# A method for measuring detailed demand for workers' competences

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## Abstract

There is an increasing need for analysing the demand for skills in the labour market . While most studies aggregate skills in groups or use available proxies for them, the authors analyse the demand by employers for individual competences. Such an analysis better reflects reality because companies usually require job candidates to have particular competences, rather than generally defined groups of skills. However, no method exists to analyse on a large scale which competences are required by employers. At a detailed level, there are hundreds of competences; thus, this demand cannot be measured in a sample survey. The authors propose a method for conducting a continuous and efficient analysis of the demand for competences of prospective employees. The method involves collecting internet job offers and analysing them with data mining and text analysis tools. The authors use this method to analyse transversal competences in the Polish labour market between November 2012 and December 2015. In performing this analysis, they refer to the detailed European Commission classification of transversal competences. Their findings indicate that of the general groups of competences, companies typically required only certain competences—especially 'language and communication competences'—while neglecting others. The number of job candidate requirements was counter-cyclical; that is, the number of requirements increased during recessions and decreased during economic expansions. However, the structure of the competences demanded did not change during the analysed period, which suggests that the structure tends to be relatively stable, at least over the business cycle. This method can be used continuously. Various institutions can analyse and publish up-to-date information on the current demand for competences, as well as on trends in this demand.

## 1. Introduction

Looking for a job? If so, do you know what employers expect from you? The sad truth is that job seekers often lack detailed knowledge of employers' expectations. The failure to share information—here, between job seekers and employers—is called information friction. It has been argued that information friction is among the most important causes of the structural mismatch between job seekers and employers, and of long-term unemployment. Boudarbat and Chernoff (2012) have observed that educational characteristics play a bigger role in this mismatch than demographic and socioeconomic characteristics. When job seekers and employers have imperfect information about each other, the former may choose unsuitable fields of education and invest in unsuitable skills. Poor educational policy design may also lead to a higher or a lower labour supply than is needed in some fields of education or skill sets. Moreover, job requirements may evolve more dynamically than the skills of job seekers.

Workers' skills—or, more accurately, competences—have been measured from a macroeconomic perspective in a number of studies, including the OECD's Survey of Adult Skills from the Program of International Assessment of Adult Competences (McGowan and Andrews 2015) and country-specific student test scores (Nordin et al. 2010). These studies provide measures of the supply of competences in the labour market. However, the demand for competences by employers and competence mismatch have so far been measured from a microeconomic perspective only (for example, Winterton et al. 2006). Meanwhile, there is a lack of research on these issues from a macroeconomic perspective.

Is it worth analysing the demand for individual competences? Chevalier (2011) shows that although the gap in mean salaries is smaller between fields of study than within them, the within-field variation can still be considerable. This is because graduates of a particular field of study do not share transversal competences, even though they share job-related competences. Nordin et al. (2010) and Zhu (2014) argue that workers with job-specific competences are less likely to be horizontally mismatched than those with mainly transversal competences. Somers et al. (2016) observe that having general skills allows a job seeker to apply to a wider variety of jobs, thereby increasing his or her chances of getting a job that is only indirectly related to his or her field of study. According to the theory of human capital, having general skills is preferable to having specific skills, because having general skills increases the productivity of workers in a wider range of occupations (Becker 1964).

The demand for specific competences, and not just for occupational skills, is important from both theoretical and economic policy points of view. The OECD Skills Strategy (2011) has formulated policies that take into account the changes in, the importance of, and the potential demand for skills. Specific, fast, and continuous information on the real demand for skills is, however, scarce. As more and more countries adopt the Strategy, there is a growing need for continuous and detailed information on the demand for skills.

Hershbein and Kahn (2017) argue that by looking directly at the skill requirements in job offers, rather than relying on assumptions about the skills associated with a particular occupation, it is possible to document the evolution in skill requirements for this occupation over time. Deming and Kahn (2017) categorise keywords representing skills found in internet job offers and analyse the relationships between the keywords on the one hand, and wages and company performance on the other. Various authors have analysed the importance of particular groups of skills. Deming (2017), for example, finds evidence of growing demand for social skills. But which social skills are most likely to be required? Careful studies of the labour market are needed to answer this question. In this paper, we investigate this issue by disaggregating general competences into individual competences, and analysing the changing importance of these competences within groups of skills.

In this article, we propose a method for conducting a continuous and efficient analysis of demand for transversal competences. We aim to answer two questions. Our first research question is as follows: What is the demand for individual transversal competences, and how has it been changing? We do not consider other elements of job offers, such as requirements for certain occupational skills, educational qualifications, or detailed job-related competences. While there is a large body of research on educational and occupational requirements, research on requirements for transversal competences has been scarce. This is partly because there is a lack of methodological research that would enable scholars to conduct such analyses. Thus, previous studies on this topic either investigated the demand for skills from an aggregate perspective or analysed measures of job-related skills. Up to now, detailed requirements in job offers have only been studied at the occupational or geographical level (Şahin et al. 2014); at the company level (Modestino et al. 2016); or by job title (Marinescu and Wolthoff 2016). We seek to fill the gap in the existing literature by focusing on individual transversal competences.

Our second research question is as follows: How can we continuously measure demand for individual competences? We propose a method for addressing this question that is based on collecting and analysing internet job offers. There is a growing literature on the use of online job offers (see, e.g., Kuhn and Skuterud (2004), Kuhn and Mansour (2011) and citations therein), and the online job market has been rapidly developing for more than a decade. Thus, looking at online job offers provides us with interesting research possibilities. We will show the usefulness of the proposed method for analysing the labour market in the context of measuring the detailed structure of vacancies by their transversal competences. While job offers are an imperfect measure of vacancies (Abraham 1987), using job offers to measure competences is preferable to relying on competing methods, all of which are based on surveys of employers. Since employers are interested in finding efficient workers, they are likely to list the skills they consider relevant in job offers. Thus, analysing job offers should give us more accurate information about the skills demanded than surveys of employers—especially given that these surveys are increasingly difficult to conduct for the simple reason that employers do not want to take part in such surveys. The question is whether internet job offers can be considered to represent the whole vacancy market. In the second decade of the 21st century, most job offers are published online. As in most European countries, internet penetration in Poland is high: in 2015, 92.7% of companies and 75.8% of households in Poland had internet access (Central Statistical Office 2016). Thus, we can assume that internet job offers are viewed by most job seekers. Pavlicek and Kristoufek (2015) show that job seekers in Poland use the internet extensively to search for jobs, and that the online activity levels of job seekers are related to movements in the unemployment rate. Internet data are relatively easy and cheap to collect continuously. Based on analyses of such data, we can compile detailed profiles of the workers who are most in demand, and track the changes in these profiles over time. Provided the necessary data are available, such analyses can be conducted as frequently as desired; here, we will work with monthly data. The proposed method also allows us to search the collected data freely and analyse them according to new criteria. All in all, internet job offers represent the majority of the vacancy market, and the specificity of online data makes it possible to analyse these offers with a high degree of frequency.

We find that internet job offers are good sources of information on competences, as they allow us to continuously analyse detailed demand for competences. Our approach enables us to classify the requirements of companies based on official classifications. It also enables to compare such information with other kinds of information, especially data on labour supply competences. Using this method, we analysed the structure of and the changes in the number of transversal competences. We found some structural and business cycle properties of competences that can be used in formulating educational and economic policies.

The article is organised as follows. In the next section, we review the definitions and the classifications of workers' competences. In the third section, we describe our proposed research

method. In the fourth section, we apply this method to the Polish labour market, and discuss the results of the analysis. In the last section, we summarise our findings, while focusing on the usefulness of the method.

### 2. Measures of a competence

Job seekers need to have knowledge not only about the demand for workers with their educational qualifications, but about the demand for the skills and competences they currently have or might need to acquire. Since the work of McClelland (1973), competence has been the main trait used in the literature to describe a worker's performance. According to Boyatzis (1982), competence is 'an underlying characteristic of a person which results in effective and/or superior performance in a job.' In the economic literature, the term 'skill' is commonly used in a broad sense to encompass all competences, and even an individual's personal characteristics, like his or her field(s) of education (qualifications) or experience (see, e.g., Hershbein and Kahn 2017). We use the term 'competence' as defined by McClelland. This meaning differentiates between an individual's competences and personal characteristics, most notably his or her educational qualifications and occupational skills. In the literature, the terms 'skill' and 'competence' are sometimes used interchangeably. We refer to such instances.

