STUDIES ON HIGHER EDUCATION AND GRADUATE EMPLOYMENT

THE MATCH BETWEEN UNIVERSITY EDUCATION AND GRADUATE LABOUR MARKET OUTCOMES (EDUCATION-JOB MATCH)

An analysis of three graduate cohorts in Catalonia

Enric Corominas, Carme Saurina and Esperança Villar

AQU Agència per a la Qualitat del Sistema Universitari de Catalunya

Quality, the assurance of improvement.

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FOREWORD

FOREWARD

It makes very little sense to talk about quality without any measureable variables. If we have no idea of what we have and there are no benchmarks, it will be difficult to know which direction to go in and even more so to improve things.

One of the opinions that has penetrated most profoundly in the collective thinking, and which regretfully is still fostered in certain sectors, is that "public universities are a factory of unemployment". Is this assertion true?

In 2001 a first joint survey on the employment (labour market) outcomes of graduates from Catalan universities was carried out by AQU Catalunya and the seven public universities in Catalonia (University of Barcelona, Autonomous University of Barcelona, the Technical University of Catalonia [Universitat Politècnica de Catalunya/UPC], Pompeu Fabra University, University of Girona, University of Lleida and Rovira i Virgili University), in order to establish, amongst other things, the time, quality and pathways of graduate employment, together with the degree of graduate satisfaction with their university studies.

This pioneer project, which was carried out in an inclusive way for the very first time, involved the harmonisation of studies on graduate employment that Catalan universities had been carrying out separately. The purpose of this ambitious project was to be able to compare and integrate the information in order to draw reliable conclusions within the context of Catalonia.

Given the importance of the data provided by the survey, the decision was made to carry out further surveys on a three-year basis (2001, 2005 and 2008) in order for records to be kept and for trends in the entry into work of graduates to be followed and analysed.

The question I ask above can be answered from the figures that are available. According to the most recent graduate labour market outcomes survey in 2008, 93.5% of respondents were employed three years after graduation, 88% of which were full-time employed, with only 3% of all graduates being unemployed.

The current economic situation will probably have altered the employment situation of the university graduate population, and the fourth survey to be carried out next year will show the degree to which this is so. Nonetheless, the reflection that I wanted to introduce in this presentation is that, if we are not capable of measuring and subsequently analysing in a rigorous way the available information, it will be difficult for us to make the decisions that are most appropriate.

On the basis of the data obtained in the survey, AQU Catalunya presents three studies. The first analyses the relationship between family status, academic background and professional employment; the second makes an in-depth examination of university undergraduate studies in relation to the needs of the labour market (degree-job match); and the third, which was undertaken with the collaboration of the Catalan Institute for Women, deals with the quality of labour market outcomes in relation to gender, and puts forward an explanatory model for entry into work and employment for female graduates. All three studies are based on reliable data and give a perspective based on the actual situation in each case.

I am very grateful to the social councils of the public universities in Catalonia, the University of Vic and the Open University of Catalonia (UOC) for giving impetus, together with the Agency, to the carrying out of the three-year survey on graduate employment and labour market outcomes. The project is one of broad scope and will have an important impact in terms of the higher education system in Catalonia. I would lastly like to express our gratitude to the researchers and technical staff who participated in carrying out the three studies. Without the contributions made by research, there is no innovation or growth in a country. And with no figures or data, one is just another person with an opinion.

Joaquim Prats Cuevas

President, AQU Catalunya

PROLOGUE

PROLOGUE

Studies on graduate employment and labour market outcomes provide university institutions with a large number of indicators with which to improve course planning, curriculum design and student guidance systems.

Aside from the use of descriptive indicators on graduate employment for quality enhancement in the universities, studies on graduate labour market outcomes – at the system scale – enable important issues that are beyond the scope of an individual university institution to be dealt with, such as a more in-depth approach to issues of particular interest regarding the entry into work of graduates. It is for this reason that AQU Catalunya, aside from releasing the results of the graduate labour market outcomes studies, makes the databases available to social researchers to obtain a broader understanding of the key aspects of graduate labour market outcomes.

A very large sample is necessary for the employment outcomes database to provide useful information in terms of different degree programmes. With information now available on three different cohorts of graduates in Catalonia, each one covering more than 10,000 graduates, the available database is probably one of the largest in Europe and is of very particular interest for research on the entry into work of graduates.

With the encouragement of the social councils of the Catalan public universities, AQU Catalunya has made these results available to the scientific community and commissioned various studies on particular aspects of the transition by graduates from university to the labour market.

With three labour market outcomes surveys – carried out in 2001, 2005 and 2008 – and more than a dozen research projects by different groups in Catalan universities, the corpus of knowledge on the transition to the labour market is already quite considerable. The three new studies in the AQU Higher Education and Graduate Employment collection deal with three matters of great importance and interest for Catalan society: equity in labour market outcomes according to social origin, the influence of gender (gender equality) and the relationship between undergraduate studies and the labour market (education-job match).

The study on *Catalan universities as a factor of equity and professional mobility*, carried out by Dr. Jordi Planas and Dr. Sandra Fachelli from the Department of Sociology at the Autonomous University of Barcelona (UAB), focuses on the analysis of equal opportunities in the student body according to gender, regarding access, learning outcomes and job prospects. The study also analyses the impact of previous studies on academic performance and employment outcomes.

The study shows that Catalan universities have an important social function concerning equity and the occupational mobility of young people. In particular, it shows the important role played by the public universities outside of the Barcelona area in establishing this equity. According to the authors, these universities have played a key role in the democratisation of study at university in Catalonia.

The study titled *The match between university education and graduate labour market outcomes (education-job match)*, by Dr. Enric Corominas (Department of Pedagogy), Dr. Carme Saurina (Department of Economics) and Dr. Esperança Villar (Department of Psychology), all three at the University of Girona, makes a joint analysis, for the first time in Catalonia, of the three surveys carried out so far of the labour market outcomes of the university graduate population and, amongst other issues, assesses the match between undergraduate studies and the situation in the labour market (education-job match) and the change in trends in the period between the first (2001) and third (2008) surveys.

Despite the fact that the graduate population has a sufficient level of knowledge and understanding to cope with the demands of the labour market, the results show that the transformation towards a generic skills and job-based learning model is still at a very early stage. Although the cohorts analysed in the study correspond to pre-Bologna programmes, the level of change shows that the indicators of learning deficit detected in these graduate employment studies have not been used to introduce changes in teaching methodologies. Studies of graduates from degree programmes that have been adapted and brought in line with the EHEA are now needed to see the effect of the regulatory changes on the learning models.

The third study, on *Gender and the labour market outcomes of the university population in Catalonia*, which was carried out by the Agency's staff with support from the Catalan Institute for Women (*Institut Català de les Dones*), analyses the differences between male and female graduates, the results of which are somewhat surprising: having accounted for the effect of different degree programmes, there were no significant differences between male and female graduates three years after having completed their studies. There are two reasons that explain this phenomenon: firstly, the fact that a control was made of the effect of the level and type of studies on graduate labour market outcomes, which is not usually done in gender research; and, secondly, it is likely that phenomena like the glass ceiling and salary discrimination have still not had time to appear.

The variable that continues to have most weight in terms of the quality of employment outcomes is the degree studied. It is therefore important for continuous efforts to be made to break with stereotypes and models of masculinity and femininity that, in the present day, have a strong effect on the pathways chosen made by male and female students in higher education, and subsequently in their professional careers.

All three studies cover new ground regarding the entry into the labour market of the population of graduates from Catalan universities. AQU Catalunya intends to continue to support the analysis of the extraordinary information made available through these surveys and, in collaboration with the Catalan universities, to increase the database with new samples to enable ongoing developments and trends to be analysed and forecasted.

It is for the higher education authorities in Catalonia to use this information and knowledge as the focus of their policies and strategies.

Josep Anton Ferré Vidal

Director, AQU Catalunya

INTRODUCTION

INTRODUCTION

Within the framework of a European agenda for higher education for dealing with the current changes in the social contexts and in order to make the university's usefulness as an institution more visible by raising its levels of efficiency and efficacy, certain authors have emphasised the need to identify the consequences stemming from the various responses of and actions adopted by higher education institutions to adapt to these changes (Brennan, 2008). Responses within the higher education system during the last ten years have included the progressive introduction of a competence-based learning model as a way of increasing graduate employability so that graduates can better adapt to the constant transformation of professional environments and also to raise the levels of worker qualification and expertise called for by the labour market in developed society.

This new educational model redefines the traditional role of the transmission of theoretical and practical knowledge in the different fields of study in that it emphasises its dimension of applicability and action orientedness, and the possibility of its transferability to various situations and contexts. Furthermore, it also incorporates the skills, attitudes and other individual aptitudes that provide for competent professional practice (Rothwell, Herbert, Rothwell, 2008; Van der Heijde, Van der Heijden, 2006).

The necessity of analysing these characteristics for the higher education system as a whole, especially in the case of the socio-cultural context in Catalonia, is evident given the notable increase in the population that has gained access to higher education in recent decades and the limited increase in productivity in comparison with the level that should have resulted from a more highly skilled work force. The decrease in productivity in Spain since the mid-nineties has jeopardised economic competitiveness and has raised questions regarding the adequacy and quality of the educational system and the use made by the market of the skilled workforce and its skills and competences (Marzo Navarro, Pedraja Iglesias, Rivera Torres, 2009).

The purpose of this study was precisely to analyse the public higher education system in Catalonia as a whole in relation to the ongoing development of the learning model over the last ten years, of its match in terms of the requirements of the skilled labour market and the returns obtained by graduates in terms of the quality of their jobs and employment three years after graduation. Using the graduates' own perceptions, an analysis was made of the response by higher education institutions, and the way this response has changed, to social demands for education and learning that are more appropriate in the workplace; how the skilled labour market has changed in terms of the selection and assessment of certain professional skills and competences; and the ways in which the postgraduate learning strategies of university graduates have changed to increase their competitiveness and distinctiveness in the labour market.

The study consists of four sections. The corresponding theoretical framework is dealt with first, together with the context of current debate on the relationship between learning and graduate employability and the aims of this particular study. A description is then given of the work methodology, with the characteristics of the study sample, the origin of the data and the analytical techniques. The third section gives an analysis of the results according to the defined aims of the study, and the last section, with a discussion and the conclusions, summarises the main results, identifies the limitations of the study and describes several implications as well as enhancement proposals for the Catalan higher education system.

1

THEORETICAL FRAMEWORK

1. THEORETICAL FRAMEWORK

1.1. The fit between university education and graduate jobs

The debate on the fit between higher education and work normally revolves around relationships of dependency and autonomy relative to the university's functions and the requirements of the economy and the production sector. The dependency model assumes a correspondence between the educational profiles of graduates and the jobs they fill – with provision matching and responding to the demands of the workplace, whereas the relative autonomy model questions the existence of a presupposed correspondence and proposes a dynamic regulation through "successive and flexible adjustments" between the labour supply and a production sector that adapts to the labour force that is available at a given time and in a given context (SALA, PLANAS, MASJUAN, ENCISO, 2007, 22).

From this perspective, it is assumed that the workforce available at a given time is active and influences demand by stimulating it. Given the difficulty of foreseeing how technology and the markets will evolve, it is questionable whether it is possible *a priori* to go into the details of job duties, content and responsibilities, as well as the changes that jobs will undergo in the future and the number of people who will be necessary to fill them. It is likewise suggested that qualification and skill cannot be assimilated just from formal undergraduate studies and that other ways of learning, for example, through work experience, are required (SALA et al., 2007, 20). This approach also advocates that a certain level of over-education (the extent to which graduates are employed in non-graduate jobs) in the workforce may be positive in economic terms insofar as a greater abundance of qualification may lead to better job possibilities by increasing the overall level of innovation and competitiveness (LEMISTRE, 2007; SALA et al., 2007).

Linked to this theoretical and macroeconomic debate on the behaviour of and relationships between labour market representatives – individuals, higher education institutions and those in the production sector – is the question regarding the effects of mismatch between education and graduate employment, at both the individual and organisational scale.

At the individual scale, the debate focuses on the consolidation of students' professional projects that lead them to go to university and their expectations regarding the type of employment they expect to get on finishing their studies (BROWN, HESKETH, 2004). It is widely accepted that vocational interests in terms of individual's values and capabilities are developed during adolescence, and people are encouraged to get involved in what they are interested in, thereby increasing their corresponding skills and abilities (ACKERMAN, 1996). In this regard, the fact of not

being able to get a job connected with one's degree or personal interests and capabilities may lead to the idea of failure due to the impossibility of being able to use and apply the skills developed at university and the loss of investment. Research on the university population has highlighted the fact that a students have a more or less defined professional project and they would be willing to accept sacrifices, such as a change in the place of residence or longer journeys, in exchange for being able to work in a job connected with their degree and personal preferences and values (Troiano, 2005). Along the same lines, studies evaluating the "success" of graduates in terms of employment, as well as research on the effects of over-qualification on university graduates, have shown the negative effects of the education-job mismatch on salaries (Mañé, Miravet, 2007; McGuiness, Bennett, 2007) and satisfaction (Allen, Van der Velden, 2001; García Aracil, 2009; Mañé, Miravet, 2007; Vila, García Aracil, Mora, 2007).

In terms of the organisational dimension of the mismatch between the degree studied and the qualifications actually required of graduates for their job, different studies have corroborated a negative impact of over-education on motivation in the workplace. Contrary to the supposition that the over-educated become more involved, which would enable them to transfer their knowledge and skills through their work, demonstrate their abilities and aspire to jobs more in accordance with their education, the empirical evidence shows a negative relationship between over-education and innovative and extra-role behaviour in organisations, and also with regard to initiative in the personal development by graduates of their professional career (Agut, Peiró, Grau, 2009). The reason for this behaviour, according to the authors, has to do with the students' prior expectations of obtaining a skilled job after many years of study and the desire to enjoy intrinsic rewards, such as the full use of one's skills and having certain responsibilities, together with external rewards, such as promotion and salary. The idea of lower-than-expected rewards, professional mismatch and the negative emotions associated with these ideas lead the worker to restrict his/her extra-role behaviour, i.e., job-related behaviour patterns over and above what is strictly specified and laid down, which have a positive impact on organisational efficacy and the worker's career.

Taking account of these personal and organisational implications of an education-job mismatch and its importance as an indicator of the performance of higher education institutions, the **first proposed objective** of the study was to **analyse the level of match between different degrees and the jobs held by graduates from the public higher education system in Catalonia, and the changes that have taken place over the last ten years in five main fields of knowledge (Humanities, Social Sciences, Experimental Sciences, Health Sciences, and Engineering and Architecture) in relation to the education-job match.**

1.2. Changes in the model of university education

The transformation of higher education systems and institutions in all developed countries in recent years has been characterised by an expansion in the number of students and university graduates (from the sixties onwards), the introduction of quality assurance policies and procedures (from the eighties onwards) and the adaptation of university curricula to the requirements of the new economy and present-day labour markets, mainly with regard to the introduction of competences (skills) as a fundamental learning objective in study programmes (from the nineties onwards).

There are profound reasons for these changes that have to do with worldwide socio-economic factors linked to technological development, new models of production and higher demand for skilled labour from organisations, amongst others. As causal factors, the literature on higher education highlights the democratisation of education that has given more students access to the higher education system; greater pressure on universities for accountability of public spending invested in education; and the pressure by production organisations and governments to enhance the professional skills of the workforce as a means for social development in a modern and competitive knowledge-based economy. The pressure exerted by various labour market representatives has led universities to adopt policies and strategies aligned with social demands. Some examples of these trends are policies to improve employability (Van der Heijde, Van der Heijden, 2006), government and university grants for innovative teaching, plans for teacher training, incentives for the adaptation of curricula to the new European Higher Education Area (pilot plans by the Catalan government since the 2004-2005 academic year), demands for competence-based academic programmes as the way for national quality assurance agencies to accredit new university degrees, the introduction of compulsory professional practice in curricula (Rodríguez Espinar et al., 2007), the introduction of specific departmental policies and the involvement of employers in subject design and teaching (Mason, Williams, Cranmer, 2009).

These initiatives have led to the restructuring of the university education model in recent years. One of the most important trends has been the change from a traditional education model based on the transmission of knowledge in the different fields of study, towards a model that advocates the development of competences and the more active involvement of the learner. The introduction of a *competence-based approach* in the defining and preparation of the learning outcomes is probably the most distinctive feature of the current university reform and is closely linked to the enhancement of graduate employability, given that it gives higher profile to and involves their professional ability and its applicability in the workplace (García, Pérez, 2008). A worker is understood to be employable today if he/she has, or can accredit, a sufficient level of professional skill that meets the needs of the labour market

and/or the changing demands of the job within the company, and where this skill is recognised in the labour market (Villar, 2007).

The new competence-based learning model has led to ideological tensions in higher education institutions between, on the one hand, those who call for scientific and cultural learning that is of a general nature and independent of the requirements of the production sector and, on the other, those who call for the university to adapt more to the labour market and the development of the real economy. Faced with the pressures from students, employers and education authorities, higher education institutions have reacted in different ways. Some sectors have been critical of the discourse on employability and of the universities' submissiveness in relation to the demands of the market, and it has been questioned whether their mission should be to reproduce the current system or to transform it and, ultimately, whether university education should involve adapting graduates to the system or develop them as people capable of transforming it through research and knowledge (Morley, 2001). Others have called for greater consideration to be given to the needs of the production sector.

From the seventies and eighties onwards, the idea that production organisations need graduates with good academic records and core competences that "facilitate faster integration into industry and ensure that they can adapt in times of change in the organisation, meaning the ability to work as part of a team, initiative, entrepreneurship, dynamism, customer service" (Rodríguez Espinar et al., 2007, 339) became increasingly important. This led to a series of "human capital" competences being introduced progressively in university education, and the distance between this and the workplace began to be gradually reduced (Greene, Saridakis, 2008). However, this process has been neither easy nor smooth, given the conceptual and terminological confusion around what should be taught, how it should be done and how it should be evaluated (Green, Hammer, Star, 2009). On the other hand, one should also bear in mind that not all fields of study are the same in terms of graduate employability: some qualifications adapt more easily to the demands of the market and are highly committed to developing human capital skills, whereas others are less sensitive and less capable of responding to professional practice (De Wert, 1996; Mason et al., 2009). These differences should therefore be taken into account when analysing what happens in different fields of study as regards the level of competence-based learning attained by graduates at the end of their studies.

Aside from the ideological discussion regarding competence-based learning and the tensions it has generated in certain university contexts (Cranmer, 2006; Green, Hammer, Star, 2009; Heijke, Meng, Remaekers, 2003; Holmes, 2001, 2006; Moreau, Leathwood, 2006; Morley, 2001; Prokou, 2008), there is no doubt that a different way of teaching and a profound shift in teaching strategies and methodologies have been taking place. Beyond the obvious perceptions of these transformations, however, there has so far been no formal assessment establishing whether the

universities have adapted to the new educational demands and if there has been any improvement in competence-based university education over the last ten years from the graduates' point of view. In order to analyse how the public higher education system in Catalonia has adapted to the demands of a learning model that is competence-based and more orientated to the workplace, the **second objective** of this study was to **assess the ongoing changes that have taken place in university education over the last ten years, based on an analysis of the level of the competences acquired by graduates in response to social demands to improve graduate employability skills.**

1.3. The usefulness of undergraduate studies in the workplace

Aside from the analysis dealing with the way in which the university education model has developed in recent years and the degree to which competences have penetrated students' education in different fields of knowledge, a second line of theoretical and empirical debate deals with the discussion about what competences should be developed during undergraduate studies at university. This is a complex matter because it simultaneously raises several issues regarding: *a*) the conceptual and terminological definition of the "competence" construct and its classification, *b*) ideological positions regarding the purpose of higher education, dealt with in the preceding section; *c*) the prioritisation of generic versus specific competences in each field of study; *d*) the actual possibilities of teaching particular competences in university classrooms; and *e*) the usefulness of different types of competences in the workplace, among other aspects.

With regard to the conceptual issue, one major difficulty in progress being made in the research and actual introduction of the competence-based learning model has been the confusion surrounding the construct itself. As Green, Hammer and Star (2009) have pointed out, there is considerable confusion over how to define the skills that graduates should acquire, what their features should be for each field of study, how they should be taught and assessed, and how their introduction should ultimately provide information on teaching practices in higher education. As the authors point out, the difficulties stem mainly from the seemingly nebulous and confusing nature of what should be taught at university. Both university authorities and researchers have used different terms to describe the anticipated outcomes of higher education. Adjectives such as "generic", "core", "key", "facilitating", "transferable" and "professional", in reference to core skills, are used together with words like "attributes" "skills", "abilities" and "competences." However, they argue that "competences" are not the same as "attributes", and that "generic" is not necessarily the same as "transferable". Moreover, the fact that generic competences have usually been considered to be discrete entities that are measurable, transferable and decontextualised from the different fields of study,

rather than being linked to the same social practice in which they acquire meaning, has also hindered their development in university curricula (Jones, 2009). Although progress has been made in terms of this being conceptually clarified, "there is no general agreement, either theoretical or empirical, on how to classify competences" (Mora, García Aracil, Vila, 2007, 122).

Regarding the prioritisation of generic versus specific competences, there is a dilemma between a general multi-purpose education that provides generic or core competences, which provide graduates with learning skills that give them greater flexibility and the capability of life-long learning, as compared to an education in highly specialised competences of a turnkey nature that are linked to a field of study and profession (García, Pérez, 2008; Green, Hammer, Star, 2009; Heijke et al., 2003). More recently, the debate has also included the need for graduates to acquire a set of competences associated with their ability to self-manage their professional career, which would include self-awareness, the development of a positive professional identity, the ability to find information connected with a chosen career and the workplace, getting a job and how to do well at the professional level (Bridgstock, 2009; Rodríguez Moreno, Álvarez, Figuera, Rodríguez Espinar, 2008).

In relation to this debate, some authors have warned of another problem concerning the difficulty that universities may have in teaching certain competences that can only be fully acquired through on-the-job work experience that cannot feasibly be developed in a purely academic context (Heijke et al. 2003; Rodríguez Espinar et al., 2007). Heijke et al. (2003) specifically pointed out the skills of leadership and management, including skills of a personal (e.g. creative problem-solving), interpersonal (motivating others and conflict negotiation) and group (empowerment and assignment delegation) nature, which are difficult to attain unless they are combined with work experience.

One way of dealing with the complexity inherent to the change in the educational model, together with the conceptual, ideological and pragmatic issues involved, has been to analyse the requirements of the production system and the usefulness of the skills developed at university by graduates to meet the required demands of their jobs on entering the labour market.

To this end, the requirements of the labour market have customarily been evaluated using two complementary methodologies; on the one hand, by directly asking employers what skills and what level of skills they consider university graduates should have in order to get a skilled job (National Agency for Quality Assessment and Accreditation of Spain/ANECA,[1] 2004; Hernández, Martín, 2007; Hernández,

[1] Agencia Nacional de Evaluación de la Calidad y Acreditación

Martín, Leguey, 2009; Marzo Navarro, Pedraja Iglesias, Rivera Torres, 2009); and, on the other, by analysing the usefulness of different skills required in graduate jobs once they have gained employment, and comparing this with the level of acquisition of these same competences during their time at university (García Aracil, Mora, Vila, 2004; García Aracil, Van der Velden, 2008; Heijke et al., 2003; Mora, García Aracil, Vila, 2007).

In both cases, studies carried out in Spain and other European countries have shown that the level of learning achieved as a result of undergraduate studies is below the level of competence required for graduate jobs, except for the command of theoretical knowledge (general and disciplinary) and the learning skills specific to their studies. However, we are unaware of any studies that have tested whether there has been a positive or negative trend in these "gaps" over time, nor how the different competences have changed in relation to the levels of learning acquired by graduates on completion of their studies, and their usefulness in graduate jobs relative to the different fields of study.

Accordingly, the **third objective** of the study was to **assess the match between competence-based learning in undergraduate studies and the requirements of and changes in the labour market through an analysis of the gaps between the acquired level of learning and its usefulness in graduate jobs**, henceforth referred to as the **education-job match**.

1.4. Postgraduate study as a strategy for enhancing employability

When analysing the labour market outcomes of graduates three years after graduation, one important fact is that many people continue to study after being awarded their university degree. There may therefore be a closer match between university education and employment as a result of a higher qualification obtained through postgraduate study.

According to human capital theory (Becker, 1964; Schuls, 1961), investment in education increases worker productivity and is recompensed by the market through higher wages. A key strategic stance for workers to take in the labour market would therefore be to increase their investment in education. This theory is based on the empirical observation of other positive correlations between the levels of education of workers and their salary profiles throughout their lives, and it suggests that, in situations where there is a shortage of work and a high level of competitiveness, people who invest in education as a differentiation strategy will achieve higher returns from their work. In the current circumstances of the massification of higher education, where practically half of each generation goes on to study at university after completing secondary education, differentiation between members of this

group would be determined by access to postgraduate education (specialist courses, Masters and doctoral degrees), under the assumption that there would be a certain homogeneity among individuals with the same qualification in terms of the type of knowledge and skills acquired, and that being the holder of a differentiated degree would be better recompensed by the market (Flores Lagunes, Light, 2009).

There are certain problems however with human capital theory related to the difficulty of demonstrating that the alleged increase in the productivity of more highly skilled workers stems from the education they have received, and the fact that this alleged productivity is unknown to whoever contracts workers when they enter the labour market. Under the present conditions of virtually universal access to university, it is also questionable whether the mere fact of spending more years in the classroom will guarantee that a person becomes more productive (Dobbs, Sun, Roberts, 2008). Consideration must also be given to the fact that people continue to study not just out of economic interest, but also to gain more interesting jobs, develop their personal abilities, and acquire more knowledge and/or social recognition.

