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A competency model for higher education: an assessment based on placements

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The European Higher Education Area, which is based on competency acquisition, has led to changes in teaching methods and student evaluations. In this new context, placements represent the best university–business connection for the development of competencies and integration of students into the employment market. Therefore, the primary objective of this study is to construct and empirically apply a model to identify and assess the generic competencies of students in their learning. The study employs a sample of 351 student reports by professional supervisors of social sciences students who held two-year placements. Before testing the hypotheses, the measuring instrument was evaluated by means of a partial least squares regression. The results identify the extent to which students acquired competencies and the primary differences between both academic years. Useful information for teachers and professionals is provided in a proposed learning and assessment tool for placements.

Keywords: competencies assessment; European higher education area; placements; partial least squares regression (PLS); skills

Introduction

The university–business relationship plays a key role in today’s rapidly changing educational context, which indicates that company training needs and student employment preparation must be coordinated (Qazi, Ali, and Tehseen 2014). Whereas the traditional university teaching model is based on knowledge transmission, the newly established European Higher Education Area (EHEA) suggests a certain rethinking of methodology with respect to the development of competencies; in particular, it means improving knowledge, skills and attitude (Melton 1994). To meet these new demands, teachers with a strong professional orientation in their teaching method and placements are required. Consequently, placement programs are the point of collaboration between universities and organizations (Frasquet, Calderón, and Cervera 2012).

Within the European context, an increasing interest in transparency has encouraged the development of qualification frameworks within the Bologna process and the Copenhagen process. The Bologna process was initiated by the Bologna Declaration in 1999, which represented an enormous reorganization of the European higher education system (Bologna Declaration 1999). Bologna consists of an inter-governmental

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process that led to the creation of the common EHEA, in addition to harmonizing university degrees and, as a result, facilitating the mobility of graduates. For its part, the Copenhagen process was launched in 2002 with the aim of improving vocational education and training by enhancing cooperation among the European higher education communities. The merging of the Bologna and Copenhagen processes into a unique European education system would appear to be the appropriate next step (Copenhagen Declaration 2002). As a result of the homogenization process, the qualifications framework (QF) of the EHEA, which relates to academic degrees earned within the higher education system, was adopted in 2005 and includes four levels (technical, bachelor's degree, master's degree and PhD). In Spain, an approach was developed using the Spanish QF for higher education. In 2008, the European QF (EQF) for life-long learning was accepted in the context of the Copenhagen process. The EQF includes all types of learning (formal, non-formal and informal) and consists of eight levels based on the knowledge, skills and competencies acquired. In this environment, both processes converge in placements: the competencies acquired by a student during the educational process and those required to pursue an occupation. In both cases, the level of qualification coincides. Therefore, the competencies associated with placements must be thoroughly considered as part of the educational process and as an educational outcome (Figure 1).

A review of the literature indicates that most studies on the acquisition of competencies in universities involve an analysis of the learning methods that are used in the courses (Marcelo et al. 2014), although several authors note that students who undertake placements acquire greater competencies (Matthew, Taylor, and Ellis 2012). Placement programs contribute to competencies in the professional context, complementing those skills that are learned from the faculty (Kuntz 2012). Nevertheless, several authors suggest that there has been limited academic research into the relationship between universities and organizations with regard to competencies that are linked to placements (Frasquet, Calderón, and Cervera 2012; Plewa and Quester 2007). Competencies can be analyzed from several perspectives, depending on the form of measurement that is used. In this respect, some researchers note that one of

