Tesserae of Graduates' Competences for Mosaics of Work Activities

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Summary. In this paper, we analyse with multivariate statistical methods the frequencies of use of the basic, cross-occupational and occupation-specific competences by employed graduates. The basic idea is that competences may be *tesserae* of a mosaic of graduate's professional personality. We analyse the relationship between competences and a set of professions. We evaluated the differential effect, on competence use, of the specific degree held by each graduate, so to connect graduate's features and working environment's characteristics in terms of a selected set of competences.
Keywords: Basic competences; Cross-occupational competences; Occupation-specific competences; Multilevel analysis; Correspondence analysis; Survey on graduates; University of Padua.

1. Professional skills of employed graduates

The work activities of graduates can be characterised by the frequent and intensive use of their competences, in other words, the knowledge, skills and willingness with which they respond to professional needs. Blended together with their values, the competences define their "professional personality" or "professional style".

Knowledge is a set of principles and usable information, abilities are durable talents that make a person capable of performing work activities, and willingness is the personality trait that favours the use of abilities.

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[1] The four authors designed and realised jointly the research work described in this paper. However, A. Boaretto wrote Sections 3 and 5 of the paper, whereas G. Rota wrote Section 2, I. Silvestri Section 3 and L. Fabbris the other sections.

The skills necessary to carry out a task are complex and multifunctional. They are multifunctional in that they help solve many tasks, and for this reason we call them "cross-occupational" (Spencer & Spencer, 1993; Isfol, 1998; Ajello & Meghnagi, 1998). They are complex because what individuals have obtained from education and professional training is processed by experience, thus enabling individuals to choose consciously their own values and goals.

Skills can be broken down into independent units. The units identified in the DeSeCo project (Befani, 2004) are:

(i)   the capacity to face complexities, which consists of the capacity to break up and analyse reality by distinguishing between what fits within known parameters and what is new,

(ii)   the skill of perception, which consists of the capacity to grasp the sense of situations and to vary one's own behaviour accordingly,

(iii)   the self-governing skill, which consists of a guideline of one's own actions based on values determining what is right, opportune and desirable,

(iv)   co-operation skills, which involve the capacity of identifying in other people's abilities the particular talents that make teamwork possible, and

(v)   the skill of narration, which consists of being able to disassociate from contingency, identify alternatives and process viable future scenarios.

Many skills are not taught in school. Many remain implicit until when they are applied to activities to be undertaken. For example, it is hypothesized that individuals are competent to work in a team if they are capable of listening, presenting problems in a suitable language and style, empathizing with others, controlling their emotions, mediating between differing interests and impositions, etc. Nevertheless, the fact that they are capable of working in a team will be proven only when they are faced with a work problem requiring teamwork.

Graduates seeking employment are required to possess various types of skills and knowledge. Those that are taken for granted in job candidates are called "basic" or "strategic/cross-occupational" skills. For a graduate, basic skills include the written and oral knowledge of English and basic computer literacy. The level required for these two skills varies according to the characteristics of the company and grows in conjunction with market globalization and the rise of education and professional training in the world[2].

Basic skills are relevant to the moment of initiation of a job, but are not necessarily used in the performance of professional activities. Indeed, Fabbris & Visentin (2004) found that basic skills are used in companies less intensely

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[2]   Many researchers stress that a basic skill is also the knowledge of the Italian language, not taking for granted that even people who have gone through at least 16 years of the Italian educational system know it.

than one would surmise by their presence in the list of requirements necessary for recruitment.

The cross-occupational skills required of recent graduates depend on the position they are to hold. In equivalent positions, they may depend on work parcelling and on the sectoring of company activities. In large companies where production is standardized and workers' individual contribution is a part of the whole, technical skills are used with greater intensity than in small companies. The multifunctionality of the positions of graduates is, on the other hand, a peculiarity of small-to-medium companies. In these companies, graduates must perform a number of specific tasks pertaining to their position, but they are also expected to perform numerous other lower- and upper-level activities (Fabbris & Visentin, 2004).

Occupation-specific skills are the graduate's professional peculiarity. For example, to an engineer in a mechanical apparatus factory the essential skills are: knowing how to make calculations, analyses, projects, designs, knowing how to operate machinery and installations with complex equipment, etc., as well as the *forma mentis* characterizing engineers. To a marketing operator in a market-oriented company the important skills are: knowing how to develop contacts with partners, customers, sellers and mediators, participating in trade fairs and markets in Italy and abroad, knowing how to use the Internet to gain knowledge of the competition's offers, etc. as well as the *forma mentis* specific to marketing and sales personnel.

What tells cross-occupational skills apart from specific skills is not technicality, but functional generality. Indeed, Levy & Murnane (1999) call cross-occupational skills *soft skills,* identifying them as technical skills but not as *hard* as specific skills.