The emergence of credentialist theories (Arrow, 1973; Spence, 1973; Stiglis, 1975; Taubman, Wales, 1973), as an alternative theoretical approach to human capital theory, saw higher education institutions being assigned a function of worker classification and selection. It was assumed that the purpose of education was not to provide knowledge or skills aimed at increasing productivity – as this is achieved subsequently in the workplace – but to certify a worker's qualities, adaptability and learning abilities. As such, education was considered to be a filter for identifying the individuals with the best employability qualities and qualifying candidates in the best conditions for both preliminary and in-house company training. Based on these premises, the signalling hypothesis holds that a degree has an additional, intrinsic value, aside from the accumulated number of years spent studying, which creates the perception of higher productivity (Dobbs et al., 2008). As these authors suggest, "the key signal that matters is whether the individual receives the diploma" (p. 793).

Both of these theories – human-capital and credentialism – predict a better position in the labour market for graduates who have completed postgraduate studies as an investment strategy to improve their level of employability. The credentialist approach however would also assume that Master's and doctoral degrees represent a greater competitive advantage compared to other more non-specific postgraduate courses and studies that are not endorsed or accredited by a recognised university degree.

Following on from this approach, the **fourth objective** of this study was to **examine the function of further studies and postgraduate learning strategies used by university graduates to enhance their professional ability and competitiveness in the labour market**.

1.5. The returns from university education and job quality

Notwithstanding the fact that graduate employment is not the only criterion for evaluating the success of a university, which is an institution that has multiple functions (Lim, 2007), it is important to determine the returns on the individual and collective investment made in higher education in order to evaluate the system's performance and contribute to its progressive improvement. In this regard, an assessment is usually made of the occupational status – or "success" – achieved by graduates at different times in their career: six months after graduation, one year after graduation, three years, five years, etc. One should bear in mind however that a graduate's occupational status reflects not only the impact of university education, but also the interaction between this and macroeconomic conditions, whatever it is that organisations value and look for at a particular time – which may be conditioned by a short-term view – and the personal qualities and characteristics of the graduates themselves, such as gender, previous work experience, the effort spent looking for employment, social position, etc. (Salas Velasco, 2007).

Follow-up studies of graduates, which are now being carried out in a systematic way in most developed countries, often use several labour market outcome indicators to evaluate the returns from university education in relation, for example, to rates of employment, salaries, job security, education-job profile match, and graduate satisfaction, among other things (Mora, 2008). Out of all of these indicators, however, researchers have focused mainly on wages and, more recently, on graduate job satisfaction. Although it is impossible to review the large number of studies on the individual and social returns from higher education, a brief summary of several conclusions is given below as a way of putting this study into context.

With regard to salary, some researchers use data obtained immediately after graduates finish their studies, whereas others use data from a few years after they have entered the labour market. However, virtually all studies agree that the degree course taken is one of the determining educational variables of salary differences among university graduates (Birch et al., 2009; Chia, Miller, 2008; García Aracil, Van der Velden, 2008; Mora et al., 2007, to mention just a few recent studies). Birch et al., for example, found up to a 12% variation in starting salaries according to the degree course taken (population in Australia), which they explain on the basis of three assumptions: *a*) some degrees are associated with especially well-paid jobs, with Medicine mentioned as an example; *b*) graduates of some degrees acquire a series of skills for which there is not very much supply in the labour market at a given time, and because of this deficit, they get higher paying jobs, while their colleagues with skills that are in surplus have to settle for any available job, and *c*) employers consider some degrees to be more difficult than others, and graduates who have managed to be successful in these are thought of as being more capable, hard-working individuals, who are worthy of higher salaries. Other educational variables

pointed out by different researchers include academic qualifications and the positive fact of having a double degree, although the gain that this variable represents is not very large compared to the cost of investing in a second career. On the other hand, the institution where graduates have studied does not seem to have a major impact, although this result depends greatly on the higher education system being analysed and the group of institutions considered in any one study as a whole (Birch et al., 2009). Other non-academic variables with an important influence on salary differences between graduates are gender, work experience, job sector and, in particular, the type of job duties and responsibilities that are carried out (Birch et al., 2009; Heijke et al., 2003).

As far as competences are concerned, it is more difficult to summarise the results obtained by different researchers, given the disparity of conceptual and methodological criteria and the socio-economic contexts, and the fact that available research examines different periods of time and, therefore, different needs and values in the labour market in relation to what is required of graduates. As Suleman and Paul (2006) point out, the competitive advantage that having computer skills represented in the mid nineties declined over subsequent years, whereas other skills associated with personnel management and administration have become more important. Added to this problem is the fact that graduate follow-up studies are made either several months or years after they finish their studies, and the importance given by the universities to different competences in the curricula at a given time may therefore have changed in relation to what is assessed in follow-up surveys several years later. For example, surveys may use a particular classification for competences at a given time regardless of the fact that these competences were not being taught or assessed when the graduates in the survey were studying. It is possible that, in the long run, competences that are systematically assessed in surveys end up being introduced in course programmes and made more high-profile by way of a feedback mechanism in the system. One additional difficulty in assessing the impact of competence-based learning on graduates' earned income refers to the fact that some of the most highly valued skills in the market – i.e. which command higher salaries – are acquired in the workplace (for example, personnel management and administration, leadership and negotiation), and it is difficult to determine the exact contribution that university education makes to their development.

The available data on graduate job satisfaction shows that, in general, graduates are moderately satisfied with their professional status (Accenture, 2007; National Agency for Quality Assessment and Accreditation of Spain/ANECA, 2004; Corominas et al., 2007; Mora, 2008; Mora, Ferrer Carbonell, 2009). Furthermore, as in the case of wage income, the degree studied is a determining variable of satisfaction, together with the education-job match (Cabrera, de Vries, Anderson, 2008; Mora et al., 2007; Vila, García Aracil, Mora, 2007). On the other hand, the gaps observed between the levels of competence acquired at university and those

required in the job, far from being a problem, have a positive impact on graduate satisfaction. The idea of high demands at work implies greater satisfaction, probably due to the perception of a higher job status and "the motivation associated with jobs that require more effort and are likely to be thought of as having greater potential in terms of both personal advancement and professional promotion" (Mañé, Miravet, 2007, 183). As for variables that are not strictly educational, the data would seem to confirm a positive relationship between income, the responsibility and complexity of job duties and graduate satisfaction (Cabrera et al., 2008; Mora et al., 2007; Vila et al., 2007). There is no agreement, however, regarding the influence of gender (Mora, Ferrer Carbonell, 2009).

Although many studies have been carried out on the returns of university education in terms of graduate wage income and satisfaction, few studies have considered the impact of higher education on job quality, defined according to a series of variables or indicators grouped together in one overall quality index. We believe it is important for these characteristics to be measured so that different partial indicators of what is considered to be job quality can be included. In this regard, a **fifth objective** of this study was to **determine the returns from undergraduate competence-based studies and postgraduate study for graduate job quality three years after graduation**.

2

METHODOLOGY

2. METHODOLOGY

2.1. Sample characteristics

The data analysed in this study are from the survey on the labour market outcomes of three cohorts of graduates from the public higher education system in Catalonia who completed their studies in the academic years corresponding to 1997-1998, 2000-2001 and 2003-2004.[2] The survey was conducted three years after their graduation by way of telephone interviews and by post. Table 1 shows the sample distribution according to university and cohort.[3]

[2] In 2000 the consortium consisting of the Ministry of Universities, Research and the Information Society (DURSI) and the Catalan public universities launched a project to periodically carry out a systematic assessment of the transition to work of graduates from the higher education system in Catalonia, and also to evaluate the quality of their labour market (employment) outcomes three years after graduation, from the perspective of the graduates themselves (Rauret, 2003). Three follow-up studies have so far been carried out, corresponding to 1998, 2001 and 2004, with a total number of 33,480 graduates being interviewed in the survey, or 50.65% of the total number of all graduates leaving university at the end of these three academic years. The reasons for the project, the technical specifications and the partial results for each year are published in two books (Rodríguez Espinar, 2003; Serra Ramoneda, 2007) and in successive technical reports produced by the Catalan University Quality Assurance Agency/AQU Catalunya. For these reports, together with the base surveys, see: http://www.aqu.cat/publicacions/insercio_laboral.html.

[3] Not included in this study are 295 graduates of the Catalan Open University in 2004, due to the special characteristics of this distance learning university and the fact that figures for this university are not available prior to this date. The reference populations for graduates in Medicine correspond to students who graduated three years earlier than each main cohort, given that the transition to professional practice and work in this field of study takes longer.

Table 1 | Sample distribution according to university and cohort

University	Total sample	Cohort 1998 Population	1998 Sample	1998 %	2001 Population	2001 Sample	2001 %	2004 Population	2004 Sample	2004 %
UB	9,025	6,105	2,716	44.5	6,160	3,030	49.2	7,363	3,279	44.5
UAB	7,356	4,433	2,120	47.8	4,536	2,631	58.0	4,759	2,605	54.7
UPC	5,579	5,114	1,896	37.1	5,140	1,989	38.7	3,594	1,694	47.1
UPF	2,442	1,367	703	51.4	1,507	847	56.2	1,682	892	53.0
UdG	3,075	1,585	875	55.2	1,633	1,100	67.4	1,599	1,100	68.8
UdL	2,629	1,195	707	59.2	1,343	947	70.5	1,411	975	69.1
URV	2,887	1,379	749	54.3	1,448	912	63.0	1,935	1,226	63.4
UVic	487	—	—	—	—	—	—	680	487	71.6
Total	**33,480**	**21,178**	**9,766**	**46.1**	**21,767**	**11,456**	**52.6**	**23,023**	**12,258**	**53.2**

UB: University of Barcelona; UAB: Autonomous University of Barcelona; UPC: Technical University of Catalunya (Universitat Politècnica de Catalunya); UPF: Pompeu Fabra University; UdG: University of Girona; UdL: University of Lleida; URV: Rovira i Virgili University; UVic: University of Vic.

According to gender, 20,217 were females (60.4%), although there is a wide variability according to degree. No appreciable differences are to be seen in the proportion of females among the three years analysed (60.8%, 59.1% and 61.2%, respectively). The degree sample error is lower than 8%, except in the case of certain specific degrees.[4]

[4] For details of the distribution of the sample errors according to degree qualification, see the different reports available at: http://www.aqu.cat/publicacions/insercio_laboral.html.

2.2. Description of the labour market outcomes survey

The labour market outcomes survey that this study is based on consists of seventy-seven (77) questions on the job situation of graduates, access to their first and current job, their job's characteristics and duties, job satisfaction, an assessment of their undergraduate studies at university, and the match between their studies and their graduate job (education-job match). They were also asked whether they had taken any further postgraduate studies and if they had any experience with mobility. A specific section dealing with the situation of graduates who were unemployed is also included.

This study focuses mainly on the questions referring to the educational requirements for the job, the assessment by the graduates themselves of their undergraduate studies at university and the suitability of – or match between – their studies and the requirements of the labour market. Consideration is also given to the question concerning the specific job duties and responsibilities of graduates in the workplace, as well as the question regarding further studies. Appendix 1 gives details of the questions used in this study.

In specific relation to competences, the survey covered the following:[5]

Theoretical learning	Practical learning
Oral expression*	Written expression*
Teamwork	Leadership
Management skills	Problem solving
Decision-making*	Creativity
Critical thinking	Instrumental competences: computing skills*
Instrumental competences: languages*	Instrumental competences: documentation*

* Competences not evaluated for the 1998 cohort.

The approach used in the survey combines a traditional perspective of university education, with questions that relate to the theoretical and practical knowledge that make up the subject matter of classic academic study, together with a series of questions concerning the learning of core competences, such as teamwork, problem solving and leadership, among others. This combination enabled an assessment to be made of the changes that have occurred over the past ten years

[5] Only eight competences were covered in the 1998 survey: theoretical learning, practical learning, teamwork, leadership, problem-solving, critical thinking, creativity and management.

in Catalan universities as a result of social pressures and adaptation to the European Higher Education Area (EHEA) for the purposes of matching university education with the requirements of the workplace and the professional world, and of improving graduate employability.

2.3. Techniques for analysing the results

For the analysis relative to the first objective of the study, contingency tables were first drawn up for the variables of education-job match and field of study, the purpose being to determine the degree of association between both of these variables, with disaggregation of the data according to cohort and gender. The values for the corrected standardised residuals were also calculated to give a comparative estimate of the observed proportion of graduates in each category relative to the anticipated distribution in the case of independence between the variables. Secondly, for the variables on the level of learning acquired in each of the fourteen competences included in the survey and their usefulness in graduate jobs, descriptive analyses (mean and standard deviation) were made and mean comparison tests done for independent samples (Student's t-test) on the basis of the education-job match variable, with a comparison made between groups of graduates who had job duties specific to their degree qualifications and those who did not.

In order to analyse the development of competence-based university education, firstly, a principal component analysis (PCA) was carried out on the series of fourteen variables that evaluate the graduates' assessment of their level of competence-based learning acquired during their time at university, the aim being to work with a smaller number of variables. In practice, the extraction of the factorial axes was done with the information provided by 17,605 graduates, with complete information on the fourteen variables corresponding to 2001 and 2004. The information relating to 1998 was rejected due to the lack of a significant number of data (the technical specifications of this analysis are detailed in Appendix 2). The mean values obtained for each field of study are represented on the factorial axes.

Gaps between the acquired level of competence-based learning and the usefulness of competences in graduate jobs were analysed by calculating the mean and standard deviation of the differences between both variables for each of the fourteen competences in the survey, disaggregated according to cohort, field of study and subject. The Pearson product-moment correlations were also calculated between the acquired level of learning and job usefulness for each of the fourteen variables in reference to the competences.

Lastly, in order to analyse the returns from university education in terms of the quality of graduate labour market outcomes three years after graduation, a hierarchical linear regression model was defined that includes as predictors the fourteen variables referring to the level of competence-based learning acquired at university, together with the variables of the degree studied, gender, public or private sector employment, postgraduate study and cohort (2001 and 2004). The job quality index was used as a criterion variable (COROMINAS, VILLAR, SAURINA, FÀBREGAS, 2007). The technical details of the multi-level analysis and for constructing the job quality index are given in Appendix 2. The results were analysed using SPSS for Windows, version 15.0, and the free R-programme software. A level of significance of 5% was chosen to interpret all of the analyses that were carried out.

3

RESULTS

3. RESULTS

This section has been divided into five analytical units according to each of the five objectives. Firstly, the data on the changes in the match between the different university degrees studied and the jobs held by graduates are presented. The second section examines the developments in competence-based learning in the Catalan higher education system over the last ten years and its response to social demands for the learning of more generic and core competences. The third section deals with the match between competence-based learning at university and its usefulness in the jobs of the graduates who responded to the survey. The fourth section includes a descriptive study of the postgraduate study strategies by Catalan graduates during the three years following graduation. Lastly, the fifth section analyses the impact of competence-based undergraduate studies on the individual returns obtained by graduates in their jobs (job quality) when other factors are analysed together, such as the cohort, subject of study, gender, sector of employment and postgraduate studies.

3.1. Changes in the education-job match

One of the most important indicators of the performance of higher education institutions is the degree of fit between the qualifications obtained by graduates and their job characteristics. All things considered, this is an indicator of the level of consolidation of the professional projects that they entered university with and, in many cases, the accomplishment of professional expectations that they set themselves as undergraduate students.

In this section, an analysis was made first of the degree of fit of jobs obtained by Catalan graduates for the three years of graduation considered (1998, 2001 and 2004), according to the field of knowledge and gender, to establish whether there were any differences between these groups, and if there was any change in the trend over the period that elapsed between the first and last surveys. Secondly, we analysed whether a greater or lesser extent of education-job match had any impact on the graduates' rating of the level of competence-based learning they acquired at university. This point is relevant, given that the objectives of the study (to determine the development of competence-based learning at university, the existence of mismatches between learning and job usefulness, and the returns of acquired learning) were dealt using subjective assessments made by the graduates themselves. It was therefore necessary to clarify the possible existence of any differences in the perceptions and assessments of competence-based learning of those who attained a good education-job match status compared to those whose

job duties were not specific to their degree studies. The fact that this latter group was possibly not fully applying the skills acquired at university may have led to bias in the way they rated the level of learning and job usefulness. Such a possibility should be checked in order to decide the appropriateness of this group being included in subsequent analyses.

3.1.1. The match between university degrees and graduate jobs

In order to evaluate the match between graduates' degrees and their jobs, the graduate labour market outcomes survey formulates two supplementary questions relating to their current job (or the last job they were in), for graduates who are currently working or have worked since graduating. They were first asked, "What were the requirements for your job?", with three possible answers being given: "Your specific degree," "Just a degree" and "No degree was required". A second question, which was conditional on the first, offered two choices: if the job required a specific degree, they were asked whether their degree was necessary for the job; and, in the case where no specific degree was called for, if it was necessary to be a university graduate. In both cases the choice of answer was either "Yes" or "No". Table 2 shows the results obtained according to field of study and gender for each of the six categories resulting from the combination of these two questions: (1) a specific degree/set qualifications and job duties specific/related to the degree/qualifications; (2) a specific degree/set qualifications and unrelated job duties; (3) a university degree and related job duties; (4) a university degree and unrelated job duties; (5) no university qualifications required and job duties specific/related to the degree/qualifications, and (6) no university qualifications required and job duties unrelated to the degree/qualifications.

As a whole, the figures show that the field of study is clearly connected with the education-job match. As can be seen from table 2, the education-job match is different for the five main fields of study covered by the survey (Humanities, Social Sciences, Experimental Sciences, Health Sciences and Engineering and Architecture). The table gives the calculated percentage of graduates (male and female graduates separately) in each of the six match categories according to field of study and cohort.[6] The boxes shaded in pink are where the observed percentage of graduates is higher than would be expected if both variables (field of study and match) were independent. This means that, if a box is shaded in pink, this category has a higher proportion of graduates than would be expected than if the data had a random distribution. Likewise, boxes shaded in yellow show a lower than expected proportion of graduates who marked the category than if the match had not been associated with the field of study.

[6] Care should be taken when comparing the figures for the different cohorts, given that the1998 survey only included four match categories, compared to six in the other two surveys.

The figures show that Humanities have a significantly higher percentage of graduates in the lower match categories, i.e. those where a university degree was not required for the job and the graduate job duties were not related to the person's undergraduate studies. Likewise, there were significantly lower percentages than would be expected for graduates working in jobs where their specific qualifications were called for and where their job duties were related to their undergraduate studies.

A similar, yet not so marked, trend can be seen for the Social Sciences. This trend is evident for both male and female graduates and for the three cohorts examined in the survey, although a certain improvement is observed in the trend of the level of match over the years. The percentage of graduates in the category "No university qualifications required and job duties unrelated to undergraduate studies" does in fact decline in successive years, possibly because of the growth in the economic cycle up until 2007, which contributed to graduates getting more highly skilled jobs.

This trend is not so clearly seen in Health Sciences or Engineering/Architecture, which show a more stable behaviour, and where there are higher percentages of match. Care should be taken however with these percentages, given that the categories for 1998 do not coincide with those of the two later cohorts, thereby making comparison difficult. In these fields of study, the percentage of graduates working in jobs with a high level of match (specific qualifications and related job duties) is significantly high compared to the low percentages in the boxes further down the table, which show a low level of match or over-qualification.

As for changes in the education-job match three years after graduation, the table shows no major changes over the years. In Humanities and Social Sciences there was a decrease in the percentages of people whose job did not require any university qualifications, but where their job duties were related to their university studies, in the case of both male and female graduates. However, the lower mismatch in this category is not compensated for by an equivalent increase in match (specific qualifications and related job duties), despite the favourable economic cycle. On the other hand, there was an increase in the percentages for the "non-specific university qualifications and job duties related to undergraduate studies" category between 2001 and 2004 (no data are available for 1998) in Humanities.

In Experimental Sciences, there was a positive trend in the "specific degree qualifications and related job duties" category in 2004 compared to the percentage figures for the two previous cohorts examined in the study. Another improvement was a decrease in the proportion of graduates in non-specific occupations and with job duties unrelated to their undergraduate studies. Moreover, the match in Health Sciences remained fairly constant over the years covered in the study and, if anything, there was a slight decrease in the percentages for the "specific qualifications and unrelated job duties" category, although this was not very marked considering the number of graduates involved. In Engineering and Architecture,

there was a slight decrease in graduates in the highest match category (specific qualifications and related job duties) between 1998 and the other two years, although the match percentages remained relatively high for all of the three cohorts, as in the case of Health Sciences.

Table 2 | Changes in the education-job match, according to field of study and gender

Education-job match		Humanities		Social Sciences	
		Males *n* (%)	Females *n* (%)	Males *n* (%)	Females *n* (%)
(1) Set_quals_Rel_job	1998	*118 (40.1)*	*322 (44.0)*	*545 (57.9)*	*1,504 (59.7)*
	2001	*169 (37.0)*	*477 (43.3)*	*762 (54.5)*	*1,979 (59.5)*
	2004	*194 (36.9)*	*517 (45.0)*	*862 (56.1)*	2,517 (64.7)
(2) Set_quals_Unrel_job	1998	*17 (5.8)*	*52 (7.1)*	96 (10.2)	257 (10.2)
	2001	15 (3.3)	51 (4.6)	58 (4.2)	152 (4.6)
	2004	25 (4.8)	**74 (6.4)**	*56 (3.6)*	181 (4.7)
(3) Uni_deg_Rel_job	1998	—	—	—	—
	2001	48 (10.5)	125 (11.3)	153 (11.0)	334 (10.0)
	2004	76 (14.4)	**171 (14.9)**	195 (12.7)	*390 (10.0)*
(4) Uni_deg_Unrel_job	1998	—	—	—	—
	2001	16 (3.5)	**57 (5.2)**	**77 (5.5)**	139 (4.2)
	2004	22 (4.2)	**67 (5.8)**	**74 (4.8)**	155 (4.0)
(5) No_deg_Rel_job	1998	24 (8.2)	**72 (9.8)**	**110 (11.7)**	**225 (8.9)**
	2001	**42 (9.2)**	**73 (6.6)**	82 (5.9)	**152 (4.6)**
	2004	50 (9.5)	69 (6.0)	125 (8.1)	**253 (6.5)**
(6) No_deg_Unrel_job	1998	**135 (45.9)**	**286 (39.1)**	**190 (20.2)**	535 (21.2)
	2001	**167 (36.5)**	**319 (28.9)**	**265 (19.0)**	516 (15.5)
	2004	**159 (30.2)**	**251 (21.8)**	**225 (14.6)**	394 (10.1)
Total Field	1998	294 (100)	732 (100)	941 (100)	2,521 (100)
	2001	457 (100)	1,102 (100)	1,397 (100)	3,325 (100)
	2004	526 (100)	1,149 (100)	1,537 (100)	3,890 (100)

Care should be taken however when interpreting the data on changes in the match over the years as the categories evaluated in each of the three cohorts do not coincide exactly. Moreover, the fact that there are only four categories for 1998, instead of six, may result in bias in the percentages corresponding to each category.

Experimental Sciences		Health Sciences		Engineering and Architecture	
Males *n* (%)	Females *n* (%)	Males *n* (%)	Females *n* (%)	Males *n* (%)	Females *n* (%)
112 (56.6)	219 (61.3)	**120 (87.6)**	**473 (88.7)**	**961 (72.3)**	**362 (76.2)**
177 (55.8)	299 (57.3)	**192 (85.3)**	**699 (88.8)**	**1,309 (63.5)**	**460 (65.6)**
236 (60.8)	386 (65.5)	**210 (86.4)**	**893 (85.6)**	**1,280 (63.5)**	472 (64.5)
28 (14.1)	**50 (14.0)**	8 (5.8)	*27 (5.1)*	152 (11.4)	**58 (12.2)**
25 (7.9)	**39 (7.5)**	*9 (4.0)*	*17 (2.2)*	97 (4.7)	36 (5.1)
20 (5.2)	**51 (8.7)**	4 (1.6)	*18 (1.7)*	**116 (5.8)**	**55 (7.5)**
—	—	—	—	—	—
45 (14.2)	58 (11.1)	*12 (5.3)*	*33 (4.2)*	258 (12.5)	**90 (12.8)**
46 (11.9)	66 (11.2)	*17 (7.0)*	*63 (6.0)*	246 (12.2)	**103 (14.1)**
—	—	—	—	—	—
13 (4.1)	24 (4.6)	*1 (0.4)*	*8 (1.0)*	*55 (2.7)*	19 (2.7)
25 (6.4)	31 (5.3)	*1 (0.4)*	*14 (1.3)*	*40 (2.0)*	*17 (2.3)*
18 (9.1)	24 (6.7)	*6 (4.4)*	*13 (2.4)*	123 (9.2)	*25 (5.3)*
9 (2.8)	21 (4.0)	*3 (1.3)*	*11 (1.4)*	123 (6.0)	32 (4.6)
19 (4.9)	*13 (2.2)*	*6 (2.5)*	*20 (1.9)*	**182 (9.0)**	41 (5.6)
40 (20.2)	64 (17.9)	*3 (2.2)*	*20 (3.8)*	*94 (7.1)*	*30 (6.3)*
48 (15.1)	81 (15.5)	*8 (3.6)*	*19 (2.4)*	221 (10.7)	*64 (9.1)*
42 (10.8)	*42 (7.1)*	*5 (2.1)*	*35 (3.4)*	*151 (7.5)*	44 (6.0)
198 (100)	357 (100)	137 (100)	533 (100)	1,330 (100)	475 (100)
317 (100)	522 (100)	225 (100)	787 (100)	2,063 (100)	701 (100)
388 (100)	589 (100)	243 (100)	1,043 (100)	2,015 (100)	732 (100)

For each cohort, the percentages represent the proportion of graduates who marked a certain education-job match category in relation to the total number of graduates in their field of study. For example, the 322 female graduates in Humanities in 1998 who responded to category 1 (specific qualifications and related job duties) represent 44% of the total number of female graduates in the Humanities (732; 100%) for that year. Values corresponding to corrected standardised residuals > |1,96| are highlighted in the table: positive values are in bold, negative values in italic.

