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Self-reported Competencies of Graduates and 'Employability' as an Ideological Purpose for Higher Education in Europe

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1. The end is the beginning (cf. table 1)

The end of my last analysis of the data regarding acquired and required competencies of university graduates is the beginning of my presentation today (Kellermann 2001). I present the findings of the Austrian part of the multinational study "Higher Education and Graduate Employment in Europe". Since the data collection and the data collected are very complex, I would like to draw your attention only to the most important results.

At first glance, table 1 reveals a particular distribution of different symbols, framed by lines and columns. The symbols are plus-signs for more acquired than required competencies; minus-signs for less acquired than required and equal-signs for equally acquired and required competencies. In a somewhat more detailed examination we see four titles to the left hand of the table and five columns with the symbols. The titles are categories for the classification of competencies: *intellectual-scholarly abilities*, *scientific-expert knowledge*, *professional-operative skills* and *social-interactive proficiency*.

The heading 'AT' of the next column to the right stands for "Austria", 'ST' at the top of the next column for "Science and Technology", 'HS' for "Humanities and Social Sciences", 'BL' for "Business and Law" and finally 'MD' for "Medical Sciences". This classification of study fields follows an OECD-publication (1993).

In the AT-column we recognize very clearly: Austrian graduates generally assessed intellectual-scholarly abilities like *analytical competencies*, *learning abilities* and *power of concentration* as similar in acquisition and requirement. They reported to have more acquired than required scientific-expert knowledge like *field-specific theoretical knowledge*, *field-specific knowledge of methods* and *foreign language proficiency*. Finally, the Austrian graduates indicated clear deficiencies regarding social-interactive proficiency like *leadership*, *planning/ordinating/organizing* and *negotiating*.

Concerning the four study fields, we see some differences. Graduates of ST and MD seem to have a surplus of *broad general knowledge*. MD indicated a deficiency in *manual skills* whereas ST and BL indicated a surplus. Acquired *written communication skills* fit the requirement in the case of HS and BL, but not in the case of MD. Acquired intellectual-scholarly abilities fit the requirements. Scientific-expert knowledge may be previously more acquired than actually required. Professional-operative skills are partly deficient, partly surplus and partly equal. Social-interactive proficiency is obviously deficient. - The next steps of my presentation deal firstly with the theoretical concept of "competency", and then with the analyses of data of the multinational project in general.

2. The concept of "competency"

According to Longman's "Dictionary of Contemporary English", competency is the "ability to do what is needed" (Longman 1987, 204). On the one hand, human beings acquire competencies through learning and specific competencies through specific education like higher education. On the other hand, appropriate acting or problem solving require competencies. Special jobs and professional work require special and professional competencies according to the increasing social division of labour. It is very important that action to meet the requirements improves simultaneously the acquisition and development of respective competencies. Also a second observation is significant: "Competency" is always connected with a meaningful connotation; its opposite is "incompetency".

I would like to add some remarks in order to qualify the already mentioned four categories of competencies:

- Intellectual-scholarly abilities refer to the cognitive domain of human beings. They are basic capabilities required for proper study and professional work. They are developed through learning and working as a student as well as a professional graduate. They are not a specific subject of a formal curriculum, but rather a part of the hidden scholarly curriculum.
- Scientific-expert knowledge also belongs to the cognitive domain. It is the essential and central subject of every formal university curriculum. It is the official matter of lectures, seminars and textbooks and it is the subject of examination and grading.
- Professional-operative skills refer to psycho-motoric or physical domains of an educated personality. They are competencies required in order to cope with specific physical and operative demands of a profession. They were acquired in exercises, training and practices contained in curricula.
- Social-interactive proficiency is connected with social and emotional competencies. It is usually not a subject of a formal curriculum. It is hard to teach because it has to be acquired by acting in adequate social situations. Guided interdisciplinary projects and scientifically controlled practical training may be components of a comprehensive curriculum that allows social-interactive proficiency to be acquired.