Most of the literature has focused on establishing competence models in a specific sector, organisation, or job. The competence model refers to a set of competences a worker needs to perform his or her job correctly. However, only a few general classifications of competences exist. According to the so-called KSAO concept, competence includes knowledge, skills (in the narrow meaning), abilities, and other characteristics (such as attitudes). Mitrani et al. (1992) define competence as a set of traits, self-concepts, motives, values, knowledge, attitudes, and behavioural and cognitive skills. Shippmann et al. (2000) emphasise that a 'worker's competence' must be reliably measured to assess job performance. Armstrong (2012) argue that 'competency' should be distinguished from 'competence': i.e., that 'competency' is connected to personal or 'soft' skills (a behavioural area), while 'competence' is connected to 'hard' skills (a functional area). However, Winterton et al. (2006) find that these two terms are used inconsistently. To address this problem, they propose using just one term, 'competence,' and present a two-dimensional typology of competence that covers both these meanings (Figure 1). We will use this typology and the term 'competence.'
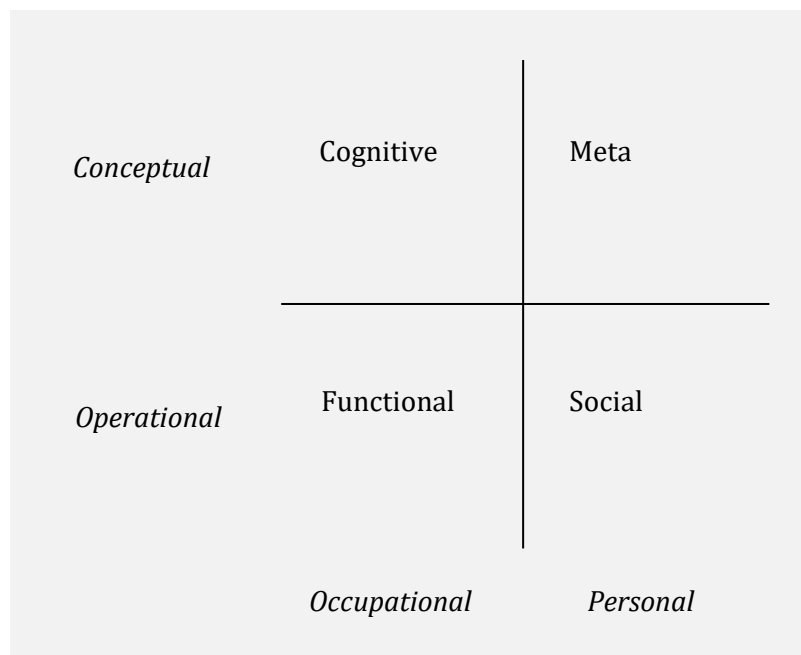
|  | Cognitive | Meta |
|---|---|---|
| *Conceptual* |  |  |
| *Operational* | Functional | Social |
|  | *Occupational* | *Personal* |

**Figure 1: The typology of competence by Winterton et al. (2006)**

Spencer and Spencer (1993) define competence as 'an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation.' They present an iceberg classification of competences, dividing them into central and surface competences. Just as the bottom part of an iceberg is hidden under water, some competences are deeply rooted, are hard to see at first, and are subject to change; while others are visible, and are thus more manageable. This classification defines the following five layers of competences:

- motives: what people consistently think;
- traits: physical characteristics and consistent behaviour;
- self-concept: attitudes, self-image, and values;
- knowledge: sum of information in specific areas; and
- skills: abilities to perform specific mental and physical tasks.

In the widely used International Standard Classification of Occupations (ISCO-08), the term 'skill' is defined as 'the ability to carry out the tasks and duties of a given job' (International Labour Office 2012); and thus has essentially the same meaning as the term 'competence'. This classification assumes that a worker's educational level leads him or her to have a certain skill level. In this classification, an individual's skill level is measured by the complexity and the range of tasks performed in a given job. The skill levels are:

- skill level 1 (primary education): performance of routine physical tasks (elementary occupations);
- skill level 2 (secondary education): operating, maintaining, and repairing machinery and equipment; manipulating information (clerical support workers);
- skill level 3 (first stage of tertiary education): performance of complex practical and technical tasks that require extensive knowledge in a specialised field (technicians, associate professionals, managers); and
- skill level 4 (second stage of tertiary education): performance of tasks that require creativity, complex problem-solving, decision-making, extensive theoretical and factual knowledge in a specialised field (managers, professionals).

United Nations Industrial Development Organization (2002) groups competences in three categories:

- managerial: essential for supervisory responsibility;
- generic: essential for all staff; and
- technical/functional: essential for any job within a defined area.

Each of these categories has three levels of proficiency: knowledgeable, proficient, and advanced.

The Occupational Information Network presented another classification of competences (called the O*Net; see, e.g., Deming 2017) that is popular in the American literature. It divides skills into six categories: basic, complex problem-solving, resource management, social, systems, and technical skills. Each of these categories covers between one and 11 skills.

However, the European Commission devised a more detailed classification for Europe. The European Commission treats competences as links between an individual's occupation and qualifications. The latter is defined as a 'formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards' (European Commission 2015). In addition, the European Commission distinguishes between job-specific and transversal competences. The job-specific

competences are broken down into categories according to occupation, while the transversal competences are broken down into five categories, with two to five subcategories divided by classes (43 in all). The categories and subcategories of the transversal competences are as follows:

- attitudes and values at work: values and attitudes;
- application of knowledge: information and communications, numeracy and mathematics, safety and the working environment;
- social skills and competences: working with others, leading others;
- language and communication: non-verbal and verbal communication, mother tongue and foreign language; and
- thinking skills and competences: learning, critical thinking, creative and entrepreneurial thinking, problem-solving, planning own work.

## 3. Research method

### 3.1. The data

In November 2004, we started using the job offer market as a source of information for studying vacancies in Poland. During the 2004-2008 period, we collected job offers published in 'Gazeta Wyborcza,' which was the most popular daily newspaper in Poland at that time. We also received the data for 1999-2003 from 'Gazeta Wyborcza'. During the 1990s and the early 2000s, the job offer market in Poland was underdeveloped. The newspaper estimated that in 2004, it published about 70% of all job offers in Poland. In 2008, when the development of internet websites with job offers had reached a more advanced stage in Poland, we started using these websites as a primary source of information about vacancies. Unfortunately, it is impossible to estimate what share of the whole market of job offers we covered in the study. We used an index form of this measure (year 2000=100) rather than the absolute number of job offers. This index proved to be a good leading indicator for unemployment, as it was able to predict turning points in the unemployment rate with a few months' lead. To some extent, this index also showed the levels of structural mismatch between participants in the labour market (Drozdowicz-Bieć et al. 2006; Pater 2006).

In November 2012, we started to collect job offers from all of the respected vacancy market websites in Poland (see Table 2 in the Appendix). While some of these websites were country-wide general websites featuring job offers for all sectors and occupations, others were sector-specific. We disregarded small local websites because they tended to have low shares of job offers containing the detailed skill requirements we aimed to analyse. We collected the data using a computer script that automated the procedure. Since then, the data have been collected on a monthly basis, at the end of each month. All job offers are downloaded and saved on a server. In the analysis (see below for details), we count only offers that are unique at a national scale. During the study period, we failed to complete the data in three months: June 2013, March 2015, and July 2015. These gaps are attributable to sudden changes in the design or the structure of some of the websites from which we were collecting the job offers that caused the algorithm to fail to appropriately locate the job offers. This situation forced us to change the collecting algorithm. Unfortunately, as the changes were delayed, we could not collect the data for these three months even after updating the algorithm.

As the job offers are collected at the end of a month, they do not constitute all vacancies in the economy. Instead, the job offers represent a specific fraction of all vacancies: i.e., the stock of vacancies on the last day of a month. Not all job offers are included (i) because vacancies posted on the internet can stay on websites for unknown and varying periods of time; and (ii) because vacancies not posted online are not taken into account. For the latter reason, it is quite likely that vacancies in the public sector and offers for jobs requiring lower education are

underrepresented. If an advertisement is for more than one job, we counted it as one advertisement and one job offer.

Another measure of vacancies in Poland is the number of job offers in public employment offices. Polish companies are supposed to post every job vacancy with a public employment office (Act on promotion of employment and labour market institutions 2004); however, this regulation is frequently ignored. In 2012, only around 50% of companies posted job offers with public employment offices, and this share had decreased to 44% in 2015 (National Bank Of Poland 2012). Yet another measure of vacancies in Poland is a quarterly representative survey of vacancies that has been conducted since 2005 by the Central Statistical Office of Poland. Figure 2 presents the three measures of vacancies: internet job offers from our data set, job offers from public employment offices, and vacancies from the representative survey. From October 2012 to December 2015, the stock of internet job offers was 45% higher than the stock of job offers from public employment offices, and was 48% higher than the number of job offers in the Central Statistical Office survey; but the stock was 40% lower than the flow of the vacancies according to the Central Statistical Office measure, and was lower than the number of job offers from the public employment offices over most of this period.