3.1.2. The graduates' rating of competence-based learning at university and its job usefulness, according to the education-job match

The objective in this section was to analyse whether there are any differences in the graduates' perception of their level of competences acquired at university and its usefulness in their job, according to the perceived degree of education-job match. The analysis of the results shows that there are differences in the way graduates value the level of competence-based learning received at university, and especially its usefulness in the workplace, according to graduate labour market outcomes three years after graduation. Those with job duties related to their qualifications gave slightly higher ratings for acquired learning, especially in the skills of theoretical and practical learning, teamwork and leadership. The differences, however, are very small, although they are statistically significant due to sample size, and some of these disappear according to the field of study.

In the case of job usefulness, the differences between the mean scores for both groups are significantly greater for all the competences evaluated. The fact that usefulness is valued differently according to whether the graduate's job matches with his/her degree probably depends on the duties and responsibilities they have in their respective jobs. Table 1 in Appendix 3 shows the mean scores for the rating of competence-based learning in the fourteen competences covered by the survey and their usefulness in graduate jobs for the two job-match categories (related job duties and unrelated job duties).

3.2. The development of competence-based learning at university

To evaluate the changes in the Catalan public higher education system in relation to competence-based learning, this section covers an analysis made of the changes in the perceptions of university graduates over various years regarding their assessment of the level of learning acquired in the fourteen specific competences evaluated in the labour market outcomes survey. To this end, a comparison is made of the responses relating to the three years of graduation (cohorts of 1998, 2001 and 2004) that comprise the sample used in this study. Only the responses from graduates working in jobs that called for specific job duties and responsibilities related to their undergraduate degree studies were considered, given the importance of knowing in particular the impressions of graduates who had acquired a job matched with their studies and who were therefore in a better position to assess the education they received at university in terms of occupational demands. On the other hand, jobs not bearing any relation to undergraduate studies could lead to bias in the graduates' assessments, given the differences that are shown in Table 1 of the Appendix.

It was decided, first, to conduct an exploratory principal components factor analysis (PCA) on the series of fourteen competences evaluated in the labour market outcomes survey in order to reduce the number of factors to work with. The result of the factor analysis shows a five axis structure with a total explained variance of 68.18%. The first factor encompasses management skills (decision-making, problem solving, leadership, management skills, teamwork); the second includes communication-related competences (oral and written expression); general academic competences (critical thinking, documentation skills) form part of the third; the fourth consists of instrumental skills (languages, computing skills); and the fifth consists of theoretical and practical competences (theoretical learning and practical learning). The detailed analysis is given in Appendix 2.

The changes in the ratings for the acquired level of competence-based learning in each of the five factors according to field of study are given in the graphs below. Each graph (Figures 1 to 5) shows two lines (vertical and horizontal) that indicate the mean values for the corresponding factor for the overall sample (2001 and 2004, respectively). These lines have a base value of 0 because the mean scores are expressed as standard factor scores. The diagonal line corresponds to the line $y = x$ which indicates whether the behaviour of the factor in a given field of study is maintained or not in both periods. When a field of study is located above the line it indicates that there was an increase in the average rating for the factor between 2001 and 2004; conversely, when an area is below the line it means that there was a decrease in the average rating given by graduates in the field of study for that factor and, therefore, that graduates in 2004 perceived they had a lower level of learning relative to their fellow students in the same subject who graduated in 2001.

Regarding the first factor (management-related competences, Figure 1), it can be seen that there was an increase in the graduates' ratings between 2001 and 2004 for all fields of study. The scores for these competences by graduates in Engineering and Architecture were higher than the average for all fields of study as a whole (to the right of the vertical line and above the horizontal line, which represent the sample means) in both 2001 (horizontal axis) and 2004 (vertical axis). The lowest ratings in relation to the other fields of study were in Humanities, in both 2001 and 2004, although it can also be seen that there was an improvement in the rating of these competences between the two cohorts.

As for communication skills, Figure 2 shows an increase in the ratings of graduates in the 2004 cohort relative to those from 2001 for all fields of study. Studies in the Humanities, and to a lesser degree in the Social Sciences, had a higher than average score in both 2001 and 2004, while those in Engineering and Architecture, followed by Experimental Sciences, had the lowest scores compared to the five fields of study as a whole, in both 2001 and 2004. In all cases the trend was positive between the two cohorts.

The changes in the case of general academic skills are much smaller (Figure 3). There was a slight drop for Humanities, Engineering and Architecture, and the Social Sciences from 2001 to 2004. The Humanities stand out as having the highest scores in these competences, with above the mean values for the five fields of study in both 2001 and 2004. Values for the Health Sciences were below the average for these competences, although there was very little difference between the two cohorts.

In terms of instrumental competences (Figure 4), it can be seen there was an increase in the ratings of 2004 compared to 2001 in all fields of study. The Health Sciences had the lowest scores compared to the overall mean, in both 2001 and 2004, while the highest scores were in Engineering and Architecture, especially in 2004.

In the case of theoretical and practical competences (Figure 5), the variations between the two periods are minimal. The values for the Health Sciences and Experimental Sciences were above the average, while those for the Humanities and Social Sciences were below the average. The fact that theoretical and practical learning were combined under the same factor may explain these results.

The series of figures appear to indicate that the Catalan universities have committed to developing generic competences that are more related to the demands of the professional market, while continuing to cater for learning of a more traditional, theoretical and practical nature. This can be seen from the slight increase in the ratings of graduates in all fields of study for skills associated with decision-making, problem solving, leadership capabilities, teamwork, oral and written expression, languages and computing skills. Improvement is still necessary however in critical thinking and documentation skills.

Figure 1 | Change in the perceived level of competence-based learning in management skills between 2001 and 2004 according to field of study

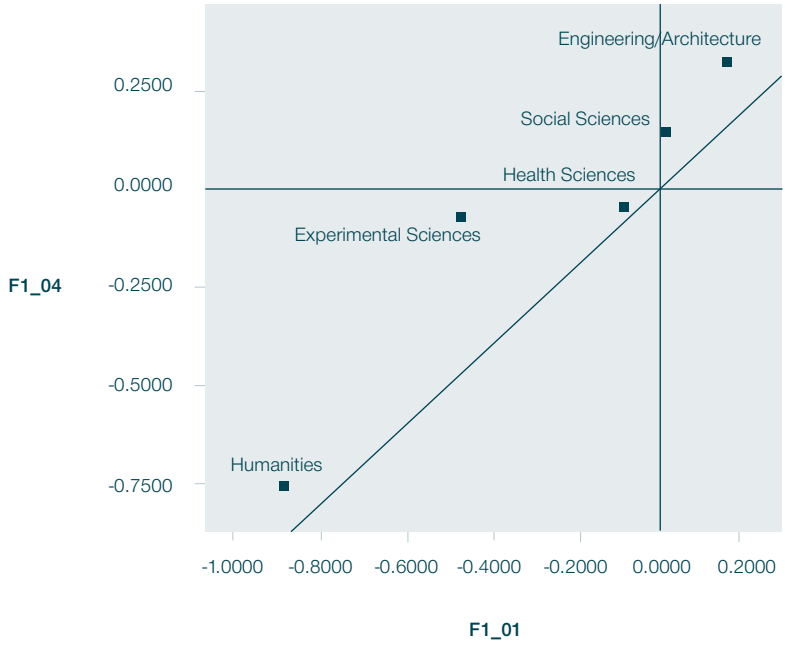


Figure 2 | Change in the perceived level of competence-based learning in communication between 2001 and 2004 according to field of study

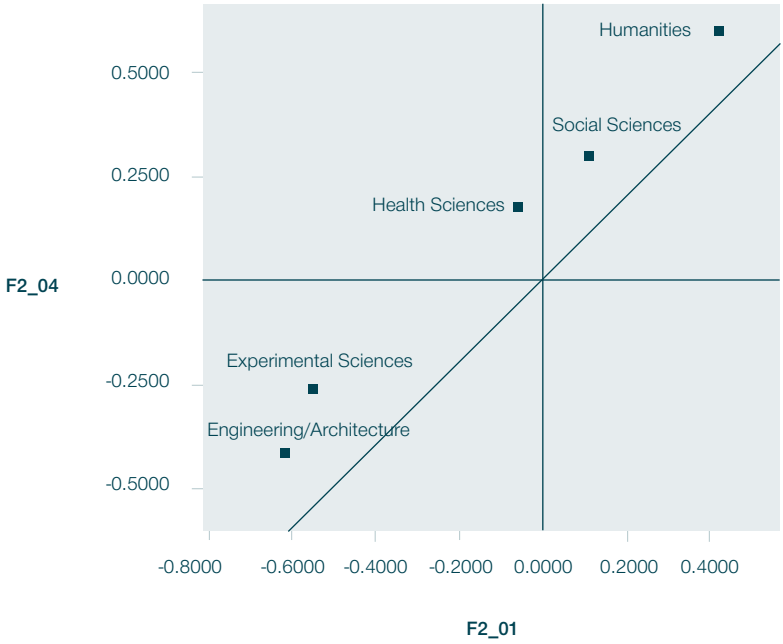


Figure 3 | Change in the perceived level of learning of general academic competences between 2001 and 2004 according to field of study

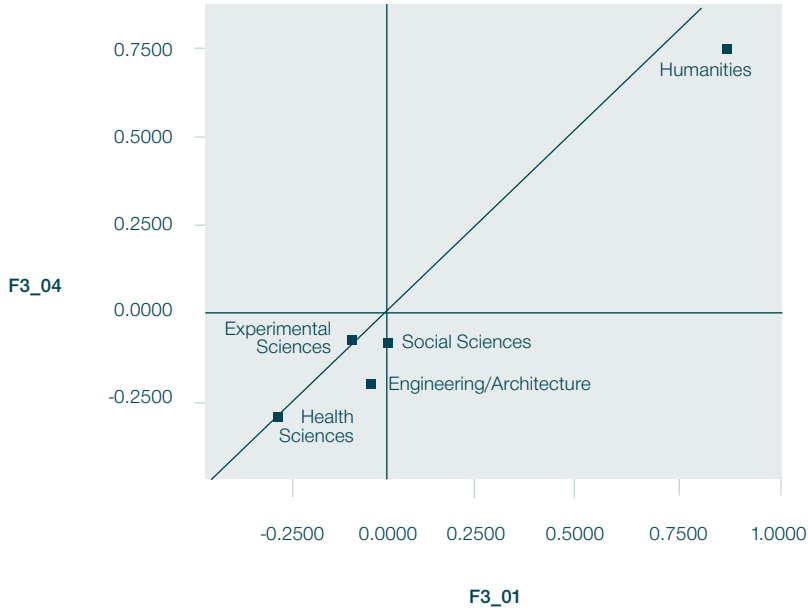


Figure 4 | Change in the perceived level of learning of instrumental competences between 2001 and 2004 according to field of study

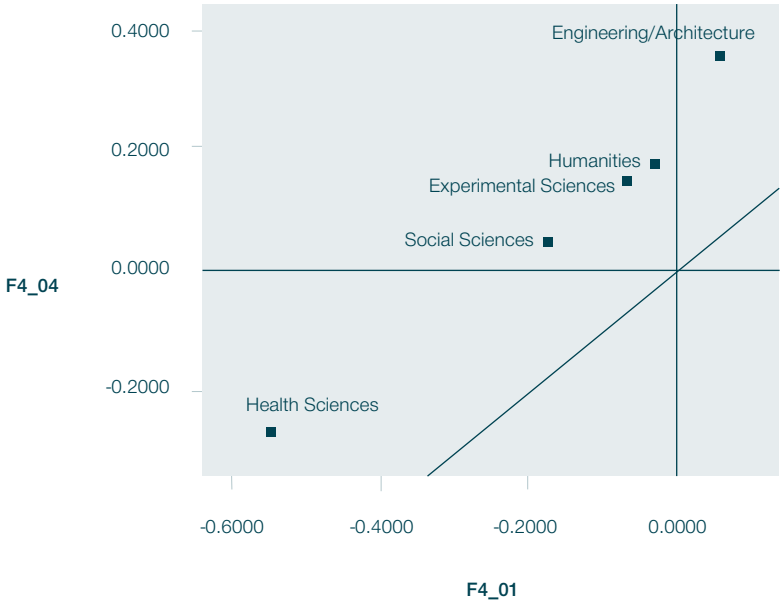
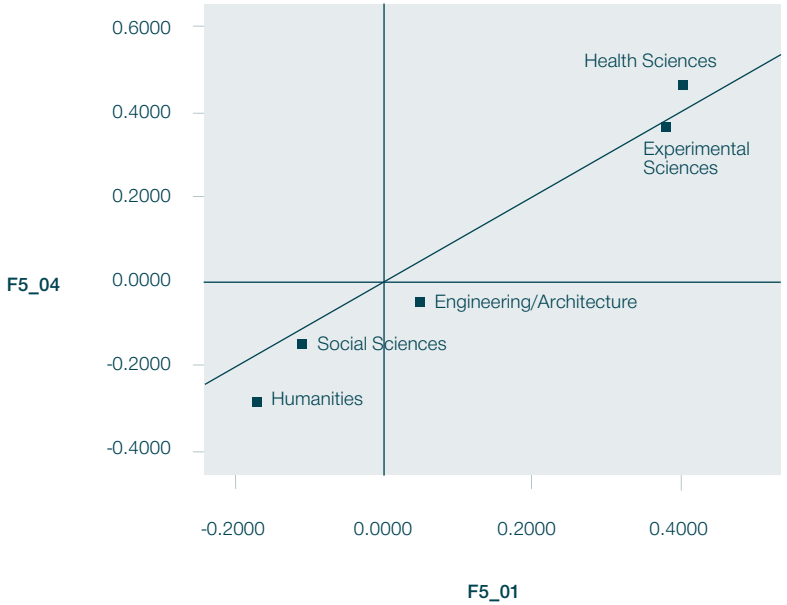


Figure 5 | Change in the perceived level of learning of theoretical and practical competences between 2001 and 2004 according to field of study



As a way of comparing the results for the three cohorts consulted in the successive waves in which the survey was applied, an analysis was also made of the data for 1998 in relation to those from 2001 in the four competences for 1998 for which there is sufficient available data: theoretical learning, practical learning, teamwork and problem-solving. Figures 6 to 9 show the results of the comparisons between the mean ratings for the two cohorts for each of the four competences. As with the previous cases, the horizontal and vertical lines of the graph represent the overall mean for the two cohorts and the diagonal line shows the changes that have occurred in the ratings between the two periods studied. In this case the mean scores are the direct scores on the scale of 1 to 7 in which the questions were formulated and not the standardised scores used in the previous section where the results were projected on the factorials axes.

Figure 6 | Change in the perceived level of learning of theoretical competences between 1998 and 2001 according to field of study

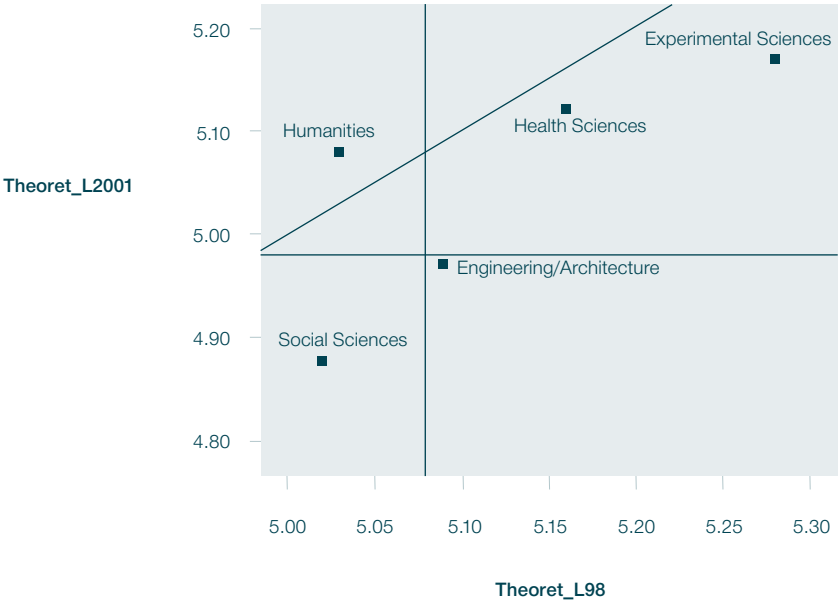


Figure 7 | Change in the perceived level of learning of practical competences between 1998 and 2001 according to field of study

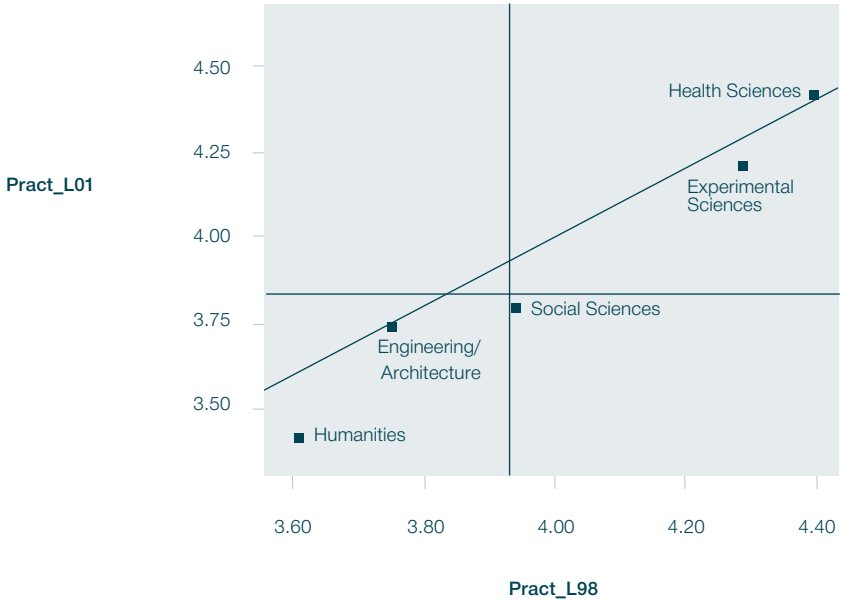


Figure 8 | Change in the perceived level of competence-based learning in teamwork between 1998 and 2001 according to field of study

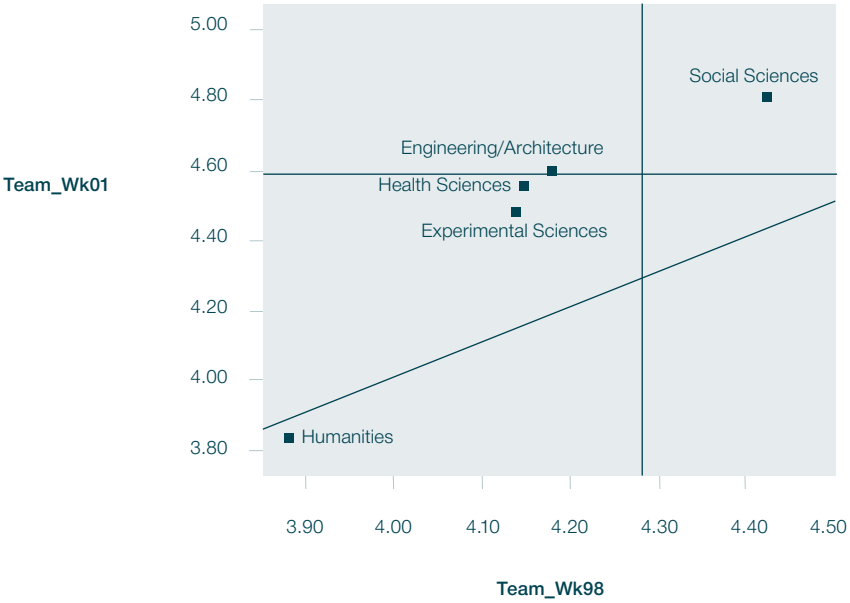
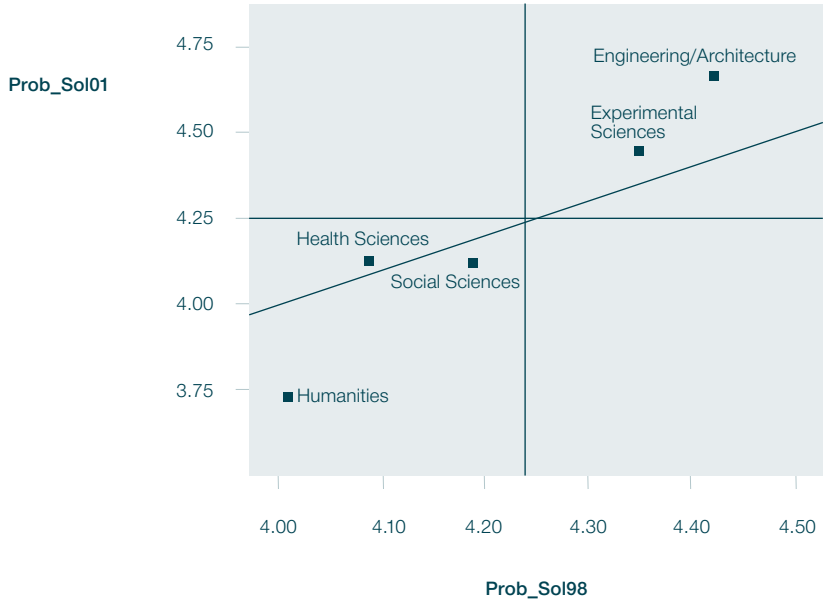


Figure 9 | Change in the perceived level of competence-based learning in problem solving between 1998 and 2001 according to field of study



The only increase in the ratings for theoretical learning was in Humanities from 1998 to 2001 (Figure 6). The fields of study with scores higher than the average were Experimental Sciences and Health Sciences, whereas the lowest were for Social Sciences.

There was hardly any change between the two cohorts with regard to practical learning (Figure 7). The Health Sciences and Experimental Sciences had the highest scores and Humanities the lowest.

The rating for teamwork was higher for all fields of study, except for Humanities. Social Sciences had the highest scores and Humanities the lowest (Figure 8).

As for problem solving, there was an increase in the rating for Engineering/Architecture and Experimental Sciences, whereas for Humanities it was lower. Engineering/Architecture and Experimental Sciences had the highest ratings relative to the average, and Humanities the lowest (Figure 9).

3.3. Changes in the gap between the acquired level of competence-based learning and graduate job usefulness

Graduates could be asked to assess their university education immediately on finishing their studies/degree; however, in order to be able to establish whether certain competences have been acquired – on the understanding that these competences are made evident in practice – they need to be consulted once they have already entered the labour market, i.e. after gaining employment. Regarding this point, Heijke et al. (2003) make an interesting distinction between the skills acquired during the learning stage that are directly applicable to professional work, skills acquired during the learning phase that facilitate the acquisition of new skills after graduation, and skills acquired within the context of the workplace.

If the intention however is to establish the deficit or surplus of a particular competence acquired during undergraduate studies and its usefulness in professional contexts, both of these issues need to be assessed at the same time (Allen, 2005). This simultaneousness may have an influence or lead to bias in the ratings. In order to test whether in fact there is any bias in the response ratings, the Pearson product-moment correlations were calculated between each pair of variables (learning and usefulness) for each of the fourteen competences assessed. The results are given in Table 2 in Appendix 3, and they show that the correlations between the level of perceived learning in relation to its job usefulness for each competence are considerably high, which may indicate the existence of a certain response tendency by graduates when they answered both questions at the same time. In fact, from the diagonal line in the graph, it can be seen that the correlations between each pair of variables are much higher and more similar to each other than the other correlations between the different competences.

3.3.1. Analysis of the gaps between the ratings for the acquired level of competence-based learning and graduate job usefulness

When the universities analyse the match between their provision of competence-based learning and the usefulness of these competences for the professional responsibilities and duties in graduate jobs, it is important to know what gaps exist between the two ratings, and also if there is any change in any mismatch over time and the distribution of any such mismatch according to the field of knowledge. The data in Table 3 enable a detailed analysis of these three issues to be carried out according to the cohort and field of knowledge.

It can be clearly seen that, for all of the three graduation cohorts covered in the study, all of the fields of knowledge and all of the competences considered, there is a mismatch between the perceived level of learning by graduates and their assessment of job usefulness. In all cases, except for theoretical learning (which used to be the priority objective in traditional academic study), the rating for job usefulness was higher than the rating for the level of learning acquired at university.