Graduates are usually involved in positions "from technician on up" (Del Favero & Fabbris, 2002), positions that also include middle-ranking managers, management assistants, executives and consultants. Recent graduates may even hold managerial positions in their first employment, just as they may accept to perform manual activities; these are nevertheless improbable positions.

In this paper, we intend to identify a limited number of possibly independent units in the use of graduate work skills (Section 3) and to create maps of skills to classify graduate professions (Section 4) with the units found. In Section 5, a multilevel analysis is made of the units deriving from the use of skills. Our paper ends (Section 6) with a few comments and suggestions.

The data used in the analysis was collected by the University of Padua in the course of a survey that began in 2000 and ended in 2005 (Fabbris, 2003). The sample was made up of five cohorts selected from as many undergraduate sessions.

Six months after graduating and every six months after that for a total of three years, specialized interviewers via a CATI (*Computer Assisted Telephone Interviewing*) system interviewed the sampled graduates.

2. Cross-occupation and occupation-specific skills

The analysis of the skills used by University of Padua graduates when performing professional activities (Table 1) shows that technical skills are frequently used by graduates and that the frequency of the use of skills varies according to their study programme.

Almost everyone uses the computer as a daily calculation, memorization, and communications tool within the organization (86%) and use his/her relational (82%) as well as English communication skills (77%) to maintain positive relations with customers/users and suppliers.

The computer is a functional tool in the activities of newly hired personnel in the company information network. Some employees, hired for technical-scientific related jobs, use the computer to perform complex calculations and designs. The importance of training to develop this skill is unquestionable.

Table 1. Frequency of use of basic and cross-occupational skills by graduates of the University of Padua, by type of study programme and faculty

Faculty	1	2	3	4	5	6	7
Agricolture	91.5	95.7	38.7	71.7	75.5	53.2	50.0
Bachelor	*91.5*	*96.3*	*40.7*	*70.0*	*78.0*	*52.4*	*54.9*
Master	*91.7*	*91.7*	*25.0*	*83.3*	*58.3*	*58.3*	*16.7*
Economics	65.9	81.8	34.1	84.1	56.8	63.6	50.0
Pharmacy	80.3	87.7	18.2	95.5	53.0	51.5	48.5
Law	86.8	92.1	31.6	84.2	64.5	38.7	29.0
Bachelor	*86.8*	*92.6*	*32.4*	*82.4*	*63.2*	*37.3*	*27.9*
Master	*87.5*	*87.5*	*25.0*	*100.0*	*75.0*	*50.0*	*37.5*
Ingeneering	87.2	79.0	31.4	82.7	86.7	63.5	80.7
Bachelor	*87.2*	*78.2*	*30.9*	*80.9*	*85.6*	*60.6*	*79.3*
Master	*87.1*	*83.9*	*41.9*	*93.5*	*93.5*	*80.6*	*90.0*
Letters, philosop	91.5	83.0	46.1	98.5	15.5	54.3	43.8
Med. Veterinary	79.0	94.7	42.1	79.0	52.6	68.4	57.9
Psychology	75.0	74.0	13.5	79.2	59.4	33.7	38.5
Education Scien	92.1	60.4	18.0	77.5	65.9	23.0	56.8
Sciences	87.7	81.8	20.6	62.4	55.9	51.2	67.1
Bachelor	*86.9*	*80.0*	*20.0*	*61.4*	*54.5*	*50.3*	*66.9*
Master	*92.0*	*92.0*	*24.0*	*68.0*	*64.0*	*56.0*	*68.0*
Political Science	90.1	80.4	38.5	90.1	67.0	47.8	41.3
Statistics	88.3	44.2	15.4	69.2	60.3	41.0	47.4
Bachelor	*88.2*	*43.1*	*15.4*	*75.0*	*63.5*	*40.4*	*50.0*
Master	*88.5*	*46.2*	*15.4*	*57.7*	*53.8*	*42.3*	*42.3*
Univers. Of Padua	85.8	77.5	28.2	81.7	64.5	49.0	56.4
Bachelor	85.5	77.4	27.8	81.6	63.4	47.6	55.3
Master	88.5	79.1	32.0	82.2	78.0	66.2	70.0

1: Computer use skill; 2: English skill; 3: Other foreign languages skill; 4: Relationships with customers; 5: Working basically in team; 6: Organising other people's work; 7: Writing reports

The relational skills useful in interfacing the productive structure the graduate works for (required of 65% of employed graduates) with the outside world could be considered a personality trait that is difficult to develop with a university education. Nevertheless, the relational skills necessary for working in a team, which involve extroversion, the ability to argue convincingly, to uphold one's own theories in public and to integrate and mediate between contending positions, may be cultivated via university studies. For instance, these skills may be developed by opting for oral exams over written ones, and by examining for academic progress in terms of empirical teamwork.

More than other graduates, those holding degrees from the School of Letters and Philosophy or from the School of Political Science (98.5% and 90.1%, respectively) use relational skills with customers, users and suppliers (Table 2), whilst Engineering graduates are more likely to organize other people's work (86.7%) and to write technical reports for the company (80.7%).

