

DO EDUCATIONAL MISMATCHES INFLUENCE JOB SATISFACTION? THE CASE OF SPANISH BUILDING ENGINEERING GRADUATES WORKING AS SITE MANAGERS

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It is important that higher education provide students with competences that enable them to maintain their employability in the professional environment. On the other hand, research has confirmed the existence of a positive relationship between education and job satisfaction by means of wages. Education-job mismatches are also reported to have serious effects on a number of labour market outcomes. But the consequences of educational mismatches (overeducation and undereducation) on employees working as construction site managers and the defects of their higher education have not been explored yet. This paper presents an exploratory study which seeks to examine the educational mismatch experienced by building engineers working as site managers, and analyses the relationship with job satisfaction. Using an interpretive approach within the qualitative paradigm, semi-structured in-depth interviews were carried out with a total of 34 Spanish building engineers. All were asked about their higher education and about their first professional experiences managing construction sites. More than half of participants confirm that the perceived negative educational mismatch (undereducation) has a negative influence in their job satisfaction, while the rest declare there is no effect. Undereducation also generates additional negative effects such as insecurity, uncertainty, embarrassment, frustration, work overload and waste of time. In order to overcome this situation, these professionals have developed different strategies such as delegating tasks, subcontracting and participating in training courses. Early conclusions are that educational mismatches due to undereducation are an important cause of job dissatisfaction for graduates in Building Engineering. Consequently, they may negatively impact construction companies through productivity decreases of these employees.

Keywords: building engineering, educational mismatch, job satisfaction, site manager, qualitative research

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INTRODUCTION

During the last decades research on education-job mismatch has grown to a considerable size (Kucel and Vilalta-Bufí 2012), focusing its attention on developed countries (Allen and van der Velden 2001, Kucel and Vilalta-Bufí 2011, Mavromaras and McGuinness 2007). Evidence has shown that education-job mismatch is a common phenomenon in different countries (Allen and van der Velden 2001) and that it causes undesirable effects in the labor market (Kucel and Vilalta-Bufí 2012).

Through education, individuals acquire knowledge, aptitudes and skills, and may therefore increase their productive capacity, with monetary returns (Allen and van der Velden 2001). In fact, there is a relationship between education and earnings that has become a fundamental tool in the research on monetary returns such as wages and income (Allen and van der Velden 2001; Verhaest and Omey 2006).

A literature review reveals a number of recently published studies in Spain focused on the relationship between the education-job mismatch and job satisfaction (Badillo Amador *et al.* 2012; Fabra and Camisón 2009; Kucel and Vilalta-Bufí 2013; Peiró *et al.* 2010). The study by Mora *et al.* (2007), centered on job satisfaction among young European higher education graduates, has highlighted that Engineering graduates (in general) tend to be more satisfied in their jobs than graduates in Humanities, Social Sciences, and Law.

In Spain, in the labour market for the construction industry, the Law 38/1999 of “Ordenación de la Edificación” (Town planning and development Act, Boletín Oficial del Estado 1999), stipulates contractor’s responsibilities among which the appointment of the “jefe de obra” (site manager). This professional takes charge of the technical representation of the contractor on site and, due to his/her educational degree level or site trade experience, must have the necessary training according to the characteristics and complexity of the construction project. This implies that depending on the judgement of the contractor, Spanish site managers will have different educational backgrounds.

No official statistics informing on the qualifications of Spanish site managers have been found in the literature review. However, according to Portales (2007, p. 8) “building engineers are the most demanded professionals for working as site managers” and Spanish site managers have a high level of University training (Asociación Española para la Calidad 2007, p.42). In other words, there has been a positive evolution in the training of Spanish site managers and, nowadays, most of them have a graduate background in Building Engineering.

In relation to the Spanish term “jefe de obra”, it might be considered synonymous with that of the site manager used in the UK and construction project manager used in Australia (Haynes and Love 2004).

This paper aims at clarifying the role of educational factors in explaining job satisfaction for building engineers working as site managers. Specific objectives are to explore the educational mismatch experienced by them, to analyse its relationship with job satisfaction and to describe the strategies used by building engineers to face it. The research has been carried out in the Autonomous Community of Castilla-La Mancha, using a qualitative methodology with semi-structured interviews that took place between July 2010 and May 2011.