Table 3 | Gaps between the assessment of the level of competence-based learning attained at university and graduate job usefulness

		Humanities			Social Sciences		
		n	$\bar{x}$	*s*	*n*	$\bar{x}$	*s*
Theoretical learning	1998	528	.58	1.57	2,361	.33	1.41
	2001	932	.78	1.83	932	.52	1.40
	2004	1,077	.46	1.51	4,342	.28	1.23
Practical learning	1998	506	-.39	1.88	2,314	-.63	1.87
	2001	927	-.55	1.99	3,499	-.58	1.64
	2004	1,077	-.45	1.57	4,342	-.44	1.38
Written expression	1998	0	-	-	0	-	-
	2001	929	-.12	1.54	3,489	-.47	1.42
	2004	1,077	-.20	1.27	4,341	-.47	1.24
Oral expression	1998	0	-	-	0	-	-
	2001	928	-1.12	1.97	3,485	-1.02	1.74
	2004	1,077	-.70	1.68	4,342	-.79	1.54
Teamwork	1998	525	-.60	1.95	2,353	-.80	1.78
	2001	931	-.73	1.86	3,500	-.52	1.51
	2004	1,077	-.81	1.61	4,341	-.56	1.34
Leadership	1998	261	-1.32	2.03	1,313	-1.30	1.85
	2001	843	-.99	1.73	3,476	-.83	1.62
	2004	1,077	-.92	1.63	4,338	-.85	1.55
Problem-solving	1998	523	-.75	1.95	2,351	-1.22	1.74
	2001	923	-1.22	1.87	3,493	-1.09	1.67
	2004	1,077	-1.20	1.87	4,341	-1.07	1.63
Decision-making	1998	0	-	-	0	-	-
	2001	926	-1.25	1.83	3,488	-1.20	1.68
	2004	1,076	-1.24	1.78	4,340	-1.11	1.63
Critical thinking	1998	261	-.19	1.94	1,310	-.71	1.70
	2001	930	-.08	1.69	3,487	-.46	1.60
	2004	1,077	-.12	1.47	4,341	-.49	1.47
Creativity	1998	259	-1.08	2.02	1,295	-1.27	1.82
	2001	930	-.75	1.75	3,498	-.85	1.62
	2004	1,077	-.70	1.59	4,342	-.83	1.58

Experimental Sciences			Health Sciences			Engineering and Architecture		
n	x̄	*s*	*n*	x̄	*s*	*n*	x̄	*s*
370	.38	1.55	609	-.23	1.35	1,458	.48	1.39
603	.81	1.65	939	.26	1.34	2,266	.26	1.41
766	.51	1.47	1,209	.21	1.22	2,324	.39	1.29
364	-.39	1.79	607	-1.08	1.82	1,440	-.64	1.82
603	-.14	1.79	939	-.60	1.76	2,265	-.48	1.70
766	.01	1.68	1,209	-.27	1.36	2,324	-.39	1.46
0	-	-	0	-	-	0	-	-
602	-1.05	1.69	936	-.62	1.59	2,240	-.85	1.55
766	-.82	1.58	1,209	-.50	1.45	2,323	-.83	1.49
0	-	-	0	-	-	0	-	-
602	-1.49	1.94	935	-1.23	1.77	2,238	-1.23	1.84
766	-1.04	1.77	1,209	-.89	1.65	2,323	-1.04	1.69
370	-1.02	1.75	604	-.97	1.76	1,463	-1.09	1.72
604	-.66	1.69	938	-.66	1.60	2,264	-.58	1.53
766	-.81	1.48	1,209	-.74	1.55	2,323	-.68	1.40
223	-1.88	1.90	260	-1.12	1.72	741	-2.38	2.02
599	-1.32	1.78	928	-.86	1.56	2,255	-1.35	1.78
766	-1.10	1.66	1,209	-.81	1.46	2,323	-1.37	1.72
369	-1.34	1.79	604	-1.40	1.72	1,456	-1.14	1.73
602	-.97	1.75	936	-1.14	1.62	2,258	-.87	1.48
766	-.97	1.60	1,209	-1.09	1.58	2,323	-.93	1.48
0	-	-	0	-	-	0	-	-
602	-1.47	1.75	938	-1.42	1.81	2,258	-1.35	1.68
766	-1.31	1.64	1,209	-1.25	1.66	2,323	-1.45	1.68
223	-1.00	1.72	262	-.92	1.77	743	-1.20	1.71
601	-.63	1.58	934	-.88	1.51	2,245	-.69	1.45
766	-.72	1.56	1,209	-.81	1.51	2,323	-.81	1.46
224	-1.64	1.83	259	-1.45	1.64	745	-1.51	1.86
603	-1.05	1.73	933	-.90	1.56	2,258	-.71	1.56
766	-1.04	1.59	1,209	-.77	1.50	2,323	-.78	1.59

Table 3 (*continuation*) | Gaps between the assessment of the level of competence-based learning attained at university and graduate job usefulness

		Humanities			Social Sciences		
		n	$\bar{x}$	*s*	*n*	$\bar{x}$	*s*
Management skills	1998	260	-1.30	1.82	1,305	-1.38	1.69
	2001	850	-1.04	1.81	3,488	-.86	1.55
	2004	1,075	-1.02	1.73	4,340	-.80	1.47
Documentation skills	1998	0	-	-	0	-	-
	2001	933	-.17	1.69	3,501	-.46	1.64
	2004	1,076	-.31	1.54	4,341	-.51	1.40
Languages	1998	0	-	-	0	-	-
	2001	930	-.88	2.01	3,493	-1.04	2.06
	2004	1,077	-1.04	2.02	4,340	-1.16	2.02
Use of computers	1998	0	-	-	0	-	-
	2001	933	-1.89	2.21	3,503	-1.54	2.04
	2004	1,077	-1.79	2.07	4,342	-1.37	1.85

Experimental Sciences			Health Sciences			Engineering and Architecture		
n	x̄	*s*	*n*	x̄	*s*	*n*	x̄	*s*
225	-1.87	1.78	261	-1.46	1.78	743	-1.81	1.77
597	-1.25	1.74	935	-1.08	1.67	2,259	-1.20	1.68
766	-1.15	1.66	1,208	-.94	1.65	2,323	-1.20	1.63
0	-	-	0	-	-	0	-	-
604	-.83	1.82	938	-.57	1.85	2,262	-.51	1.61
766	-.78	1.67	1,209	-.76	1.55	2,324	-.61	1.47
0	-	-	0	-	-	0	-	-
602	-1.94	2.31	931	-1.55	2.06	2,260	-1.63	2.16
766	-1.18	2.23	1,209	-1.45	2.09	2,323	-1.92	2.17
0	-	-	0	-	-	0	-	-
603	-1.35	1.95	933	-1.70	2.13	2,222	-1.27	1.84
766	-1.32	1.86	1,209	-1.49	1.91	2,323	-.97	1.65

This mismatch will be more or less important according to the starting point on which the rating for graduate learning is based. A mismatch of 1 point when the assessed level of learning is 5 on a scale of 1 to 7 is not the same as when the assessed level is 2. Most of the scores by Catalan graduates from the three cohorts for competence-based learning were between 3.5 and 5.5, except for language learning, computing skills and leadership, which were slightly lower than other skills (see Table 3 in Appendix 3). Given this considerable similarity, in the following analysis consideration is given to the direct mismatch between both ratings, regardless of the actual assessment of their studies.

Taking the sample as a whole, it cannot be definitively concluded that there is any trend towards a reduction in the gaps for all of the competences analysed. There is a certain reduction in the differences of certain competences, mainly between 1998 and the other two graduation cohorts, but care should be taken in the interpretation of this, given the different classification for the competence categories dealt with in the survey in 1998. Although there are a few cases of a decrease in the gaps in the 2004 survey in comparison to previous surveys, there is no pattern on which to infer any constant in the education-job fit of these competences.

Disaggregation of the data according to the field of study broadly speaking shows a reduction in the gap between 2001 and 2004 in oral expression in all fields of study, written expression in Experimental Sciences, Health Sciences and Engineering/Architecture, decision-making in Social Sciences, Experimental Sciences and Health Sciences, documentation skills in Experimental Sciences, languages in Experimental Sciences and Health Sciences, and computing skills in all fields of study.

If a comparison is made between the three cohorts, the reduction in mismatch can be seen mainly in:

- Practical learning in the Health Sciences and Engineering/Architecture.
- Problem-solving in the Social Sciences and Health Sciences.
- Creativity in the Humanities, Social Sciences, Experimental Sciences and Health Sciences.
- Management skills in all fields of study.

Nevertheless, the differences between those who graduated in 2001 and 2004 are very small for the majority of the competences and fields of study analysed.

Despite the use of means, it is important to bear in mind that, in overall terms and as can be seen from Table 4, almost 45% of graduates rated the acquired level of competence-based learning and the job usefulness of the competences as being the same; the range for cases where a higher rating for usefulness relative to learning – excluding theoretical learning – was between 36.3 percent and 56 percent; moreover, between 5.3 percent and 18 percent of the survey respondents, not just in theoretical learning but in all of the competences, felt they had a learning surplus relative to job usefulness.

Table 4 | Percentage of graduates according to the gap between education-job usefulness

Competences	*n*	No gap	Deficit	Surplus
Theoretical learning	23,259	38.3	20.7	41.0
Practical learning	23,155	45.2	36.8	18.0
Written expression	17,912	52.6	36.3	11.1
Oral expression	17,905	47.5	44.5	8.0
Teamwork	23,238	45.7	42.3	12.0
Leadership	20,588	44.3	48.5	7.2
Problem-solving	23,200	41.0	51.3	7.6
Decision-making	17,926	40.0	54.7	5.3
Critical thinking	20,689	45.9	40.9	13.3
Creativity	20,698	42.2	47.4	10.4
Management skills	20,612	43.8	49.8	6.6
Documentation	17,954	46.5	38.7	14.8
Languages	17,931	41.4	50.0	8.6
Computing skills	17,911	37.0	56.0	7.0

3.3.2. Analysis of the gaps according to each competence

In order to obtain more details, an analysis was made of changes in the mismatch between different subjects for each of the fourteen competences dealt with in the survey (the details are given in Table 4 in Appendix 3).

As for **theoretical learning**, the characteristic difference relative to other competences is that the balance is always positive (except in the case of Law). Considering that this competence includes what was traditional academic learning, these results can be interpreted as being a perceived excess of theoretical learning relative to graduate job requirements. The observed gaps are not very large however and, in general, there is a predominance of medium-low values (lower than 0.80). In Humanities, the values are slightly higher for Philosophy/Humanities and lower (very low, under 0.40) for Fine Arts. In the Social Sciences, Pedagogy and Education had the lowest gaps, whereas they were slightly higher for Experimental Sciences (around 1) in Physics/Mathematics. In Engineering and Architecture, the figure for Architecture is very low (under 0.40), it is average for Information/Communication (around 1), and the values for Civil Engineering were medium-high (differences

between 1.20 and 1.59). Graduates in Fine Arts, Pedagogy, Education and Architecture agreed that their theoretical learning was on a very similar level to their job requirements and that it was highly useful, whereas graduates in Philosophy, Humanities, Physics, Mathematics and Civil Engineering considered that theoretical learning was not very useful for professional purposes.

With regard to **practical learning**, there is little variability between subjects, with a predominance of values below 0.80 in most cases. Some degrees did not fit into this pattern, such as Philology, Law, Labour Studies and Architecture, which had somewhat higher values (around 1), and Civil Engineering, with values over 1.20. It is important to remember that, for this group, there is a mismatch between theoretical learning and job usefulness. It cannot be said that the values for this mismatch are directly related to the number of practical credits in the respective curricula.

Irrespective of what graduates studied at university and what their job is, **written expression** is a highly necessary instrumental competence. According to the data analysed, the closest match between learning and job usefulness is in subjects in the Humanities, where there were smaller gaps, except for Fine Arts, where the mismatch is slightly higher (values of around 1). Outside of the Humanities, the differences increase. The differences in Social Sciences were between 0.40 and 0.80, whereas in Experimental Sciences they increased to between 0.80 and 1.20. It can thus be assumed that written expression is more intense in the traditional subjects in Humanities than in the sciences, or at least graduates in the respective fields of study see it that way. There is more variability in the Health Sciences and Engineering/Architecture. The highest levels of mismatch were in Civil Engineering and Veterinary Science.

With regard to **oral expression** there is a slight increase in the size difference between learning and usefulness in comparison to written expression. There is a close parallel however with written expression in terms of the slight increase in the gap in subjects in the Social Sciences in comparison to Humanities, and in the Experimental Sciences relative to the Social Sciences. There is also a higher variability in subjects in the Health Sciences and Engineering/Architecture, as in the case of written expression. Fine Arts, Civil Engineering and Veterinary Science all had high or very high values (over 1.60).

Competence-based learning in **team work** has become one of the main demands made by the labour market on higher education institutions in recent years. There is a certain match in the majority of subjects in terms of the competences acquired and their usefulness in graduate jobs, with differences between 0.40 and 1.20 between the two. There were particularly low values (below 0.40) for Industrial Relations, Political Science, Communication, Documentation, Pedagogy, Education, Health Sciences (first cycle specialisations) and Veterinary Science, and slightly higher ones (between 1.20 and 1.60) for Economics/Business Administration and Management and Law in the Social Sciences, and Civil Engineering in Engineering/Architecture.

No trend or pattern can be seen between the three cohorts, where the values are all similar. This skill is developed and fostered in students through practice in work done with others at university, and teamwork is a constant later on in their professional careers.

Leadership as a competence/skill is not usually found in traditional university curricula. The survey data actually show graduates gave relatively low ratings for learning acquired in this competence, with means between 2.81 for graduates in Humanities and up to 3.53 in the case of Social Sciences. In terms of the gap between learning and job usefulness, there were differences above 0.80 in most subjects, although with considerable variability. In the Social Sciences, there are high values (over 1.60) for Economics/Business Management and Administration, as well as Psychology, and low values (below 0.40) in the case of Industrial Relations, Pedagogy and Education. For the Health Sciences (first cycle specialisations), the values were different to the general trend with values between 0.40 and 0.80, whereas in Engineering and Architecture, the subject with the highest values (above 1.60) is Civil Engineering.

With regard to **problem-solving**, there is considerable variability between subjects in terms of the match between degree and job usefulness. Although the general trend shows a range of values from 0.80 to over 2, there were low-level gaps in Physics/Mathematics and Civil Engineering. Problem-solving is a skill that is particularly specific to these subjects. On the contrary, the highest values are seen in Law, the Social Sciences, and Medicine/Odontology, Pharmacy and Veterinary Science in the Health Sciences.

There is a considerable similarity between **decision-making** and problem-solving in terms of both the ratings and the changes between the three cohorts, which are barely noticeable. In Humanities, the differences have average values, which increase in Catalan Studies, Hispanic Studies and Fine Arts. In the Social Sciences, the values were between 0.80 and 1.50, with Law, Economics/Business Management and Administration and Political Science at the upper end, and Business Studies, Industrial Relations and Education at the lower end. In Experimental Sciences, Chemistry and Biology, the values reach close to 1.50, whereas in Physics and Mathematics the differences are around 1. Medicine/Odontology, Pharmacy and Veterinary Science have considerably higher values (up to 1.60) than Health Sciences (first cycle specialisations), the figure for which is around 0.90. In Engineering and Architecture, the highest values are in Nautical Science and Agriculture (around 1.80), and for all of the others it is above 1.

Critical thinking is considered to be typical competence developed by university education and used in the kind of work done by university graduates. According to the data analysed, this would still seem to be the case, with high mean ratings for all fields of study (with averages above 4 in all three cohorts and all fields of study). In terms of gaps between the level of learning and job usefulness, the differences are

relatively low in most subjects (under 0.80), except for Fine Arts and Medicine/Odontology, Pharmacy and Veterinary Medicine, with medium and medium-to-high values (between 0.80 and 1.60).

With **Creativity** there is a pattern of behaviour in the observed education-job mismatch with most values being between 0.40 and 1.60. The subjects with the highest values are Psychology, Chemistry, Medicine/Odontology and Pharmacy. The lowest values are for Architecture (the artistic dimension of this competence is very present in both the learning stage and professional activity of this profession).

With regard to **management skills**, the Humanities and Social Sciences have average mismatch values (between 0.80 and 1.20), with the highest values in Psychology and the lowest in Documentation. In Experimental Sciences (especially in the case of Chemistry), Health Sciences (except for first cycle specialisations) and Engineering and Architecture (where Civil Engineering stands out), the values of the differences are between 1.20 and 1.60. Management skills are usually necessary, to a greater or lesser degree, in all of the professions associated with university graduates. The universities certainly need to promote strategies to further develop this competence.

As regards the education-job gap relative to **documentation skills**, low and medium-to-low values (below 0.80) are more common in the Humanities, Social Sciences (the lowest values observed in are in Political Science and Documentation), Health Sciences (except for Medicine/ Odontology, with medium-to-high values between 1.20 and 1.60) and Engineering and Architecture (only with average values between 0.80 and 1.19 in Nautical Science). The values were slightly higher in Experimental Sciences, with average values for all three subjects. This competence has always been fostered in university education, and its usefulness is highly variable according to the professional activity. The low level of mismatch in Documentation is an example of how certain generic competences for graduates as a whole become specific in certain degree programmes.

Language learning has not been a typical feature of university education. This is demonstrated by the low ratings by graduates for competence-based learning in languages at university (M = 2.56, SD = 1.7). Moreover, in line with current conditions of demand in the labour market, there is an education-job mismatch with high and medium-to-high values (between 1.60 and 2) in a large number of subjects, although with some exceptions. In Humanities, the values for Philology subjects are average around 1 (although low in Philology 2: Foreign Languages and Translating and Interpreting), a figure that can be explained by the fact that this is typical for studies in this field of knowledge. In the Social Sciences, there are high and very high gap values (above 1.60) in Communication and Documentation, and medium-to-low values (between 0.40 and 0.80) in Economics/Business Management and Administration and Education. The values in the three subjects in Experimental

Sciences are very high (above 2), whereas the values in the Health Sciences/first cycle specialisations are average (around 1). In Engineering and Architecture, there are very high mismatch values (more than 2) in Advanced Production Technologies and Information/Communication. These variations are probably associated with the graduates' need for information and to be aware of and up-to-date with leading-edge research and developments in the professional field, together with intense collaboration with colleagues in other countries.

The need for **computing skills** in all university professions is very intense and continues to grow. Moreover, there are certain subjects where computing skills form an intrinsic part of the curriculum. In cases such as these, the values of the observed education-job mismatch are lower than for all other degrees, which shows a higher match between learning and the market requirements for these studies. As a whole, there are high range education-job differences in the case of Humanities, with very high values (above 2) in Fine Arts, Hispanic Studies and Catalan Studies. In the Social Sciences, there are very high values in Law and Industrial Relations, whereas the values in Documentation and Education had average values (around 1). In the Experimental Sciences, Physics/Mathematics also had average values. In Health Sciences, there are also average values for first cycle specialisations and Veterinary Science, whereas Medicine/Odontology and Pharmacy had high values (above 1.60). In Engineering and Architecture, Architecture stands out with very high values (above 2), and, at the other extreme, with medium-to-low and low values (below 0.80), Information/Communication (both technical and higher), which are subjects that have an obvious computing skills content in the curricula.

3.4. The impact of postgraduate study on job quality

The fourth aim of the study was to examine the strategies of Catalan graduates regarding further studies during the years immediately following completion of their first or second cycle degree. Table 5 shows the distribution of the responses to the question, "From the time when you completed your studies, did you continue to study, or are you still studying?" which had six possible answers: "No", "Yes, specialist courses", "Yes, a Bachelor's degree", "Yes, a postgraduate course or Master's degree", "Yes, a doctoral degree" or "Others". In the table, a new variable was added to distinguish between holders of non-technical first cycle and second cycle qualifications, and between holders of technical first cycle and second cycle qualifications (architects and engineers).[7]

[7] Relative to the pre-Bologna system.

Table 5 | Response rates to the different categories of postgraduate study according to the type of first or second cycle undergraduate degree[8]

Degree type		Further studies: No	Yes, specialist courses	Yes, a second-cycle degree	Yes, a postgrad./ master's	Yes, a doctorate	Yes, others	Total
First cycle	*n*	1,549	1,334	1,368	1,124	35	400	5,810
	%	26.7%	23.0%	23.5%	19.3%	0.6%	6.9%	100.0%
Second cycle	*n*	2,393	1,772	1,093	2,557	993	771	9,579
	%	25.0%	18.5%	11.4%	26.7%	10.4%	8.0%	100.0%
Second cycle Eng./Arch.	*n*	749	420	224	494	204	158	2,249
	%	33.3%	18.7%	10.0%	22.0%	9.1%	7.0%	100.0%
First cycle Eng./Arch.	*n*	978	575	720	503	34	192	3,002
	%	32.6%	19.2%	24.0%	16.8%	1.1%	6.4%	100.0%
Total		**5,669**	**4,101**	**3,405**	**4,678**	**1,266**	**1,521**	**20,640**
%		**27.5%**	**19.9%**	**16.5%**	**22.7%**	**6.1%**	**7.4%**	**100.0%**

Care should be taken when analysing the results shown in table 5, given that the data only apply to graduates with a job specifically related to their qualifications; moreover, the survey only covers one continuous learning process for each participant whereas in fact students may have undergone different learning processes. It is assumed that the respondent's answer was relative to the most "important" one.

As can be seen from the table, one third of all first and second-cycle technical degree holders (architects and engineers) did not continue their studies, whereas in the case of first and second cycle non-technical degree holders it was a quarter. A Bachelor degree was the preferred choice of first-cycle non-technical degree holders and first-cycle architects and engineers, whereas for second-cycle architects and engineers and second cycle non-technical degree holders, the study of a Bachelor degree implied they went on to take a second degree. Conversely, postgraduate

[8] Relative to the pre-Bologna system.

courses and Master's degrees were the preferred choice of holders of a Bachelor degree and second cycle architects and engineers.

There were fewer cases of doctoral degrees (approximately 10% of second cycle graduates). The few cases among first-cycle degree holders and first-cycle engineers probably correspond to people who went on to take a second-cycle degree after their first-cycle degree and then a PhD.

Specialist courses are a way of studying that is similar to all four groups and they accounted for 20% of the study options. The main difference was between first cycle non-technical degree holders and all other graduates.

"Others" includes miscellaneous learning in languages, computing skills and other instrumental skills and accounted for around 7% in all four groups.

In the following section, an analysis is made of the influence of postgraduate study on graduate job quality.

3.5. The returns on university education and graduate job quality

An analysis of the returns from the investment made by universities and the students themselves in terms of competence-based learning is important in the evaluation of the efficacy of the higher education system and of the investment made. For this reason, an empirical model is presented to establish the returns obtained by graduates from their studies at university relative to their job quality status three years after graduation. In specific terms, this involved an analysis of the impact on graduates of learning the fourteen competences covered by the labour market outcomes survey, together with other variables identified in previous studies as being explanatory factors for graduate job quality, namely, the degree studied, gender, sector of employment (public or private), postgraduate study and, in this case, the year of graduation (1998, 2001 and 2004).

To analyse the contribution of these variables to explaining graduate job status, a multi-level regression model was defined where the variable to be explained was the level of graduate job quality achieved three years after graduation, based on the variables mentioned in the previous paragraph.

The choice to use a multi-level model (Goldstein, 1986, 1986b, 1995) was determined by the fact that the sample is clearly segmented according to fields of knowledge, which behave differently in the labour market, as seen in previous sections. Multi-level models enable data to be used where there is a dependence between the observations (in this case, students with the same degree), and they are particularly useful for analysing data within the same context, as in the case of

students with degrees in the same subject. They basically propound an analytical structure on different levels and set out a sub-model for each level. In this model, the first level is made up of university graduates who responded to the survey three years after graduation, with the second level referring to the particular degree programmes taken.

Hierarchical models are made up of two parts: one part that is general and common to all contexts (to all subjects, in this case), also called the fixed part or effect, and a part that is specific to each context, know as the random part or effect. The actual specifications of the model are given in Appendix 2.

The fixed coefficients (β_0, β_j and β_1), as in a typical regression model, explain the impact of different explanatory variables on the dependent variable, the graduate job quality index (JQI), with the other variables in the model taken as constant. In particular, β_0 indicates the base value for all of the individuals in the absence of any explanatory variables.

The empirical model presented here introduces random effects in some of the explanatory variables (gender, sector and year of graduation), in addition to introducing a random effect in the baseline. This type of model, which takes account of the introduction of random effects in the independent term on the explanatory variables, is known generically as a random coefficient model. Random coefficients provide an understanding of the differences in the impact on the dependent variable in the second level of study, i.e. the different degrees studied, in terms of both the baseline effect and the behaviour of several of the explanatory variables introduced.

As an indicator of the job status or level of job quality for defining the empirical model (variable *Y*), the job quality index (Corominas et al., 2007) was used. See Appendix 2 for the details.

As a second level for the model, we decided not to use the specific degree studied as a natural group unit, but to base it on disaggregation according to subject. Working at a level of disaggregation with 122 different degrees would unduly complicate the presentation and interpretation of the results, while the level for the five fields of knowledge was too generic and would fail to discriminate the different behaviour patterns of certain groups of degree qualifications in the labour market. Disaggregation according to the thirty-seven (37) subjects covered by the survey, on the other hand, can be considered a fairly natural grouping from the point of view of explaining graduate job quality. Product Design and Development, together with Specific Philologies, were removed due to the low number of students (5 and 26 graduates with degree-related jobs, respectively),[9] so the model was ultimately defined according to the remaining thirty-five (35) subjects.

[9] Aeronautics does not appear in the model as there was no graduates in this subject working in jobs related to their degree in any of the three cohorts.

The specific model agreed on finally is as follows:

$$JQI_{ik} = \beta_{0k} + \beta_{1k}\ Gender_{ik} + \beta_{2k}\ Sector_{ik} + \beta_{3}\ TheoreticalL_{ik} + \beta_{4}\ PracticalL_{ik} + \beta_{5}Written_{ik} + \beta_{6}\ Oral_{ik} + \beta_{7}\ Teamwork_{ik} + \beta_{8}\ Leadership_{ik} + \beta_{9}\ Problem\ solving_{ik} + \beta_{10}\ Decision\text{-}making_{ik} + \beta_{11}\ Critical\ thinking_{ik} + \beta_{12}\ Creativity_{ik} + \beta_{13}\ Management\ skills_{ik} + \beta_{14}\ Documentation\ skills_{ik} + \beta_{15}\ Languages_{ik} + \beta_{16}\ Computing\ skills_{ik} + \beta_{17k}\ Year\ of\ graduation_{ik} + \beta_{18}\ Further\ studies_{ik} + \boldsymbol{\varepsilon}_{ik}$$

This shows the random effects associated with the subjects (*k*) entered in the baseline effect (β_{0k}) and on the variables of gender (β_{1k}), sector (β_{2k}) and year of graduation (β_{17k}).

The value for the job quality index was modelled according to different explanatory variables, with the first analytical level being the individual and introducing the random effect corresponding to the second level of analysis (in this case, the subject studied) in the baseline effect (β_{0k}) and several of the explanatory variables *X* (gender, sector and year of graduation).

The explanatory variables introduced as fixed effects in the model are the evaluation of learning at university in the fourteen competences covered by the survey and the categorical variable of the respondents' continuing their studies or not.

In order to obtain the best model, which is the one presented in this report, the different explanatory variables were progressively introduced as fixed effects. When the best fixed effect model was obtained, the random effects were then progressively introduced beginning with the baseline. To compare the validity of the different models, a comparison of likelihood ratios was carried out between the different models considered.