Over the November 2012–December 2015 period, we collected on average 83.4 thousand unique job offers each month (with standard deviation of 18.6 thousand). The number of collected internet job offers was affected by the business cycle. Between 2012 and 2014, we observed a post-crisis expansion of the Polish vacancy market. The number of internet job offers increased from 42.4 thousand at the end of 2012Q4 to 94.1 thousand at the end of 2014Q1. In 2014, the real gross domestic product (GDP) growth rate stabilised. Companies reacted by decreasing their demand for new workers (to 72.4 thousand job offers at the end of 2014Q4). In 2015, GDP started growing slightly faster, causing the number of posted vacancies to increase to 93.9 thousand at the end of 2015Q4.
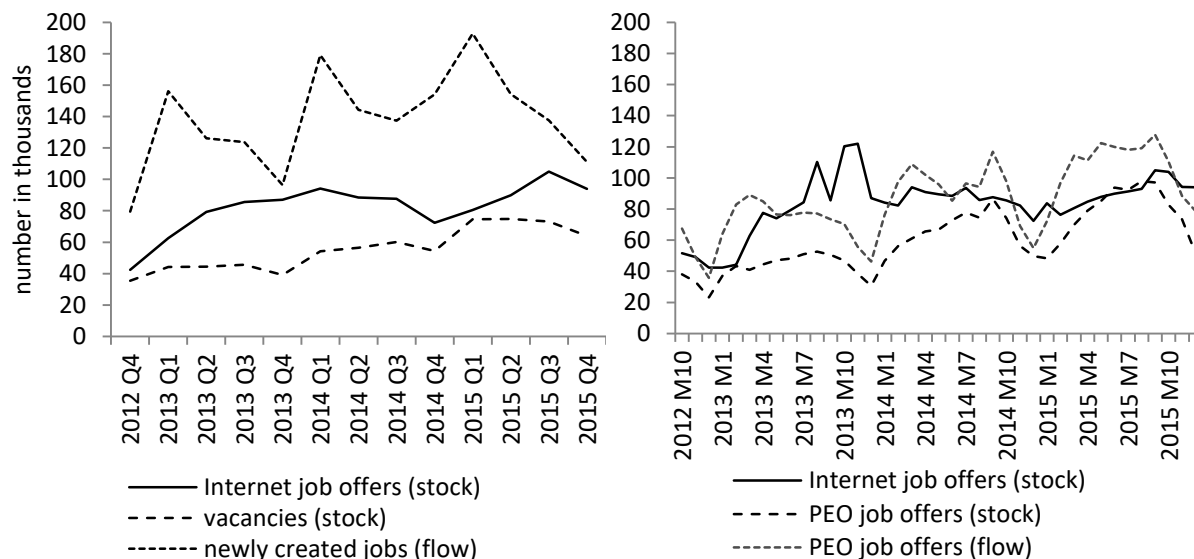
**Figure 2: Internet job offers, job offers from public employment offices (PEO), vacancies, and newly created jobs (in thousands)**
Vacancies (stock) and newly created jobs (vacancy flow) come from the quarterly representative survey on the Demand for Labour conducted by Central Statistical Office in Poland. Internet job offers on the left chart are presented for the end of a quarter. Stock refers to the data at the end of a month or a quarter, while flow refers to the data for the whole month or quarter.

### 3.2. The algorithm for searching for competences in job offers

On the last day of each month during the study period, all job offers were downloaded from the websites accessed in our study (see Table 2 in the Appendix) and stored in a local database in the original HTML format. First, we applied parsing to the data: the data stored in the standard HTML format were converted into plain text. Parsing removes information such as font size, colour, and other formatting tags.

After parsing, we lemmatised the data; that is, we identified the basic forms of all of the words in the text (for example, verbs were transformed into their infinitives, while nouns were transformed into their nominative cases in singular forms). For this process, we developed a tool based on the Morfologik-stemming-1.9.0 library. For some of the words that form the competences, this library provides inconsistent lemmatised words. To deal with any such instances that we spotted during the analysis, we created an additional dictionary of exceptions. At this stage, our most important task was to find specific competences in the texts of job offers. Because the words used to describe a given competence can vary across job offers, the algorithm should deal with the following situations:

a) the competence is mentioned in the sentence; and

b) the competence is mentioned in the sentence, but with different words than the words that appear in the dictionary.

To solve these problems, we first prepared a list of competences (based on the European Commission list of transversal competences, likely the most detailed such classification). Our approach enabled us to obtain data on individual competences. Another advantage of this approach is that it helped us detect the various terms companies use to describe competences, which enabled us to increase the dictionary's size. For this process, we created a dictionary of synonyms based on three dictionaries (www.slownik-synonimow.eu, www.synonimy.pl, and sjp.pwn.pl). Using this larger dictionary—with more phrases (including colloquial ones) describing competences and their groups—we were able to obtain a more accurate representation of the competences demanded in the labour market.

As the job offers and the dictionary of competences had the same form after this process, we were able to analyse the job offers according to the competences they might have mentioned. We noticed that some of the competences were too specific to be of use to employers: for example, 'explain mathematical findings,' or 'make appropriate use of eye contact.' Instead, employers demanded competences that were defined in a general way. Thus, we also searched job offers for classes of competences. For the two above examples, these classes were 'communicate mathematical work process' (which includes 'explain mathematical findings') and 'use non-verbal cues' (which includes 'make appropriate use of eye contact'). While neither of these two competences appeared in job offers, the classes they are from did appear.

### 3.3. Data analysis

In the results section, we present our findings on the number of competences per job offer. In the categories, subcategories, and classes of competences, one job offer can include more than one competence of a given type. For this reason, the numbers of competences per job offer in these groups of competences cannot be interpreted as shares. If a single competence appeared twice in one job offer (because, for example, the offer was for two positions), we counted it once.

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Thus, for a given competence, we can interpret its number per job offer as the share of job offers that contain the competence.

We study the co-occurrence of competences by counting how many times their pairs (over 32 thousand) and triplets (over 513 thousand) occurred together in the same job offer. To analyse similarities in time changes between classes of competences, we applied Pearson's correlation coefficient for monthly occurrences of the classes in job offers.

The data were analysed with exploratory data analysis and graphical methods in Microsoft Excel and R (R Core Team 2016).

## 4. Results

### 4.1. Tendencies

In the unique internet job offers published during the November 2012–December 2015 period, competences appeared on average 240.2 thousand times per month; which gives us a figure of 2.8 unique competences per job offer (with 0.3 standard deviation). These two measures followed a visible tendency over time (Figure 3). During the whole analysed period, companies increased their requirements by 0.7 competences. The lowest number of competences per job offer was at the beginning of the analysed period (2.2 competences on average). This figure grew until February 2015, when it reached 3.1 competences per job offer. In the next month, this number began to decrease slowly, reaching 2.9 competences in December 2015.

The unemployment rate in Poland was slowly increasing after mid-2008, when the crisis first started affecting the Polish labour market. This negative tendency continued even during the post-crisis recovery. Although the pace of unemployment growth decreased during 2011, it accelerated again in 2012. From 2009 to the beginning of 2012, the number of internet job offers in Poland was increasing rapidly. This pattern might indicate that there was an increasing level of structural mismatch in the Polish labour market during the 2009-2012 period. These changes were followed by an economic slowdown, which lasted until September 2013. During this period, unemployment and vacancies changed in opposite directions: i.e., unemployment increased while vacancies decreased. Interestingly, it appears that during this slowdown, employers raised the requirements for job candidates, as the number of competences per job offer increased. This increase might be due to the mismatch identified earlier and the period of low labour market tightness, during which the vacancy-to-unemployment ratio was low. The low level of labour market tightness indicates that labour demand was low, and thus that competition for jobs among job seekers was high. These developments may explain why employers had elevated requirements for prospective workers during this period. However, it is also possible that employers tend to search for a smaller number of more competent workers during economic slowdowns than they do during economic expansions. Starting in October 2013, the unemployment rate slowly started to decrease, but the number of competences per job offer was still increasing. It took over a year for this number to stabilise in response to increasing labour market tightness. With decreasing unemployment and fewer people looking for work, employers had problems finding new workers; thus they stopped raising their requirements for candidates, and even lowered them slightly. Higher but longer-lasting job requirement levels during recessions were also reported for the U.S. economy by Hershbein and Kahn (2017). They called this process 'upskilling'. Long-lasting upskilling effects were found in the U.S. regions that suffered most severely during the Great Recession of 2007-2010. Since this recession was milder in Poland, upskilling pressures may have affected the Polish labour market to a lesser extent, and for a shorter period of time. Modestino et al. (2016) found evidence of downskilling in the U.S. economy after the Great Recession.