3. The reduction of complexity

Our joint project "Higher Education and Graduate Employment in Europe" is very complex (<http://www.uni-kassel.de/wz1/tseregs.htm>). It includes research teams of twelve countries, more than 35.000 questionnaires, a research instrument of 16 pages with many specific questions on ten research areas like high school education, studies, transition from the university to employment, conditions of work, continuing education, professional expectations, evaluation of higher education - not to mention acquired and required competencies. Many more variables contribute to this extreme complexity. It is evident that the reduction of the complexity is imperative. I have already introduced explicit and implicit ways of complexity reduction regarding our question in discussion.

Explicitly, I classified a long list of competencies into four main categories and a variety of different studies into four study fields. Furthermore, I reduced the number of participating countries to only four: I took Austria as an example for countries in Central Europe, Spain for countries with Romance languages, Sweden for the Scandinavian countries and Japan as a country outside Europe.

Implicitly, I used a method to reduce the variety of responses to our question. The question contains 36 terms for specified competencies. These competencies are to be assessed according to a five point scale from 1 "to a very high extent" to 5 "not at all", first, regarding the extent of acquisition at the time of graduation in the year 1994/95, secondly, regarding the work requirements approximately four years later at the time of the investigation. The objective of the method was to identify the status of the respective competency as surplus, deficient or similar in regard to competencies' acquisition and requirement. Surplus means that an individual respondent indicated the acquired competency as at least two scale points above the degree of the respective requirement. Analogically, deficient means that the required competency was at least two scale points above the respective acquisition. If the assessment between an acquired and required competency differs at most one scale point, this competency was taken as by and large similar regarding acquisition and requirement.

The next and final step in order to reduce complexity was to rank all competencies according to their status. Only those competencies that ranked on the first three positions of each of the three status rows were accepted for further analyses. (In the case of the same value for the third rank, all competencies were accepted.)

4. Status-assessment and ranking of the competencies (cf. table 2)

Let us now continue with the introduction of all 36 competencies, their status-assessments by all the approximately 35.000 graduates of all participating countries and the respective ranking of the competencies. The column "deficit" contains three types of information like the remaining two columns with their headings "surplus" and "similar": First, the percentage to which all graduates individually assessed the respective competency as deficient; secondly, the rank of all 36 competencies according to the respective percentage, and, thirdly, the minus-symbol for the first three ranks.

The highest deficient rank is held by competency no. 20 *negotiating* with 36 per cent, the lowest by no. 5, *learning abilities*, with 5 per cent, i.e. the frequencies of deficient competencies range from 5 to 36 per cent. – Like *negotiating*, about one third of all graduates felt deficiencies in *planning/co-ordinating/organizing* and *computer skills*. These three competencies are marked by the minus-symbol. – The range of frequencies regarding surplus runs from only 15 per cent to 2 per cent. The highest ranks are held equally by *field specific theoretical knowledge* and *foreign language proficiency*, the third rank by *manual skills*.

Regarding the "similar"-column, the frequencies are between 61 and 88 per cent. I.e. no fewer than 6 graduates out of 10 assessed all 36 competencies as similar in regard to the acquisition at the time of graduation and the work requirements four years later. At the top of this ranking we find *learning abilities*, *power of concentration*, *analytical competencies* and *adaptability*. – I dare to say that this is a very remarkable result. It may be unexpected for all critics of higher education. It is a real question whether or not this high extent of similarities between reported acquisition of competencies at the time of graduation and work requirements four years later, can be significantly increased. I will come back to this issue later.

5. Groupings of highly ranked competencies (cf. table 3)

In order to reduce complexity to make the data more transparent, we now apply the already introduced groupings into the four categories of competencies and the four fields of studies.