Given that the questionnaire used by students who graduated in 1998 did not contain some of the variables considered in the model, it is important to point out that the 1998 cohort was excluded from the fit, and the results are therefore for the purposes of analysing only the 2001 and 2004 cohorts.

The model's results are given in table 6, with a distinction made between the results obtained for fixed and random effects.

Table 6 | Model results: fixed effects

Variable	Reference category		Value	Std. error	P	Sig.
Baseline			48.88	1.21	0.000	***
Gender	Female	Male	1.91	0.34	0.000	***
Sector	Public	Private	3.52	0.57	0.000	***
TheoreticalL			0.55	0.09	0.000	***
PracticalL			0.01	0.07	0.916	
Written			0.11	0.09	0.257	
Oral			-0.15	0.09	0.088	*
Teamwork			0.43	0.09	0.000	***
Leadership			0.51	0.08	0.000	***
Problem solving			-0.22	0.11	0.039	**
Decision-making			0.24	0.11	0.028	**
Critical thinking			0.46	0.09	0.000	***
Creativity			-0.02	0.08	0.819	
Management skills			0.22	0.09	0.015	**
Documentation skills			-0.04	0.09	0.585	
Languages			0.01	0.06	0.877	
Computing skills			-0.02	0.07	0.802	
Year of graduation	2001	2004	2.88	0.30	0.000	***
Further studies	No	Specialist/ other courses	-0.38	0.20	0.060	*
		Bachelor degree	0.38	0.22	0.085	*
		Postgraduate course, Master's or doctoral degree	0.99	0.24	0.000	***

AIC = 123.508; N = 15.541; *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

Model results: random effects

Standard error variable

Baseline	5.46
Gender (male vs female)	1.24
Sector (private vs public)	2.79
Year of graduation (2004 vs 2001)	1.37
Residual	12.74

	Coefficients			
Subjects	**Baseline**	**Gender (male vs female)**	**Sector (private vs public)**	**Year of graduation (2004 vs 2001)**
Geography and History	52.28	0.73	-1.03	3.49
Literature and Humanities	43.97	1.14	4.53	3.84
Comparative studies	50.76	1.91	3.21	2.31
Catalan Studies	43.54	1.38	2.88	4.30
English and German Philology	43.16	2.07	5.31	3.77
Classical Philology	42.05	0.66	3.85	4.48
Fine Arts	41.60	0.62	4.85	2.95
Economics/Business Management and Administration	52.24	1.17	4.63	1.92
Business Studies	52.86	1.99	2.34	2.61
Law	56.58	3.42	0.81	2.72
Diploma in Industrial Relations	48.88	2.77	4.16	2.87
Political Science	55.16	2.70	-0.32	2.51
Advertising and Communication	52.40	1.38	-0.55	3.72
Librarianship and Documentation	52.33	1.34	1.15	1.89
Psychology	44.23	1.23	3.56	3.13
Pedagogy	53.18	1.22	-0.42	5.16
Teaching and Social Education	49.81	0.70	1.26	6.09
Tourism	46.68	1.61	3.51	3.16
Chemistry	43.03	1.61	7.02	3.02
Biology and Environmental Sciences	40.38	1.88	6.78	2.15
Physics and Mathematics	45.42	2.24	5.95	1.93
Optics and Optometry	45.26	1.56	4.27	3.21
Medicine	48.71	2.36	6.68	3.85
Food Science and Technology and Pharmacy	44.36	0.97	6.57	3.02
Veterinary Science	47.49	1.45	0.92	3.66
Architecture	56.01	3.62	2.68	1.20
Engineering, Surveying and Public Works	51.30	2.79	4.77	1.85
Civil Engineering	56.96	2.58	3.14	1.10
Naval Engineering	53.06	2.68	3.26	2.11
Industrial Engineering (Technical)	52.49	3.79	2.56	1.27
Industrial Engineering	51.93	3.32	5.49	1.37

Computer Engineering	53.48	1.62	2.15	2.47
Computer Engineering, Electronics and Telecommunications Engineering	46.25	1.87	7.96	2.06
Agricultural Engineering and Forestry	45.04	2.31	4.50	2.85
Agronomy and Forestry	47.75	2.38	4.73	2.61

Pseudo-R^2 = 0,96

Although the model is non-linear and R^2 cannot be interpreted directly, the percentage for over-dispersion gives a value of 3.96%. Both of these statistics indicate that the model explains around 97% of the observed variability.

The fixed effect coefficients are interpreted as in a standard regression model, i.e. the baseline effect or origin ordinate of the fitted model is at 48.88. Being male accounts for a 1.91% increase in the job quality index relative to being female, if the other explanatory variables remain constant; a job in the private sector sees an increase of 3.52% relative to one in the public sector, and 2004 as the year of graduation represents an increase of 2.88% relative to 2001 in this index. With regard to taking further studies after an undergraduate degree, it can be seen that a specialist course signifies a decrease of 0.38 in the job quality index compared to not taking one, but doing a Bachelor degree, a postgraduate course or a Master's or doctoral degree leads to an increase of 0.38% and 0.99%, respectively, relative to not having done any other type of studies.

Competences are variables measured on a scale of seven and the values should be interpreted as a mean increase or decrease of each additional whole value (i.e. no decimal points). It can be seen that variability produced in the job quality index by the graduates' rating of their competence-based learning at university has a much smaller impact than that caused by other introduced explanatory variables, especially the sector, year of graduation and gender. In fact, there was no value over 0.55 for any of the fourteen competences and there were even negative values in some cases, indicating a lower job quality among those who gave a higher rating for learning acquired in the competence in question. It should also be noted that some of the competences are not statistically significant in the model (practical learning, written expression, creativity, documentation skills, language learning and computing skills), which more than likely is because of either the degree of multicollinearity with each other or a high level of homogeneity in the graduates' rating for learning in these competences at university. The values obtained for the fixed effects should be interpreted as a mean value of the values that would be obtained for each of the different subjects taken by the students.

The second level of analysis, which uses the results obtained from the random coefficients, highlights the differences in the rating of job quality according to the subject taken at university.

The information provided by the random effect coefficients between the different subjects studied shows the differential impact of gender, sector and year of graduation for each of the 35 subjects analysed, and also the differences in the baseline relative to the mean value obtained in the result for the fixed effects. In terms of the baseline, the subjects with a value higher than the average base value of 48.88 in the job quality index are: Geography and History (52.28), Comparative Studies (50.76), Economics/Business Management and Administration (52.24), Business Studies (52.86), Law (56.58), Political Science (55.16), Advertising and Communication (52.40), Librarianship and Documentation (52.33), Pedagogy (53.18), Teaching and Social Education (49.81), Architecture (56.01), Engineering, Surveying and Public Works (51.30), Civil Engineering (56.96), Naval Engineering (53.06), Industrial Engineering (Technical) (52.49), Industrial Engineering (51.93) and Computer Engineering (53.48).

In relation to gender, it can be seen that being male has a positive effect on job quality in all subjects. However, subjects that are above the mean fixed effect relative to gender, i.e. subjects where the fact of being male has a greater positive impact on job quality, are as follows: English and German Philology (2.07), Business Studies (1.99), Law (3.42), Diploma in Industrial Relations (2.77), Political Science (2.70), Physics and Mathematics (2.24), Medicine (2.36), Architecture (3.62), Surveying and Public Works (2.79), Civil Engineering (2.58), Naval Engineering (2.68), Technical Industrial Engineering (3.79), Industrial Engineering (3.32), Agricultural Engineering and Forestry (2.31) and Agronomy and Forestry (2.38).

In terms of the sector in which they work, it can be seen that, in general, a job in the private sector had a more positive effect on the graduate job quality index than one in the public sector, except for certain specific subjects, such as Geography and History (-1.03), Political Science (-0.32), Advertising and Communication (-0.55) and Pedagogy (-0.42), where a job in the public sector had a greater effect than one in the private sector. Subjects above the mean fixed effect relative to the sector in which graduates work, i.e. the subjects in which a job in the private sector had a greater positive impact on the job quality index, are as follows: Literature and Humanities (4.53), English and German Philology (5.31), Classical Philology (3.85), Fine Arts (4.85), Economics/Business Management and Administration (4.63), Diploma in Industrial Relations (4.16), Psychology (3.56), Chemistry (7.02), Biology and Environmental Sciences (6.78), Physics and Mathematics (5.95), Optics and Optometry (6.68), Food Science and Technology and Pharmacy (6.57), Surveying and Public Works (4.77), Industrial Engineering (5.49), Computer Engineering, Electronics and Telecommunications (7.96), Agricultural Engineering and Forestry (4.50) and Agronomy and Forest Engineering (4.73).

Lastly, with regard to the year of graduation, there is a positive effect of this variable on those graduating in 2004 in all areas, probably due to the upswing in the growth cycle of the Catalan economy during the years prior to 2008 and also the fact that this led to a noticeable improvement in job quality for university graduates. The subjects in which graduation in 2004 represented a higher than average effect relative to 2001 are: Geography and History (3.4), Literature and Humanities (3.84), Catalan Studies (4.30), English and German Philology (3.77), Classical Philology (4.48), Fine Arts (2.95), Advertising and Communication (3.72), Psychology (3.13), Pedagogy (5.16), Teaching and Social Education (6.09), Tourism (3.16), Chemistry (3.02), Optics and Optometry (3.21), Medicine (3.85), Food Science and Technology and Pharmacy (3.02) and Veterinary Science (3.66).

4

DISCUSSION AND CONCLUSIONS

4. DISCUSSION AND CONCLUSIONS

This study forms part of a series of research projects at the national and international scale, the purpose of which is to analyse the relationship between higher education and graduate labour market outcomes using the ratings or assessments by graduates in follow-up surveys carried out systematically in many higher education systems.

With the general purpose being to analyse the changes in competence-based learning in the public higher education system in Catalonia and its adaptation to the requirements of the labour market, five main objectives were set. A summary of the main conclusions is given below.

Changes in the education-job match

Firstly, the level of fit between the degrees taken by graduates at university and their jobs was analysed, as well as the change in the level of match between the three cohorts of graduates from the public higher education system in Catalonia. The main conclusion that stands out from this analysis is the differential behaviour in terms of the degree of fit according to the field of study. The highest percentages of graduates with job responsibilities and duties related to their degrees and with jobs that called for specific qualifications were in the Health Sciences, Engineering/Architecture and Experimental Sciences. In the Social Sciences and Humanities, on the other hand, there were comparatively high percentages of graduates in jobs where no specific degree was required and where the job responsibilities and duties were not specific to their qualifications, together with relatively lower percentages of graduates in jobs that called for a specific qualification.

Although some authors, such as Dugdale (1997), have pointed out the fact of some degrees having longer access routes to employment before a good match status is reached is not necessarily negative, the point of view taken here is that, three years after graduation, such a result should be considered to be negative, although for certain degrees the periods of adjustment may be longer due to the characteristics of the professionalisation process.

On the other hand, it is also important to bear in mind the fact that some graduates go to university, not with the intention of getting trained professionally so they can get a job, but to broaden their knowledge and with no particular instrumental

purpose, for which reason it is possible that such graduates stayed in their previous jobs that were not strictly linked to the qualifications that they subsequently acquired.

In terms of the impact of the level of education-job match on the graduates' assessment of competence-based learning at university and job usefulness, the results show that the graduates evaluated job usefulness differently according to their job status three years after graduation. Graduates with job responsibilities and duties related to their undergraduate studies thereby tended to value the job usefulness of competences more positively.

Developments in the learning model

As a result of societal pressures and the needs of the productive economy, and to increase graduate employability and economic competitiveness, higher education institutions have focused on the transformation towards a competence-based learning model for human capital in the professional world. The second objective of this study was to assess the level to which universities have adapted, at least dialectically, to these demands of the labour market and the education authorities so as to include competence-based learning in university curricula.

The results of these analyses show that universities began to respond to these requirements in the period covered by the study, albeit very slowly. One should bear in mind, however, that the turning point regarding the shift to a competence-based learning model for university education occurred in 1999 with the Bologna Declaration, although this did not lead to the adoption of specific policies in the higher education system in Catalonia until the Catalan government's implementation of pilot plans to bring degrees and qualifications in line with the EHEA in 2004-2005. The learning outcomes of degrees covered by the pilot schemes were obviously defined in the form of academic and professional competences, together with the way these should be acquired by students. However, by the time the plan was launched and all of the accompanying teacher training actions set in motion, the last cohort of graduates (2004) covered by the graduate labour market outcomes study had already finished their studies.

From the standpoint of competence-based learning, this was therefore a time of transition for both the universities and the labour market. On the one hand, the students in the three cohorts in the survey did not directly experience the new competence-based learning model and, on the other, private enterprise and the labour market in Catalonia have only very recently begun to incorporate this concept into worker selection and performance evaluation processes in organisations. It will therefore be necessary to monitor later graduate cohorts to verify ongoing developments in this regard.

The gaps between the level of acquired learning and job usefulness

In the same way, when analysing the gap between the level of competence-based learning acquired at university and job usefulness, it should be born in mind that the concept of competences only just recently started to be used to describe jobs and define university studies, which may have hindered the accurate assessment and rating of these concepts by the respondents. We understand, for example, that students may have received a specific learning process in the skill of problem solving without actually knowing because it was not made explicit or distinguished as such in the university curricula.

At all events, and in response to the third aim of the study, there continues to be a mismatch between the competences that are required in jobs (according to the graduates) and the level of competence-based learning acquired at university. This result is consistent with similar studies carried out at the European level. Garcia Aracil and Van der Velden (2008), for example, with a population of graduates from eleven European countries, found a mismatch profile similar to ours in terms of positive differences in favour of university education relative to general theoretical knowledge, but negative in relation to other competences assessed. It should be pointed out that the gaps in the abovementioned study are slightly more moderate (on a scale of 1 to 5, there are only two cases, negotiation and planning, in which the difference in the gap between acquired and required competences had a value of around 1 point), which is equivalent to a difference of 1.4 on a scale of 1 to 7 as used in this study).

Although there seems to have been an appreciable decrease in the gaps between the 1998 cohort and the subsequent ones, there is no systematic pattern of decrease when comparing the data for 2001 and 2004. For the 2004 cohort, there continue to be differences above 1 between the rating for the acquired level of competences and job usefulness for decision-making and languages – all fields of knowledge – and computing skills – all fields of knowledge except Engineering and Architecture. More specifically, in the Humanities, Social Sciences and Health Sciences, attention needs to be paid to the skill of problem-solving, while in Experimental Sciences and Engineering/Architecture there are important mismatches (over 1 in value) in oral expression, leadership and management skills. There is also a high level of education-job usefulness mismatch in relation to the competence of management skills in Humanities and creativity in Experimental Sciences for the 2004 cohort.

The gaps found between the degree studied and job usefulness are not a matter of great concern, given the positive correlation between graduate satisfaction and graduate jobs that has been pointed out in many studies, in the sense that graduates claim they achieve a higher job status and more chances of future promotion (Mañé,

Miravet, 2007). Having acquired a good job, a mismatch implies a challenge to improve. On the other hand, it should to born in mind that the job usefulness of competences is merely one of the dimensions to be considered by universities when making decisions about the learning model. Even though a competence is not directly applicable in the workplace, it may continue to be of interest to society, regardless of the labour market. Moreover, the professional opportunities offered by some degrees are highly heterogeneous, meaning that distinctive skills are required and they are not always envisaged in terms of the short term. In this sense, undergraduate studies at university need to be comprehensive and, in particular, help must be given to graduates to enable them to become aware of the need to take the initiative and to be proactive in managing their own professional development.

Postgraduate study as a differentiation strategy

The massification of university education in recent decades has led to more pressure being put on the skilled labour market and more competitiveness between the graduates entering the labour market and employment. This situation, coupled with the shortage of skilled jobs, leads many graduates to go on to take further studies on completion of their undergraduate studies, with the aim of setting themselves apart from their colleagues through the value provided by a postgraduate qualification. Furthermore, as pointed out in numerous studies, the existence of significant gaps between university-acquired learning and the competences required in the workplace leads graduates to continue studying in order to successfully deal with the demands of their job.

On the basis of these considerations, one important aim of the study was to understand the strategies followed by Catalan graduates through further and postgraduate study and to determine how they deal with gaps between the level of learning acquired at university and their job requirements in terms of skills and competences. Several authors have suggested that the education-job requirements gap is resolved in the workplace through the higher learning capacity and willingness to learn that graduates have acquired during their time at university (Heijke et al., 2003). The hypothesis of these authors is that the generic competences that are learned at university do not have a direct influence on labour market outcomes, although they do show an indirect impact in terms of the higher capability of students to study and learn. The data on Catalan graduates in the three cohorts studied show that only about one in four of the respondents were not studying at all, which was slightly higher (around one in three) in the case of all architects and engineers (both first cycle and second cycle).[10] All of the others continued to study in

[10] Pre-Bologna.

different ways according to their undergraduate studies. Those taking first cycle degrees (both technical and non-technical) were more likely to take a Bachelor's degree; graduates (including second cycle technical degree holders) tended to go to take Master's degrees. Fewer graduates (only 10%) went on to take a PhD.

The impact of university studies on graduate job quality

The final aim of the study was to establish the impact of competences in explaining job quality three years after graduation of graduates with a job related to their degree. The results of the multi-level regression model performed on the job quality variable show that the influence of competences on the job quality index is discrete when compared with other explanatory variables, such as the subject studied, gender, employment in either the public or private sector, cohort or the fact of having completed a Master's degree or doctoral studies after undergraduate studies.

Aside from the fact that there was an improvement in graduate job quality three years after graduation from a comparison of the 2004 cohort with those of 1998 and 2001, in line with an upswing in the economic growth cycle prior to the crisis of 2008, we believe two important conclusions stand out from these data. On the one hand, competence-based learning does appear to have an impact on graduate labour market outcomes, although very little and basically relative to theoretical learning, leadership, critical thinking, teamwork and management skills. However, other competences that showed large gaps between education-job usefulness, such as languages and computing skills, did not have much influence on graduate labour market outcomes. The second conclusion is that postgraduate study did make a noteworthy contribution to explaining the job quality index, especially now that the universities have committed to an educational model that, generally speaking, combines undergraduate and postgraduate study. As far as we know, there have been no previous studies in this field evaluating the impact of postgraduate study on graduate labour market outcomes three years after graduation and, moreover, with a control over other factors such as undergraduate qualifications, gender or job sector. This information may help to establish the contribution of this variable in the analysis of labour market outcomes and help bring into focus the fact that, aside from their undergraduate degree studied at university, graduates use strategies to improve their competitiveness in the labour market included, and that it is therefore necessary to include further studies taken by graduates in any follow-up made of their labour market outcomes.

The impact of gender on labour market outcomes continues to be an important issue in all fields of study, even where there is a clear feminisation, as in the case of Humanities, Education and Psychology. This is a problem that does not strictly depend on the university, although the university itself may have an influence through

this problem being made evident, by helping future professionals to become aware in the classroom through the analysis of their own discriminatory practices, and by way of follow-up studies and observatories that explore employment policies and practices in the labour market, the ways in which job vacancies are defined and publicised, the language used to draw up situations vacant columns, company recruitment and promotion policies, etc., especially in the fields of study where such differences are more prominent.

Another noteworthy consideration is the distinctive value of certain qualifications in a labour market that is clearly segmented regarding graduate job quality. Although a full knowledge-based economy is still not set in place, and neither have a sufficient number of skilled jobs been created to absorb the supply of existing university graduates, there is a series of sectors in Catalonia where there is a higher level of technological development and where there are good working conditions for graduates, including the health sector, information technology, education and architecture (the survey data are from before the 2007 crisis). Employment in these areas calls for a competence profile that is typical of graduates with qualifications in related subjects who enter a closed market that is generally regulated, and who have studies that are essentially professionally orientated.

Limitations of the study

It is important to point out that all data came from the graduates themselves, and there was therefore no way to check, for example, if their rating of the level of their studies at university actually coincides with the education that they received. From the analyses made of the data, there is in fact show a high level of variability in the ratings according to all three variables (degree, university and cohort). In addition, the graduates' views were surveyed retrospectively, i.e. three years after graduation. The fact that these data strongly correlate, and in a similar way for all, with the rating of the job usefulness of competences means that a suspected bias perhaps would not have existed if the data had been collected at the time of the graduates completing their studies. The fact that the ratings may have been conditioned by more or less favourable graduate labour market outcomes should also be taken into account. In addition, no definition of the competences was given in the survey, and it was left to each graduate to interpret the meaning and content of each one, which may well have been different for each field of study.

Another issue to be taken into account is that the study examines three specific cohorts (1998, 2001 and 2004) at a time of a major transition, both from the point of view of higher education institutions and from the standpoint of the labour markets. In the case of the universities, important structural transformations have been taking place, as in the reforms to the curricula of Bachelor and Master's degrees,

performance objectives (learning outcomes) and learning methodologies, as well as greater permeability and exchange with the social stakeholders, amongst other things. In the labour market, significant changes have been taking place in the traditional models of professional careers and organisational affiliation, and there has been an increase in the demand for highly technical qualifications as well as skills of a motivational and relational nature that go beyond what has traditionally formed part of university education. In this context, the results of the study may help to establish how the universities are adapting to these changes and, regarding competences in particular, point out where more attention is needed both in general and in relation to different subjects of study.

Implications of the results and the prospects

Before concluding this report, it must also be stressed that, in addition to the considerable effort being made by the universities to develop generic skills (teacher training, developing teaching handbooks and materials, conferences and workshops, etc.), attention also needs to be paid to other issues that have a greater impact on graduate labour market outcomes and job quality. Very specifically, this concerns the choice of subject. All national and international studies agree that this variable is the main factor explaining success in the labour market, which shows unequivocally that the labour market is segmented and that it differentially selects and assesses certain profiles over others (Corominas et al., 2007; García Aracil, Van der Velden, 2008; Salas Velasco, 2007; Vila, García Aracil, Mora, 2007, to mention just a few recent works). Special attention should therefore be paid to studying ways to introduce learning elements that add market value to lower rated degrees (new technologies, synergies between students taking different degrees in joint development projects, more participation by outside professionals through teaching assistance, mentoring, etc.).

In short, attention should remain focused on the fact that the main competence that a graduate brings to the labour market is still his/her competence profile (learning outcomes) in the form of a degree (which defines their professional identity and qualifications to carry out a series of related job responsibilities and duties), and it is the value of this competence profile that needs to be improved in the case of degrees that are less attractive in terms of the labour market. Rather than competence-based learning, it is therefore more a question of studies that produce competent professionals. The learning of generic competences, some of which are difficult to study within the university context (Heijke et al., 2003), forms an important, yet not exclusive, part of university education and of the value of its learning outcomes. From now onwards, it therefore remains to be seen what specific skills are defined and taught in each degree, which ones are selected and promoted in the labour market for each profession, and to what extent the selection

and incorporation of new competences in each professional profile helps to reduce the differences in the job quality of graduates from different fields of study. In this respect, wise decision-making in the selection and teaching of specific competences for each profile will make a significant contribution to the success of new degrees in the labour market.

The universities would also do well to pay attention to that fact that it is not the only stakeholder responsible for the employment outcomes and professional development of graduates: firstly, because it is difficult for students to learn many of the skills needed in the labour market exclusively within the context of university classrooms; and, secondly, because other stakeholders, such as the family, the social networks in which people interact and learn in an informal way, the individuals who direct their education and make decisions, and the organisations that train their employees, etc. all contribute to what is a personal project that, far from coming to an end on completion of undergraduate studies, lasts for the individual's entire lifetime. In this regard, a recent study by Accenture, the consulting firm, and the Universia educational web portal (2007) showed that higher education institutions take more responsibility for competence-based learning than is attributed to them by companies and graduates, whereas students considered that it was themselves who were primarily responsible for their own competence-based learning.

One should also bear in mind that success in the labour market, i.e. graduates getting jobs that are relevant to their studies, is only a first step in their professional development and that, once they have gained a job, they still face the important challenge of actually staying in it (and also of holding on to it). As various recent studies have highlighted, less than 50% of graduates from colleges in the United States continue to work in the same job two years after graduation (Wendlandt, Rochlen, 2008), which does suggest the need for assistance and guidance by universities in the processes of preparing for employment and the transition to work, in addition to competence-based learning.

In short, the information provided by the data from the follow-up surveys is a valuable source of knowledge for universities in that they enable performance indicators to be obtained for each degree and institutional enhancement policies to be planned so that the provision of education can be adapted to the demands of both students and the labour market. Furthermore, the systematic collection of data on the entire higher education system in Catalonia makes it feasible to carry out comprehensive analyses of its educational efficacy in relation to the professional employment outcomes of graduates, as well as the detailed study of changes in the performance indicators and assessment of the trends and changes that occur in university education in response to the demands placed by society on the universities.