Table 2. Frequency of use of occupation-specific skills by University of Padua graduates and parameters of the factorial analysis of the matches, by faculty

Skills	Master	Bachelor	Factor loads	Communality
Faculty of Agriculture				
Application of agronomic analysis techniques	44.4	8.3	0.31	0.573
Application of forestry analysis techniques	34.1	9.1	0.24	0.357
Application of zootechnical analysis techniques	15.9	0.0	0.18	0.199
Use of economics, estimates, etc.	50,0	33.3	0.25	0.375
Use of lab and technical and scientific instrumentation	31.7	16.7	0.18	0.189
Use of topological, GIS analysis techniques	44.4	16.7	0.27	0.438
Use of vegetable protection techniques	34.1	16.7	0.23	0.311
Faculty of Economics				
Accounting and budget analysis	72.8	=	0.12	0.248
Financial market analysis and decisions	31.8	=	0.13	0.304
Legal aspects of company management (commerce and taxes)	56.8	=	0.11	0.203
Management control, budgeting and reporting	59.1	=	0.16	0.448
Logistics process management	32.6	=	0.12	0.272
Company finances management	40.9	=	0.17	0.492
Marketing and communication planning/management	59.1	=	0.05	0.481
Company planning and management	59.1	=	0.16	0.459
Planning of computer systems	30.2	=	0.13	0.310
Programming of raw material production / purchasing	27.3	=	0.13	0.288
Auditing	38.6	=	0.13	0.294

Skills	Master	Bachelor	Factor loads	Communality
Use of mathematical/statistical decisional models, data analysis	43.2	=	0.10	0.171
Use of organizational and process analysis tools	47.7	=	0.17	0.481
Management and development of human resources	37.2	=	0.10	0.164
Faculty of Pharmacy				
Familiarity with pharmaceutical legislation	90.9	=	-0.21	0.134
Chemical, microbiological and technological analysis	13.2	=	0.44	0.568
Development of pharmaceuticals, chemicals and cosmetics	18.2	=	0.47	0.638
Use of lab techniques and instruments	43.9	=	0.36	0.371
Faculty of Law				
The ability to interpret or apply new laws	91.2	87.5	0.23	0.328
The ability to write an act or legal opinion	75.0	75.0	0.30	0.547
The ability to orientate concrete cases to judicial categories	91.2	87.5	0.19	0.233
Composition of disputes, mediation between subjects and interests	79.4	62.5	0.25	0.419
Familiarity with contractual regulations	88.2	100.0	0.19	0.227
Search of bibliographical info on laws and regulations	77.6	37.5	0.21	0.284
The ability to hold a legal discussion	88.2	75.0	0.27	0.460
Faculty of Engineering				
Discussion of technical/scientific problems	84.5	90.3	0.33	0.345
Design/planning	48.4	38.7	0.30	0.274
Development of mathematical models	30.9	25.8	0.33	0.344
Calculation	58.8	58.1	0.35	0.385
Search of information on databases and reading material	78.6	64.5	0.29	0.27
Use of lab and technical and scientific instrumentation	52.9	74.2	0.22	0.151
Faculty of Letters and Philosophy				
Application of economics/corporate knowledge	34.1	=	0.15	0.071
Cultural, museum and environmental asset cataloguing	25.2	=	0.21	0.143
Written and oral dominion of the language	96.1	=	0.42	0.572
Search of sources and data in the Internet and reading material	72.1	=	0.38	0.471
Problem-solving	88.3	=	0.41	0.563

Skills	Mas-ter	Bache-lor	Factor loads	Com-munality
Faculty of Veterinary Medicine				
Data management and analysis	57.9	=	0.34	0.372
Application of clinical knowledge	73.7	=	0.46	0.653
Use of technical and scientific instrumentation	79.0	=	0.49	0.750
Faculty of Psychology				
Analysis of observable and experimental data	44.8	=	0.16	0.417
Application of personality research techniques	33.3	=	0.18	0.534
Application of behaviour observation techniques	69.8	=	0.15	0.350
Analysis of group dynamics	62.5	=	0.16	0.097
Mediation between subjects, interests and cultures	71.9	=	0.08	0.119
Orientating toward study and/or work	49.0	=	0.09	0.198
Planning of educational intervention	62.5	=	0.11	0.317
Conduction of clinical interviews	29.2	=	0.14	0.227
Familiarity with and use of data sources	59.4	=	0.12	0.287
Construction of tools to measure psychological variables	20.8	=	0.13	0.229
Experimental research	23.2	=	0.12	0.384
Planning therapy	34.4	=	0.15	0.476
Administration and correction of tests	36.2	=	0.16	0.399
Faculty of Education Science				
Data analysis	64.8	=	0.12	0.337
Active listening skills	95.7	=	0.12	0.322
The application of edutainment and educational methods/techniques	74.6	=	0.15	0.476
Diagnosis of the needs/potentials of people and community	83.5	=	0.16	0.606
Interpretation of events as per education science	79.1	=	0.13	0.392
Mediation between subjects, interests and cultures	79.0	=	0.13	0.353
Orientating toward study and/or work	57.6	=	0.11	0.272
Systematic observation and use of methods and tools	79.1	=	0.13	0.364
Planning, monitoring and assessing educational events	79.9	=	0.16	0.573
Promoting interpersonal and inter-group interaction	87.1	=	0.14	0.419
Research-action skills	64.8	=	0.13	0.369
Use of mediated and direct language and techniques	89.1	=	0.1	0.236
Faculty of Mathematical, Physical and Natural Sciences				
Mediation between subjects, interests and cultures	62.1	56.0	0.09	0.033
Discussion of scientific and technical problems	74.3	72.0	0.27	0.290