- Regarding social-interactive proficiency, four out of ten graduates of ST indicated deficiencies in *negotiating* and *planning/co-ordinating/organizing*. To a somewhat less extent graduates of HS balanced the same way, whereas graduates of MD felt a deficit in *taking responsibility/decisions*.
- Concerning scientific-expert knowledge, only three competencies were highly ranked and all three as surplus. But there is no consistent assessment: Between 13 and 19 per cent of ST, HS and BL indicated *field-specific theoretical knowledge* as surplus, *field-specific knowledge of methods* only HS with 13 per cent and *foreign languages proficiency* HS, BL and MD with 14 to 19 per cent. Whereas about a third of graduates of HS, BL and MD indicated *computer skills* as deficient, 12 per cent of BL graduates and 14 per cent graduates of ST reported *manual skills* as a surplus. Every third graduate of MD felt a deficit in *working under pressure* and every third graduate of ST saw a deficit regarding *economic reasoning*.
- Finally, regarding intellectual-scholarly abilities there is no difference between *learning abilities* and *power of concentration* - almost 9 out of 10 graduates in ST, HS, BL and MD assessed those two competencies by and large equally in acquisition and requirement. 7 per cent of graduates of MD indicated a surplus in *creativity*, 11 per cent of ST and 9 per cent of MD in *broad general knowledge*. - Again, it is amazing how many graduates of the different study fields generally assessed their intellectual-scholarly abilities as equal in acquisition and requirement.

6. Differences and similarities of competencies' status among Austrian, Spanish, Swedish and Japanese graduates (cf. table 4)

The last part of the presentation of empirical data deals with differences and similarities regarding the four main categories of competencies, the four main fields of studies and the four selected countries. The combination of all these variables makes the analysis very complex again. But I will try to point your attention to only a few findings.

First, let us look at the column with the heading "All" inside table 4. "All" means all fields of study in the country in question. I already explained the Austrian case at the beginning of this report. - Regarding Spain it may be amazing that in table 4 *critical thinking* and *working independently* as intellectual-scholarly abilities are marked with a plus-sign. In no other country do we see a similar result. Is that true or is it an effect of translation? In the category scientific-expert knowledge, *field-specific theoretical knowledge* and *knowledge of methods* are not remarkable; *foreign language proficiency* is counted as a surplus like in the other three countries. The deficiencies that were mostly indicated by the Spanish graduates were *working under pressure* and *computer skills* like in the case of Sweden and Japan, and *planning/co-ordinating/organizing* like in the Austrian and Swedish cases.

The Austrian graduates deviated from the general assessment only regarding *analytical competencies*, the Swedish in regard to *adaptability* and *working in a team* and the Japanese regarding *getting personally involved* - all three groups assessed the acquisition and the requirement of the respective competencies equally. But *economic reasoning* seems to be a significant deficit of the Japanese graduates.

The analyses of competencies' status in the combination of country and field of study reveals the following: There is no difference regarding a surplus in *foreign language proficiency* between graduates of HS, BL and MD and regarding a deficit in *negotiating* between HS and MD from Austria, Spain, Sweden and Japan. Surprisingly, Spanish graduates of BL indicated a surplus in *creativity*. The already mentioned similar case regarding *critical thinking* is due to the judgement of Spanish graduates of HS, BL and MD. The general Spanish deficiency in *working under pressure* is due to the Spanish ST, HS, BL and MD. Swedish graduates of MD indicated a surplus of *loyalty/integrity*. Only Swedish BL saw *reflective thinking*, only Swedish HS saw *adaptability* and only Swedish ST saw *problem-solving ability* at the top of similar acquisition and requirement. The general Japanese deficiency in *economic reasoning* is due to the Japanese graduates of ST, HS and MD.

Highly ranked deficiencies regarding *taking responsibility/decisions* were brought out specifically by Swedish graduates of BL and Austrian graduates of MD; Swedish graduates of ST and MD, Austrian graduates of HS and BL reported the same in regard to *leadership*. The ranking of *planning/co-ordinating/organizing* as a significant deficit by the Swedish graduates in general is due to the respective ranking of ST-graduates, HS-graduates and, remarkably, of BL-graduates.

Looking finally at the whole picture of symbols (in table 4) we can state the following: The respondents indicated deficiencies partly in regard to professional-operative skills, in general regarding social-interactive proficiency. Specifically scientific-expert knowledge - almost regardless of the country and the field of study - yielded a surplus. But obviously, the majority of acquired competencies at the time of graduation fit the work requirements four years later.