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APPENDIX

APPENDIX 1

QUESTIONS FROM THE LABOUR OUTCOMES SURVEY USED IN THIS STUDY

In relation to your **CURRENT JOB** (your main job) or your **LAST JOB**:

8. What were the requirements for your job?
   (1) Your specific degree
   (2) Just a degree
   (3) No degree was required

9. If (*1*): Is your degree relevant to your job? (1) Yes (2) No

9. If (*2*) or (*3*): Do you think one needs to be a university graduate to do your job?
   (1) Yes (2) No

10. What sector of economic activity does the company that you work for belong to?

12. What kind of contract do you have?
    (1) Permanent
    (2) Self-employed
    (3) Temporary
    (4) Grant
    (5) Without a contract

13. How long is the contract?
    (1) Less than six months
    (2) Between six months and one year
    (3) Between 1 and 3 years
    (4) Self-employed
    (5) No contract

14. The company/organisation's sector: (1) Public (2) Private

15. What is your gross annual salary?
    (1) Less than 9,000 EUR
    (2) Between 9,000 EUR and 15,000 EUR
    (3) Between 15,000 EUR and 18,000 EUR
    (4) Between 18,000 EUR and 30,000 EUR
    (5) Between 30,000 EUR and 40,000 EUR
    (6) Over 40,000 EUR

In relation to your **CURRENT JOB**, rate from 1 (low) to 7 (high) your satisfaction with:

18. The job content
19. The prospects for enhancement and promotion
20. The salary level
21. The usefulness of knowledge from your degree in your job
22. The job in general

ASSESSMENT OF YOUR UNIVERSITY STUDIES AND ITS MATCH WITH THE JOB

What do you think about your degree? Rate from 1 (very low) to 7 (very high) the level of university education you received in terms of its job usefulness:

31./32. Theoretical learning
33./34. Practical learning
35./36. Oral expression
37./38. Written expression
39./40. Teamwork
41./42. Leadership
43./44. Management skills
45./46. Problem solving
47./48. Decision-making
49./50. Creativity
51./52. Critical thinking
53./54. Instrumental competences: computing skills
55./56. Instrumental competences: languages
57./58. Instrumental competences: documentation

FURTHER STUDIES

61. From the time when your completed your undergraduate studies, did you/have you continue/d to study?
    (1) No
    (2) Yes, specialist courses
    (3) Yes, a Bachelor's
    (4) Yes, a postgraduate/Master's course
    (5) Yes, a doctoral degree
    (6) Others

62. Are you taking further studies at the same university? (1) Yes (2) No

APPENDIX 2

TECHNICAL RESULTS OBTAINED FROM THE DATA ANALYSIS

1. Results obtained from the extraction of five axes according to the principal components

Commonalities	Initial	Extraction
Theoretical learning	1.000	.815
Practical learning	1.000	.673
Written expression	1.000	.747
Oral expression	1.000	.756
Teamwork	1.000	.587
Leadership	1.000	.675
Problem solving	1.000	.706
Decision-making	1.000	.713
Critical thinking	1.000	.689
Creativity	1.000	.562
Administration	1.000	.579
Documentation skills	1.000	.574
Languages	1.000	.740
Computing skills	1.000	.729

Extraction method: principal component analysis

Total explained variance

	Initial eigenvalues			Sum of the square factor loadings			Rotation sums of squared loadings		
Component	Total	% of variance	% accumulated	Total	% of variance	% accumulated	Total	% of variance	% accumulated
1	5.463	40.307	40.307	5.643	40.307	40.307	3.257	23.267	23.267
2	1.080	7.718	48.025	1.080	7.718	48.025	1.850	13.213	36.479
3	.981	7.007	55.032	.981	7.007	55.032	1.730	12.358	48.837
4	.941	6.720	61.752	.941	6.720	61.752	1.408	10.057	58.894
5	.900	6.428	68.179	.900	6.428	68.179	1.300	9.285	68.179
6	.726	5.188	73.368						
7	.670	4.789	78.157						
8	.562	4.017	82.174						
9	.543	3.879	86.053						
10	.477	3.410	89.463						
11	.439	3.132	92.595						
12	.391	2.789	95.385						
13	.344	2.455	97.839						
14	.303	2.161	100.000						

Extraction method: principal component analysis

Rotated component matrix[a]

	Components				
	1	2	3	4	5
Decision-making	.746		.348		
Problem solving	.737		.314		.209
Leadership	.703	.397			
Administration	.675	.229		.202	
Teamwork	.648	.374			
Creativity	.497	.225	.494		
Oral expression	.322	.772			
Written expression		.758	.353		
Critical thinking	.320	.217	.731		
Documentation skills			.625	.328	
Languages		.300	.221	.775	
Computing skills	.397			.730	
Theoretical learning			.315		.840
Practical learning	.366	.294		.202	.627

Extraction method: Principal component analysis
Rotation method: Varimax with Kaiser normalisation
[a] Rotation converged in 8 iterations

2. Specifications of the multi-level model to explain the level of job quality

The model is specified as follows:

$Y_{ik} = \beta_{0k} + \Sigma\, \beta_{jk} X_{jik} + \Sigma\, \beta_{l} Z_{lik} + \varepsilon_{ik}$ [1]
$\beta_{0k} = \beta_0 + \mu_{0k}$ where μ_{0k} is the random effect associated with the subject j^{th} $\mu_{0k} \rightarrow N(0,\sigma_{\mu 0})$
$\beta_{jk} = \beta_j + \eta_{jk}$ where η_{jk} ; $\eta_{jk} \rightarrow N(0,\sigma_{\eta})$ and β_{jk} is the random coefficient associated with the variables *X*
β_0, β_j, and β_l are the fixed coefficients, with β_l being the fixed coefficient associated with the explanatory variables *Z*
ε_{ik} is the random error; $\varepsilon_{ik} \rightarrow N(0,\sigma_{\varepsilon})$
As an explanatory variable *Y*, the job quality index (JQI) was used, where *i* denotes the individual, *k* indicates the subject and *j* and *l* are the summation indices.

Fitted model:
$JQI_{ik} = \beta_{0k} + \beta_{1k}Gender_{ik} + \beta_{2k}\ Sector_{ik} + \beta_3\ TheoreticalL_{ik} + \beta_4\ PracticalL_{ik} + \beta_5\ Written_{ik} + \beta_6\ Oral_{ik} + \beta_7\ Teamwork_{ik} + \beta_8\ Leadership_{ik} + \beta_9\ Problem\ solving_{ik} + \beta_{10}\ Decision\text{-}making_{ik} + \beta_{11}\ Critical\ thinking_{ik} + \beta_{12}\ Creativity_{ik} + \beta_{13}\ Management\ skills_{ik} + \beta_{14}\ Documentation\ skills_{ik} + \beta_{15}\ Languages_{ik} + \beta_{16}\ Computing\ skills_{ik} + \beta_{17k}\ Cohort_{ik} + \beta_{18}\ Further\ studies_{ik} + \varepsilon_{ik}$

3. Specifications of the job quality index

This is an index made up of four variables that are commonly used in studies on job quality: the education-job match (match between the job and undergraduate studies), the type of contract, salary and individual job satisfaction. Different response categories for each variable were defined to show a higher or lower quality job, with a weighted score given to each defined level (between 0 and 3 for the first three variables and between 0.5 and 1.5 for satisfaction). Lastly, the following formula was used to construct the index:

$$JQI = f\,[(C + R + A) * S]$$

where *C* is the type of contract (with five categories), *R* is the salary income (with five levels), *A* is the education-job match (with the six levels of match given in Table 2) and *S* job satisfaction (five categories). Each person was given a single score in the index ranging from 0 to 100 (for more details on the justification and calculation of this index, see Corominas et al., 2007).

APPENDIX 3

COMPLEMENTARY TABLES

Table 1 | The mean assessment and standard deviation of the acquired level of competence-based learning, and the Student *t*–test for comparing the means according to job match

Related job specifications		Studies				Usefulness			
		n	$\bar{x}$	*SD*	*t*	*n*	$\bar{x}$	*SD*	*t*
Theoretical learning	No	7,652	4.7	1.4	12.5***	7,620	3.1	1.7	65.4***
	Yes	24,353	5.0	1.2		24,325	4.5	1.5	
Practical learning	No	7,595	3.5	1.7	21.2***	7,559	3.1	1.9	56.5***
	Yes	24,251	4.0	1.6		24,207	4.5	1.8	
Written expression	No	4,979	4.4	1.6	1.8	4,971	4.3	1.8	25.1***
	Yes	17,920	4.4	1.5		17,914	5.0	1.5	
Oral expression	No	4,979	3.8	1.7	3.0**	4,967	4.3	1.9	22.1***
	Yes	17,913	3.9	1.7		17,911	4.9	1.6	
Teamwork	No	7,660	4.3	1.7	13.3***	7,629	4.5	1.8	31.5***
	Yes	24,340	4.6	1.6		24,307	5.3	1.5	
Leadership	No	6,514	3.1	1.6	9.4***	6,496	3.8	1.9	24.8***
	Yes	21,182	3.4	1.6		21,169	4.5	1.7	
Problem solving	No	7,644	4.2	1.6	6.2***	7,616	4.7	1.8	29.0***
	Yes	24,310	4.3	1.6		24,275	5.4	1.5	
Decision-making	No	4,981	3.9	1.6	4.9***	4,980	4.6	1.8	24.2***
	Yes	17,933	4.0	1.5		17,934	5.3	1.5	
Critical thinking	No	6,566	4.5	1.7	-0.3	6,545	4.3	1.8	31.6***
	Yes	21,287	4.5	1.6		21,252	5.1	1.5	
Creativity	No	6,554	3.8	1.7	4.9***	6,535	4.0	1.9	30.6***
	Yes	21,284	3.9	1.6		21,262	4.8	1.6	
Managements skills	No	6,524	3.7	1.7	2.9**	6,504	4.4	1.8	20.4***
	Yes	21,199	3.8	1.6		21,179	4.9	1.6	
Documentation skills	No	4,990	4.3	1.6	2.3*	4,981	4.1	1.8	31.2***
	Yes	17,959	4.4	1.5		17,956	5.0	1.5	
Languages	No	4,986	2.5	1.8	1.4	4,976	3.4	2.2	14.8***
	Yes	17,936	2.6	1.7		17,941	4.0	2.1	
Computing skills	No	4,983	3.4	1.8	7.0***	4,978	4.5	2.1	16.3***
	Yes	17,915	3.6	1.8		17,913	5.0	1.8	

* p < .05; ** p < .01; *** p < .001

Table 2 | Correlations matrix between the perceived level of learning in each competence and job usefulness

Assessment of competence-based learning	Assessment of the perceived job usefulness of competences													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Theoretical learning	.44	.24	.22	.23	.16	.15	.19	.18	.18	.14	.17	.21	.10	.13
2. Practical learning	.28	.53	.20	.24	.25	.17	.19	.19	.17	.21	.16	.16	.12	.15
3. Written expression	.23	.21	.54	.35	.22	.18	.15	.16	.21	.23	.19	.23	.11	.11
4. Oral expression	.25	.28	.34	.46	.25	.22	.15	.17	.21	.22	.18	.18	.11	.11
5. Teamwork	.18	.25	.24	.27	.49	.25	.22	.23	.20	.23	.22	.17	.06	.16
6. Leadership	.23	.23	.21	.22	.29	.46	.18	.21	.19	.21	.25	.16	.09	.13
7. Problem-solving	.22	.20	.18	.18	.24	.24	.41	.29	.21	.19	.24	.18	.10	.18
8. Decision making	.26	.25	.20	.21	.26	.25	.30	.39	.25	.25	.23	.19	.07	.14
9. Critical thinking	.19	.17	.26	.23	.21	.17	.20	.21	.47	.28	.17	.22	.08	.11
10. Creativity	.20	.23	.23	.23	.24	.21	.19	.22	.26	.49	.18	.18	.08	.14
11. Management skills	.22	.21	.21	.21	.25	.29	.22	.22	.17	.20	.46	.19	.08	.18
12. Documentation skills	.19	.15	.23	.20	.18	.16	.17	.17	.19	.18	.20	.47	.11	.15
13. Languages	.16	.16	.17	.16	.10	.12	.09	.08	.11	.15	.10	.14	.40	.14
14. Computing skills	.15	.20	.13	.13	.21	.21	.19	.16	.12	.18	.21	.15	.17	.43

All of the correlations are significant at a level of $p < .0005$

Table 3 | Descriptive statistics of the graduates' rating of competences on the basis of their degree and its job usefulness, according to field of study and in overall terms

			Humanities			Social Sciences		
			n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
Theoretical learning	Degree	1998	1,326	**4.94**	1.3	4,285	**4.95**	1.6
		2001	1,610	**5.06**	1.2	4,754	**4.86**	1.2
		2004	1,675	**4.68**	1.5	5,427	**4.69**	1.3
		All	4,611	**4.89**	1.4	14,466	**4.82**	1.2
	Usefulness	1998	1,307	**3.42**	1.9	4,266	**4.16**	1.7
		2001	1,605	**3.69**	1.9	4,744	**4.04**	1.6
		2004	1,675	**3.85**	1.9	5,427	**4.25**	1.5
		All	4,587	**3.67**	1.9	14,437	**4.16**	1.6
Practical learning	Degree	1998	1,293	**3.43**	1.8	4,204	**3.75**	1.8
		2001	1,602	**3.36**	1.7	4,751	**3.72**	1.6
		2004	1,675	**3.49**	1.8	5,427	**4.00**	1.6
		All	4,570	**3.42**	1.7	14,382	**3.83**	1.7
	Usefulness	1998	1,273	**3.17**	2.0	4,178	**4.04**	2.0
		2001	1,598	**3.48**	2.0	4,739	**4.06**	1.9
		2004	1,675	**3.64**	1.9	5,427	**4.32**	1.8
		All	4,546	**3.45**	2.0	14,344	**4.16**	1.9
Written expression	Degree	1998	–	–	–	–	–	–
		2001	1,606	**5.05**	1.5	4,738	**4.50**	1.5
		2004	1,675	**5.18**	1.6	5,426	**4.70**	1.4
		All	3,281	**5.12**	1.5	10,164	**4.61**	1.5
	Usefulness	1998	–	–	–	–	–	–
		2001	1,603	**4.87**	1.8	4,731	**4.80**	1.6
		2004	1,675	**4.33**	1.8	5,427	**4.28**	1.6
		All	3,280	**4.12**	1.8	10,160	**4.10**	1.7

Experimental Sciences			Health Sciences			Engineering/Architecture			All		
n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
747	**5.20**	1.1	772	**5.17**	1.1	2,278	**5.04**	1.1	9,408	**5.01**	1.2
906	**5.17**	1.1	1,021	**5.12**	1.0	2,781	**4.96**	1.1	11,072	**4.96**	1.1
977	**4.93**	1.3	1,286	**5.13**	1.2	2,747	**4.73**	1.3	12,112	**4.76**	1.3
2,630	**5.09**	1.2	3,079	**5.14**	1.1	7,806	**4.90**	1.2	32,592	**4.90**	1.2
746	**4.10**	1.9	771	**5.11**	1.5	2,271	**4.32**	1.5	9,361	**4.17**	1.7
903	**3.84**	1.7	1,021	**4.74**	1.4	2,779	**4.19**	1.4	11,052	**4.08**	1.6
977	**4.20**	1.6	1,286	**4.84**	1.5	2,747	**4.22**	1.4	12,112	**4.25**	1.6
2,626	**4.04**	1.7	3,074	**4.88**	1.5	7,797	**4.24**	1.5	32,525	**4.17**	1.6
743	**4.50**	1.6	770	**4.50**	1.6	2,247	**3.73**	1.6	9,257	**3.80**	1.7
907	**4.16**	1.4	1,021	**4.38**	1.5	2,779	**3.78**	1.5	11,060	**3.76**	1.6
977	**4.39**	1.6	1,286	**4.74**	1.5	2,747	**3.93**	1.5	12,112	**4.02**	1.6
2,627	**4.26**	1.5	3,077	**4.56**	1.5	7,773	**3.80**	1.5	32,429	**3.87**	1.7
736	**4.02**	2.1	769	**5.25**	1.8	2,235	**4.11**	1.8	9,191	**4.04**	2.0
902	**3.92**	1.9	1,021	**4.88**	1.8	2,778	**4.05**	1.7	11,038	**4.04**	1.9
977	**4.17**	1.8	1,286	**4.94**	1.7	2,747	**4.21**	1.7	12,112	**4.26**	1.8
2,615	**4.04**	1.9	3,076	**5.00**	1.7	7,760	**4.13**	1.7	32,341	**4.12**	1.9
–	–	–	–	–	–	–	–	–	–	–	–
904	**3.73**	1.6	1,018	**3.90**	1.5	2,744	**3.72**	1.5	11,010	**4.27**	1.6
977	**4.10**	1.5	1,286	**4.31**	1.5	2,746	**3.99**	1.5	12,110	**4.52**	1.5
1,881	**3.92**	1.6	2,304	**4.13**	1.5	5,490	**3.86**	1.5	23,120	**4.40**	1.6
–	–	–	–	–	–	–	–	–	–	–	–
902	**4.62**	1.8	1,018	**4.52**	1.5	2,742	**4.49**	1.6	10,996	**4.69**	1.6
977	**3.70**	1.7	1,286	**4.13**	1.6	2,746	**3.73**	1.6	12,111	**4.02**	1.6
1,882	**3.46**	1.7	2,303	**3.94**	1.6	7,805	**4.49**	1.5	23,114	**3.89**	1.1

Table 3 | Descriptive statistics of the graduates' rating of competences on the basis of their degree and its job usefulness, according to field of study and in overall terms (*continuation from previous page*)

			Humanities			Social Sciences		
			n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
Oral expression	Degree	1998	–	–	–	–	–	–
		2001	1,605	**3.91**	1.8	4,733	**3.89**	1.7
		2004	1,675	**4.33**	1.8	5,427	**4.28**	1.6
		All	3,280	**4.12**	1.8	10,160	**4.10**	1.7
	Usefulness	1998	–	–	–	–	–	–
		2001	1,601	**4.75**	2.0	4,728	**4.79**	1.8
		2004	1,675	**4.78**	1.8	5,427	**4.96**	1.6
		All	3,276	**4.76**	1.9	10,155	**4.88**	1.7
Teamwork	Degree	1998	1,333	**3.82**	1.8	4,284	**4.38**	1.7
		2001	1,609	**3.92**	1.7	4,747	**4.76**	1.6
		2004	1,675	**3.94**	1.8	5,426	**4.88**	1.6
		All	4,617	**3.90**	1.8	14,457	**4.69**	1.6
	Usefulness	1998	1,312	**4.13**	2.0	4,258	**5.00**	1.7
		2001	1,608	**4.46**	1.9	4,741	**5.16**	1.6
		2004	1,675	**4.59**	1.8	5,426	**5.38**	1.5
		All	4,595	**4.41**	1.9	14,425	**5.20**	1.6
Leadership	Degree	1998	671	**2.73**	1.7	2,393	**3.37**	1.7
		2001	1,479	**2.82**	1.6	4,719	**3.44**	1.6
		2004	1,675	**2.99**	1.7	5,424	**3.67**	1.6
		All	3,825	**2.88**	1.6	12,536	**3.53**	1.6
	Usefulness	1998	661	**3.70**	2.1	2,378	**4.49**	1.8
		2001	1,479	**3.67**	1.9	4,719	**4.16**	1.7
		2004	1,675	**3.74**	1.9	5,424	**4.44**	1.7
		All	3,815	**3.71**	1.9	12,521	**4.35**	1.7

Experimental Sciences			Health Sciences			Engineering/Architecture			All		
n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
–	–	–	–	–	–	–	–	–	–	–	–
905	**3.20**	1.6	1,917	**3.70**	1.6	2,743	**3.27**	1.6	11,003	**3.66**	1.7
977	**3.70**	1.7	1,286	**4.13**	1.6	2,746	**3.73**	1.6	12,111	**4.02**	1.6
1,882	**3.46**	1.7	2,303	**3.94**	1.6	7,805	**4.49**	1.5	23,114	**3.89**	1.7
–	–	–	–	–	–	–	–	–	–	-	–
901	**4.62**	1.9	1,018	**4.91**	1.6	2,741	**4.41**	1.7	10,989	**4.69**	1.8
977	**4.68**	1.8	1,286	**4.98**	1.6	2,746	**4.71**	1.6	12,111	**4.86**	1.7
1,878	**4.65**	1.8	2,304	**4.95**	1.6	5,487	**4.56**	1.7	23,100	**4.78**	1.7
748	**4.10**	1.6	773	**4.17**	1.6	2,281	**4.13**	1.6	9,419	**4.20**	1.7
907	**4.50**	1.5	1,020	**4.58**	1.5	2,728	**4.56**	1.4	11,061	**4.55**	1.6
977	**4.43**	1.6	1,286	**4.65**	1.6	2,746	**4.73**	1.5	12,110	**4.66**	1.6
2,632	**4.36**	1.6	3,079	**4.51**	1.6	7,805	**4.49**	1.5	32,590	**4.49**	1.7
746	**4.98**	1.6	766	**5.08**	1.7	2,272	**5.18**	1.5	9,354	**4.93**	1.7
905	**5.00**	1.6	1,020	**5.19**	1.5	2,776	**5.09**	1.5	11,050	**5.03**	1.6
977	**5.16**	1.5	1,286	**5.35**	1.5	2,747	**5.38**	1.4	12,111	**5.25**	1.6
2,628	**5.06**	1.6	3,072	**5.23**	1.6	7,795	**5.22**	1.5	32,515	**5.08**	1.6
437	**2.68**	1.6	376	**3.14**	1.6	1,206	**2.83**	1.6	5,083	**3.08**	1.7
899	**2.85**	1.5	1,009	**3.26**	1.5	2,767	**3.13**	1.5	19,873	**3.21**	1.6
977	**3.09**	1.5	1,286	**3.50**	1.6	2,746	**3.50**	1.6	12,108	**3.47**	1.6
2,313	**2.92**	1.5	2,671	**3.36**	1.6	6,719	**3.23**	1.6	28,064	**3.30**	1.6
431	**4.33**	1.8	372	**4.16**	1.8	1,203	**5.11**	1.7	5,045	**4.50**	1.9
899	**4.15**	1.8	1,012	**4.13**	1.7	2,767	**4.42**	1.7	10,876	**4.16**	1.8
977	**4.14**	1.7	1,286	**4.29**	1.7	2,747	**4.83**	1.6	12,109	**4.39**	1.7
2,307	**4.18**	1.8	2,670	**4.21**	1.7	6,717	**4.71**	1.7	28,030	**4.32**	1.8

Table 3 | Descriptive statistics of the graduates' rating of competences on the basis of their degree and its job usefulness, according to field of study and in overall terms (*continuation from previous page*)

			Humanities			Social Sciences		
			n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
Problem-solving	Degree	1998	1,333	**3.96**	1.7	4,280	**4.15**	1.5
		2001	1,596	**3.78**	1.7	4,733	**4.12**	1.5
		2004	1,675	**3.76**	1.8	5,427	**4.29**	1.6
		All	4,604	**3.82**	1.7	14,440	**4.19**	1.6
	Usefulness	1998	1,308	**4.41**	1.9	4,258	**5.17**	1.6
		2001	1,594	**4.80**	1.9	4,729	**5.09**	1.6
		2004	1,675	**4.73**	1.9	5,426	**5.27**	1.6
		All	4,577	**4.67**	1.9	14,413	**5.18**	1.6
Decision making	Degree	1998	–	–	–	–	–	–
		2001	1,602	**3.71**	1.7	4,727	**3.99**	1.5
		2004	1,674	**3.72**	1.8	5,425	**4.15**	1.6
		All	3,276	**3.71**	1.7	10,152	**4.08**	1.5
	Usefulness	1998	–	–	–	–	–	–
		2001	1,600	**4.80**	1.8	4,728	**5.05**	1.6
		2004	1,674	**4.73**	1.9	5,427	**5.17**	1.6
		All	3,274	**4.77**	1.9	10,155	**5.11**	1.6
Critical thinking	Degree	1998	673	**5.08**	1.6	2,391	**4.49**	1.6
		2001	1,607	**5.16**	1.5	4,739	**4.53**	1.6
		2004	1,675	**5.20**	1.5	5,426	**4.62**	1.6
		All	3,955	**5.16**	1.5	12,556	**4.56**	1.6
	Usefulness	1998	667	**4.68**	1.9	2,373	**4.98**	1.6
		2001	1,604	**4.83**	1.8	4,725	**4.77**	1.6
		2004	1,675	**5.07**	1.8	5,426	**4.99**	1.6
		All	3,946	**4.91**	1.8	12,524	**4.90**	1.6

Experimental Sciences			Health Sciences			Engineering/Architecture			All		
n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
747	**4.40**	1.6	772	**4.12**	1.5	2,275	**4.38**	1.6	9,407	**4.20**	1.6
906	**4.54**	1.6	1,017	**4.12**	1.4	2,772	**4.65**	1.5	11,024	**4.24**	1.5
977	**4.57**	1.6	1,286	**4.27**	1.5	2,746	**4.82**	1.5	12,111	**4.36**	1.6
2,630	**4.51**	1.6	3,075	**4.18**	1.5	7,793	**4.63**	1.5	32,542	**4.27**	1.6
747	**5.44**	1.5	764	**5.41**	1.5	2,265	**5.46**	1.4	9,342	**5.18**	1.6
905	**5.29**	1.6	1,018	**5.22**	1.5	2,772	**5.45**	1.4	11,018	**5.17**	1.6
977	**5.43**	1.5	1,286	**5.32**	1.4	2,747	**5.68**	1.3	12,111	**5.31**	1.6
2,629	**5.38**	1.5	3,068	**5.31**	1.5	7,784	**5.54**	1.4	32,471	**5.22**	1.6
–	–	–	–	–	–	–	–	–	–	–	–
905	**3.80**	1.5	1,020	**3.97**	1.5	2,774	**3.92**	1.5	11,028	**3.91**	1.5
977	**3.93**	1.6	1,286	**4.20**	1.6	2,746	**4.14**	1.5	12,108	**4.07**	1.6
1,882	**3.87**	1.5	2,306	**4.10**	1.5	5,520	**4.03**	1.5	23,136	**4.00**	1.6
–	–	–	–	–	–	–	–	–	–	–	–
905	**5.12**	1.6	1,020	**5.37**	1.6	2,772	**5.22**	1.5	11,025	**5.09**	1.6
977	**5.16**	1.5	1,286	**5.40**	1.5	2,747	**5.48**	1.4	12,111	**5.20**	1.6
1,882	**5.14**	1.6	2,306	**5.38**	1.5	5,519	**5.35**	1.4	23,136	**5.15**	1.6
438	**4.60**	1.5	379	**4.06**	1.5	1,213	**4.09**	1.7	5,094	**4.45**	1.6
903	**4.45**	1.6	1,016	**4.14**	1.5	2,755	**4.17**	1.5	11,020	**4.50**	1.6
977	**4.58**	1.6	1,286	**4.32**	1.5	2,746	**4.25**	1.6	12,110	**4.58**	1.6
2,318	**4.57**	1.6	2,681	**4.22**	1.5	6,714	**4.19**	1.6	28,224	**4.53**	1.6
434	**5.20**	1.6	375	**487**	1.6	1,203	**5.21**	1.5	5,052	**5.00**	1.7
904	**4.91**	1.7	1,015	**5.00**	1.5	2,756	**4.79**	1.5	11,004	**4.82**	1.6
977	**5.15**	1.5	1,286	**5.09**	1.5	2,747	**5.00**	1.5	12,111	**5.03**	1.6
2,315	**5.07**	1.6	2,676	**5.02**	1.5	6,706	**4.95**	1.5	28,167	**4.94**	1.6

