

**Are universities ready to face
knowledge-based economies?**

**Les universités européennes sont-
elles prêtes à affronter les défis
des économies fondées sur la
connaissance?**

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Main questions

- Do European universities develop the competencies required by knowledge-based economies?
- What are the competencies valued in the labour market?
- Beyond the monetary value of competencies, what are the more required?

Main questions

- What are the competencies under produced by higher education?
- Do specific modes of teaching and learning have a stronger impact on the production of required competencies?
- Are some countries more ready to face knowledge based economy?

Macro-economic evolutions

Since the mid seventies

- No more stable and permanent growth
- No more predictable demand

End of the 20th century

- Strengthening of the knowledge based economy

How to define the knowledge-based economy ?

Meeting point between

a continuous growth of investments and activities devoted to “knowledge”

a revolution of production techniques and of techniques of knowledge transmission (IT)

As a consequence of these macro economic evolutions:

New organisational models reinforced by the globalisation of the economies, which promotes their diffusion.

Initial training is no more conceived as a preparation to specific occupational slots, but rather to provide workers with the basic tools enabling them to adapt themselves to varying occupational needs.

All these evolutions imply higher education develops new **competencies** linked to

- information technologies
- but above all enabling graduates to evolve in a changing world, to become flexible professionals.

New prospects for the education economists

This modern conception of education leads to a new vision of the traditional human capital models. In this approach, human capital was measured using a rather rough method, by the number of years of education and training (or by the degree) and by the number of years of experience.

The stress on competencies leads to define human capital, no longer by a variable describing a **process**

but by a set of variables describing the **results** of the educational process, i.e. the different competencies acquired by the educated workers

Which data can be used?

Need for data describing

- the competencies acquired by graduates
- the competencies required by jobs
- the quality of study provision
- the situation regarding the labour market

The CHEERS project

- Careers after Higher Education: a European Research Survey
- From autumn 1998 to spring 2000: 36,000 graduates from 11 European countries and Japan provided information through a written questionnaire on the relationship between higher education and employment four years after graduation.
- Thirteen research institutions coordinated by Ulrich Teichler (university of Kassel, Germany)

The typology of competencies

- Graduates asked to state in respect of a list of 36 competencies the extent to which these were required in their current work as well as the extent to which they had acquired these competencies at the time of the graduation.
- The question was “Please, state the extent to which you had the following competencies at the time of graduation and to what extent they are required in your current work”. Scale of answers from 1= ‘To a very high extent’ to 5=’Not at all’

These 36 competencies can be split into three main sets : theoretical knowledge, practical knowledge and behavioural skills.

Theoretical knowledge involves four competencies such as “broad general knowledge”, “field-specific theoretical knowledge”.

Practical knowledge is described on the basis of seven competencies among those “written communication skills”, “foreign-language proficiency”, “computer skills”.

Regarding the behavioural skills, two levels have been taken into consideration: the individual level, which refers to the direct link between the worker and the tasks he/she has to perform, and the collective level, which considers the worker as a member of a work organisation.

At the individual level, seventeen competencies are rated, such as : “problem-solving ability”, “working under pressure”, “time management”, “fitness for work”, “power of concentration”

At the collective level, eight competencies are described such as : “taking responsibilities and decisions”, “working in a team”, “planning, coordinating and organizing”, “leadership”.

Competencies and earnings

- Basic earning models, with competencies
- Models for specific occupational groups
(symbolic analysts, civil servants)

Basic model

Mincerian approach, with logarithm of earnings fitted by:

- number of H.E. years (officially required to get the degree)
- experience (from the graduation)
- gender
- age
- country
- field of study
- weekly work hours

In addition

The grades given by the graduates to the competencies acquired when they get their degree

The results of the basic model

	B	Std. dev.	Sign.
Years of H.E.	4.29 ^E -02	.005	.000
Experience	3.6E-03	.000	.000
Gender(F=1;M=0)	-.13	.008	.000
Age	7.4E-03	.001	.000
Italy (ref.)			
Spain	-.18	.018	.000
Netherlands	.33	.017	.000
France	.33	.016	.000
Austria	.45	.016	.000
Finland	.45	.021	.000
Germany	.63	.015	.000
Norway	.66	.015	.000
Humanities (ref.)			
Social sciences	5.17E-02	.015	.001
Law	5.71E-02	.017	.001
Sciences/health	.10	.012	.000
Engineering	.167	.013	.000
Business	.17	.014	.000
Week work hours	8.39E-03	.000	.000
(cst)	2.98	.078	.000

a Dependant variable : Logarithm of gross annual earnings (Kilos Euros)

The results of the basic model (2)