7. Employability as a new objective of higher education in Europe

On the 800th anniversary of the university of Paris on May 25, 1998, four European ministers in charge of higher education published the "Sorbonne Joint Declaration". The politicians indicated in this paper as their main objective: the harmonization of the architecture of the European higher education system in order to facilitate "student mobility as well as employability". The "Joint Declaration of the European Ministers of Education Convened in Bologna on the 19th of June 1999" continued with the formula: "Adoption of a system of degrees easily readable and comparable in order to promote the European citizens' employability and the international competitiveness of the European system of higher education." This document con-

tains no reflection of universities' own objectives in scientific research, teaching, studying, understanding or self-organized work and life. In this Bologna process, as it came to be called later on, universities and studies became means of mobility, employability and international competitiveness. - In the following paragraph I only intend to talk about "employability" although there are also good reasons for discussions of mobility and competitiveness.

Having in mind that, e.g., more than 60 per cent of university graduates of 11 European countries and Japan assessed 36 different comprehensive competencies as more or less similar in regard to acquisition at the time of graduation and requirement four years later, no specific complaint seems to be justified. I dare to say: There is no legitimation for more disparagement of the genuine purposes of higher education as an essential task of the universities in favour of more orientation towards employability. No doubt, higher education has weaknesses like everything that human beings do and establish. It is reasonable and deeply connected with scientific thinking to aim at permanent improvements. Especially, social-interactive competencies need to be improved by more appropriate curricula and a re-organization of the studies. - One reason for the remarkable result of more or less graduates' appropriate knowledge, abilities and skills may be that the universities right from their beginning offered professional opportunities like studies in law, theology and medicine on the basis of philosophy. Experts in jurisdiction, health, religion and more fields were required to build up and maintain the functioning of the emerging civil society. In this early process philosophy can be seen as the leading discipline striving for thinking, understanding (cognition) and knowledge since the days of Socrates, Plato, Aristotle, in ancient times and many more thinkers in many more countries in many more epochs. Thus, two perspectives were connected with each other from the beginning of the universities in the 11th and 12th century - research and teaching for practical and applicable knowledge as well as for the development of individual and collective cognition in general in order to back enlightenment and emancipation. The general purpose of all these efforts is to ensure and to improve all that human beings need for their life. In regard to this main purpose of work and education all the other aims mentioned are in fact instrumental, in no case ends in themselves.

The Bologna process is apparently one-sided in stressing only professional higher education. But even worse, the current European ministers in charge of higher education as well as the European university rectors explicitly aim at "employability" of graduates in order to promote economic competition. I like to quote Dr. Andris Barblan, Secretary General, Association of European Universities (CRE, 17. April 1999): "... a Declaration urging for the development of a European higher education space that would match and support the economic, commercial and financial markets launched by the European Union over the last forty years ... employability rather than instruction is becoming the keyword for the development of a competitive Europe." If this aim generally accepted as the basic orientation for acting in regard to higher education, the consequences for the students, the faculty as well as for the university as a whole, for science and even for the satisfaction of life for many people would be desparate. I only mention the most important reasons:

- Instead of an intrinsic motivation for research, studying, learning and understanding an extrinsic reason dominates the efforts of students and professors. As empirical studies have revealed, "flow experience" creates intrinsic motivation (Csikszentmihalyi/Schiefele 1993); flow as the feeling of being excited and deeply involved in a specific process like research and understanding. The "crowding out" of intrinsic work motivation decreases work performance (Frey 1997, 427).
- Instead of teaching that is based on scientific knowledge, faculty has to teach in favour of the interests of the external employment system with uncertain and permanently changing conditions for employment. Structural changes become a matter of individual responsibility (Plath 2000).
- Instead of being institutions with their own genuine mission in the development of science and knowledge, the universities have to become instruments for the system's development of markets, prices, profits and shareholder values. At the same time, less powerful institutions ask rectors and deans for "social learning and citizenship education in the context of contemporary changes in European society" (Children's Identity 2001). The Hague Appeal for Peace stated 1999: "The coming generation deserves a radically different education ... Students need the skills and knowledge to create and maintain peace."