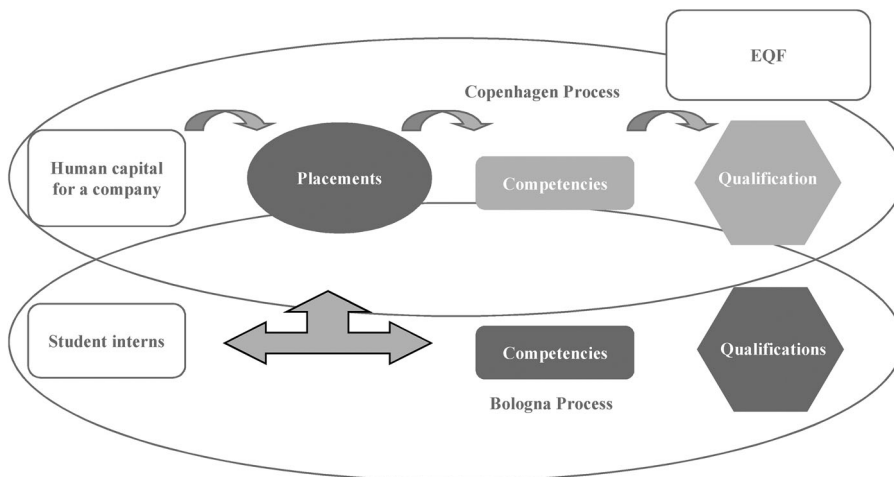


Figure 1. Bologna process versus Copenhagen process within the EQF.

the best ways to determine the relevant issues regarding competencies is to use conceptual models (Van Loo and Semeijn 2004). However, the majority of these models do not provide assessment mechanisms. Such studies generally emphasize initiatives that seek to define a means of establishing assessment criteria (Schulz and Starnov 2010).

In the process of assessing competency acquisition, most analyses have focused primarily on student perceptions. Nevertheless, some authors suggest that competencies can be measured using the opinions of professional experts (Frasquet, Calderón, and Cervera 2012; Van Loo and Semeijn 2004). Fewer studies consider the skills that are applied in or acquired from companies. Additionally, such studies generally consider students who have previously been integrated into the labor market, that is, not interns (Harvey, Locke, and Morey 2002). Another relevant feature involves the degrees referred to in the studies. In most cases, the particularities of each degree or specific field are not considered, although there are some researchers who analyze and emphasize the relevance of placements in certain academic specialties, such as the social sciences, which is the principal category of academic discipline that is addressed in this study (Frasquet, Calderón, and Cervera 2012). With regard to the analysis of competencies, the papers have focused on countries such as Australia (Jackson 2014), Malaysia (Hamid et al. 2013), Taiwan (Chen and Chen 2012) or the USA (Altbach 2014). Of the countries that are included in the EHEA, numerous studies relate to Germany (Schaeper 2009), Italy (Triventi 2014), the UK (Auburn, Ley, and Arnold 1993) or Spain (Frasquet, Calderón, and Cervera 2012). Several research projects have focused on Spain, and the country was considered suitable for the present study because it was one of the 29 countries that joined the Bologna process in the first stage (1999).

In this respect, what type of competencies should be studied? A literature review suggests generic and specific competencies. However, several researchers consider generic competencies to be highly transferable because they are required for various jobs and occupations (Delamare and Winterton 2005; Stasz 1997). Concentrating on generic competencies may provide a competitive advantage to students joining the labor market.

Moreover, there are several studies that consider the different variables that are involved in measuring competencies. In the USA, the Secretary of Labor and the Secretary's Commission on Achieving Necessary Skills (1991) develop an internationally recognized categorization that has been applied in recent studies such as the proposal developed in Marhuenda, Bernad, and Navas (2010). These competencies have been widely used in the literature and refer to the official programs of social sciences degrees. They include, autonomy (Marhuenda, Bernad, and Navas 2010), professional ethics (Boni and Lozano 2007), communication (Clemente-Ricolfe and Escribá-Pérez 2013), use of information and communications technology (Van Loo and Semeijn 2004) and teamwork (Vaatstra and De Vries 2007).

Therefore, the primary objective of this study is to develop a model of generic competencies based on placements for the social sciences in Spain. The Spanish context presents certain particularities because the university–business connection was established more recently in Spain than in other countries (Kucel and Vilalta-Bufí 2013). This task involves identifying the main factors in developing this type of competency in the social sciences from a professional's perspective. Specifically, autonomy, professional ethics, communication, the use of information and communications technology and teamwork were considered. Professionals represent the group that verifies the

extent to which interns are prepared for their future integration into the labor market. On the one hand, the strengths and weaknesses of the current learning system are determined. On the other hand, a tool is presented that can analyze how placements can complement those competencies that are acquired in the classroom.

The remainder of the paper is organized as follows. First, a review of the literature on competency, placements and competency-based models is conducted. Then, the paper describes the sample and the measures that are employed in the empirical research, which is followed by the results of the conceptualization of competency. Finally, the study's main conclusions and recommendations are offered.