Table 3 | Descriptive statistics of the graduates' rating of competences on the basis of their degree and its job usefulness, according to field of study and in overall terms (*continuation from previous page*)

			Humanities			Social Sciences		
			n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
Creativity	Degree	1998	472	**4.12**	1.8	2,364	**3.86**	1.7
		2001	1,605	**4.25**	1.7	4,742	**3.85**	1.6
		2004	1,675	**4.16**	1.8	5,427	**3.93**	1.7
		All	3,952	**4.19**	1.8	12,533	**3.88**	1.7
	Usefulness	1998	660	**4.60**	2.0	2,358	**4.89**	1.7
		2001	1,602	**4.51**	1.9	4,734	**4.52**	1.7
		2004	1,675	**4.59**	1.8	5,427	**4.65**	1.7
		All	3,937	**4.56**	1.9	12,519	**4.65**	1.7
Management skills	Degree	1998	670	**3.81**	1.8	2,384	**4.07**	1.6
		2001	1,487	**3.43**	1.7	4,731	**3.96**	1.5
		2004	1,672	**3.35**	1.7	5,425	**4.10**	1.6
		All	3,829	**3.46**	1.7	12,540	**4.04**	1.6
	Usefulness	1998	661	**4.87**	1.9	2,365	**5.29**	1.6
		2.001	1,486	**4.31**	1.9	4,731	**4.71**	1.6
		2.004	1,672	**4.18**	1.9	5,425	**4.81**	1.6
		All	3,819	**4.33**	1.9	12,521	**4.86**	1.6
Documentation skills	Degree	1998	–	–	–	–	–	–
		2001	1,609	**4.91**	1.5	4,747	**4.44**	1.6
		2004	1,674	**4.76**	1.6	5,425	**4.39**	1.5
		All	3,283	**4.83**	1.6	10,172	**4.41**	1.6
	Usefulness	1998	–	–	–	–	–	–
		2001	1,608	**4.64**	1.8	4,741	**4.69**	1.7
		2004	1,674	**4.76**	1.8	5,426	**4.77**	1.6
		All	3,282	**4.70**	1.8	10,167	**4.73**	1.6

Experimental Sciences			Health Sciences			Engineering/Architecture			All		
n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
436	**3.64**	1.7	375	**3.40**	1.5	1,208	**3.76**	1.7	5,055	**3.82**	1.7
905	**3.65**	1.6	1,015	**3.46**	1.6	2,773	**3.93**	1.6	11,040	**3.87**	1.6
977	**3.56**	1.6	1,286	**3.60**	1.7	2,746	**3.96**	1.6	12,111	**3.90**	1.7
2,318	**3.61**	1.6	2,676	**3.52**	1.6	6,727	**3.91**	1.6	28,206	**3.88**	1.7
434	**4.94**	1.7	372	**4.74**	1.7	1,203	**5.23**	1.5	5,027	**4.93**	1.7
904	**4.48**	1.7	1,016	**4.34**	1.7	2,769	**4.57**	1.5	11,025	**4.51**	1.7
977	**4.50**	1.7	1,286	**4.33**	1.7	2,747	**4.68**	1.5	12,112	**4.60**	1.7
2,315	**4.58**	1.7	2,674	**4.39**	1.7	6,719	**4.74**	1.5	28,164	**4.62**	1.7
438	**3.72**	1.7	376	**3.65**	1.7	1,210	**3.82**	1.6	5,078	**3.92**	1.7
901	**3.63**	1.7	1,018	**3.33**	1.6	2,772	**3.69**	1.5	10,909	**3.73**	1.6
977	**3.39**	1.6	1,285	**3.39**	1.6	2,745	**3.90**	1.5	12,104	**3.82**	1.6
2,316	**3.55**	1.7	2,679	**3.40**	1.6	6,727	**3.80**	1.5	28,091	**3.80**	1.6
436	**5.31**	1.5	373	**5.03**	1.6	1,204	**5.59**	1.4	5,039	**5.28**	1.6
899	**4.73**	1.8	1,018	**4.40**	1.7	2,772	**4.82**	1.6	10,906	**4.65**	1.7
977	**4.50**	1.8	1,285	**4.30**	1.7	2,746	**5.05**	1.5	12,105	**4.70**	1.7
2,312	**4.74**	1.8	2,676	**4.44**	1.7	6,722	**5.05**	1.5	28,050	**4.79**	1.7
–	–	–	–	–	–	–	–	–	–	–	–
907	**4.25**	1.6	1,020	**4.16**	1.6	2,779	**4.34**	1.5	11,062	**4.44**	1.6
977	**4.38**	1.6	1,286	**4.24**	1.6	2,747	**4.35**	1.5	12,109	**4.42**	1.6
1,884	**4.31**	1.6	2,306	**4.29**	1.6	5,526	**4.35**	1.5	23,171	**4.43**	1.6
–	–	–	–	–	–	–	–	–	–	–	–
906	**4.75**	1.7	1,020	**4.71**	1.6	2,774	**4.76**	1.5	11,049	**4.71**	1.7
977	**5.01**	1.6	1,286	**4.94**	1.6	2,747	**4.87**	1.5	12,110	**4.83**	1.6
1,883	**4.89**	1.7	2,306	**4.84**	1.6	5,521	**4.82**	1.5	23,159	**4.77**	1.6

Table 3 | Descriptive statistics of the graduates' rating of competences on the basis of their degree and its job usefulness, according to field of study and in overall terms (*continuation from previous page*)

			Humanities			Social Sciences		
			n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
Languages	Degree	1998	–	–	–	–	–	–
		2001	1,605	**3.24**	2.2	4,740	**2.32**	1.6
		2004	1,675	**3.56**	2.2	5,423	**2.68**	1.7
		All	3,280	**3.40**	2.2	10,163	**2.52**	1.7
	Usefulness	1998	–	–	–	–	–	–
		2001	1,605	**3.97**	2.3	4,735	**3.32**	2.1
		2004	1,675	**4.41**	2.3	5,424	**3.80**	2.1
		All	3,280	**4.20**	2.3	10,159	**3.57**	2.1
Computing skills	Degree	1998	–	–	–	–	–	–
		2001	1,608	**2.50**	1.7	4,750	**3.29**	1.7
		2004	1,675	**2.89**	1.8	5,426	**3.73**	1.8
		All	3,283	**2.70**	1.8	10,176	**3.52**	1.8
	Usefulness	1998	–	–	–	–	–	–
		2001	1,608	**4.24**	2.1	4,745	**4.76**	1.9
		2004	1,675	**4.50**	2.1	5,426	**5.05**	1.8
		All	3,283	**4.37**	2.1	10,171	**4.91**	1.8

Experimental Sciences			Health Sciences			Engineering/Architecture			All		
n	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*	*n*	$\bar{x}$	*S*
–	–	–	–	–	–	–	–	–	–	–	–
906	**2.09**	1.5	1,012	**1.99**	1.4	2,774	**2.19**	1.4	11,037	**2.37**	1.7
977	**2.50**	1.6	1,286	**2.45**	1.6	2,746	**2.51**	1.5	12,107	**2.73**	1.8
1,883	**2.30**	1.5	2,298	**2.25**	1.5	5,520	**2.35**	1.5	23,144	**2.56**	1.7
–	–	–	–	–	–	–	–	–	–	–	–
904	**3.79**	2.2	1,015	**3.52**	2.0	2,772	**3.74**	2.1	11,031	**3.58**	2.1
977	**4.51**	2.1	1,286	**3.88**	2.0	2,746	**4.36**	2.0	12,108	**4.08**	2.1
1,881	**4.16**	2.2	2,301	**3.72**	2.0	5,518	**4.05**	2.1	23,139	**3.84**	2.1
–	–	–	–	–	–	–	–	–	–	–	–
907	**3.73**	1.6	1,016	**2.51**	1.5	2,718	**4.01**	1.8	10,999	**3.31**	1.8
977	**3.98**	1.7	1,286	**3.01**	1.6	2,746	**4.68**	1.7	12,110	**3.77**	1.8
1,884	**3.86**	1.7	2,302	**2.79**	1.6	5,464	**4.34**	1.8	23,109	**3.55**	1.8
–	–	–	–	–	–	–	–	–	–	–	–
905	**5.00**	1.8	1,016	**4.20**	1.9	2,717	**5.18**	1.7	10,991	**4.76**	1.9
977	**5.26**	1.6	1,286	**4.47**	1.9	2,747	**5.57**	1.4	12,111	**5.05**	1.8
1,882	**5.13**	1.7	2,302	**4.35**	1.9	5,464	**5.37**	1.6	23,102	**4.91**	1.9

Table 4 | Differences in the graduates' rating of their degree and its job usefulness: subjects in the Humanities

		Geography and History			Philosophy and humanities			Comparative studies		
		n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Theoretical learning	1998	127	**.83**	1.66	37	**.86**	1.53			
	2001	315	**.95**	1.81	85	**1.33**	2.03			
	2004	379	**.59**	1.55	107	**.48**	1.62	34	**.76**	1.58
Practical learning	1998	122	**-.16**	1.83	35	**-.20**	1.92			
	2001	314	**-.34**	2.03	82	**-.37**	2.05			
	2004	379	**-.40**	1.65	107	**-.37**	1.18	34	**-.82**	2.24
Written expression	1998	0			0					
	2001	314	**-.12**	1.69	85	**.01**	1.31			
	2004	379	**-.37**	1.41	107	**-.18**	1.23	34	**.09**	1.00
Oral expression	1998	0			0					
	2001	313	**-.94**	1.89	85	**-.86**	1.96			
	2004	379	**-.63**	1.71	107	**-.73**	1.84	34	**-1.03**	2.10
Teamwork	1998	124	**-.66**	2.08	38	**-.82**	1.74			
	2001	315	**-.72**	1.83	85	**-.54**	1.80			
	2004	379	**-.77**	1.54	107	**-1.02**	1.83	34	**-.82**	1.71
Leadership	1998	73	**-1.11**	1.93	17	**-1.47**	2.15			
	2001	310	**-1.00**	1.74	84	**-.90**	1.75			
	2004	379	**-.94**	1.64	107	**-.93**	1.69	34	**-.97**	1.49
Problem-solving	1998	123	**-.67**	2.18	37	**.05**	1.73			
	2001	312	**-1.05**	1.85	85	**-1.05**	1.99			
	2004	379	**-1.20**	1.83	107	**-1.16**	2.01	34	**-1.24**	1.99
Decision making	1998	0			0					
	2001	314	**-1.10**	1.88	84	**-1.05**	1.76			
	2004	379	**-1.36**	1.88	106	**-1.11**	1.76	34	**-1.24**	1.79
Critical thinking	1998	74	**-.38**	2.10	17	**.29**	1.83			
	2001	314	**.11**	1.74	85	**.26**	1.68			
	2004	379	**-.08**	1.56	107	**.28**	1.48	34	**-.06**	.78
Creativity	1998	73	**-1.00**	2.12	17	**.00**	1.73			
	2001	315	**-.66**	1.85	85	**-.51**	1.89			
	2004	379	**-.84**	1.68	107	**-.47**	1.46	34	**-.53**	1.48

Philology Catalan and Spanish			Philology. Foreign Langs. & Translating and Interpreting			Philology Classics			Fine Arts		
n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
112	**.60**	1.62	153	**.46**	1.36				63	**.30**	1.82
209	**.75**	1.70	211	**.81**	1.62	18	**.72**	2.02	86	**-.37**	1.99
201	**.53**	1.51	271	**.31**	1.48	22	**.45**	1.26	63	**.00**	1.28
105	**-.53**	1.98	151	**-.62**	1.74				61	**-.20**	2.02
208	**-.74**	2.02	211	**-.82**	1.60	18	**-.17**	.86	86	**-.67**	2.51
201	**-.83**	1.68	271	**-.38**	1.45	22	**-.23**	1.45	63	**.03**	1.15
0			0						0		
209	**-.11**	1.37	209	**.28**	1.24	18	**-.11**	1.08	86	**-1.21**	1.87
201	**-.12**	1.24	271	**-.02**	1.02	22	**.05**	1.50	63	**-.52**	1.39
0			0						0		
208	**-1.40**	2.11	210	**-.72**	1.74	18	**-1.22**	2.13	86	**-2.28**	1.99
201	**-.93**	1.79	271	**-.56**	1.44	22	**-.73**	1.88	63	**-.81**	1.48
112	**-.94**	2.11	153	**-.35**	1.83				62	**-.50**	1.91
209	**-.99**	1.96	210	**-.48**	1.69	18	**-1.33**	2.06	86	**-.81**	2.08
201	**-1.22**	1.84	271	**-.42**	1.31	22	**-.59**	1.22	63	**-1.13**	1.73
56	**-1.48**	1.94	65	**-1.22**	2.03				22	**-1.73**	2.16
205	**-1.14**	1.78	207	**-.92**	1.65	18	**-.83**	1.92	11	**-.27**	2.28
201	**-1.09**	1.76	271	**-.80**	1.48	22	**-.41**	1.44	63	**-.94**	1.77
112	**-1.08**	1.86	152	**-.71**	1.80				62	**-.73**	2.00
205	**-1.40**	2.02	209	**-1.09**	1.54	18	**-1.28**	1.84	86	**-1.86**	2.13
201	**-1.41**	2.00	271	**-1.08**	1.73	22	**-.45**	1.63	63	**-1.35**	1.95
0			0						0		
207	**-1.53**	1.90	210	**-1.00**	1.57	18	**-1.06**	1.92	85	**-1.98**	1.93
201	**-1.47**	2.00	271	**-1.03**	1.46	22	**-.73**	1.58	63	**-1.06**	1.65
57	**.11**	2.00	64	**-.23**	2.04				21	**-.90**	1.26
207	**-.22**	1.71	212	**.04**	1.34	18	**-.50**	1.10	86	**-1.07**	2.00
201	**-.26**	1.41	271	**-.17**	1.40	22	**-.50**	1.63	63	**-.32**	1.56
57	**-1.25**	2.13	64	**-1.22**	1.72				21	**-1.14**	1.80
207	**-1.11**	1.85	211	**-.68**	1.51	18	**-.94**	1.89	86	**-.55**	1.49
201	**-.99**	1.71	271	**-.54**	1.37	22	**-.59**	1.71	63	**-.19**	1.54

Table 4 | Differences in the graduates' rating of their degree and its job usefulness: subjects in the Humanities (*continuation from previous page*)

		Geography and History			Philosophy and humanities			Comparative studies		
		n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Management skills	1998	73	**-1.38**	1.97	18	**-.83**	1.69			
	2001	314	**-.91**	1.84	84	**-1.08**	2.10			
	2004	379	**-1.02**	1.70	107	**-1.04**	1.79	34	**-1.18**	1.60
Documen-tation skills	1998	0			0					
	2001	315	**-.10**	1.78	85	**-.14**	1.75			
	2004	378	**-.33**	1.63	107	**-.19**	1.43	34	**.03**	1.51
Languages	1998	0			0					
	2001	312	**-1.45**	2.08	85	**-.69**	2.17			
	2004	379	**-1.61**	2.31	107	**-1.21**	2.02	34	**-.35**	1.20
Computing skills	1998	0			0					
	2001	315	**-1.82**	2.35	85	**-1.59**	2.17			
	2004	379	**-1.93**	2.22	107	**-1.64**	1.92	34	**-1.56**	1.91

	Philology Catalan and Spanish			Philology. Foreign Langs. & Translating and Interpreting			Philology Classics			Fine Arts		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
	56	**-1.07**	1.80	64	**-1.52**	1.67				22	**-1.59**	1.82
	207	**-1.31**	1.71	208	**-.93**	1.74	18	**-1.17**	1.65	11	**-.91**	1.97
	200	**-1.18**	1.82	270	**-.89**	1.69	22	**-.41**	1.18	63	**-1.14**	1.85
	0			0						0		
	209	**-.16**	1.72	212	**-.14**	1.45	18	**-.61**	1.79	86	**-.40**	1.81
	201	**-.42**	1.56	271	**-.16**	1.45	22	**-.36**	1.43	63	**-.81**	1.55
	0			0						0		
	209	**-.51**	2.18	212	**-.38**	1.27	18	**-.94**	1.86	86	**-1.23**	2.13
	201	**-.84**	1.80	271	**-.24**	1.30	22	**-.68**	2.15	63	**-1.86**	2.22
	0			0						0		
	209	**-2.27**	2.26	212	**-1.68**	1.94	18	**-2.39**	2.15	86	**-2.10**	2.26
	201	**-2.05**	2.04	271	**-1.43**	1.89	22	**-1.50**	1.99	63	**-2.16**	2.12

Table 5 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in the Social Sciences

		Econ./Bus. Adm. + Mgt.		Bus. studies		Law		Labour studies	
		n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
Theoretical learning	1998	485	**.39**	389	**.39**	265	**-.10**	157	**.18**
			1.45		1.40		1.39		1.36
	2001	637	**.74**	412	**.45**	350	**.54**	256	**.61**
			1.33		1.28		1.49		1.50
	2004	720	**.37**	503	**.27**	392	**.28**	384	**.32**
			1.19		1.15		1.29		1.12
Practical learning	1998	468	**-.82**	379	**-.75**	252	**-1.20**	155	**-.87**
			1.96		1.73		2.19		1.78
	2001	636	**-.63**	410	**-.58**	350	**-.94**	256	**-.48**
			1.59		1.41		1.99		1.82
	2004	720	**-.40**	503	**-.45**	392	**-.83**	384	**-.59**
			1.31		1.27		1.83		1.51
Written expression	1998	0		0		0		0	
	2001	629	**-.50**	411	**-.47**	349	**-.89**	255	**-.34**
			1.37		1.22		1.63		1.35
	2004	720	**-.55**	503	**-.28**	391	**-.70**	384	**-.33**
			1.31		1.00		1.41		1.12
Oral expression	1998	0		0		0		0	
	2001	629	**-1.14**	409	**-1.05**	349	**-1.45**	255	**-.66**
			1.78		1.64		2.04		1.67
	2004	720	**-.93**	503	**-.60**	392	**-1.15**	384	**-.55**
			1.60		1.38		1.89		1.43
Teamwork	1998	483	**-1.32**	389	**-.94**	265	**-1.26**	155	**-.57**
			1.85		1.77		1.94		1.61
	2001	635	**-.82**	412	**-.74**	348	**-.91**	256	**-.44**
			1.68		1.46		1.61		1.67
	2004	720	**-.91**	503	**-.44**	391	**-.81**	384	**-.39**
			1.51		1.21		1.58		1.24

	Political science		Communication		Documentation		Psychology		Pedagogy			Educ.
	n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
	74	**.62**	171	**.87**			179	**.55**	140	**.16**	498	**.27**
		1.60		1.22				1.47		1.48		1.32
	161	**.89**	223	**.67**	60	**.33**	211	**.61**	243	**.34**	952	**.33**
		1.71		1.49		1.20		1.24		1.38		1.38
	216	**.61**	212	**.31**	105	**.09**	190	**.32**	273	**.14**	1,317	**.23**
		1.31		1.32		1.26		1.44		1.16		1.25
	73	**-.40**	169	**-.11**			179	**-.39**	138	**-.36**	498	**-.39**
		1.51		1.63				2.01		1.85		1.71
	161	**-.27**	223	**-.28**	60	**-.62**	211	**-.53**	243	**-.60**	949	**-.56**
		1.79		1.69		1.21		1.68		1.54		1.55
	216	**-.10**	212	**-.19**	105	**-.24**	190	**-.45**	273	**-.33**	1,317	**-.44**
		1.23		1.23		1.26		1.49		1.36		1.31
	0		0				0		0		0	
	160	**-.52**	223	**-.52**	60	**-.45**	211	**-.48**	240	**-.46**	951	**-.30**
		1.44		1.62		1.28		1.50		1.38		1.40
	216	**-.48**	212	**-.38**	105	**-.47**	190	**-.72**	273	**-.54**	1,317	**-.43**
		1.46		1.15		1.32		1.52		1.13		1.20
	0		0				0		0		0	
	159	**-1.02**	223	**-.62**	60	**-1.18**	211	**-1.03**	240	**-1.20**	950	**-.91**
		1.74		1.55		1.57		1.82		1.82		1.62
	216	**-.75**	212	**-.50**	105	**-.92**	190	**-1.17**	273	**-.71**	1,317	**-.75**
		1.63		1.43		1.67		1.73		1.53		1.41
	71	**-.92**	173	**-.03**			179	**-.91**	139	**-.35**	496	**-.36**
		2.20		1.96				1.71		1.70		1.35
	160	**-.53**	223	**-.13**	60	**-.53**	211	**-.59**	244	**-.50**	951	**-.18**
		1.46		1.36		1.53		1.49		1.47		1.29
	216	**-.39**	212	**-.52**	105	**-.70**	190	**-.88**	273	**-.35**	1,317	**-.42**
		1.51		1.22		1.29		1.63		1.07		1.17

Table 5 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in the Social Sciences (*continuation from previous page*)

		Econ./Bus. Adm. + Mgt.		Bus. studies		Law		Labour studies	
		n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
Leadership	1998	245	**-1.93**	175	**-1.42**	154	**-1.44**	107	**-.98**
			1.94		1.85		1.88		1.68
	2001	634	**-1.17**	411	**-.88**	347	**-.97**	253	**-.67**
			1.73		1.53		1.69		1.81
	2004	720	**-1.25**	503	**-.71**	390	**-1.17**	384	**-.64**
			1.73		1.41		1.81		1.47
Problem-solving	1998	482	**-1.45**	388	**-1.20**	266	**-1.62**	156	**-1.11**
			1.64		1.73		2.01		1.66
	2001	635	**-.99**	412	**-.90**	346	**-1.27**	253	**-.90**
			1.53		1.46		1.78		1.80
	2004	720	**-1.03**	503	**-.79**	392	**-1.23**	384	**-.92**
			1.51		1.35		1.74		1.65
Decision making	1998	0		0		0		0	
	2001	634	**-1.24**	411	**-1.13**	348	**-1.34**	254	**-1.07**
			1.70		1.55		1.87		1.73
	2004	720	**-1.26**	503	**-.81**	392	**-1.51**	384	**-1.02**
			1.67		1.55		1.97		1.68
Critical thinking	1998	243	**-.88**	176	**-.86**	155	**-1.08**	106	**-.53**
			1.69		1.75		1.87		1.48
	2001	634	**-.46**	411	**-.31**	349	**-.64**	252	**-.47**
			1.52		1.38		1.76		1.43
	2004	720	**-.62**	503	**-.36**	391	**-.69**	384	**-.33**
			1.53		1.20		1.58		1.53
Creativity	1998	242	**-1.30**	173	**-1.21**	154	**-1.34**	106	**-.92**
			1.81		1.87		2.03		1.53
	2001	636	**-.92**	412	**-.66**	348	**-1.12**	254	**-.58**
			1.60		1.36		1.62		1.55
	2004	720	**-.91**	503	**-.52**	392	**-1.08**	384	**-.66**
			1.69		1.44		1.66		1.61

	Political science		Communication		Documentation		Psychology		Pedagogy		Educ.	
	n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
	56	**-1.64**	98	**-1.17**			89	**-1.75**	68	**-1.07**	318	**-.67**
		2.39		1.95				1.99		1.68		1.45
	158	**-.80**	221	**-.82**	59	**-.83**	212	**-.96**	240	**-.76**	941	**-.56**
		1.78		1.59		1.83		1.60		1.53		1.46
	216	**-1.11**	212	**-.87**	105	**-.96**	190	**-1.23**	273	**-.59**	1,315	**-.60**
		1.76		1.60		1.49		1.75		1.41		1.29
	73	**-1.48**	170	**-.83**			179	**-1.12**	139	**-.86**	495	**-1.07**
		2.00		1.87				1.84		1.63		1.56
	160	**-1.06**	223	**-1.25**	60	**-1.27**	212	**-1.08**	242	**-1.23**	950	**-1.14**
		1.73		1.76		1.80		1.59		1.83		1.70
	216	**-1.18**	212	**-1.28**	105	**-1.17**	190	**-1.42**	272	**-.99**	1,317	**-1.13**
		1.71		1.62		1.55		1.93		1.54		1.69
	0		0				0		0		0	
	158	**-1.29**	222	**-1.24**	60	**-1.45**	211	**-1.13**	242	**-1.21**	948	**-1.16**
		1.72		1.76		1.88		1.69		1.60		1.63
	216	**-1.22**	212	**-1.17**	105	**-.86**	190	**-1.49**	273	**-.99**	1,315	**-1.03**
		1.67		1.54		1.40		1.74		1.48		1.53
	56	**-.29**	97	**-.72**			88	**-1.01**	68	**-.59**	318	**-.36**
		1.79		1.49				2.25		1.60		1.50
	160	**37**	223	**-.16**	60	**-.93**	210	**-.65**	242	**-.60**	946	**-.56**
		1.78		1.94		1.38		1.53		1.69		1.55
	216	**.24**	212	**-.26**	105	**-.57**	190	**-.75**	273	**-.47**	1,317	**-.59**
		1.76		1.72		1.31		1.66		1.40		1.35
	55	**-1.53**	96	**-1.22**			88	**-2.16**	66	**-1.06**	312	**-1.14**
		1.95		1.89				1.99		1.43		1.70
	161	**-.59**	223	**-.36**	60	**-1.27**	211	**-.99**	243	**-1.21**	950	**-.89**
		1.63		1.75		1.66		1.66		1.80		1.62
	216	**-.77**	212	**-.52**	105	**-.90**	190	**-1.29**	273	**-.92**	1,317	**-.87**
		1.70		1.54		1.40		1.93		1.64		1.45