- ▮ Instead of a comprehensive understanding of science as basic research, new technical and organizational development as well as responsible application of knowledge, science is designed for pure utilisation or even exploitation (Plasonig 2001).
- ▮ Last but not least: Instead of offering joy and satisfaction for everyone who feels the need for enlightenment and intellectual discoveries, studying, research and learning in general become instrumental for competition and economic growth.

The pivotal question remains: What is all the competition and economic growth for? Are they ends in themselves? Is not life the ultimate purpose of all human efforts? - But taking into account on the one hand that universities overcome many different models of society and many historical ideologies, and on the other hand that human beings have usually a broad intellectual range for appropriate understanding, learning and acting, we may be hopeful. These capacities of universities and human beings may also explain why graduates' competencies empirically turned out as mostly adequate to everyday work requirements - almost regardless of countries and study fields. In this context, I would like to mention a study conducted by the University of Exeter, U.K., that "is seeking to gain an enhanced understanding of the acquisition and development of core and generic skills in higher education and employment against a backdrop of continued pressure for their effective delivery from employers, government departments, and those responsible for the management and funding of higher education." (Bennet/Dunne/Carré 1999, 71). Nevertheless, improvements are always needed. - Concluding my presentation, I would like to summarize.

8. Conclusions

Everyone requires competencies in order to act properly. Competencies are a person's abilities, skills and knowledge to do what is needed. Competencies are acquired through experience, more specifically through education. Higher education helps to develop special competencies. The question is whether or not university students are able to acquire those competencies they need for their professional life after graduation. - Without any doubt, the acquisition of competencies depends on the correspondence between the stimulating climate and teaching culture of the institution on the one hand, and the students' intrinsic motivation and learning style on the other. The multinational research project "Higher Education and Graduate Employment in Europe" makes it possible to compare graduates' self-reported acquired competencies at the time of graduation with required competencies that graduates feel they need four years after graduation. - It turned out that graduates have certain deficiencies and, in certain respects surpluses, regarding their competencies, although acquired and required competencies are in balance to a considerable extent. - Since the declaration of Sorbonne (1998) by four ministers in charge of higher education (from Britain, France, Italy and Germany) and the subsequent documents (e.g. Bologna 1999, Prague 2001) many European countries have aimed at a comparable structure of studies. New main purposes of higher education have been proclaimed: International competitiveness of higher education and, especially, employability of graduates. The remaining question is how creativity and productivity of graduates, including their typical professional competencies, can be better achieved by the traditional means of intrinsic motivation and stimulating climates, or by the externally determined purpose of employability in order to obtain international competitiveness.

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Table 1: Differences and similarities between acquired and required competencies¹ - Austria (groups of study fields², status³; N = 2,312)

	AT	ST	HS	BL	MD
1 Intellectual-scholarly abilities					
Broad general knowledge		+	=		+
Cross-disciplinary thinking/knowledge					=
Analytical competencies	=	=			
Learning abilities	=	=	=	=	=
Working independently			=		
Power of concentration	=	=	=	=	=
Getting personally involved					=
2 Scientific-expert knowledge					
Field-specific theoretical knowledge	+	+	+	+	+
Field-specific knowledge of methods	+		+	+	
Foreign language proficiency	+		+	+	+
3 Professional-operative skills					
Manual skills		+		+	-
Written communication skills			=	=	+
Economic reasoning		-			-
Time management				-	
4 Social-interactive proficiency					
Taking responsibility, decisions					-
Leadership	-		-	-	
Planning, co-ordinating and organising	-	-	-		
Negotiating	-	-	-	-	

1) deficit: required competency at least 2 scale points higher than acquired competency, surplus: acquired competency at least 2 scale points higher than required competency, similar: difference between acquired and required competency of at most 1 scale point on the basis of each single respondent.
Accepted are only rank 1-3 of percentages in each ranking as deficit, surplus or similar. In case of the same value for the third rank, all respective competencies are accepted.