Review of the literature

The role of the university in the development of competencies

Various studies have analyzed the role of universities in society and their connection with businesses. Savage (2005) considers the advantages and disadvantages of learning both in university and in employment environments. Tejada (2005) argues that university education has been based on a theoretical approach and identifies a number of drawbacks arising therefrom. Other studies emphasize the university's significance to industry (Capó-Vicedo, Molina-Morales, and Capó 2013) based on the support services that it provides to businesses. These authors recommend alliances to connect the academic and professional fields. This crucial link enables universities to act as partners in generating innovative projects (Abramo, D'Angelo, and Di Costa 2011). In fact, Qazi, Ali, and Tehseen (2014) investigate the relationship between higher education and economic growth in several countries. Thus, higher education is linked to the school system, state, labor market, students and their families (Triventi 2014). The relationships between universities and companies are relevant to the creation of value for different stakeholders (Frasquet, Calderón, and Cervera 2012). Vaatstra and De Vries (2007) demonstrate how students with a higher education are better prepared for the labor market because of the development of competencies in their careers.

What do we mean by competency? Competency has been defined by numerous researchers, and there are several explanations of the term in the literature because of its relevance in different fields. Traditionally, competency is defined as knowledge, skills and attitude. However, in the literature, competency is considered a composite of the knowledge, skills and attitudes (Frasquet, Calderón, and Cervera 2012) required to adequately undertake a task or intellectual process that is appropriate to a professional performance in a defined context. Competencies include learning a variety of perspectives that apply to a variety of problems. The need to adjust abilities to tasks (Tuning Project 2007) is also considered. From the labor market perspective, the term competency is not replaced by the concept of qualification but is instead linked to productivity (Van Loo and Semeijn 2004). In particular, Van Loo and Semeijn (2004) highlight the relevance of competencies in the transition from education to work, and they define productivity based on the reports that are used to measure competencies in the labor market. Beazley, Boenisch, and Harden (2002) highlight the increase in productivity and effectiveness in those placements and jobs in which competencies are enhanced in terms of management and/or responsibility. Moreover, the concept of competency is not only related to the professional perspective but also linked to the moral and/or ethical dimensions (Boni and Lozano 2007).

There are some studies that compare competencies between countries relative to the connection between universities and firms. Specifically, Kucel and Vilalta-Bufi (2013) analyze the university–business connection in Spain and the Netherlands. Their results show that the balance between work and study is more efficient in the Netherlands. These authors note that Spain should pay more attention to placements and specific knowledge. For example, in the social sciences, which represents more than 30% of Spanish university students, the development of competencies might be better achieved when students are sent on placements during the course of their university studies.

In this context, the Bologna process is defined as a process of globalization of higher education in the member countries of the European Union within the EHEA (Bologna Declaration 1999). The EHEA implementation process created uncertainty regarding new academic roles (Rodríguez et al. 2011) because it involves changes in course planning, student assessment and the practical classroom approach that should adjust education toward competency-based learning.

In this context, competency-based learning takes a new practice-oriented teaching method into account (Marcelo et al. 2014). Tierno, Iranzo, and Barrios (2013) note that changes must be made in the learning–teaching method because the system is based on competency. These authors introduce competency mapping by academic degree, development, assessment criteria and the contributions of the courses to each competency. For Pérez and Vila (2013), proactive teaching methods and education that is based on student self-study encourage the development of competencies. Therefore, it is necessary to incorporate new methods for teachers to improve student skills while they hone their cognitive, communicative, managerial or affective competencies (León and Latas 2007) because possible contradictions can occasionally be detected in comparing teacher and student perspectives (Gutiérrez-García et al. 2011).

Placements and the development of competencies

Vaatstra and De Vries (2007) found that learning methods are based in training for the workplace by applying theoretical knowledge to real cases. Thus, the workplace is a perfect setting for students' to learn (Ogilvie and Homan 2012). These authors define this concept as work-based learning. Furthermore, in this sense, several researchers state that placements provide formative and professional experiences (Ballesteros, Manzano, and Moriano 2001). It is important to spend time training interns so that they can be successful. Classroom-based teaching provides the necessary knowledge to develop good practices (Latorre 2007). Placements are necessary and recommended to supplement the university learning process because they develop competencies as they develop skills and abilities. García (2009) adds that it is important to clarify which competencies must be acquired. Marhuenda, Bernad, and Navas (2010) analyze the role of student supervisors based on interviews with professionals and observations of interns. Student supervisors can assess and guide students toward their future integration into the labor market. For Durán-Aponte and Durán-García (2012), placements are a formative method on an equal footing with any other formative tool, that is, a 'living space' that offers an opportunity to approach the world of employment. Thus, there are intersections among placements, the academic workplace and professional identity (Kuntz 2012).