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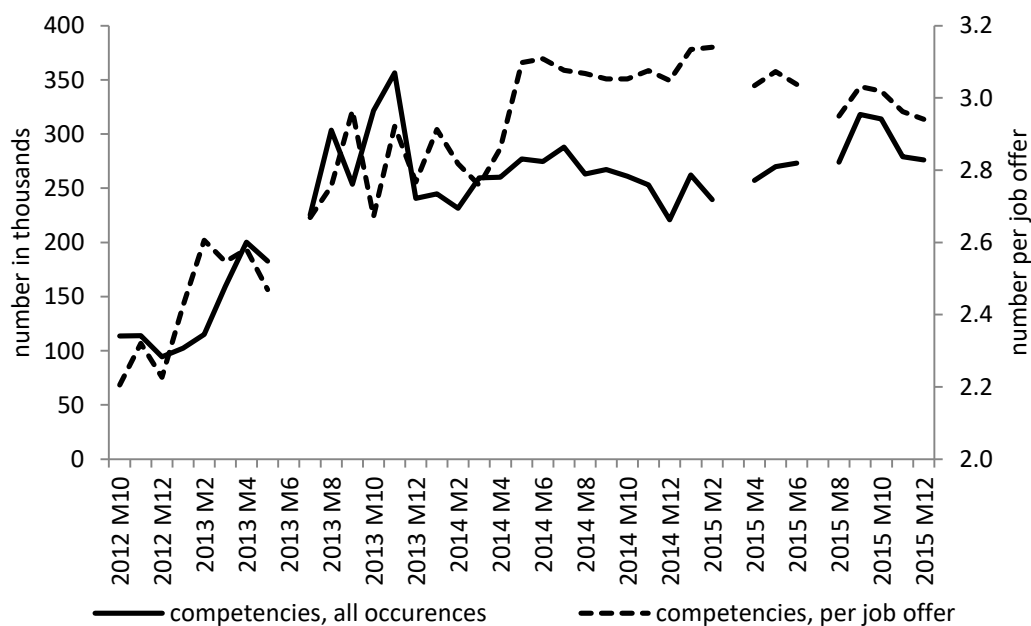
**Figure 3: Transversal competences: all occurrences (left scale) and per job offer (right scale)**

### 4.2. Popularity

The European Commission divides transversal competences into five categories, which reflect the structure of these competences. These categories consist of subcategories, which in turn include classes containing single competences. This structure was fairly stable within the analysed period (see Table 1, and Table 3 in the Appendix for a detailed classification). The competences that were mentioned most frequently were those related to 'language and communication' as well as 'attitudes and values at work;' while the competence that was mentioned least frequently was 'application of knowledge.'

For the category 'attitudes and values at work,' we found that Polish employers were more likely to search for workers with strong 'attitudes' rather than 'values.' The largest number of competences mentioned in vacancies was observed for this subcategory: 0.81 competences from this category appeared in an average job offer. The competences in this class that were in greatest demand were 'demonstrate commitment' (0.77 competences per job offer) and the following individual competences: 'meet commitments,' 'work independently,' and 'attend to detail.' However, 'make an effort,' 'show enthusiasm,' and 'work efficiently' also appeared in many job offers. In the 'values at work' subcategory (0.12 per job offer), 'show good manners' occurred most often.

**Table 1: Number of transversal competences per job offer in Poland, November 2012–December 2015**

| Category | Competences | Mean | Min | Max | First | Last |
|---|---|---|---|---|---|---|
| I | Attitudes and values at work | 0.93 | 0.72 | 1.03 | 0.72 | 0.95 |
| II | Application of knowledge | 0.05 | 0.04 | 0.06 | 0.04 | 0.05 |
| III | Social skills and competences | 0.30 | 0.21 | 0.35 | 0.21 | 0.32 |
| IV | Language and communication | 0.99 | 0.77 | 1.10 | 0.77 | 1.00 |
| V | Thinking skills and competences | 0.60 | 0.46 | 0.67 | 0.46 | 0.62 |
| | All | 2.88 | 2.21 | 3.14 | 2.21 | 2.94 |

Mean: mean no. of competences per job offer throughout the studied period; min, max: minimum and maximum mean no. of competences per job offer in a month; first, last: no. of competences per job offer in the first and last months of the analysis.

No competence in the 'application of knowledge' category constituted at least one percent of the total. 'Information and communication' with 'numeracy and mathematics' together accounted for 0.05 competences per average job offer.

In 'social skills and competences,' the most important class of competences for employers was 'work as part of a team' (0.19 per job offer). But companies did not demand any specific competence, such as 'share opinions or information' or 'collaborate on tasks.' Instead, they defined their requirements more generally. 'Leading others' (but 'build relationships' rather than 'exercise responsibility') appeared half as frequently as 'work as part of a team.'

The category of competences 'language and communication' was popular primarily due to the demand for workers with 'verbal communication' and 'language skills.' These two competences were mentioned equally frequently (0.50 competences per job offer each). In the 'verbal communication' subcategory, the need for 'negotiating' skills and 'knowledge of presentation techniques' was often emphasised. The foreign languages in greatest demand were 'English' and 'German.' It appears, however, that companies did not consider 'non-verbal communication' skills important.

On average, 0.60 'thinking skills and competences' appeared per job offer. In the majority of job offers that included competences from this category, 'plan own work' skills (0.38 competences per job offer) and, in particular, the ability to 'manage time' appeared most often. 'Problem-solving' skills (0.10 competences per job offer) was in second place, with the ability to 'troubleshoot' being the most popular. 'Creative thinking,' 'critical thinking,' and 'learning' were mentioned less frequently.

During the analysed period, positive tendencies in the number of competences per job offer were found for four of the 43 classes of competences: namely, 'demonstrate commitment,' 'examine evidence,' 'manage the learning self,' and 'work as part of a team'. For most classes of competences, we observed positive but unstable trends. Some of these classes, such as 'exercise responsibility' and 'take action to solve a problem,' had been at stable levels for at least a year following the beginning of the analysed period. These levels then started to increase and remained high up to the end of the period. The other classes increased over time, but displayed large fluctuations with no clear trends. For 10 classes, such as 'set targets' and 'turn new ideas into action,' the number of competences per job offer increased in the middle of the analysed period, and then decreased again. No clear trends were observed for nine classes of competences.

Between 2012 and 2015, 'meet commitments' (category I) became slightly less important for companies, while 'work as part of a team' (category III) and 'take action to solve the problem' (category V) became slightly more important. Among the five categories, demand for competences from category II was most stable. Among the competences in category IV, companies started to value 'language skills' slightly more than 'verbal communication.' Having English language skills became even more important over this period.

Of the specific competences mentioned in the job offers studied, 'English' appeared most often (in 30% of all job offers, Figure 4). Skills in several other languages were also among the most frequently mentioned competences: after English, German was the foreign language that was most in demand (it appeared in 11% of job offers). 'Work out time line' was the second-most desired competence (category V). The competences from the category 'attitudes and values at work' that were mentioned most frequently were 'meet commitments,' 'work independently,' and 'attend to details.' In addition to languages, competences in the 'verbal communication' subcategory of category I were among the most frequently mentioned competences. 'Facilitate groups,' which is a social competence, was in 14th place. The second-most frequently mentioned thinking competence, 'use operating systems' (category V), was in 22nd place. The most frequently requested competences in the 'application of knowledge' category, 'demonstrate

tolerance' and 'use electronic databases,' were in 20th and 25th place, respectively. For the competences 'German' and 'demonstrate tolerance,' we observed that there were short periods in which they were mentioned much more often. Thus, these competences occurred unevenly during the analysed period.
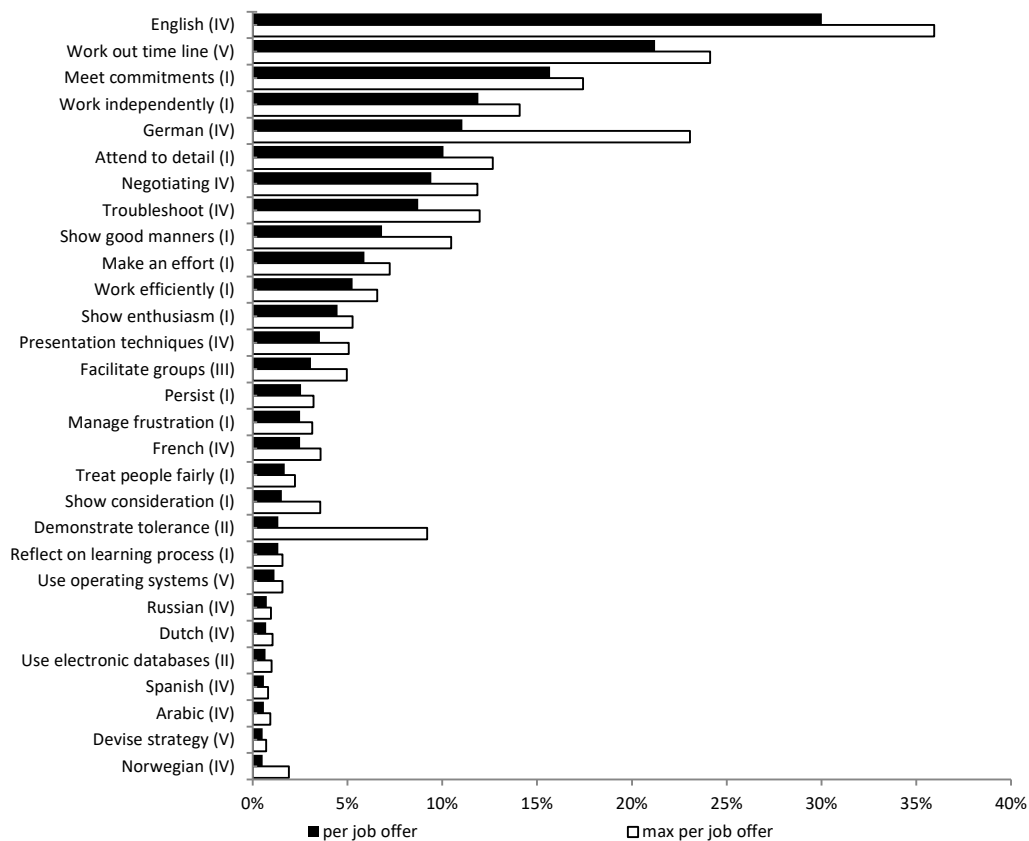


**Figure 4: The number (per job offer) of the most frequently mentioned competences (with their categories)**
The graph includes 29 competences that appeared in at least 0.5% of job offers. The grey bars represent a mean value for the whole period, while the white bars represent the maximum monthly number of mentions per job offer.