Skills	Master	Bachelor	Factor loads	Communality
Development of mathematical models	33.6	36.0	0.27	0.278
Organization of lab activities	42.4	44.0	0.38	0.565
Finding, consulting and use of database information	74.5	76.0	0.25	0.254
Use of laboratory and scientific instrumentation	54.5	56.0	0.38	0.564
Faculty of Political Science				
Familiarity with budgets, accounting	54.4	=	0.31	0.511
Analysis of statistics	38	=	0.21	0.546
Familiarity with corporate economics, marketing	58.2	=	0.22	0.241
Orientating toward study and/or work	39.6	=	0.12	0.244
Composition of disputes, mediation between subjects interests and cultures	69.7	=	0.22	0.070
Knowledge of contractual, labour, corporate law	57.6	=	0.26	0.260
Knowledge of civil law	44.6	=	0.11	0.356
Knowledge of economics and financial science	64.8	=	0.32	0.660
Faculty of Statistics				
Budget analysis, management control	42.3	38.5	-0.02	0.003
Familiarity with and use of official data sources	51.9	42.3	0.2	0.347
Construction and interpretation of decision-making indicators	51.9	46.2	0.18	0.265
Population and social forecasting	11.5	8.0	0.19	0.297
Economic forecasting	34.6	38.5	0.14	0.162
Computer simulation (Montecarlo method)	34.6	26.9	0.17	0.252
Interpretation of miscellaneous analysis results	32.7	30.8	0.24	0.469
Planning and assessment of services	30.8	50.0	0.21	0.360
Survey, market research and product testing planning	27.5	26.9	0.21	0.379
Experiment planning and interpretation of results	34.6	30.8	0.21	0.377

Graduates make use of skills acquired during their university studies in varying measures depending on whether the job they hold is consistent with the studies they did. Almost all occupation-specific skills used at work were acquired during the university years. School of Letters and Philosophy graduates are an exception, as 34.1% apply business-corporate skills not obtained through their university studies.

Some technical skills are "shared" by graduates of different majors. Graduates from the Schools of Education Science, Political Science and Mathematical, Physical and Natural Sciences share the ability to mediate between subjects, interests and culture. This proves that the frequency with which technical skills are used ties with the profession, context and company size.

It is also evident that the basic skills used by those who hold a technical po-

sition could be skills specific to those who hold administrative or marketing positions. For example, linguistic skills, which are taken for granted in any newly hired employee, are specific to those who work in import-export departments or in trade fair or market organization. The basic nature of the skills is also connected with the tasks performed and the operating context.

3. Main factors of skills

We applied factor analysis to search for latent factors (Fabbris, 1997) with the SAS package (SAS Institute Inc., 1994, 2000) on data regarding the use of skills by employed graduates. Various types of analysis were conducted:
- one on the use of seven cross-occupational or basic skills common to all University of Padua graduates;
- one for each school, concerning occupation-specific skills.

The factor loadings found with the analysis of non-specific skills are shown in Table 3. The solution shows the presence of a main factor, which grades the presence *versus* the absence of basic cross-occupational skills used by graduates.

The second factor compares two different types of non-specific skills. On the one hand there is the professional knowledge of languages, by now expected as a requisite for most jobs. On the other hand, there are cross-occupational skills, such as the ability to organize the work of others and perform teamwork.

Table 3. Factor loadings and common variables for cross-occupational and basic skills

Skills	Factor loadings		Communality
	I factor	II factor	
Working in team	0.180	0.453	0.380
PC use	0.237	0.128	0.263
Relationships with customers	0.208	0.119	0.205
Read and speck in a foreign language	0.307	-0.500	0.701
Organising other people's work	0.241	0.471	0.512
Reading and writing in English	0.338	-0.433	0.716
Writing reports	0.285	0.174	0.389

Every sample unit corresponds to two scores, one concerning the "use of specific skills" factor, and the other to the use of non-specific skills. The average score by school is an estimate of their level of use by employed graduates (Table 4).