Another significant aspect is based on the correlation between competencies that are acquired by students and those that are required by companies (Freire, Teijeiro, and Pais 2013). In the immediately previously cited study, which took place in the north

of Spain, a dual perspective is adopted by investigating students who work and companies that employ graduates, and the authors conclude that competencies that are valued by the companies are greater than those that are acquired by the graduates. This particular problem arises from a shortage of placements.

Educators believe that there are strong associations between placement programs for students and the success of new graduates in their transition to practice (Matthew, Taylor, and Ellis 2012). For these authors, these programs prepare students for their professional careers. Moreover, for La Vonne, Doan-Crider, and Fedynich (2012), experiential learning is a method that can be used with success in different disciplines. Specifically, these authors highlight placements with specific companies and organizations as providing an effective learning method for experiential education.

Placements influence not only training systems but also employment policies (Jackson 2014; Wilton 2012), as they are considered to be capable of improving the future integration of students into the labor market (Caballero, Piñeiro, and García-Pintos 2008). Several studies suggest that more feedback from students is received by universities that participate in regular meetings with other students and placement coordinators. Implementing organizational formulas with employers, as in the UK (Harvey, Locke, and Morey 2002), or coordinating with entrepreneurs in developing a business plan prepared by students, as at the University of Newcastle, is also regarded as valuable.

Competency-based models

Generally, there are two types of competencies: generic and specific (Becker 1980). Generic competency is frequently applied to the majority of employment situations (Stasz 1997). Learning environments that focus on both generic and specific competencies prepare students better (Vaatstra and De Vries 2007). According to Boni and Lozano (2007), university teaching should provide the generic and specific competencies of each discipline, as well as offer the means by which students can become responsible citizens. They present the relationships between competencies and ethical goals. For Navío (2005), competencies are developed from knowledge and skills and are related to a specific occupation. Meng and Heike (2005) have investigated how different learning environments and the use of time by students facilitates the acquisition of generic competencies.

In this context, several authors have proposed models to evaluate higher education, including dimensions for measuring competencies and, specifically, for measuring generic competencies. Van Loo and Semeijn (2004) developed a model to measure competency in graduate surveys. They consider that competency can be measured by using self-reports or through expert ratings provided by key informants or observers. For these researchers, the main variables that comprise the competency measurement are the following: communication, leadership, accuracy, technological skills, planning and organization, which use numbers, teamwork and capacity to address changes, professional knowledge, creativity and initiative. Vaatstra and De Vries (2007) define a model for higher education in which competencies are used as dependent variables in the regression analysis that is conducted. They contemplate curricular and extracurricular activities such as sports, experience abroad and work experience. Generic competency includes the knowledge and attitudes that can be used successfully in different professional situations, such as planning and coordination, ability to solve problems, disciplinary thinking, learning ability, independence and the ability to work as part

of a team. The results show that more activating learning environments provide students with more competencies than traditional learning environments. Chen (2012) proposes the SERVQUAL model of total quality management (TQM) to improve the service quality in the educational system. Consistent with the foregoing, Asif et al. (2013) propose a TQM model that is evaluated by structural equation modeling, including different critical success factors: leadership, vision, measurement and analysis, process control and evaluation, program design, resource allocation and stakeholder focus. Hamid et al. (2013) propose six value indicators: leadership, ethics, productivity, employee, stakeholders and overall performance. Chen and Chen (2012) propose a multiple-criteria decision-making model that includes different dimensions of creativity evaluation. For these authors, improving innovation is essential to create competitive advantages.