3) deficit - status: -
surplus - status: +
similar - status: =

2) AT = Austria (all groups of study fields)
ST = Science and Technology
HS = Humanities and Social Sciences
BL = Business and Law
MD = Medical Sciences

**Table 2: Individual differences between acquired and required competencies¹
(deficit, surplus, similar²; per cent, rank, top position³; all countries⁴, N = 36,697)**

Competencies	deficit			surplus			similar		
	%	rank	top	%	rank	top	%	rank	top
1 Broad general knowledge	8	34/35		9	5		83	6/7	
2 Cross-disciplinary thinking/knowledge	12	25/26		6	9-11		82	8-10	
3 Field-specific theoretical knowledge	11	27-31		15	1/2	+	74	26/27	
4 Field-specific knowledge of methods	17	17		10	4		74	26/27	
5 Foreign language proficiency	10	32		15	1/2	+	75	24/25	
6 Computer skills	31	3	-	3	25-32		66	34/35	
7 Understanding complex ... systems	20	12-14		4	18-24		77	21	
8 Planning, co-ordinating and organising	32	2	-	2	33-36		66	34/35	
9 Applying rules and regulations	23	9		3	25-32		73	28	
10 Economic reasoning	28	4/5		4	18-24		67	33	
11 Documenting ideas and information	20	12-14		5	12-17		75	24/25	
12 Problem-solving ability	20	12-14		2	33-36		78	17-20	
13 Analytical competencies	11	27-31		5	12-17		84	3-5	=
14 Learning abilities	5	36		8	6/7		88	1/2	=
15 Reflective thinking, assessing one's own work	16	18-20		4	18-24		80	14-16	
16 Creativity	16	18-20		7	8		78	17-20	
17 Working under pressure	26	7/8		3	25-32		71	29	
18 Accuracy, attention to detail	16	18-20		3	25-32		81	11-13	
19 Time management	28	4/5		2	33-36		70	30/31	
20 Negotiating	36	1	-	3	25-32		61	36	
21 Fitness for work	14	21/22		5	12-17		80	14-16	
22 Manual skills	9	33		11	3	+	80	14-16	
23 Working independently	14	21/22		4	18-24		82	8-10	
24 Working in a team	19	15/16		4	18-24		78	17-20	
25 Initiative	19	15/16		4	18-24		78	17-20	
26 Adaptability	13	23/24		3	25-32		84	3-5	=
27 Assertiveness, decisiveness, persistence	21	11		3	25-32		76	22/23	
28 Power of concentration	8	34/35		4	18-24		88	1/2	=
29 Getting personally involved	11	27-31		5	12-17		84	3-5	=
30 Loyalty, integrity	11	27-31		5	12-17		83	6/7	
31 Critical thinking	11	27-31		8	6/7		81	11-13	
32 Oral communication skills	22	10		2	33-36		76	22/23	
33 Written communication skills	12	25/26		6	9-11		82	8-10	
34 Tolerance, appreciating of different points of view	13	23/24		6	9-11		81	11-13	
35 Leadership	26	7/8		5	12-17		69	32	
36 Taking responsibility, decisions	27	6		3	25-32		70	30/31	

1) Question E1: Please, state the extent to which you had the following competencies at the time of graduation in 1994 or 1995 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'. - Individual: on the basis of each single respondent.

2) deficit: required competency at least 2 scale points higher than acquired competency - status: -

surplus: acquired competency at least 2 scale points higher than required competency - status: +

similar: difference between acquired and required competency of at most 1 scale point - status: =

3) top position: rank 1-3; in case of the same value for the third rank, all respective competencies are accepted

4) Italy, Spain, France, Austria, Germany, Netherlands, United Kingdom, Finland, Sweden, Norway, Czech Republic, Japan