The correlation coefficient between the two factor scores for Paduan graduates is 0.38. Clearly, a high correlation indicates that when performing their job, graduates use cross-occupational skills jointly with technical skills, whilst

Table 4. Average score value on factors combining cross-occupational skills and correlation coefficients with the occupation-specific factor, by faculty

Faculty	Average score on cross-occupational skills	Correlation between technical-specific and cross-occupational scores
Agriculture	0.144	0.36
Economics	0.004	0.50
Pharmacy	-0.194	0.46
Law	-0.060	0.50
Engineering	0.260	0.20
Letters and Philosophy	-0.009	0.48
Veterinary medicine	0.148	0.28
Psychology	-0.266	0.47
Education Science	-0.199	0.49
Sciences (Math, …)	-0.051	0.48
Political Science	0.068	0.34
Statistics	-0.295	0.50
Padua University	0.000	0.38

graduates who do not use cross-occupational skills also do not use technical skills. This shows that the work activities performed by graduates are not so characterized by the type of skills used as by the intensity of the use of skills.

Engineering graduates recorded the lowest correlation between the intensity of use of technical and cross-occupational skills. In fact, engineers hold heterogeneous professional positions, from those who require the use of organizational-management skills where the approach to work activities is less technical in the traditional engineering sense, to those that require complex occupation-specific skills, such as those necessary for planning and research, in which few cross-occupational skills are used. The highest correlation was recorded for activities in the social and economics sectors, that is, for graduates from the schools of Economics, Law and Statistics (50%).

4. Jobs on skill maps

A number of 118 professions was recorded among working graduates, some of which, being specific or with low market demand, are filled by a meagre amount of graduates. A factor analysis (Fabbris, 1997) was performed on the usage of seven cross-occupational and basic skills. The factorial solution is described in Figure 1 and in Table 5.

The graph juxtaposes (along the first axis, vertical) an area of usage versus the non-usage of skills and (along the horizontal factor) of skills requiring public relations *versus* those that envisage activities performed individually.

Table 5. Factor coordinates of active variables that determined the solution of analysis of correspondences and some supplementary variables

	Code	F(1)	F(2)	*Code*	F(1)	F(2)
Active variables						
Computer skill	Yes=c1	-0,26	-0,01	No=c1_n	0,88	0,01
English skill	Yes =c3	-0,71	0,37	No=c3_n	0,73	-0,39
Other languages	Yes =c4	-1,02	0,87	No=c4_n	0,39	-0,34
Relationship with customers	Yes =c5	-0,20	0,05	No=c5_n	1,01	-0,27
Working in team	Yes =c6	-0,16	-0,14	No=c6_n	0,87	0,78
Organising others' work	Yes =c7	-0,37	-0,44	No=c7_n	0,69	0,82
Writing reports	Yes =c9	-0,48	-0,42	No=c9_n	0,56	0,49
Supplementary variables						
Company size	Artig.	0,17	0,07	Piccola	0,05	-0,05
	Media	-0,11	0,01	Grande	-0,23	-0,02
Job	a2	-0,16	-0,20	a3	0,36	-0,06
	a4	0,03	0,42	a5	1,12	0,47
Income	<600	0,64	0,36	600-1000	0,22	0,11
	1000-1600	-0,10	-0,08	>1600	-0,46	-0,09
Satisfaction for own job	s1	0,49	0,18	s2	0,09	0,06
	s3	-0,17	-0,09	s4	-0,39	-0,06
Value professional skills	Val	-0,08	-0,05	No_Val	0,56	0,36
Use methods and techniques	Mt	-0,16	-013	No_mt	0,21	0,16
Forma mentis	Fm	-0,08	-0,08	No_fm	0,37	0,35
Work environment	S	0,30	0,30	Eq_u	-0,03	-0,11
				Eq_d	-0,17	-011
Faculty	Fac01	-0,18	0,06	Fac02	0,07	0,44
	Fac03	0,05	0,13	Fac04	0,14	0,08
	Fac05	-0,31	-0,42	Fac06	0,01	0,97
	Fac08	0,19	0,46	Fac09	0,30	0,24
	Fac10	0,57	-0,24	Fac11	-0,01	-0,17
	Fac12	-0,05	0,13	Fac13	0,70	0,07
Substitutability of degree	laurea_spec	-0,11	-0,16	Diploma	0,41	0,31
				Other degree	-0,07	0,02

Setting the professions on coordinated axes (Figure 2, Table 6), four sections can be identified:

- *the first section* (top right), characterized by a meagre use of skills and interaction with customers, work carried out independently, low starting salaries, irregular labour contracts or precarious status, and low job satisfaction. Professions are: teacher and tutor of pre-university educational institutions, sales clerk, pharmaceuticals representative, journalist, analytical psychologist and production and logistics head with subordinate duties and activities not related to university studies. These graduates are predominantly from the schools of Humanities, Psychology, Pharmacy, Veterinary Medicine and also from the schools of Law and Statistics;
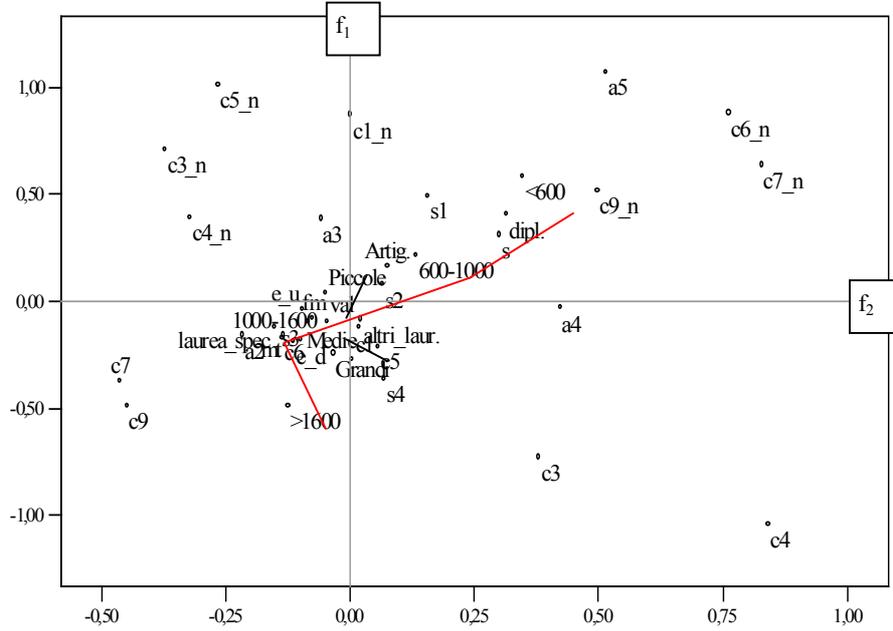
Figure 1. Active and illustrative variables over the layout of correspondence analysis
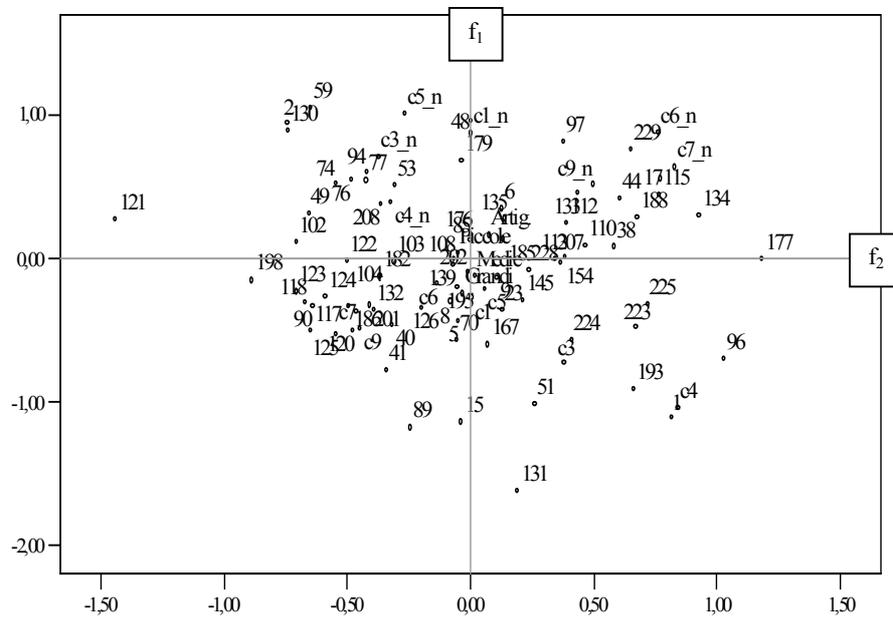
Figure 2. Active modes and professions represented on the resulting graph from the analysis of correspondences