In the Spanish context, the acquisition of competencies has also been studied as essential to the assumption of management and leadership responsibilities. Leví-Orta and Ramos-Méndez (2013) analyze the competencies of the holders of various Spanish university degrees and reflect on competency-based learning and on the possible comparisons of degrees. These authors propose a model of components that constitute 'standard competency' or 'average competency' and includes attitude, skill and knowledge. Villardón-Gallego et al. (2013) propose a model in which competency consists of four dimensions (knowledge transfer, self-learning, knowledge creation and self-managed learning) that were previously tested by Schulz and Starnov (2010). For these authors, time management, communication and teamwork determine how managers work and relate to increased efficiency in task performance. Pérez and Vila (2013) consider the following four attributes of competency in innovation: identifying new opportunities, developing new ideas, questioning ideas and mobilizing capacities. Marhuenda, Bernad, and Navas (2010) refer to autonomy, teamwork, responsibility, communication and the use of technology. Clemente-Ricolfe and Escribá-Pérez (2013) propose a structural model for the perception of acquired skills, considering methodological, social, participatory and specialized aspects. They conducted a thorough review of the basic generic competencies, including the following: teamwork, oral and written communication, planning, coordination and organization, adaptability, analytical skills, responsibilities and decision-making, trouble-shooting, learning, documenting ideas, initiative, independent work, negotiation, language skill, creativity, information technology (IT) and reflective capacity. Additionally, Boni and Lozano (2007) highlight the responsibility and ethics components as cultivating factors of competency. Finally, Cortés-Pascual, Cano-Escoriaza, and Orejudo (2014) define a model that is based on the development of work values from higher education, such as the influence of family and teachers on students.

According to the literature review, there are a large number of competencies. The development of this study is based on those competencies that are included in the Secretary of Labor and the Secretary's commission on achieving necessary skills (1991) from the U.S. Department of Labor, which presented one of the most well-known international classifications of competencies. This classification has been applied in recent studies (Marhuenda, Bernad, and Navas 2010). This institution identifies the following five competencies that are linked to the autonomous management of resources: responsibility, interpretation of information, communication of information, technology and cooperative work. These capabilities appear in many studies, and all are generic competencies that are included in the official programs of social sciences degrees (Table 1). Thus, hypothesis (H1) was proposed as follows: there is a direct and significant

Table 1. Main competencies in literature review.

Competency	References
Accuracy	Van Loo and Semeijn (2004)
<i>Autonomy</i>	Clemente-Ricolfe and Escribá-Pérez (2013); Marhuenda, Bernad, and Navas (2010); Pérez and Vila (2013); Schulz and Starnov (2010); Van Loo and Semeijn (2004); Vaatstra and De Vries (2007); Villardón-Gallego et al. (2013)
<i>Communication</i>	Clemente-Ricolfe and Escribá-Pérez (2013); Marhuenda, Bernad, and Navas (2010); Schulz and Starnov (2010); Van Loo and Semeijn (2004); Villardón-Gallego et al. (2013)
Coordination and organization	Clemente-Ricolfe and Escribá-Pérez (2013)
Addressing changes	Clemente-Ricolfe and Escribá-Pérez (2013); Van Loo and Semeijn (2004)
Using numbers	Asif et al. (2013); Clemente-Ricolfe and Escribá-Pérez (2013); Van Loo and Semeijn (2004)
Employee	Hamid et al. (2013)
Knowledge creation	Schulz and Starnov (2010); Villardón-Gallego et al. (2013)
Knowledge transfer	Schulz and Starnov (2010); Villardón-Gallego et al. (2013)
Languages	Clemente-Ricolfe and Escribá-Pérez (2013)
Leadership	Asif et al. (2013); Hamid et al. (2013); Van Loo and Semeijn (2004)
Negotiation	Clemente-Ricolfe and Escribá-Pérez (2013)
Overall performance	Hamid et al. (2013)
Planning	Clemente-Ricolfe and Escribá-Pérez (2013); Vaatstra and De Vries (2007); Van Loo and Semeijn (2004)
Process control	Asif et al. (2013)
Productivity	Hamid et al. (2013)
<i>Professional ethics</i>	Boni and Lozano (2007); Cortés-Pascual, Cano-Escoriaza, and Orejudo (2014); Hamid et al. (2013); Marhuenda, Bernad, and Navas (2010); Vaatstra and De Vries (2007)
Professional knowledge	Van Loo and Semeijn (2004)
Resource allocation	Asif et al. (2013)
Responsibilities and decision-making	Clemente-Ricolfe and Escribá-Pérez (2013)
Solving problems	Vaatstra and De Vries (2007); Clemente-Ricolfe and Escribá-Pérez (2013)
Stakeholder focus	Asif et al. (2013); Hamid et al. (2013)
<i>Teamwork</i>	Clemente-Ricolfe and Escribá-Pérez (2013); Marhuenda, Bernad, and Navas (2010); Schulz and Starnov (2010); Van Loo and Semeijn (2004); Vaatstra and De Vries (2007); Villardón-Gallego et al. (2013)
Time management	Schulz and Starnov (2010); Villardón-Gallego et al. (2013)
<i>Use of information and communications technology</i>	Asif et al. (2013); Clemente-Ricolfe and Escribá-Pérez (2013); Marhuenda, Bernad, and Navas (2010); Van Loo and Semeijn (2004)
Vision	Asif et al. (2013)

