lenaerts, and Paquier (2017) emphasise the relevance of job advertisements as a valuable source to examine both labour market and occupations skill needs.

Nevertheless, some studies claim the lack of clarity on the attributes required by employers (Kennan *et al.* 2006). Kureková *et al.* (2016) address the representativeness of job advertisements, while Walsh, Johnson, and Sugarman (1975) note a lack of information. Walsh and colleagues question, in addition, whether those advertisements reflect the local labour market, since small employers are less likely to use job advertisements because of their negligible job openings. Despite the drawbacks, job advertisements provide easy access to information on the labour market; other qualitative techniques to obtain data are significantly time and resource consuming for both the researcher and employer.

Available literature on job advertisements shows that a long list of skills and other attributes are required by employers. Nevertheless, communication and interpersonal skills are the ones most required (e.g. Choi & Rasmussen, 2009), but some advertisements express the need of foreign languages, team work, and working under pressure, among others (e.g. Wellman, 2010).

We attempt to answer the following research questions: are job offers for graduates or non-graduates? What does the information included in job advertisements provide about graduates' jobs? What type of occupations, skills, and other attributes are in high demand? To answer these questions, our empirical research explores 1,752 online job advertisements limited to graduates and post-graduates (masters), collected in 2019, and available on European Union websites. We compare countries and occupations for which there are job offers in Europe and apply a fuzzy cluster analysis to identify types of skills and the countries, industries, and occupations associated with each set of skills.

The rest of paper is organised as follows. Section 2 provides information about the data and the methodology used to decompose them; the empirical findings are presented in Section 3; and Section 4 concludes.

2. The data and methodology

The data were collected in 2019, on the European Union website EURES and private website Monster.com. We limited the number of advertisements to 150 per country and excluded countries with fewer than 40 advertisements. Table 1 shows the proportion of online job advertisements collected from European websites for the countries meeting our criteria.

Table 1.Proportion of job advertisements.

Country	%
Germany	8.56
Belgium	3.60
Croatia	3.71
Slovakia	8.56
Spain	8.56
Greece	8.56
Netherlands	8.56
Luxemburg	8.56
Malta	4.57
Portugal	8.56
Czech Republic	8.56
Romania	8.56
Sweden	8.56

We found 230 different skills and other attributes. The first step of our analysis consisted of a content analysis of advertisements to create a categorisation of terms based on frequency, literature review, and self knowledge. It should be stressed that around 40 skills specified the foreign language demand in job advertisements; given their frequency, those were recoded in "other foreign languages". Some skills are reported with slightly different names e.g. orientation towards outcomes, goals, business, solutions; these were aggregated in "orientation towards results". A set of skills was clustered in "work attitudes": iniatiative, commitment, proactivity, motivation, positive attitude, persistence, loyalty, and caring. The "personal qualities" include open mind, dynamism, ambition, confidence, and persistence. Finally, a set of skills remained just the way they appeared in the ads.The subsequent analysis is based on 19 skills and attributes. To examine the skills by occupation, we used ISCO and converted each occupation of job advertisements into a one-digit occupation.

3. Empirical evidence

The data were decomposed in fuzzy clusters by means of a grade of membership (GoM) analysis (Woodbury & Clive, 1974), which revealed six clusters. Table 2 gives a qualitative overview of skill set categories we can expect to find in each of those fuzzy clusters. At

first glance, we notice that English and work attitudes appear to be transversal attributes that are relevant in most skill clusters. On the other hand, some skills are relevant in only one cluster: analytical skills, adaptability, and IT.

Table 2. Fuzzy clusters: the skill sets in job advertisements.

Job requirements	I	II	III	IV	V	VI
Specific skills			*			
IT skills			*			
English	*	*	*			*
Other foreign languages	*	*			*	
Interpersonal skills					*	
Autonomy					*	
Problem solving						*
Quality						*
Work attitudes	*		*		*	*
Communication	*					*
Planning and organisation	*					
Stress					*	
Innovation	*					
Responsibility	*				*	
Personal qualities						*
Leadership	*				*	*
Orientation towards the results					*	*
Analytical skills						*
Flexibility and adaptability	*					

We then labelled the skill sets according to the mix of skills and other attributes that prevail or are distinctive for clusters. Accordingly, we label cluster I as adaptability skills; cluster II as foreign languages; III as specific skills; IV as undifferentiated; V as work attributes; and cluster VI as managing skills. The evidence reported in Table 2 shows that in cluster IV there is no distinctive skill required by employers, while in all other clusters a particular mix of skills prevails. The clusters of adaptability skills (I), work attributes (V), and

managing skills (VI) include a large number of skills. Work attitudes and leadership are found across these clusters.

Table 3 reports occupation and employment conditions associated with each cluster of skills.

Table 3.Characteristics associated with skill sets.

	Cluster I **Adaptability skills**	Cluster II Foreign languages	Cluster III **Specific skills**	Cluster IV **Undifferentiated**	Cluster V Work attributes	Cluster VI **Managing skills**
Occupation	Managers Clerical support	Clerical support	Professionals Technicians Associate Professionals	Services and sale Craft and related trades	Professional	Managers
Contract	Direct hire1		Direct hire	Fixed term	Internship Temporary	Direct hire
Working time	Full time	Full time	Full time	Part time		Full time
Experience	1-3 years	>10 years	4-9 years	<1year	<1year	4-9 years >10 years

As can be noted, services and sale occupations have no particular skill requirements. Employers demand graduates but we are uncertain about the need of highly skilled workers for those jobs. The results suggest that for high qualified occupations, employers indicate a mix of skills, but also specific skills acquired through work experience.

Furthermore, the employment conditions differ among skill sets. While for occupations having no particular required skill set, employers offer flexible and part-time job; for others they are concerned with transaction costs and tend to protect their investment in searching for and recruiting the best candidates.

4. Concluding remarks

This ongoing research seeks to identify the skills required from higher education graduates in different European labour markets. Unlike previously published studies based on job advertisements, our research examined job offers of EU countries and for any occupation.

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[1] "A direct hire refers to a situation in which a company that intends to hire a candidate offers them the job directly […] As a direct hire involves action and investment from the hiring company, direct hires are usually made when filling permanent roles as opposed to a temporary or contract-to-hire roles", https://jobadder.com/glossary-term/direct-hire

The empirical evidence indicates that a demand for graduates exists for qualified and non-qualified occupations, but in this latter case no particular skill is required.

The results show that no distinctive skill or other attribute prevails in the cluster that we labelled as undifferentiated. This is the case of job offers for service and sale workers. On the contrary, a particular skill set is required for high qualified occupations, which includes cognitive (analytical skills), interpersonal (communication), and organisational abilities (orientation towards results). For these occupations, employers additionaly require specific skills acquired through work experience.

Our preliminary results raise the question about the need of graduates for certain occupations. In other words, do employers really need graduates for services and sale occupations? This question deserves further scrutiny.

Further research should compare the results from the two internet sites (EURES and Monster). We question whether public and private sites differ in the occupations sought and the contents of advertisements.

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