Table 6. Factorial coordinates of professions

	Profession	D1	D2		Profession	D1	D2
1	Purchases	-0.75	0.82	118	Civil engineer	-0.28	-0.65
2	Insurance agent	0.95	-0.73	120	Telecommunications engineer	-0.48	-0.46
5	Agronomist	-0.40	-0.03	121	Construction engineer	0.28	-1.43
6	Finance administration	0.38	0.12	122	Electric engineer	0.00	-0.48
8	Financial analyst	-0.10	-0.15	123	Electronics engineer	-0.33	-0.62
9	Analyst programmer	-0.23	-0.02	124	Management engineer	-0.21	-0.57
15	Quality controller	-1.11	0.00	125	Computer engineer	-0.60	-0.54
17	Production assistant	0.60	0.77	126	Mechanical engineer	-0.31	-0.15
23	Lawyer, legal practitioner	-0.31	0.14	130	Electronics engineering technician	0.71	-0.79
38	ISO quality certifier	-0.03	0.47	131	Computer engineering technician	-0.74	-0.45
40	Chemist	-0.43	-0.20	132	Mechanical engineering technician	-0.41	-0.38
41	Industrial chemist	-0.75	-0.31	133	Instructor	0.50	0.44
44	Clerk, sales clerk	0.47	0.60	134	Primary school teacher	0.34	0.97
48	General consultant	1.05	0.06	135	Second. school teacher	0.32	0.16
49	Labour consultant	0.21	-0.87	139	Chemical analyst	0.03	-0.09
51	Financial consultant	-0.97	0.31	145	Marketing analyst	-0.26	0.23
53	Legal consultant	0.53	-0.30	154	Veterinary small anim.	0.02	0.38
59	Management control	1.08	-0.65	167	Training operator/org.	-0.56	0.11
70	Technical-scientific documentation	-0.53	-0.04	176	Prod. planning, purchases/sales	0.49	0.42
74	Educator	0.55	-0.55	177	Customer care	0.04	1.21
76	Pre-school teacher	0.58	-0.47	179	Production & logistics	0.45	0.02
77	Community educator	0.57	-0.41	182	Development & design	-0.10	-0.35
85	Pharmacist	0.17	0.00	185	Clinical psychologist	0.17	0.18
89	Applied physicist	-1.15	-0.20	186	Labour psychologist	-0.30	-0.49
90	Electronics physicist	-0.31	-0.63	188	Neuropsychologist	0.33	0.70
94	Trainer	0.63	-0.42	193	Public relations	-0.86	0.71
96	Trainer-counsellor	-0.66	1.08	195	Quality controller	-0.54	-0.11
97	Tutor	0.84	0.39	198	Laboratory head	-0.13	-0.89
102	Geologist	0.14	-0.71	201	R & D	-0.30	-0.39
103	Environment geologist	0.01	-0.29	202	Researcher	-0.10	0.06
104	Geologist -construction	-0.10	-0.32	207	Secretary & staff	-0.03	0.36
108	Human res. manager	0.03	-0.06	208	Personnel selection	0.42	-0.37
110	Journalist, press-room	0.14	0.46	223	Marketing	-0.43	0.70
112	Admin. clerk/officer	0.33	0.36	224	Quality assessment	-0.06	0.62
113	Paralegal	-0.19	0.10	225	Sales management	-0.27	0.75
115	Pharmaceut. promoter	0.47	0.80	228	Other, related major	-0.02	0.27
117	Chemical engineer	-0.52	-0.65	229	Other, unrelated	0.75	0.64

- *the second section* (top left) has to do with jobs that do not involve inter-action with customers. These types of occupations include that of corporate, legal or labour consultant, community and pre-school teacher, insurance agent, personnel selector, company administration management control head, building designer, electronics technician and professional geologist;
- *the third section* (bottom left) consists of positions such as laboratory head, research and development and quality control technician and designer, almost all types of engineers and engineering technicians, applied physicist, chemist, computer engineer, scientific document collector, quality assurance inspector, labour psychologist, financial analyst, corporate finance and administration head, agronomist and field geologist. These jobs are characterized by high salaries, the feeling that the worker's professional skills are appreciated in the workplace, daily use of cross-occupational skills except for linguistics skills, and by *forma mentis*, teamwork, often together with experts of various professions in fairly sizeable companies that may overtop a workforce of 250;
- *the fourth section* (bottom right) is comprised of occupations with a high use of skills geared toward clientele and toward international contacts (linguistic, dialectic and relational). They involve purchasing, marketing and post-sales (customer care), public relations, guidance, certification and quality assurance, secretarial work and administration staff, financial consulting, training course organization, law firms, social and economic research, as well as other professions generically relevant to the major studied. Performing the job gives a certain satisfaction in monetary terms, not always accompanied by as much professional satisfaction. This is the area with the most graduates with degrees in Economics, Political Science and Agriculture.

5. Multilevel analysis of use of skills

In order to study the variables associated to the use of skills shorn of the influence of the degree, the relationship between the factor scores in Section 3 can be examined from a multilevel standpoint. The analysis consists of an estimate of a multilevel linear regression model in which the first level units, the graduates, are embedded within the second level units, the faculties:

$$y_{ij} = \gamma_{00} + \sum_{h=1}^{H} \gamma_{h0} x_{hij} + \sum_{k=1}^{K} \gamma_{0k} z_{kj} + U_{0j} + R_{ij}$$

Factor scores on the first cross-occupational factor and on the first specific factor are dependent variables. There being no second level explanatory variables, the variability between academic degrees is attributed to the intersec-

tion's random component. The results[3] are in Table 7.