VARIABLES OF STUDY

The study of job satisfaction has been approached from manifold viewpoints, which have enriched its definition with different nuances. Thus, some authors state that there is not a universal and agreed-upon definition as such for the term (Navarro-Astor *et al.* 2010). Here we use Locke's definition: it is the result of a subjective evaluation of the existing discrepancy between what people want from their job and what they perceive they get from it (cited by Kucel and Vilalta-Bufí 2013, p. 1).

Although there exists a variety of factors affecting job satisfaction (Pajo *et al.* 2010), which implies that it can be examined from different viewpoints by using different categories (Schmidt 2007), in this research only education-job mismatch will be considered with a one-dimensional approach to job satisfaction.

In relation to the second variable of study, educational mismatch, "a plethora of definitions and conceptualisations have been developed, with a lack of consistency in the terminology used. As a result, terms such as "overeducation", "overqualification", "underutilisation" and "underemployment" are used variably and interchangeably" (Scurry and Blenkinsopp 2011, p. 644). Educational mismatch may refer both to over- and undereducation (Verhaest and Omeij 2006). Workers are overeducated if the skills they bring to their jobs exceed the skills required for that job (Groot and van den Brink 2000) or when their formal qualification is higher than that required for carrying out the job (Peiró *et al.* 2010). Symmetrically, an individual working in a job where the required level of education is higher than his actual education is defined as undereducated (Mavromaras and McGuinness 2007).

Allen and van der Velden (2001) are of the opinion that the terms educational mismatch and skill mismatch are connected, since the first implies the second. Education-labor mismatch refers to the level of discord between the job performed by an individual and his/her education and skills (Kucel and Vilalta-Bufí, 2012). Furthermore, other authors use another related term, "competence mismatches" (Badillo *et al.* 2008). The level of professional competence is determined by the abilities, skills, attitudes and knowledge possessed by workers, which may be lower or higher than those required in their jobs. When this happens, there is a competence mismatch in the job-worker pairing.

In this research, since interviewees did not differentiate between educational, skill or competence mismatches, we use the general term education-job mismatch.

Research has shown contradictory results regarding the relationship between education and job satisfaction. Some have found both positive or negative links (Kucel and Vilalta-Bufí 2011), others indicate that the link is not conclusive (Albert and Davia 2005), that "results are ambiguous in most cases" (Mavromaras and McGuinness 2007, p. 281) or outline the existence of mixed results (Kampelmann and Rycx 2012).

RESEARCH APPROACH

The sample is composed of 34 building engineers, who were recruited through snowball sampling. Interviews have an average duration of 60 minutes.

Participants were 27 males and 7 females, within a 23-63 age span. 15% of respondents were under 29 years of age, 23% between 30 and 33, 47% between 34 and 37, 12% between 38 and 40 and 3% were over 60. As regards their occupation 9% were working as liberal professionals in construction project management teams, 6%

had their own construction company, and 85% were working as site/construction project managers or as team directors. The provinces where they were working at the time were Cuenca (53%), Albacete (26%), Ciudad Real (12%), Toledo (6%), and Guadalajara (3%).

In terms of educational background all of them had a degree in Building Engineering, but had studied in various universities: 67% in Universidad de Castilla-La Mancha, 12% in Universitat Politècnica de Valencia, 12% in Universidad Politécnica de Madrid, 6% in Burgos and 3% in Granada. As regards professional experience as site managers, 21% had less than 3 years, 26% from 3 to 5, 35% from 5 to 10, 15% from 10 to 16 and 3% more than 25 years of experience. For identification throughout transcriptions, participants are assigned a number.

Due to the qualitative nature of this research, we decided to use the method of worker self-assessment (Hartog 2000) in an indirect way, by asking participants to describe whether, compared to their education in Building Engineering, a higher, a lower or a different education was needed for carrying out their job. They were also asked to identify the strategies followed in order to solve potential education-job mismatches and to think about the consequences of these gaps on their job satisfaction.

Interviews were recorded and transcribed. The ATLAS-ti software programme was used for the analysis of the transcribed material. The exploratory analysis allowed the finding of regularities, which in turn made easier the generation of codes and categories. Relations between data and categories have been established by means of an interpretative analysis, trying to describe the phenomena studied, with the aim of developing a future theoretical model (Charmaz 2006).