**Table 3: Deficit, surplus, similar competencies¹ – groups of study fields²
(status³, per cent; N = 36,697)**

	ST		HS		BL		MD		Total	
	status	%	status	%	status	%	status	%	status	%
1 Intellectual-scholarly abilities										
Creativity							+	7		
Broad general knowledge	+	11			=	85	+	9		
Loyalty, integrity							=	86		
Working independently			=	84						
Getting personally involved							=	86	=	84
Analytical competencies	=	86							=	84
Learning abilities	=	89	=	86	=	88	=	90	=	88
Adaptability					=	85	=	86	=	84
Power of concentration	=	88	=	87	=	88	=	90	=	88
2 Scientific-expert knowledge										
Field-specific theoretical knowledge	+	17	+	19	+	13			+	15
Field-specific knowledge of methods			+	13						
Foreign language proficiency			+	17	+	19	+	14	+	15
3 Professional-operative skills										
Manual skills	+	14			+	12			+	11
Computer skills			-	34	-	35	-	31	-	31
Working under pressure							-	31		
Economic reasoning	-	36								
4 Social-interactive proficiency										
Planning, co-ordinating and organising	-	38	-	31	-	29			-	33
Negotiating	-	40	-	34	-	39			-	36
Taking responsibility, decisions							-	30		

1) deficit: required competency at least 2 scale points higher than acquired competency
 surplus: acquired competency at least 2 scale points higher than required competency
 similar: difference between acquired and required competency of at most 1 scale point

3) deficit - status: -
 surplus - status: +
 similar - status: =

2) ST = Science and Technology
 HS = Humanities and Social Sciences
 BL = Business and Law
 MD = Medical Sciences

Table 4: Deficit, surplus, similar competencies¹ – groups of study fields²; Austria, Spain, Sweden, Japan³ (status⁴)

	All				ST				HS				BL				MD				Total
	AT	ES	SE	JP	AT	ES	SE	JP	AT	ES	SE	JP	AT	ES	SE	JP	AT	ES	SE	JP	
1 Intellectual-scholarly abilities																					
Understanding complex ... systems																				-	
Creativity														+					+	+	
Broad general knowledge					+	+	+		=									+	+		
Critical thinking		+								+				+					+		
Loyalty, integrity		=	+	=		=		=+		=		=		=		=			+		
Working independently		+				+			=		=										
Cross-disciplinary thinking/know.		=						=									=	=			
Getting personally involved							=			=		=				=	=			=	
Analytical competencies		=				=		=												=	
Reflective thinking															=						
Learning abilities		=	=	=		=	=	=	=	=	=		=	=	=		=	=	=	=	
Adaptability				=						=				=	=	=		=	=	=	
Power of concentration		=	=			=	=	=	=			=	=	=	=		=	=	=	=	
Problem-solving ability							=														
2 Scientific-expert knowledge																					
Field-specific theoretical know.	+		+	+	+		+	+	+		+	+	+		+	+	+			=	
Field-specific knowledge of methods	+		+	+			+	+	+		+	+	+		+					+	
Foreign language proficiency	+	+	+	+		+		+	+	+	+	+	+	+	+	+	+	+	+	+	
3 Professional-operative skills																					
Manual skills					+	+							+	+		+	-			+	
Written communication skills									=	+				=				+			
Accuracy, attention to detail																				-	
Computer skills		-	-	-						-	-	-		-	-	-		-	-	-	
Working under pressure		-	-	-		-				-				-	-	-		-	-		
Economic reasoning				-	-	-	-					-				-	-			-	
Time management													-		-						
4 Social-interactive proficiency																					
Working in a team				=			=					=			=				=		
Taking responsibility, decisions														-		-					
Leadership		-		-			-		-				-						-		
Planning, co-ordinating and organ.		-	-	-		-	-	-	-		-			-						-	
Negotiating		-		-		-	-	-	-		-		-		-					-	

1) deficit: required competency at least 2 scale points higher than acquired competency
surplus: acquired competency at least 2 scale points higher than required competency
similar: difference between acquired and required competency of at most 1 scale point

2) ST = Science and Technology
HS = Humanities and Social Sciences
BL = Business and Law
MD = Medical Sciences
All = all fields of study

3) AT = Austria
ES = Spain
SE = Sweden
JP = Japan
Total = all 12 countries

4) deficit - status: -
surplus - status: +
similar - status: =



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