Among the 50 most popular competences, we found a positive trend over time for only 'attend to detail' and 'share information.' For most of these competences, we observed that the number of mentions per job offer increased starting in 2012, but displayed unstable growth trends, especially in 2014-2015. We also found that for nine competences, there were sub-periods during which the number of mentions per job offer grew, but only temporarily. This phenomenon might be attributable to employers making certain investments that suddenly increased labour demand for particular competences, but for a short period of time only. For the other nine competences, no visible trend was found. A decline was observed only for 'Russian' language skills.

### 4.3. Relations

Applying correlation coefficients for monthly occurrences of classes of competences, we analysed similarities in the time changes between them (Figure 5). We found high positive correlations between:

- 'demonstrate commitment' on the one hand and 'handle challenges,' 'work as part of a team,' 'manage the learning self,' 'take action to solve a problem,' and 'manage time' on the other;

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- 'work as part of a team' on the one hand and 'negotiate/resolve conflict,' 'manage the learning self,' 'explore issues,' 'take action to solve a problem,' and 'manage time' on the other;
- 'spoken interaction' on the one hand and 'build relationships' and 'manage time' on the other.
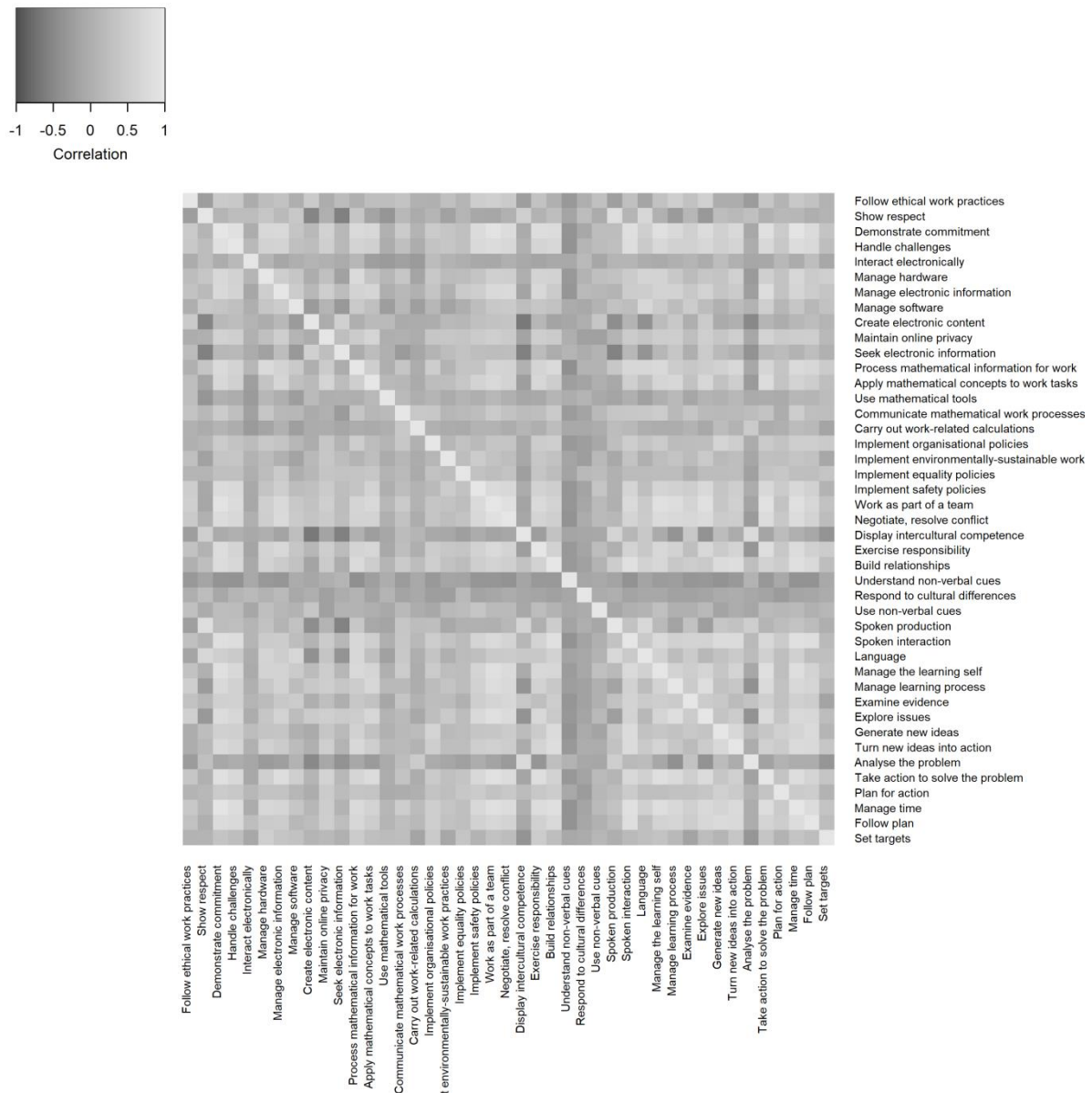


**Figure 5: Correlation coefficients representing the co-occurrence of classes of competences, estimated based on monthly numbers of their occurrences in job offers**

A strong correlation between two classes of competences means that the demand for these competences developed in the same direction or was reported by employers in the same phases of the business cycle. Time changes in the 'understand non-verbal cues' class were negatively correlated with changes in most other classes of competences. The appearance of some of the classes of competences was not correlated with the appearance others; namely, 'respond to cultural differences,' 'use non–verbal cues,' 'analyse the problem,' 'use mathematical tools,' 'carry out work-related calculations,' 'display intercultural competence,' and 'interact electronically.' These classes of competences may have been independent of the general trends in the vacancy market, and could have been unique in the sense that employers' demands for them changed in specific periods. These periods may have corresponded to periods in which

large investments were made in unique sectors of the economy as part of large initiatives, such as the construction of a specific subsidiary of an international company. Thus, because of their sectoral specificity, it is possible that these inflows were not correlated with any general economic tendencies.

We also analysed pairs and triplets of competences that appeared together in the same job offer. Among the competences that were mentioned together most often were 'English' and 'German' and 'English' and other competences, with the most popular being 'work out time line,' 'meet commitments,' and 'troubleshoot.' Other competences that frequently appeared together were 'work independently' on the one hand, and 'work out time line' and 'meet commitments' on the other. In addition, we found that a few classes of competences were connected with the above competences and with themselves. Among them were 'working as part of a team,' 'spoken production,' 'demonstrate commitment,' 'manage time,' and 'generate new ideas.' All of these these competences were also included in the most frequently occurring triplets of competences.

## 5. Educational policy recommendations

Our findings indicated that 'English' was the most popular competence, but that 'German' was also very popular; and that these two competences often appeared together in job offers. Kocór et al. (2015: 50) observed that these language skills are required for several occupations in particular: namely, specialists, managers, and clerical support workers. As Polish companies aspire to enter global supply chains and to engage in export activities, the demand for foreign language skills is strong. According to Cywiński and Harasym (2016), Polish companies tend to absorb innovations in the form of computer information, proprietary rights, and economic competences from foreign investments. Unless the employees of these companies speak foreign languages, the assimilation of intangible capital is practically impossible.

Pieniążek et al. (2014) argued that Polish graduates have little awareness of the importance of communication skills, and that these skills should therefore be emphasised in the educational process. There is also a need for educational institutions to take a more practical approach to teaching foreign languages (by, for example, focusing more on conversation and less on grammar). Thus, more verbal communication should be incorporated into the core curriculum of the Polish and foreign language courses in the general educational system. While verbal communication skills are crucial for companies, they are undervalued in the Program Bases that set the minimum standards in Polish schools.

We also found that certain thinking skills and competences are important for companies. In Poland, it is commonly thought that these skills are developed during science courses. We believe, however, that education in the arts and humanities as well as in the sciences encourages the development of these skills. In their humanities courses on subjects such as art, history, and philology, schools should move away from a focus on the acquisition of rote knowledge and towards an emphasis on the development of thinking skills (such as analysis, creativity, and abstract thinking). Currently in the Polish educational system, the knowledge requirements are far too high (at all educational levels, from primary to tertiary), while the development of cognitive competences is undervalued.