RESEARCH FINDINGS

Identifying the educational-job mismatch

Few participants declare that the Building Engineering degree had properly trained them for carrying out the duties of the construction manager. The majority report that education had been partial or that it had not been useful. University studies do not seem to prepare building engineers to play the role of the site manager right after their degree. For some this is not a gap, they believe that universities cannot meet this employability demand. *“The Technical School offers you general training and you, listening to professionals on site, they are the ones who teach you, especially if you have little experience”* (Nº 33).

According to participants, undereducation was found in the following topics: business management, labour management, financial management, construction management, construction process development and site planning and organization. Some of these results accord with Smallwood and Emuze (2012) who concluded that in South Africa diplomats and graduates skills in planning and organizing should be improved. More than half of the interviewees also mentioned having little skills regarding the use and application of computer tools, and as a consequence felt under-skilled. *“I wish they had taught us, because we did not work at all with the tools that we used afterwards at work”* (Nº 17).

Considering the study programmes published in the web pages of the Universities where participants had studied, we have carried out an analysis of the credit distribution assigned to different basic subjects established in the White Book of Building Engineering Degree (ANECA 2004). Results are shown in Table 1. Indeed, it clearly illustrates that the percentage of credits assigned to subjects related to

Construction Management is below that assigned to Scientific Fundamentals and Graphic Expression.

Marzo-Navarro *et al.* (2008) in their research about competencies of Spanish graduates, concluded that university education shows weak points regarding scarce practical training and a lack of basic professional knowledge and capacities. Building engineers working as site managers would agree with this result, since they ask for an increase in practical training on site and for providing a more applied content to most subjects. Even though they have in mind the fact that the degree also entitles them to develop different professional careers.

Confronting the educational-job mismatch

When talking about strategies or actions followed to solve the perceived lack of knowledge, skill or competence at work, many participants used the following expressions: “sort myself out”, “do anything”, “find the way”, “make it through”, “do what you have to do”. These words involve a mixture of actions, strategies or, at times, shortcuts to solve the problems and succeed when facing difficult situations. Respondents described these behaviors as a positive trait of the building engineer linked to a good decisive capacity and to life-long learning skills.

Table 1: % credit distribution in Building Engineering degrees in different Spanish Universities (Source: Personal compilation)

Topic	Subjects	UCLM ¹	UPM ²	UPV ³	UGR ⁴	UBU ⁵	Mean
Scientific Fundamentals	Mathematics; Physics	10.0%	9.9%	12.0%	15.4%	15.0%	12.5%
Graphic Expression	Descriptive geometry; Graphic Expression Topography	12.3%	16.5%	15.3%	18.5%	18.0%	16.1%
Building Techniques & Technologies	Materials; Construction; Pathology; Site equipment; Construction History	26.4%	26.9%	27.3%	24.6%	26.0%	26.3%
Building structures & facilities	Structures; Facilities	11.7%	11.5%	12.0%	10.3%	13.0%	11.7%
Process Management	Safety & risk prevention; Quality; Organization, planning & control	5.9%	8.2%	9.0%	5.1%	5.0%	6.7%
Applied Law & Economics	Applied Economics; Measurements; Legal aspects; Valuation	8.8%	8.2%	9.7%	11.3%	11.0%	9.8%
Optional		19.2%	13.2%	10.7%	8.2%	4.0%	11.1%
Technical projects and Final Undergraduate Project	Technical projects; Final Undergraduate Project	5.8%	5.5%	4.0%	6.6%	8.0%	6.0%

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The strategies pointed out can be grouped in the following categories: use of internet, asking colleagues and/or friends, bibliography research, queries to material suppliers or subcontractors, gaining experience on site, training, studying notes, asking the professional association of building engineers and subcontracting. As site manager N° 21 recalls, many participants face their lack of preparation for the practical aspects of

work on site by carrying out a mixture of actions: *“Trying to talk to colleagues, reading documentation, books, internet, nowadays any of these”*.