relationship between generic competencies (CP) and (a) autonomy (AU), (b) professional ethics (PE), (c) communication (CO), (d) the use of information and communications technology (IT) and (e) teamwork (TW).

Methodology

Study sample

The study sample consisted of 351 student reports that were completed by professionals who were the placement supervisors of students in the social sciences degree program at the Department of Social Sciences of a public university during the academic years 2011/2012 (122) and 2012/2013 (229). We selected the sample using a multistage sampling technique. In the first stage, a stratified sampling method was developed to generate an equal proportion of surveys in terms of the number of students who were enrolled in the placement program during the two academic years. The target group consisted of third- and fourth-year students who attended the university. The students who were selected were enrolled in social sciences programs. In the second stage, a simple random sampling was used for the final selection of the student reports, which were completed by professionals over the two academic years. The students who were in these two groups were different, confirming that both samples included independent observations. A survey questionnaire was used for data collection purposes, and the responses were obtained by means of the Internet within 10 days after the end of each placement. The professionals were contacted by email, and a phone call was made to those professionals who did not reply within the required time.

The target population was defined as the cluster of students who were enrolled at the university (29,000). The sample size reflects an error of $\pm 5.5\%$ for a 95% confidence interval, considering the estimation of a variable with two equally probable categories ($p = q = 0.5$). Most placements were in the banking sector (52.5% in 2011/2012 and 45.9% in 2012/2013), and the other placements were in fields such as the legal sector, consulting and advisories, public administration or notaries and registries in relative percentages. Given the size of the companies and placements that were offered, 54.4% of the placements were performed at large companies (over 250 employees) and at large banks, in particular. In relative terms, the number of placements in microenterprises (1–9 employees) (16.4% in 2011/2012 and 24.9% in 2012/2013) and small enterprises (10–49 employees) (13.9% in 2011/2012 and 15.3% in 2012/2013) significantly increased. Regarding the distribution of placements by area of development, finance (45.9% in 2011/2012 and 40.6% in 2012/2013) and administration are the most in demand (Table 2).

Scales and measurement model

Within the EHEA, several authors have questioned the analysis of generic competencies because of the key role that they play in the employment world (Freire, Teijeiro, and Pais 2013). For example, the question of ‘to what extent does higher education help to develop competencies?’ has been asked in various studies (Pérez and Vila 2013). Therefore, a model has emerged based on the defined competencies in the social sciences degrees under study, which are consistent with those obtained from our review of the social science education research literature. The competencies were measured using a 10-item Likert scale (1 = strongly disagree; 10 = strongly agree)

Table 2. Description of the companies that participated in the survey.

Variable	Types	Global (351) (%)	Academic year 2011/2012 (122) (%)	Academic year 2012/2013 (229) (%)
Sectors	Banking	48.1	52.5	45.9
	Consulting and advisories	6.3	5.7	6.6
	Construction	2.0	1.6	2.2
	Legal	6.0	1.6	8.3
	Notaries and registries	6.0	7.4	5.2
	Leisure	2.0	2.5	1.7
	Public	7.4	7.4	7.4
	Health	4.8	6.6	3.9
	Others	17.4	14.8	18.8
Type of company	Microenterprises	21.9	16.4	24.9
	Small enterprises	14.8	13.9	15.3
	Medium enterprises	8.8	10.7	7.9
	Large enterprises	54.4	59.0	52.0
Area	Administration	37.9	35.2	39.2
	Finance	42.5	45.9	40.6
	Foreign trade	4.9	6.5	3.9
	Tax law and accounting	8.3	8.2	8.3
	Marketing	6.6	4.1	7.9

(Table 3). According to Van Loo and Semeijn (2004), most part of respondents chose Likert-scaled questions for the competency evaluation.