In terms of the competences that refer to individual traits, it appears that employers are most likely to be looking for workers who can work independently, are committed, and have strong self-discipline. It seems that employers value such competences in part because they are unable to shape them through company training. Thus, such competences should be developed throughout the educational process, starting at its lowest levels. There is, however, evidence that having such competences does not increase an individual's chances of getting a job, even though they increase the returns to the individual when working (Kwiecińska-Zdrenka 2013). According to managers, it is difficult to verify whether workers have such competences until after they have been recruited and are on the job. This may be the reason why requirements for

soft skills are uncommon in job offers for technical and science positions. Thus, while the need for such skills is high, having them is not a condition for employment.

We also found that the demand for managerial skills (such as decision-making, time management, and showing initiative) was higher than the demand for analytical skills. It appears that managerial skills are seen as more practical than analytical skills, especially in middle-income countries, which have relatively low shares of companies that can be considered innovative. Among the social skills, the competences related to cooperation, working in a team, and working efficiently with contractors were in greater demand than competences related to leadership. Among the skills related to the handling of new technologies or the application of knowledge, the demand was highest for 'use operating systems' and 'use electronic databases.' It is likely that there are certain competences that all or almost all companies consider essential (such as 'use mobile phone' or 'use printers'), but that are seen as too obvious to be worth mentioning in a job offer.

Our results suggest that a majority of Polish employers undervalue employees' approaches to the work environment and to ethics at work. A potential explanation for this finding is that most companies focus on short-term goals while disregarding long-term business development. To encourage more sustainable business development practices, policy measures aimed at increasing Polish companies' awareness of the determinants of economic stability may be needed. Notable exceptions to this general trend are high-technology and knowledge-intensive companies, which tend to see these competences as contributing to their long-term economic performance (Pieniążek et al. 2014). Such companies invest significant resources in research and development and create intellectual property. Thus, to ensure their access to intellectual capital, these companies value having employees with advanced qualifications and competences.

While the levels of the demand for skills changed over the study period, the structure of this demand was relatively stable, or at least did not change considerably with the business cycle. To the extent that there were any structural shifts, the demand for social competences increased slightly, while the demand for language and communication competences decreased slightly. The most positive trends were observed for work as part of a team and attitudes towards work. Unlike the demand for transversal competences, the demand for occupations and job-related competences underwent significant structural changes during the analysed period (see Kocór et al. 2015). Meanwhile, the demand for workers with lower qualifications increased while the demand for highly qualified workers decreased. This latter development may be attributable to a shortage of vocational workers resulting from their high rates of emigration.

## 6. Conclusion

For job seekers, having up-to-date information about employers' detailed demands might be helpful. That is why we decided to propose a method for analysing the demand for competences at a macroeconomic level. This method, which involves the collection and analysis of internet job offers over a long time period of time, enables us to analyse the demand for competences at a relatively low cost. During the November 2012–December 2015 period, we collected internet job offers from the most important recruitment websites in Poland. We then analysed these job offers according to the competences they mentioned. We used the European Commission (2015) classification of transversal competences to perform our analysis.

We found evidence of upskilling during economic contractions and of downskilling after such downturns. These observations suggest that the number of competences companies require of job candidates is counter–cyclical. Such counter-cyclicality may lead to increases in levels of labour market mismatch during economic contractions, which may in turn help explain jobless recoveries (Jaimovich and Siu 2012). Even if wages decrease and the pool of unemployed workers increases during an economic contraction, job creation may speed up slowly as a result of competence mismatch.

During the analysed period, around three transversal competences were mentioned in an average job offer, and this number was increasing throughout the period. The structure of competences in terms of category and class was relatively stable. The competences that were most valued by employers were 'language and communication' skills as well as 'attitudes and values at work.' Of the language skill competences, 'English' was the most popular, followed by 'German;' indeed, many job offers demanded skills in both of these languages. Of the competences related to individual traits, the ability to work independently, to show commitment, and to have strong self-discipline were mentioned most frequently. Of the competences related to social skills, cooperation, working in a team, and working efficiently with contractors appeared most often. These competences were found to be universal, which likely means that the transversal requirements have not changed much despite rapid technological development. To some extent, this finding contradicts the claim made by Docherty and Marking (1997) that competences are changing constantly, especially in manufacturing, where technological change tends to occur quickly. However, while their observation may not hold for transversal competences, it is likely true for job-specific competences. Of the competences related to the handling of new technologies or the application of knowledge, the most important were shown to be 'use operating systems' and 'use electronic databases.' We also found that the above competences were most likely to appear in pairs and triplets in the same job offer. We believe that companies require certain basic competences (such as 'use mobile phone' or 'use printers'), but consider them too obvious to be worth mentioning in a job offer.

Measuring demand for individual competences may help shape the OECD Skills Strategy. Likely because of methodological difficulties (methods for collecting and analysing data are lacking, and data sources are rarely public), studies attempting to do so have been scarce. The Ministry of National Education in Poland publishes and updates the Program Bases, which outline the competences and qualifications for primary and secondary education, as well as for particular subjects within these educational levels. Similarly, the Ministry of Science and Higher Education in Poland publishes the National Qualifications Framework. Both documents list the competences and qualifications a student is expected to acquire, but do not include recommendations for which competences should be stressed in the curriculum. On the one hand, students may be encouraged to focus on learning competences that are useful in the labour market in order to improve the structural matches between job seekers and the requirements of employers. On the other hand, it is likely that transversal competences are *not* easily taught and are *not* transferable between activities (Hendrick 2017 and citations therein). Thus, a transversal competence (such as those concerned with critical thinking) applied to a particular activity or job is usually not applicable in another. This suggests that transversal skills are even more rare—but are not as transversal—as is commonly believed. In other words, transversal competences are job-specific, too. Thus, we believe that job-specific competences, rather than transversal competences, should be taught; and that instruction in the latter should focus on the field's specificity. In the next stage of research, we plan to analyse job-specific competences, and to focus on competences connected to particular occupations and fields of education.

The proposed method can be helpful for job seekers, although only indirectly. While job seekers will not be able to use the method directly, various academic, governmental, and non-profit organisations can. Such organisations include research institutes and statistical offices; training institutions; educational policy-makers, such as boards of education; career advice centres, such as employment offices; university career services; and the European jobs network. By using this method continuously, these organisations can analyse and publish up-to-date information on the current demand for competences, as well as on the trends in this demand.

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**Appendix**

**Table 2: A list of Polish internet websites with job offers**

| |
|---|
| http://interkadra.pl |
| http://jobexplorer.pl |
| http://jobexpress.pl |
| http://kariera.pl |
| http://karierawnieruchomosciach.pl |
| http://praca.gratka.pl |
| http://pracawbiurze.pl, |
| http://pracawsprzedazy.pl |
| http://pracownicy.it |
| http://www.dlastudenta.pl |
| http://www.gazetapraca.pl |
| http://www.goldenline.pl/praca |
| http://www.gowork.pl |
| http://www.hrk.pl |
| http://www.ibroker.pl |
| http://www.infopraca.pl |
| http://www.jober.pl |
| http://www.jobs.pl |
| http://www.jobs4.pl |
| http://www.karierawfinansach.pl |
| http://www.linguajob.pl |
| http://www.metropraca.pl |
| http://www.monsterpolska.pl |
| http://www.mypraca.pl |
| http://www.praca.pl |
| http://www.pracanateraz.pl |
| http://www.pracuj.pl |
| http://www.profesja.pl |
| http://www.przedstawiciele.pl |
| http://www.strefa-hostess.pl |
| http://www.szybkopraca.pl |