Table 7. Multilevel regression models on factor scores calculated over the first cross-occupation factor and on the first occupation-specific factor (* p=0.15)

Variables	Fattore di trasversalità			Fattore di specificità		
	γ_{h0}	s(γ_{h0})	p	γ_{h0}	s(γ_{h0})	p
Intercept	-0.59	0.48	0.237	-0.49	0.71	0.497
Manager	0.17*	0.10	0.087	0.30*	0.16	0.059
Regulated profession	-0.05	0.10	0.642	0.09	0.16	0.575
Atipical contract	0.06	0.06	0.358	-0.06	0.10	0.532
Other	-0.16*	0.11	0.142	-0.02	0.17	0.898
Private sector	-0.01	0.05	0.886	-0.14*	0.09	0.109
Income >1100 Euro	0.20*	0.09	0.030	0.08	0.15	0.588
Income between 850 and 1100 €	0.07	0.07	0.376	0.06	0.12	0.607
Unemployed at graduation	-0.01	0.04	0.804	0.07	0.07	0.298
Firm 50-250 workers	-0.02	0.05	0.765	0.02	0.09	0.814
Firm 250-1000 workers	0.10*	0.06	0.091	-0.06	0.09	0.523
Firm more than 1000 workers	0.21*	0.10	0.035	-0.06	0.16	0.698
Age at graduation	-0.01	0.01	0.159	-0.01	0.01	0.511
Graduation mark	0.01*	0.01	0.029	0.01*	0.01	0.140

Significant predictors in the model in which the dependent variable is the cross-occupational skills score are the professional position, the salary, the size of the company and the graduation mark. The use of these skills is greater when the company is larger and the higher the grade-mark, the higher it is for executives and the lower for blue-collar workers, apprentices and merchants (all from the 'other' category) with respect to employees.

As regards regression on occupation-specific skills scores, the multilevel model perforce yields the same results as a simple linear regression: in fact, since scores are normalized in each school, divergence between groups is null. As per fixed effects, the use of technical skills is higher in executives than in clerks and for the more brilliant academic careers.

This analysis confirms the hypothesis that highly qualified jobs involving a high degree of responsibility require greater use of both cross-occupational and specific skills. It comes as no surprise that company size is important, since in companies with a high workforce the tasks of a recent graduate are technical but also orientated toward management and organization.

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[3]   The SAS (SAS Institute Inc., 2000) MIXED Procedure, which allows for the estimate of linear hierarchy models with a method of the closest reflection of reality (Wolfinger, 1999), was used for statistics analysis. The predictors' levels of reference are: clerk/staff member as the average professional position; salaries under 850 euros as the average pay; less than 50 employees as the average company size.

6. Conclusions

We found that cross-occupational skills are used massively in the workplace, more so than basic skills. Indeed, jobs requiring computer use and knowledge of the English language, considered necessary requirements for hiring, as these skills are overall used less than cross-occupational skills.

A person hired to perform a professional activity needs skills specific to the sector. These skills are acquired almost exclusively through higher studies, at university level, in particular. The intensity with which graduates use them when working depends on the specific position they hold. Nevertheless, the speed with which technology, techniques and the skills necessary for work are to be updated requires the development of the capacity to learn throughout one's entire working life with an outlook toward constant updating. The basic skill of workers is therefore the capacity to learn.

Indeed, jobs and professional positions may also vary considerably depending on company size. Graduates working in smaller companies must be more versatile and more willing to cover a wide spectrum of tasks. The larger the company, the more probable it becomes that the type of service rendered will be exclusively of a technical nature. Therefore, not only the level of use of skill varies, but also the mix necessary for different types of companies.

The possibility of associating to each graduate values representative of the intensity of use of occupation-specific, cross-occupational and basic skills to a graduate is analysed in the note. Thus, a sample of employed graduates was used to measure their use of skills.

The solution of estimating the intensity of the use of specific skills separately from cross-occupational skills and cross-occupational-strategic skills results in the definition of skills specific to a particular profession. If they are specific, these skills are absent in most of the other professions. The method of estimating the technical level of a graduate's work activities is therefore heavy under a computational standpoint and sparing in general indications.

The quantification of the intensity of use of specific, cross-occupational and basic skills by each graduate is nevertheless the technical condition used to qualify each position or profession according to the technical and cross-occupational levels of the skills used. The types and levels of professional qualification to associate with educational profiles emerging from university careers can be discerned by mapping these skills.

The intensity of use of cross-occupational skills is discriminating from a social and professional standpoint. On one side of the spectrum, there are professions openly deemed as satisfying, consistent with the university career graduates invested in, and that make them practically irreplaceable in their position. On the other side, there are more general jobs characterized by a high graduates' offer and by the frustration of those employed regarding the moral and material rewards obtained.

From among the positions that graduates consider the most frustrating, and which we hand over to the attention of university study strategists, we extrapolate the teacher.

Another profession that merits the attention of academics is that of administrative staff. It is located in the area of little use of occupation-specific and cross-occupational skills. However, it is better positioned, in terms of competence use, than numerous other specific occupations (cultural tourism, professions involving marketing and post-sales services, and even professions such as microbiologist and some engineering positions).

This corroborates the idea that numerous "generalist" study programmes that converge in this position can be enhanced in the future, given the demand for more technical training for this type of professional.

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