Table 5 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in the Social Sciences (*continuation from previous page*)

		Econ./Bus. Adm. + Mgt.		Bus. studies		Law		Labour studies	
		n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
Management skills	1998	245	**-1.51**	174	**-1.45**	154	**-1.57**	104	**-1.15**
			1.71		1.77		1.91		1.60
	2001	632	**-.97**	411	**-.73**	350	**-1.20**	255	**-.76**
			1.53		1.35		1.79		1.53
	2004	720	**-.92**	503	**-.55**	391	**-1.13**	384	**-.70**
			1.47		1.14		1.72		1.45
Documentation skills	1998	0		0		0		0	
	2001	635	**-.38**	412	**-.42**	348	**-.82**	256	**-.51**
			1.70		1.56		1.82		1.58
	2004	720	**-.52**	503	**-.39**	392	**-.78**	384	**-.60**
			1.49		1.25		1.51		1.44
Languages	1998	0		0		0		0	
	2001	633	**-1.36**	412	**-.67**	349	**-1.28**	255	**-1.04**
			2.14		2.00		1.98		1.85
	2004	720	**-1.39**	503	**-.78**	392	**-1.43**	384	**-1.13**
			2.24		2.01		2.11		1.98
Computing skills	1998	0		0		0		0	
	2001	636	**-1.87**	412	**-1.44**	349	**-2.20**	256	**-2.05**
			1.92		1.73		2.20		2.19
	2004	720	**-1.59**	503	**-.92**	392	**-2.08**	384	**-1.78**
			1.88		1.52		2.19		2.13

	Political science		Communication		Documentation		Psychology		Pedagogy		Educ.	
	n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
	56	**-1.88**	97	**-1.66**			89	**-1.82**	68	**-1.01**	315	**-1.02**
		2.04		1.76				1.96		1.34		1.32
	161	**-.99**	222	**-1.03**	60	**-.45**	211	**-1.00**	242	**-.89**	944	**-.68**
		1.70		1.74		1.55		1.63		1.47		1.45
	216	**-1.07**	212	**-.90**	105	**-.38**	190	**-1.29**	273	**-.69**	1,316	**-.70**
		1.69		1.52		1.14		1.75		1.47		1.42
	0		0				0		0		0	
	161	**-.25**	223	**-.67**	60	**-.12**	210	**-.30**	244	**-.48**	952	**-.44**
		1.64		1.66		1.25		1.67		1.64		1.59
	216	**-.19**	212	**-.59**	105	**-.17**	190	**-.52**	273	**-.47**	1.316	**-.51**
		1.58		1.29		1.10		1.57		1.37		1.35
	0		0				0		0		0	
	160	**-1.28**	223	**-2.07**	60	**-1.92**	210	**-.90**	242	**-1.24**	949	**-.53**
		2.12		2.17		2.34		2.22		2.02		1.85
	216	**-1.28**	212	**-2.01**	105	**-1.80**	190	**-1.27**	273	**-1.26**	1.315	**-.86**
		2.16		2.18		2.13		1.89		1.90		1.76
	0		0				0		0		0	
	161	**-1.39**	223	**-1.29**	60	**-.83**	210	**-1.23**	244	**-1.77**	952	**-1.14**
		1.68		1.93		1.53		2.04		2.19		2.07
	216	**-1.12**	212	**-1.33**	105	**-.84**	190	**-1.24**	273	**-1.50**	1.317	**-1.19**
		1.74		1.73		1.54		1.75		1.77		1.76

Table 6 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in the Experimental Sciences

		Chemistry			Biology and Natural Sciences			Physics and Mathematics		
		n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Theoretical learning	1998	108	**.27**	1.57	179	**.31**	1.38	83	**.70**	1.83
	2001	170	**.49**	1.71	305	**.80**	1.64	128	**1.25**	1.52
	2004	172	**.45**	1.39	428	**.42**	1.40	166	**.80**	1.66
Practical learning	1998	106	**-.54**	1.93	178	**-.30**	1.81	80	**-.41**	1.58
	2001	170	**-.31**	1.99	305	**.04**	1.74	128	**-.33**	1.58
	2004	172	**.14**	1.67	428	**.03**	1.65	166	**-.19**	1.75
Written expression	1998	0			0			0		
	2001	169	**-1.08**	1.77	305	**-1.04**	1.69	128	**-1.03**	1.61
	2004	172	**-.87**	1.54	428	**-.73**	1.51	166	**-1.01**	1.78
Oral expression	1998	0			0			0		
	2001	169	**-1.56**	2.01	305	**-1.46**	1.98	128	**-1.51**	1.77
	2004	172	**-1.06**	1.74	428	**-.93**	1.71	166	**-1.34**	1.91
Teamwork	1998	108	**-1.06**	1.81	179	**-1.13**	1.65	83	**-.75**	1.89
	2001	171	**-.78**	1.62	305	**-.51**	1.74	128	**-.87**	1.61
	2004	172	**-.95**	1.58	428	**-.64**	1.40	166	**-1.11**	1.55
Leadership	1998	55	**-2.31**	1.83	116	**-1.71**	1.93	52	**-1.81**	1.88
	2001	169	**-1.49**	1.80	303	**-1.25**	1.80	127	**-1.28**	1.73
	2004	172	**-1.28**	1.66	428	**-.99**	1.65	166	**-1.19**	1.68
Problem-solving	1998	106	**-1.62**	1.61	178	**-1.56**	1.78	85	**-.54**	1.83
	2001	170	**-.93**	1.73	305	**-1.21**	1.77	127	**-.46**	1.62
	2004	172	**-1.17**	1.50	428	**-1.15**	1.61	166	**-.32**	1.50
Decision making	1998	0			0			0		
	2001	170	**-1.61**	1.74	304	**-1.58**	1.78	128	**-1.02**	1.63
	2004	172	**-1.45**	1.69	428	**-1.33**	1.62	166	**-1.10**	1.62
Critical thinking	1998	56	**-1.29**	1.50	115	**-1.19**	1.71	52	**-.29**	1.80
	2001	170	**-.73**	1.26	304	**-.63**	1.70	127	**-.51**	1.68
	2004	172	**-.97**	1.38	428	**-.75**	1.66	166	**-.37**	1.38

Table 6 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in the Experimental Sciences (*continuation from previous page*)

		Chemistry			Biology and Natural Sciences			Physics and Mathematics		
		n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Creativity	1998	55	**-2.09**	1.85	116	**-1.61**	1.89	53	**-1.23**	1.58
	2001	171	**-1.20**	1.73	305	**-.97**	1.76	127	**-1.03**	1.64
	2004	172	**-1.14**	1.57	428	**-1.06**	1.57	166	**-.89**	1.70
Management skills	1998	56	**-2.05**	1.74	116	**-1.87**	1.73	53	**-1.68**	1.92
	2001	169	**-1.24**	1.76	300	**-1.31**	1.77	128	**-1.11**	1.66
	2004	172	**-1.26**	1.62	428	**-1.15**	1.71	166	**-1.07**	1.59
Documentation skills	1998	0			0			0		
	2001	171	**-.75**	1.85	305	**-.83**	1.86	128	**-.92**	1.71
	2004	172	**-.83**	1.84	428	**-.73**	1.48	166	**-.85**	1.92
Languages	1998	0			0			0		
	2001	171	**-2.13**	2.41	303	**-1.79**	2.23	128	**-2.04**	2.33
	2004	172	**-2.35**	2.24	428	**-2.16**	2.28	166	**-2.03**	2.08
Computing skills	1998	0			0			0		
	2001	171	**-1.51**	1.80	304	**-1.38**	2.03	128	**-1.05**	1.94
	2004	172	**-1.43**	1.82	428	**-1.45**	1.87	166	**-.87**	1.82

Table 7 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in the Health Sciences

		Health Sciences 1st cycle specialisations			Medicine and Odontology			Pharmacy			Veterinary Science		
		n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Theoretical learning	1998	314	**-.26**	1.27	108	**.27**	1.57	108	**.27**	1.57	108	**.27**	1.57
	2001	403	**.22**	1.24	291	**.21**	1.30	157	**.66**	1.37	88	**-.08**	1.65
	2004	613	**.11**	1.13	327	**.14**	1.18	201	**.52**	1.38	68	**.57**	1.51
Practical learning	1998	313	**-1.05**	1.56	46	**-2.35**	1.72	139	**-.79**	1.97	109	**-1.00**	2.15
	2001	403	**-.33**	1.40	291	**-.75**	1.64	157	**-.09**	1.76	88	**-2.30**	2.48
	2004	613	**-.22**	1.13	327	**-.48**	1.39	201	**.05**	1.62	68	**-.57**	1.94
Written expression	1998	0			0			0			0		
	2001	402	**-.32**	1.28	290	**-.83**	1.55	157	**-.40**	1.72	87	**-1.72**	2.13
	2004	613	**-.30**	1.28	327	**-.74**	1.55	201	**-.70**	1.60	68	**-.62**	1.72
Oral expression	1998	0			0			0			0		
	2001	402	**-.80**	1.51	289	**-1.41**	1.87	156	**-1.38**	1.88	88	**-2.31**	1.80
	2004	613	**-.62**	1.47	327	**-1.14**	1.72	201	**-1.18**	1.80	68	**-1.35**	2.06
Teamwork	1998	312	**-.70**	1.56	46	**-1.13**	1.63	138	**-1.74**	1.95	108	**-.74**	1.87
	2001	403	**-.32**	1.41	290	**-1.10**	1.60	157	**-.87**	1.78	88	**-.41**	1.73
	2004	613	**-.45**	1.42	327	**-1.10**	1.61	201	**-.90**	1.59	68	**-1.12**	1.77
Leadership	1998	142	**-.78**	1.51	26	**-1.69**	1.76	57	**-1.82**	2.01	35	**-.89**	1.60
	2001	398	**-.64**	1.38	286	**-.86**	1.49	157	**-1.13**	1.72	87	**-1.43**	2.04
	2004	613	**-.58**	1.35	327	**-.97**	1.45	201	**-1.22**	1.60	68	**-.88**	1.68
Problem-solving	1998	312	**-1.21**	1.66	46	**-2.15**	1.73	137	**-1.93**	1.81	109	**-.97**	1.54
	2001	401	**-.84**	1.45	291	**-1.25**	1.68	156	**-1.11**	1.70	88	**-2.15**	1.59
	2004	613	**-.87**	1.43	327	**-1.40**	1.68	201	**-1.24**	1.74	68	**-1.16**	1.66
Decision making	1998	0			0			0			0		
	2001	402	**-.88**	1.45	291	**-1.50**	1.90	157	**-1.67**	1.74	88	**-3.13**	1.93
	2004	613	**-.93**	1.50	327	**-1.65**	1.75	201	**-1.55**	1.75	68	**-1.40**	1.84
Critical thinking	1998	142	**-.63**	1.71	26	**-.69**	1.57	58	**-1.52**	1.85	36	**-1.22**	1.79
	2001	402	**-.50**	1.28	290	**-1.10**	1.65	156	**-1.03**	1.59	86	**-1.64**	1.45
	2004	613	**-.52**	1.37	327	**-1.27**	1.65	201	**-.96**	1.57	68	**-.72**	1.29

Table 7 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in the Health Sciences (*continuation from previous page*)

		Health Sciences 1st cycle specialisations			Medicine and Odontology			Pharmacy			Veterinary Science		
		n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Creativity	1998	140	**-1.28**	1.62	26	**-1.69**	1.62	57	**-1.79**	1.83	36	**-1.39**	1.36
	2001	403	**-.59**	1.41	287	**-1.08**	1.55	156	**-1.16**	1.66	87	**-1.33**	1.77
	2004	613	**-.57**	1.40	327	**-1.02**	1.61	201	**-.97**	1.57	68	**-.74**	1.33
Management skills	1998	142	**-1.32**	1.70	26	**-1.92**	1.85	57	**-1.67**	1.98	36	**-1.31**	1.70
	2001	402	**-.68**	1.45	290	**-1.34**	1.75	156	**-1.24**	1.70	87	**-1.80**	1.87
	2004	612	**-.67**	1.57	327	**-1.19**	1.61	201	**-1.31**	1.80	68	**-1.12**	1.66
Documentation skills	1998	0			0			0			0		
	2001	402	**-.12**	1.59	291	**-1.31**	1.93	157	**-.47**	1.77	88	**-.39**	2.09
	2004	613	**-.56**	1.50	327	**-1.20**	1.62	201	**-.78**	1.54	68	**-.47**	1.39
Languages	1998	0			0			0			0		
	2001	400	**-1.15**	1.83	288	**-2.00**	2.15	155	**-1.76**	2.27	88	**-1.53**	2.07
	2004	613	**-.88**	1.81	327	**-1.92**	2.19	201	**-2.29**	2.20	68	**-1.87**	2.27
Computing skills	1998	0			0			0			0		
	2001	401	**-1.28**	2.06	288	**-2.18**	2.22	156	**-2.22**	1.98	88	**-1.10**	1.87
	2004	613	**-1.18**	1.79	327	**-1.95**	1.93	201	**-1.87**	2.02	68	**-.85**	1.82

Table 8 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in Engineering and Architecture

		Architecture		Tech. Civil Engineering		Civil Eng.		Nautic. Science	
		n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
Theoretical learning	1998	286	**-.01**	67	**.40**	34	**1.21**	3	**.67**
			1.33		1.60		1.47		.58
	2001	322	**.23**	84	**.67**	64	**1.39**	29	**.24**
			1.30		1.39		1.69		1.53
	2004	294	**.20**	95	**.49**	82	**.61**	30	**.13**
			1.19		1.28		1.37		1.41
Practical learning	1998	279	**-1.16**	67	**-1.25**	34	**-1.21**	3	**-1.67**
			2.02		2.00		1.87		2.89
	2001	322	**-.98**	84	**-.79**	64	**-1.22**	29	**-.52**
			1.84		1.46		1.86		1.79
	2004	294	**-.72**	95	**-.79**	82	**-1.09**	30	**-.60**
			1.58		1.54		1.87		1.57
Written expression	1998	0		0		0		0	
	2001	317	**-.74**	83	**-.75**	64	**-1.25**	29	**.21**
			1.40		1.40		1.61		1.11
	2004	294	**-.64**	95	**-.68**	82	**-1.55**	30	**-.50**
			1.36		1.38		1.69		.97
Oral expression	1998	0		0		0		0	
	2001	317	**-.97**	83	**-1.12**	64	**-2.03**	29	**-.03**
			1.71		1.73		2.02		1.64
	2004	294	**-.83**	95	**-.95**	82	**-1.91**	30	**-.70**
			1.52		1.51		2.10		1.39
Teamwork	1998	286	**-.97**	67	**-1.22**	34	**-1.65**	3	**-2.67**
			1.79		1.71		1.72		1.15
	2001	321	**-.28**	84	**-.64**	64	**-1.39**	29	**-.97**
			1.51		1.42		1.22		1.27
	2004	294	**-.48**	95	**-.75**	82	**-1.55**	30	**-.90**
			1.19		1.36		1.83		1.21

Adv. Prod. Technologies		Adv. Prod. Technols.		ICT		Information & Comm.		Agric. Technologies		Agric. SC.	
n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
337	**.58**	201	**.68**	170	**.59**	221	**.81**	71	**.14**	63	**.24**
	1.39		1.31		1.35		1.36		1.41		1.35
516	**.57**	259	**.66**	325	**.63**	290	**.88**	248	**.53**	129	**.67**
	1.38		1.46		1.34		1.53		1.34		1.30
412	**.38**	358	**.43**	407	**.43**	339	**.61**	156	**.17**	151	**.26**
	1.28		1.26		1.22		1.48		1.01		1.40
334	**-.28**	196	**-.68**	168	**-.42**	220	**-.52**	71	**-.30**	63	**-.59**
	1.68		1.78		1.63		1.55		1.78		2.15
515	**-.22**	259	**-.55**	325	**-.31**	290	**-.30**	248	**-.34**	129	**-.67**
	1.64		1.76		1.38		1.57		1.85		1.91
412	**-.32**	358	**-.32**	407	**-.14**	339	**-.19**	156	**-.55**	151	**-.50**
	1.46		1.46		1.20		1.31		1.49		1.57
0		0		0		0		0		0	
511	**-.80**	253	**-1.05**	323	**-.74**	285	**-1.15**	246	**-.62**	129	**-1.13**
	1.53		1.56		1.47		1.71		1.61		1.67
412	**-.70**	358	**-.92**	406	**-.72**	339	**-1.20**	156	**-.58**	151	**-.93**
	1.32		1.55		1.46		1.71		1.36		1.59
0		0		0		0		0		0	
510	**-1.12**	253	**-1.45**	323	**-1.12**	285	**-1.50**	246	**-1.04**	128	**-1.80**
	1.75		1.89		1.77		1.89		1.81		2.09
412	**-.98**	358	**-1.14**	406	**-.81**	339	**-1.35**	156	**-.84**	151	**-1.24**
	1.57		1.73		1.59		1.80		1.71		1.89
337	**-1.12**	206	**-1.29**	171	**-.87**	222	**-1.37**	69	**-.33**	63	**-.81**
	1.75		1.81		1.43		1.69		1.42		1.87
516	**-.61**	259	**-.58**	325	**-.45**	290	**-.76**	248	**-.48**	128	**-.85**
	1.56		1.64		1.38		1.53		1.51		1.74
412	**-.61**	358	**-.75**	406	**-.51**	339	**-.75**	156	**-.58**	151	**-.98**
	1.45		1.49		1.31		1.31		1.41		1.49

Table 8 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in Engineering and Architecture (*continuation from previous page*)

		Architecture		Tech. Civil Engineering		Civil Eng.		Nautic. Science	
		n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
Leadership	1998	116	**-2.32**	47	**-2.28**	14	**-3.00**	3	**-4.00**
			2.02		1.99		2.18		2.00
	2001	317	**-1.29**	84	**-1.56**	64	**-1.98**	29	**-1.31**
			1.83		1.66		1.58		1.69
	2004	294	**-1.17**	95	**-1.33**	82	**-1.99**	30	**-1.17**
			1.56		1.55		2.03		1.86
Problem-solving	1998	284	**-1.19**	67	**-1.24**	34	**.12**	3	**-2.33**
			1.60		2.13		1.61		1.15
	2001	318	**-1.10**	83	**-.87**	64	**-.52**	29	**-1.28**
			1.61		1.49		1.27		1.73
	2004	294	**-1.29**	95	**-.72**	82	**-.77**	30	**-1.37**
			1.59		1.40		1.14		1.92
Decision making	1998	0		0		0		0	
	2001	321	**-1.33**	83	**-1.37**	64	**-1.17**	28	**-1.71**
			1.68		1.71		1.11		1.70
	2004	294	**-1.46**	95	**-1.42**	82	**-1.85**	30	**-1.87**
			1.58		1.55		1.69		2.01
Critical thinking	1998	115	**-1.28**	46	**-1.39**	14	**-.36**	3	**-1.33**
			1.54		1.74		1.78		2.52
	2001	320	**-.45**	84	**-.74**	64	**-.36**	28	**-.86**
			1.47		1.42		1.28		1.96
	2004	294	**-.77**	95	**-.88**	82	**-.95**	30	**-.90**
			1.56		1.26		1.67		1.58
Creativity	1998	115	**-1.31**	47	**-1.47**	14	**-1.29**	3	**-2.67**
			1.86		1.90		1.64		3.21
	2001	321	**-.03**	84	**-.75**	64	**-.77**	28	**-.39**
			1.52		1.64		1.34		1.47
	2004	294	**-.16**	95	**-.72**	82	**-1.20**	30	**-.50**
			1.58		1.33		1.65		1.36

Adv. Prod. Technologies		Adv. Prod. Technols.		ICT		Information & Comm.		Agric. Technologies		Agric. SC.	
n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
181	**-2.35**	137	**-2.80**	75	**-1.88**	91	**-2.88**	44	**-1.48**	29	**-1.72**
	2.03		1.98		1.87		1.97		1.93		2.00
513	**-1.34**	259	**-1.38**	325	**-1.27**	290	**-1.46**	246	**-1.16**	128	**-1.47**
	1.69		2.05		1.72		1.76		1.73		1.88
412	**-1.31**	358	**-1.45**	406	**-1.13**	339	**-1.66**	156	**-1.33**	151	**-1.48**
	1.70		1.73		1.70		1.77		1.73		1.84
335	**-1.39**	204	**-1.29**	170	**-.94**	221	**-.90**	70	**-.87**	63	**-1.22**
	1.74		1.74		1.47		1.62		1.37		1.95
515	**-.86**	259	**-.75**	325	**-.81**	290	**-.64**	246	**-.97**	129	**-1.12**
	1.50		1.49		1.34		1.24		1.56		1.70
412	**-.88**	358	**-.83**	406	**-.85**	339	**-.74**	156	**-.96**	151	**-1.36**
	1.47		1.44		1.46		1.32		1.49		1.70
0		0		0		0		0		0	
515	**-1.44**	258	**-1.38**	325	**-1.12**	290	**-1.40**	246	**-1.24**	128	**-1.77**
	1.76		1.74		1.53		1.61		1.70		1.83
412	**-1.45**	358	**-1.55**	406	**-1.15**	339	**-1.43**	156	**-1.21**	151	**-1.71**
	1.73		1.63		1.66		1.71		1.44		1.89
181	**-1.33**	138	**-1.33**	75	**-.84**	91	**-1.31**	46	**-.72**	31	**-1.00**
	1.70		1.66		1.64		1.91		1.57		2.24
511	**-.78**	255	**-.79**	320	**-.73**	289	**-.75**	247	**-.62**	127	**-.83**
	1.38		1.53		1.35		1.35		1.58		1.65
412	**-.84**	358	**-.85**	406	**-.67**	339	**-.88**	156	**-.62**	151	**-1.00**
	1.39		1.44		1.38		1.44		1.43		1.77
182	**-1.69**	137	**-1.64**	76	**-1.21**	91	**-1.73**	46	**-1.00**	30	**-1.77**
	1.94		1.81		1.42		2.00		1.74		2.28
515	**-.81**	259	**-1.03**	324	**-.68**	290	**-.82**	245	**-.86**	128	**-.97**
	1.54		1.64		1.44		1.52		1.58		1.64
412	**-.87**	358	**-.89**	406	**-.75**	339	**-.96**	156	**-.79**	151	**-.99**
	1.63		1.48		1.62		1.53		1.47		1.76

Table 8 | Differences in the graduates' assessment of their degree and its job usefulness: subjects in Engineering and Architecture (*continuation from previous page*)

		Architecture		Tech. Civil Engineering		Civil Eng.		Nautic. Science	
		n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
Management skills	1998	115	**-2.04**	47	**-2.02**	14	**-1.50**	3	**-2.00**
			1.70		1.62		1.70		2.00
	2001	320	**-1.47**	84	**-1.25**	64	**-2.03**	29	**-1.17**
			1.91		1.72		1.91		1.81
	2004	294	**-1.32**	95	**-1.21**	82	**-1.96**	30	**-1.00**
			1.76		1.41		1.96		1.53
Documentation skills	1998	0		0		0		0	
	2001	322	**-.70**	84	**-.23**	64	**-.39**	29	**-.83**
			1.58		1.59		1.60		1.73
	2004	294	**-.79**	95	**-.61**	82	**-.61**	30	**-.80**
			1.39		1.53		1.36		1.47
Languages	1998	0		0		0		0	
	2001	319	**-1.09**	84	**-.99**	64	**-1.31**	29	**-1.66**
			1.75		1.74		1.83		2.11
	2004	294	**-1.38**	95	**-1.31**	82	**-1.77**	30	**-1.87**
			1.71		1.78		2.21		2.43
Computing skills	1998	0		0		0		0	
	2001	322	**-2.33**	84	**-1.19**	64	**-1.59**	29	**-.10**
			2.07		1.88		2.01		1.54
	2004	294	**-2.01**	95	**-1.53**	82	**-1.38**	30	**-1.13**
			1.87		1.76		1.78		1.85

Adv. Prod. Technologies		Adv. Prod. Technols.		ICT		Information & Comm.		Agric. Technologies		Agric. SC.	
n	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*	*n*	*M/SD*
180	**-1.76**	137	**-1.85**	75	**-1.33**	92	**-2.16**	46	**-1.43**	30	**-1.80**
	1.79		1.68		1.54		1.98		1.59		2.46
515	**-1.11**	259	**-1.19**	324	**-.94**	289	**-1.21**	247	**-1.03**	128	**-1.43**
	1.61		1.80		1.48		1.56		1.65		1.63
412	**-1.10**	358	**-1.24**	406	**-.84**	339	**-1.33**	156	**-1.30**	151	**-1.40**
	1.57		1.58		1.47		1.70		1.54		1.83
0		0		0		0		0		0	
515	**-.52**	258	**-.41**	325	**-.49**	289	**-.61**	247	**-.34**	129	**-.47**
	1.59		1.60		1.57		1.62		1.78		1.50
412	**-.56**	358	**-.50**	407	**-.65**	339	**-.75**	156	**-.40**	151	**-.36**
	1.47		1.50		1.47		1.57		1.24		1.51
0		0		0		0		0		0	
515	**-1.75**	259	**-2.33**	325	**-1.54**	289	**-2.16**	247	**-1.37**	129	**-1.17**
	2.30		2.38		2.10		2.16		2.01		2.24
411	**-1.88**	358	**-2.56**	407	**-1.67**	339	**-2.49**	156	**-1.82**	151	**-1.55**
	2.25		2.40		2.00		2.15		2.12		2.23
0		0		0		0		0		0	
516	**-1.13**	259	**-1.18**	325	**-.52**	247	**-.63**	247	**-1.67**	129	**-1.93**
	1.69		1.67		1.34		1.36		2.01		1.95
412	**-.92**	358	**-.92**	406	**-.35**	339	**-.30**	156	**-1.37**	151	**-1.32**
	1.53		1.58		1.16		1.24		1.83		1.88

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