**Table 3: Detailed classification of competences, November 2012–December 2015 (number per job offer)**

| Category | Class | Competences | | Mean | Min | Max | First | Last |
|---|---|---|---|---|---|---|---|---|
| **I** | | | **Attitudes and values at work** | **0.93** | **0.72** | **1.03** | **0.72** | **0.95** |
| I | *1* | | *Values* | *0.12* | *0.07* | *0.24* | *0.08* | *0.10* |
| I | | *1.1* | *Follow ethical work practices* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| I | | 1.1.1 | Identify social impact | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 1.1.2 | *Reflect on own work practices* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 1.1.3 | *Identify environmental impact* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 1.1.4 | Make ethical choices | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 1.1.5 | Identify ethical issues | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | *1.2* | *Show respect* | *0.12* | *0.07* | *0.23* | *0.07* | *0.10* |
| I | | 1.2.1 | Treat people fairly | 0.02 | 0.01 | 0.02 | 0.01 | 0.02 |
| I | | 1.2.2 | Work with different viewpoints | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| I | | 1.2.3 | Show consideration | 0.02 | 0.00 | 0.04 | 0.00 | 0.00 |
| I | | 1.2.4 | Demonstrate tolerance | 0.01 | 0.00 | 0.09 | 0.00 | 0.01 |
| I | | 1.2.5 | Show good manners | 0.07 | 0.05 | 0.10 | 0.05 | 0.06 |
| I | *2* | | *Attitudes* | *0.81* | *0.64* | *0.92* | *0.64* | *0.85* |
| I | | *2.1* | *Demonstrate commitment* | *0.77* | *0.61* | *0.87* | *0.61* | *0.81* |
| I | | 2.1.1 | Meet commitments | 0.16 | 0.13 | 0.17 | 0.13 | 0.16 |
| I | | 2.1.2 | Attend to quality | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 2.1.3 | Make an effort | 0.06 | 0.04 | 0.07 | 0.04 | 0.06 |
| I | | 2.1.4 | Attend to detail | 0.10 | 0.07 | 0.13 | 0.08 | 0.12 |
| I | | 2.1.5 | Show enthusiasm | 0.04 | 0.03 | 0.05 | 0.04 | 0.05 |
| I | | 2.1.6 | Be curious | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 2.1.7 | Persist | 0.03 | 0.02 | 0.03 | 0.02 | 0.03 |
| I | | 2.1.8 | Work independently | 0.12 | 0.09 | 0.14 | 0.10 | 0.12 |
| I | | 2.1.9 | Work efficiently | 0.05 | 0.04 | 0.07 | 0.04 | 0.05 |
| I | | *2.2* | *Handle challenges* | *0.04* | *0.03* | *0.05* | *0.03* | *0.04* |
| I | | 2.2.1 | Manage frustration | 0.03 | 0.02 | 0.03 | 0.02 | 0.02 |
| I | | 2.2.2 | Cope with pressure | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 2.2.3 | Deal with uncertainty | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 2.2.4 | Learn from mistakes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 2.2.5 | Adapt to changes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| I | | 2.2.6 | Build on experience | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **II** | | | **Application of knowledge** | **0.05** | **0.04** | **0.06** | **0.04** | **0.05** |
| II | *1* | | *Information and communications* | *0.03* | *0.02* | *0.03* | *0.02* | *0.03* |
| II | | *1.1* | *Interact electronically* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | 1.1.1 | Communicate on-line | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.1.2 | Use mobile phone | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.1.3 | *Choose method of electronic interaction* | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.1.4 | Observe 'netiquette' | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.1.5 | Use on-line services | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | *1.2* | *Manage hardware* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | 1.2.1 | Use printers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.2.2 | Use pointing devices | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.2.3 | Use image scanners | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | *1.3* | *Manage electronic information* | *0.01* | *0.01* | *0.01* | *0.01* | *0.01* |
| II | | 1.3.1 | Use word processing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.3.2 | Retrieve files | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.3.3 | Detect bias in electronic information | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.3.4 | Evaluate quality of electronic information | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.3.5 | Use spreadsheets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.3.6 | Use electronic databases | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 |
| II | | 1.3.7 | Store files | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.3.8 | Cross-check electronic information | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | *1.4* | *Manage software* | *0.01* | *0.01* | *0.02* | *0.01* | *0.02* |
| II | | 1.4.1 | Use office software | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| II | | 1.4.2 | Use operating systems | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 |
| II | | *1.5* | *Create electronic content* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | 1.5.1 | Produce electronic images | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.5.2 | Produce tables | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.5.3 | Edit electronic content | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.5.4 | Type text | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.5.5 | Design spreadsheets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.5.6 | Produce audio files | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | 1.5.7 | Produce text files | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | *1.6* | *Maintain online privacy* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | 1.6.1 | Review online privacy settings | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.6.2 | Up-date online security measures | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.6.3 | Install anti-virus software | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.6.4 | Choose online security measures | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.6.5 | Identify online threats | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | 1.6.6 | Set up passwords | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| II | | *1.7* | | | *Seek electronic information* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | | 1.7.1 | | Use internet browsers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 1.7.2 | | Retrieve information from the internet | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | *2* | | | | ***Numeracy and mathematics*** | ***0.02*** | ***0.01*** | ***0.03*** | ***0.02*** | ***0.02*** |
| II | | *2.1* | | | *Process mathematical information for work* | *0.01* | *0.01* | *0.01* | *0.01* | *0.01* |
| II | | | 2.1.1 | | Organise data | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 2.1.2 | | Interpret data | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 2.1.3 | | Gather data | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | *2.2* | | | *Apply mathematical concepts to work tasks* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | | 2.2.1 | | Identify mathematical problem | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | | 2.2.2 | | Apply mathematical method | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 2.2.3 | concepts | Choose relevant mathematical | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | *2.3* | | | *Use mathematical tools* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | | 2.3.1 | | Use measuring equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 2.3.2 | | Use calculators | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | | 2.3.3 | | Use ICT | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | *2.4* | | processes | *Communicate mathematical work* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | | 2.4.1 | | Record data | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 2.4.2 | | Explain mathematical findings | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | | 2.4.3 | | Illustrate mathematical findings | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | | 2.4.4 | language | Use appropriate mathematical | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | *2.5* | | | *Carry out work-related calculations* | *0.01* | *0.00* | *0.02* | *0.00* | *0.00* |
| II | | | 2.5.1 | | Measure | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 |
| II | | | 2.5.2 | | Work with shape | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 2.5.3 | | Use numbers | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | *3* | | | | ***Health in working environment*** | ***0.00*** | ***0.00*** | ***0.01*** | ***0.00*** | ***0.00*** |
| II | | *3.1* | | | *Implement organisational policies* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | | 3.1.1 | | Support company plan | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 3.1.2 | | Support company mission | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 3.1.3 | | Monitor policy implementation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 3.1.4 | | Apply quality standards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | *3.2* | | work practices | *Implement environmentally-sustainable* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | | 3.2.1 | | Minimise environmental risks | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | | 3.2.2 | | Preserve environmental heritage | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | | 3.2.3 | | Assess environmental impact | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 3.2.4 | practices | Reduce environmentally harmful work | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | *3.3* | | | *Implement equality policies* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | | 3.3.1 | backgrounds | Consider different cultural | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | | 3.3.2 | | Support gender equality | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 3.3.3 | | Foster cultural diversity | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | *3.4* | | | *Implement safety policies* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| II | | | 3.4.1 | | Store equipment safely | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 3.4.2 | | Identify risks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 3.4.3 | | Use safe working methods | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | | | 3.4.4 | | Take precautions | n.a. | n.a. | n.a. | n.a. | n.a. |
| II | | | 3.4.5 | | Use correct equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | | | **Social skills and competences** | **0.30** | **0.21** | **0.35** | **0.21** | **0.32** |
| III | *1* | | | | ***Working with others*** | ***0.20*** | ***0.14*** | ***0.24*** | ***0.14*** | ***0.22*** |
| III | | *1.1* | | | *Work as part of a team* | *0.19* | *0.13* | *0.23* | *0.13* | *0.21* |
| III | | | 1.1.1 | | Accept constructive criticism | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 1.1.2 | | Share information | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| III | | | 1.1.3 | | Give constructive criticism | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 1.1.4 | | Foster social networks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 1.1.5 | | Share opinions | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| III | | | 1.1.6 | | Collaborate on tasks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 1.1.7 | | Share resources | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | *1.2* | | | *Negotiate, resolve conflict* | *0.01* | *0.00* | *0.01* | *0.01* | *0.01* |
| III | | | 1.2.1 | | Influence on others | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| III | | | 1.2.2 | | Persuade others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 1.2.3 | | Argue cases | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 1.2.4 | | Seek consensus | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 1.2.5 | | Seek compromise | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 1.2.6 | | Propose options | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | *1.3* | | | *Display intercultural competence* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| III | | | 1.3.1 | | Use culturally appropriate gesture | n.a. | n.a. | n.a. | n.a. | n.a. |
| III | | | 1.3.2 | | Use culturally appropriate language | n.a. | n.a. | n.a. | n.a. | n.a. |
| III | *2* | | | | ***Leading others*** | ***0.11*** | ***0.07*** | ***0.13*** | ***0.08*** | ***0.10*** |
| III | | *2.1* | | | *Exercise responsibility* | *0.04* | *0.02* | *0.06* | *0.02* | *0.03* |
| III | | | 2.1.1 | | Foster quality | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| III | | | 2.1.2 | Facilitate groups | 0.03 | 0.02 | 0.05 | 0.02 | 0.02 |
| III | | | 2.1.3 | Support colleagues | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 2.1.4 | Support change | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| III | | | 2.1.5 | Decide priorities | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| III | | *2.2* | | *Build relationships* | *0.07* | *0.05* | *0.08* | *0.05* | *0.06* |
| III | | | 2.2.1 | Encourage staff | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 2.2.2 | Mentor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| III | | | 2.2.3 | Motivate staff | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | | **Language and communication** | **0.99** | **0.77** | **1.10** | **0.77** | **1.00** |
| IV | *1* | | | *Non-verbal communication* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| IV | | *1.1* | | *Understand non-verbal cues* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| IV | | | 1.1.1 | Understand postures | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 1.1.2 | Understand uses of personal space | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 1.1.3 | Read facial expressions | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 1.1.4 | Read different types of eye contact | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 1.1.5 | Understand gestures | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 1.1.6 | Read different types of touch | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | *1.2* | | *Respond to cultural differences* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| IV | | *1.3* | | *Use non-verbal cues* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| IV | | | 1.3.1 | Use appropriate facial expressions | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 1.3.2 | Make appropriate use of touch | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 1.3.3 | Make appropriate use of personal space | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 1.3.4 | Use appropriate gestures | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 1.3.5 | Make appropriate use of eye contact | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 1.3.6 | Use appropriate posture | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | *2* | | | *Verbal communication* | *0.49* | *0.39* | *0.57* | *0.40* | *0.47* |
| IV | | *2.1* | | *Spoken production* | *0.22* | *0.17* | *0.27* | *0.17* | *0.21* |
| IV | | | 2.1.1 | Presentation techniques | 0.04 | 0.03 | 0.05 | 0.03 | 0.03 |
| IV | | *2.2* | | *Spoken interaction* | *0.27* | *0.22* | *0.32* | *0.23* | *0.26* |
| IV | | | 2.2.1 | Debating techniques | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 2.2.2 | Interrogating | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 2.2.3 | Persuading | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 2.2.4 | Negotiating | 0.09 | 0.07 | 0.12 | 0.08 | 0.09 |
| IV | *3* | | | *Language* | *0.50* | *0.38* | *0.59* | *0.38* | *0.53* |
| IV | | *3.1* | | *Language* | *0.50* | *0.38* | *0.59* | *0.38* | *0.53* |
| IV | | | 3.1.1 | Russian | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 |
| IV | | | 3.1.2 | Estonian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.3 | Vietnamese | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.4 | Azerbaijani | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.5 | Bulgarian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.6 | Czech | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| IV | | | 3.1.7 | English | 0.30 | 0.24 | 0.36 | 0.24 | 0.34 |
| IV | | | 3.1.8 | Greek | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.9 | Kurdish | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.10 | Javanese | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.11 | Galician | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.12 | Slovak | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.13 | German | 0.11 | 0.07 | 0.23 | 0.07 | 0.09 |
| IV | | | 3.1.14 | Hindi | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.15 | Malayalam language | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.16 | Romani | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.17 | Yiddish | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.18 | Finnish | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.19 | Dutch | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 |
| IV | | | 3.1.20 | Ukrainian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.21 | Lithuanian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.22 | Limburgish | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.23 | Serbian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.24 | Marathi language | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.25 | Kazakh | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.26 | Hungarian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.27 | Belarusian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.28 | Punjabi | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.29 | Gujarati | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.30 | Arabic | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 |
| IV | | | 3.1.31 | Occitan | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.32 | Persian | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| IV | | | 3.1.33 | Portuguese | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.34 | Bihari language | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.35 | Tamil | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.36 | Macedonian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.37 | Latvian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.38 | Spanish | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 |