Internet has become a fundamental source for sorting out educational mismatches and for fulfilling the lack of information and vagueness of architectural projects. Through its use, construction managers can have fast access to technical and commercial information, improving and making the task of document and record management much easier. As interviewee N° 8 explains: *“It makes your life happier”*, or according to another: *“Internet which is a very useful tool, it has everything in it, lately I’ve been using it, you look it up in the internet and you find anything”* (N° 10).

Not many interviewees refer to the hours invested in filtering the information obtained from internet search engines, or in checking its veracity or applicability. But for some, time devoted to research implies a productivity decrease or a waste of time: *“In the process of searching information many hours go by”* (N°17). According to their opinions, having a source of information seems to be more important than side effects derived from processing, filtering and corroborating it.

Looking for advice from colleagues and friends is the second most quoted strategy and it is clearly related to the social capital of the building engineer. Participants accord a high value to this resource, as well as Spanish architects do (Navarro-Astor and Caven 2012). Colleagues can be workmates from the same company or not, and friends are usually classmates from University.

Advice required by site managers might be related to doubts due to the lack of information in projects or to technical or bureaucratic problems raised during project execution. Other matters have to do with information regarding subcontractors, material manufacturers or construction systems. Finally, they also need to have an initial guide where they can look for information. Promptness of the reply to the enquiry is the fundamental aspect of this resource.

Spanish Building Engineering university degrees authorize graduates to the professional practice of building engineering. Therefore, subjects’ programmes aim to provide a general knowledge. On the other hand, construction projects tend to be innovative and learning generated by on site problem solving remains with the individuals and the tasks concerned (Winch 2010). It can be argued then that when building engineers ask colleagues for help in problem solving, an informal knowledge transfer actually takes place (Raidén *et al.* 2009).

None of the Spanish participants come from a site trade background and yet, they are managing construction sites. It seems natural then that site work experience is considered another essential element for overcoming the lack of practical preparation. They use words such as determination, self-improvement, progressing, learning, studying, asking, taking in, gathering information or being trained in their daily working routines as site managers. They refer to the time and effort devoted to develop professionally. In fact, the less professional experience they have, the more education-job mismatches they perceive. When engineers enter the labour market, right after graduation, they experience more education-job mismatches: *“When you start working you have no idea about anything, at the end you have to study everything and well,..., at times you make mistakes, you get it right, you learn from errors”* (N° 10). These words accord with the argument that “mismatches are temporary phenomena that appear at the start of a career and typically become less frequent with age and labour market experience” (Mavromaras and McGuinness 2007, p. 281).

These temporary mismatches could be cut down if construction companies used mentorship programs with new graduates. These programs consist of pairing new employees with senior staff on similar career paths, for providing professional guidance and for checking appropriate on-the-job training (Loosemore *et al.* 2003). Furthermore, mentors facilitate knowledge transfer of job specific skills (Raidén *et al.* 2009; Winch 2010), and of values, beliefs and ways of working (Fellows *et al.* 2002).

Regarding training, respondents participate in courses, study from books and notes and browse the web looking for useful information. The common theme in all their responses is the effort, the cost when paying for courses, the additional work and the waste of productive time involved. Apart from the perceived lack of preparation during their undergraduate studies, continuous technological improvements in the construction industry and their will to develop professionally, have also pressed them to follow this course of action.

When referring to all these strategies, some building engineers use words reflecting a high level of individualism and a search for life-long learning. After all, the process of studying and integrating new concepts is an individual and internal process, which belongs to each person: *“Doing training on my account, being self-sufficient and self-taught... When I've had an education gap I've trained myself and I've looked for training in that matter”* (N° 24).

At times, when participants admit being ignorant, not being trained enough for the matter, not having time for training, a lack of necessary computer tools or a mixture of all these, the fastest alternative to solve the education-job mismatch is subcontracting: *“It is not worth it. How much are they going to charge me for making the calculations or for recalculating the framework? 200€? How long will it take to do it myself? 3 days? It isn't interesting for the company, it does not interest anyone”* (N° 1).

In any case, the perceived mismatch, regarding both knowledge and skills, implies a waste of time, work overload and/or a decrease in the performance of the engineer. This research confirms other authors' results showing that a lack of preparation negatively influences site managers' performance (Kucel and Vilalta-Bufí 2012).