	B	Std.dev.	Sign.
Computation skills	-1.98E-02	.004	.000
Learning competencies	-1.31 ^E -02	.005	.017
Foreign language proficiency	-1.16E-02	.004	.002
Economic reasoning	-1.12E-02	.004	.003
Analytical competencies	-1.08 ^E -02	.005	.021

a Dependant variable : Logarithm of gross yearly earnings (Kilos Euros)

Earning models by occupational groups with competences

	Beta	Signification
Symbolic analysts		
Foreign language proficiency	-.043	.002
Computation skills	-.028	.039
Analytical competencies	-.035	.008
Learning abilities	-.033	.013
Other variables of the basic model		
N	3871	
Adjusted R2	.443	.000
Civil servants		
Ability to apply rules and regulations	-.076	.000
Other variables of the basic model		
N	1634	
Adjusted R2	.370	.000

Acquired and under-produced competencies

- The more acquired competencies
- The more under-produced competencies:
difference between the proportion of graduates who declare a given competency to be required to a high or a very high extent, and the proportion who also state the same competency acquired to a high or a very high extent.
The mean of this difference is 20% with a standard deviation of 10%. We will thus consider the competencies with a difference between the two proportions that is higher than 30%.

More acquired competencies at Time of Graduation in 1994/95 (percent “high”; responses 1 and 2)

	Euro pean Union	Japan	Mean
Learning abilities	83	55	80
Power of concentration	72	62	71
Loyalty, integrity	68	70	68
Working independently	72	31	68
Field-specific theoretical knowledge	67	53	66

Proportion of graduates declaring they are competent in under-produced competencies

	Europe an Union	Japan	Mean
Problem-solving ability	58	39	56
Working under pressure	55	36	53
Taking responsibilities, decision	48	29	47
Time management	45	33	44
Planning, co-ordinating and organising	39	18	37
Computer skills	31	29	31

Proportion of highly competent graduates (answ. 1 and 2) for under-produced competencies (individual and collective tasks)

Under-produced competencies (individual tasks)

	Problem-solving ability	Working under pressure	Time management	Computer skills	
Sweden		75	68	32	29
U.K.		65	67	55	41
Netherlands		64	56	49	39
Norway		64	62	44	33
Germany		59	56	38	32
Finland		59	54	43	37
Austria		58	59	44	36
France		52	48	45	24
Spain		51	37	54	21
Italy		47	51	50	20
Czech Rep.		41	46	36	30
E.U.		58	55	45	31
Japan		39	36	33	29

Under-produced competencies (collective tasks)

	Taking responsibilities, decision	Planning, co- ordinating and organising
Sweden	62	54
U.K.	61	37
Netherlands	53	33
Norway	51	31
Germany	51	46
Finland	49	51
Austria	47	38
France	46	41
Spain	39	39
Italy	39	18
Czech Rep.	38	35
E.U.	48	39
Japan	29	18

The relation between modes of teaching and learning, provision of study and competencies acquired

- the correlations between the variables of the two dimensions (modes of teaching and competencies) have been systematically computed amongst the 35000 interviewed graduates.

Modes of teaching and learning, types of provision of study which have a major impact on the under-produced competencies, and related countries

Modes of teaching and learning, types of provision of study	Influence upon under-produced competencies		Countries providing more
	Individual level (1)	Collective level (2)	
Attitudes and socio-communicative skills		X	Netherlands, United Kingdom, Norway
Project and problem-based learning	X	X	United Kingdom, Norway
Independent learning	X	X	Italy, Netherlands, United Kingdom, Finland, Norway
Direct acquisition of work experience		X	Sweden, Netherlands, Norway
Practical emphasis of teaching and learning	X	X	Netherlands, United Kingdom
Teaching quality	X	X	United Kingdom
Course content of major	X		United Kingdom

(1) "problem-solving ability", "working under pressure", "time management"

(2) "taking responsibilities, decision", "planning, co-ordinating and organising"

This table has been produced in considering the highest correlation levels between modes of teaching and competencies ($\alpha < 0.01$, $N=25240$)

Previous changes in universities have essentially been quantitative ones, in order to face increasing demand for higher education

Contemporary challenges are different: because of the stabilisation or even the decrease in the size of the young cohorts, more attention can be given to qualitative rather than to only quantitative adaptation. Indeed, contemporary economies require competencies that suppose new modes of teaching and learning.

More difficult for universities to promote qualitative evolutions than quantitative ones.

- Qualitative evolutions mean changes in the way of teaching and learning, i.e. in the way in which many academics work.
- Are faculty ready to change?
- Since academic work relies on autonomy and self control, which incentives could be implemented in a world where the professional careers depend more on research results than on student performances?

Universities are institutions which change with difficulty. Nevertheless, they need to change themselves to new requirements, otherwise they may know the destiny of dinosaurs.