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|---|---|---|---|---|---|---|---|---|---|
| IV | | | 3.1.39 | Telugu language | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.40 | Romanian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.41 | Turkish | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.42 | Sign language | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.43 | Danish | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| IV | | | 3.1.44 | Urdu language | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.45 | Bosnian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.46 | Basque | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.47 | Maltese | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.48 | French | 0.02 | 0.02 | 0.04 | 0.02 | 0.03 |
| IV | | | 3.1.49 | Icelandic | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.50 | Greek, Ancient (to 1453) | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.51 | Catalan | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.52 | Irish | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.53 | Norwegian | 0.01 | 0.00 | 0.02 | 0.00 | 0.00 |
| IV | | | 3.1.54 | Welsh | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.55 | Walloon | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.56 | Sardinian | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.57 | Hebrew | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.58 | Italian | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 |
| IV | | | 3.1.59 | Georgian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.60 | Berber language | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.61 | Swedish | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| IV | | | 3.1.62 | Chinese | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.63 | Korean | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.64 | Croatian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.65 | Polish | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.66 | Bengali | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.67 | Montenegrin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.68 | Slovenian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.69 | Latin | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.70 | Albanian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | | | 3.1.71 | Armenian | n.a. | n.a. | n.a. | n.a. | n.a. |
| IV | | | 3.1.72 | Japanese | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | | **Thinking skills and competences** | **0.60** | **0.46** | **0.67** | **0.46** | **0.62** |
| V | *1* | | | *Learning* | *0.02* | *0.02* | *0.03* | *0.02* | *0.03* |
| V | | *1.1* | | *Manage the learning self* | *0.01* | *0.01* | *0.02* | *0.01* | *0.01* |
| V | | | 1.1.1 | Reflect on learning process | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 |
| V | | | 1.1.2 | Prioritise learning tasks | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | *1.2* | | *Manage learning process* | *0.01* | *0.01* | *0.01* | *0.01* | *0.01* |
| V | | | 1.2.1 | Monitor learning process | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 1.2.2 | Plan learning | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 1.2.3 | Use different learning strategies | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | *2* | | | *Critical thinking* | *0.04* | *0.03* | *0.04* | *0.03* | *0.04* |
| V | | *2.1* | | *Examine evidence* | *0.03* | *0.02* | *0.04* | *0.02* | *0.03* |
| V | | | 2.1.1 | Check facts | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | | 2.1.2 | Consider alternative views | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | | 2.1.3 | Critique reasoning | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | | 2.1.4 | Consider impact of judgement | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | | 2.1.5 | Notice bias | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | *2.2* | | *Explore issues* | *0.01* | *0.00* | *0.01* | *0.00* | *0.01* |
| V | | | 2.2.1 | Make judgements | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 2.2.2 | Draw conclusions | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 2.2.3 | Question assumptions | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | | 2.2.4 | Explain reasoning | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | | 2.2.5 | Identify live topics | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 2.2.6 | Recognize connections | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 2.2.7 | Identify patterns | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 2.2.8 | Ask key questions | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | *3* | | | *Creative thinking* | *0.06* | *0.05* | *0.07* | *0.05* | *0.05* |
| V | | *3.1* | | *Generate new ideas* | *0.05* | *0.04* | *0.05* | *0.04* | *0.04* |
| V | | | 3.1.1 | Anticipate needs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 3.1.2 | Experiment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 3.1.3 | Show originality | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 3.1.4 | Recognise opportunity | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 3.1.5 | Visualize completed work | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | *3.2* | | *Turn new ideas into action* | *0.01* | *0.01* | *0.01* | *0.01* | *0.01* |
| V | | | 3.2.1 | Create implementation strategy | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 3.2.2 | Adapt implementation strategy | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | | 3.2.3 | Produce original work | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | *4* | | | *Problem-solving* | *0.10* | *0.08* | *0.14* | *0.08* | *0.12* |
| V | | *4.1* | | *Analyse the problem* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| V | | | 4.1.1 | Explore context of problem | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | | 4.1.2 | Examine causes of problem | n.a. | n.a. | n.a. | n.a. | n.a. |

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| | | | | | | Mean | min | max | first | last |
|---|---|---|---|---|---|---|---|---|---|---|
| V | | | 4.1.3 | problem | Identify stakeholders involved in | n.a. | n.a. | n.a. | n.a. | n.a. |
| V | | 4.2 | | | *Take action to solve the problem* | *0.09* | *0.06* | *0.13* | *0.06* | *0.11* |
| V | | | 4.2.1 | | Implement strategy | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 4.2.2 | | Coordinate actions | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 4.2.3 | | Multi task | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 4.2.4 | | Evaluate success | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 4.2.5 | | Troubleshoot | 0.09 | 0.06 | 0.12 | 0.06 | 0.10 |
| V | | 4.3 | | | *Plan for action* | *0.01* | *0.01* | *0.01* | *0.01* | *0.01* |
| V | | | 4.3.1 | | Devise strategy | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 |
| V | | | 4.3.2 | | Set goals | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | | 4.3.3 | | Prioritise actions | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | 5 | | | | **Planning own work** | **0.38** | **0.29** | **0.42** | **0.30** | **0.39** |
| V | | 5.1 | | | *Manage time* | *0.35* | *0.27* | *0.39* | *0.28* | *0.36* |
| V | | | 5.1.1 | | Work out time line | 0.21 | 0.15 | 0.24 | 0.17 | 0.23 |
| V | | 5.2 | | | *Follow plan* | *0.03* | *0.02* | *0.03* | *0.02* | *0.03* |
| V | | | 5.2.1 | | Monitor progress | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| V | | 5.3 | | | *Set targets* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* |
| V | | | 5.3.1 | | Identify tasks | n.a. | n.a. | n.a. | n.a. | n.a. |
| | | | | Sum | | 2.88 | 2.21 | 3.14 | 2.21 | 2.94 |

Mean: mean no. of competences per job offer throughout the studied period; min, max: minimum and maximum mean no. of competences per job offer in a month; first, last: number of competences per job offer in the first and last months of the analysis. n.a. means that the corresponding competence was not identified in any job offer; 0.00 means that the number of competences per job offer was less than 0.01.