Effects of educational-job mismatch on job satisfaction

For around one third of the interviewees these mismatches do not influence their job satisfaction. Because they consider that university offers general training, not specifically applied to the professional role of the site manager, educational gaps do not affect them. It is a question of what they expect from the undergraduate curriculum and what they get.

But more than half of the participants report that their job satisfaction is negatively affected: *“Mismatches affect badly, ... not being well trained you have to invest in more education in order to balance out”* (N° 8). This result accords with previous researches (Allen and de Weert 2007; Kucel and Vilalta-Bufí 2012).

This negative consequence is increased when graduate site managers have to give commands and supervise the work of experienced construction workers with site trade background. The situation implies that the building engineer does not know whether the task is being executed well enough, how it must be done or even if the final result is correct. At times, feeling ashamed, they try to hide their lack of knowledge when talking to either subordinates on site or to subcontractors: *“In some matters you are completely lost, and all you do is pretending. In front of the subcontractor you try not to show that you don't know a thing”* (N° 22).

Ignoring how to apply knowledge acquired at undergraduate education was an important motive for dissatisfaction, due to the lack of preparation for the practical aspects of construction works execution. *“You’ve studied a university degree, but when you get to the site you feel that you don’t know anything... But at the technical school they don’t explain many basic things, basic such as “you have to place the terrazzo, place the skirting board and then spread the plaster”... nobody tells you the basic ideas that could help when entering a site, you feel completely lost”* (N° 31).

Now and then, respondents used the metaphor of being “thrown in the deep end” when describing their transition into industry. Lack of knowledge becomes overwhelming and causes traumatic experiences such as the one described by a female participant when recalling her first job as site manager: *“In those days my heart really sank, because I said to myself: “Oh my God! I’ve been studying for 8 years and now I am not going to apply anything because, honestly, this is really unsatisfactory and disappointing. On site I felt like being punched up from all directions, the truth is I had no clue where the blows might come from”* (N° 30).

Other negative effects can be inferred from the following expressions: *“feeling like an ignorant”* (N° 4), *“frustration”* (N° 31), *“seeing oneself as inexperienced”* (N° 12), *“uncertainty”* (N° 5), *“feeling completely useless”* (N° 17), *“being lost”* (N° 5, N° 31), *“feeling uncomfortable”* (N° 32) or *“finding one self out of the game”* (N° 32).

Additionally, some respondents point out that when having the adequate education for carrying out the required tasks, they feel both job satisfaction (Badillo *et al.* 2008) and personal satisfaction. Furthermore they feel confident about how to do things correctly, being a positive feeling that could be transmitted to subordinates, colleagues and company leaders.

Finally, in disagreement with previous results (Allen and van der Velden 2001), overeducation of building engineers does not negatively affect their job satisfaction. As an example, for a participant *“education is never in excess”* (N° 7).

CONCLUSIONS

Despite the limited size of the sample and qualitative approach applied to the research, this study confirms the existence of educational-job mismatches in building engineering, in relevant subjects for the work of the site manager such as site planning and organization, construction methods and financial management. These may be due to the difficulty of transferring the real construction site environment to university classrooms. Nevertheless, the curriculum of Building Engineering degree programmes deserves to assign more credits to subjects related to construction management.

The implication for curriculum development is twofold. On the one hand, practical stages in construction companies during the last years of the undergraduate program are encouraged. On the other, knowledge and skills should be taught with more application to daily practices on site, following the procedures and using the computer tools commonly used by construction companies.

In accord with results from previous researches, more than half of participants identify a negative link between undereducation and job satisfaction. Nonetheless, a few point out that overeducation does not affect them negatively. On the contrary, they feel more confident, more productive and competent at work.

Furthermore, undereducation generates additional negative consequences such as insecurity, uncertainty, embarrassment, frustration, work overload and waste of time;

negatively affecting the productivity of building engineers. In order to confront this situation, these professionals have developed different strategies such as delegating tasks, subcontracting, making use of their social capital and practicing their life-long learning skills by further studying and/or participating in training courses.

One of the limitations of this work is that it has not compared participants' responses with the curriculum of each of the Building Engineering degree programmes under study. The number of universities involved, several study programme changes occurred over the past twenty years as well as differences in subject approach, length and requirements, due not only to teachers' view but also to the number of credits assigned, are some of the reasons for this limitation. This raises a research question of interest for future works.

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