There are two distinct approaches to construct measurement: reflective and formative. It is important to determine the correct approach because an inappropriate specification can result in significant problems (Jarvis, MacKenzie, and Podsakoff 2003; MacKenzie, Podsakoff, and Jarvis 2005). One of the main errors that recurs in many studies is the use of reflective measurement models for formative constructs (Jarvis, MacKenzie, and Podsakoff 2003). The use of formative measurements can sometimes provide better estimates. The election process is complex, and there are various criteria that simplify this decision such as the direction of causality, interchangeable measurements, correlations, nomological networks and error terms.

The typical methods for verifying construct validity and reliability that use reflective indicators are not appropriate in a formative model. Multicollinearity among formative indicators is a significant problem because it prevents the separation of influences that are exerted by each measurement on the latent variable (Bollen and Lennox 1991). For a first approximation of the distinction between reflective and formative models, MacKenzie, Podsakoff, and Jarvis (2005) defined three stages: (a) the definition of knowledge and conceptual assessment, (b) purification and (c) measurement validation, which incorporates a global measurement if the construct is formative, that is, if it contains at least two reflective indicators (Jarvis, MacKenzie, and Podsakoff 2003). In this study, competencies are conceptualized as a second-order model that consist of the sum of various dimensions, which are related to their indicators in a reflective manner. Studies have validated the formative conceptualization of this

Table 3. Measurement scales.

Dimension	Indicator		References
Autonomy	AU1	'A creative person with initiative'	Asif et al. (2013); Boni and Lozano (2007); Clemente-Ricolfe and Escribá-Pérez (2013); Cortés-Pascual, Cano-Escoriaza, and Orejudo (2014); Hamid et al. (2013); Marhuenda, Bernad, and Navas (2010); Schulz and Starnov (2010); Vaatstra and De Vries (2007); Van Loo and Semeijn (2004); Villardón-Gallego et al. (2013)
	AU2	'Able to work with autonomy'	
Professional ethics	PE1	'Responsible, involved and motivated student'	
	PE2	'Shows ethical responsibility'	
Communication skills	CO1	'Presents oral and written communication skills'	
	CO2	'Able to explain his/her ideas'	
ICT use	IT1	'Technical and learning ability'	
	IT2	'Knows specific programs from the business world'	
Teamwork	TW1	'Has adapted to the company and works as part of a team'	
	TW2	'Able to be self-organized'	
Generic competencies	GC1	'Has acquired generic competencies during his/her placement'	
	GC2	'Carries out his/her work properly from generic competencies acquired during his/her placement'	
Assessment	AS1	'General assessment of the practices developed'	Marhuenda, Bernad, and Navas (2010)
	AS2	'Student's perception of his/her future work'	

construct and propose second-order models (Clemente-Ricolfe and Escribá-Pérez 2013). In addition, to confirm the nomological validity of the model, it was necessary to consider another construct, that is, the adapted assessment by Marhuenda, Bernad, and Navas (2010). Thus, a second hypothesis (H2) was proposed between the generic competencies and the assessment (Figure 2).

To estimate the measurement model and the structural model, a partial least squares (PLS) regression was used, which is the most suitable technique for small models and formative constructs because of its predictive character (Chin 1998). SmartPLS 2.0 software was employed (Ringle, Wende, and Will 2005), and the bootstrap technique was used for significance, generating 500 subsamples of the same size as the sample (total: 351; academic year 2011/2012: 122; and academic year 2012/2013: 229), and using a two-tailed *t*-student distribution and 499 degrees of freedom ($n-1$). The differences between both academic years were also studied to determine possible changes in the education system. The literature review found some contributions that suggest the existence of relevant variations based on the development of competencies throughout the academic courses (Vaatstra and De Vries 2007). In this respect, to contrast the hypotheses concerning the differences between the two groups, a procedure was used that allows non-parametric comparisons to be made, which is a suitable methodology for multi-group PLS analysis (Henseler, Ringle, and Sinkovics 2009). A third hypothesis (H3) was consequently proposed: significant differences can be found in

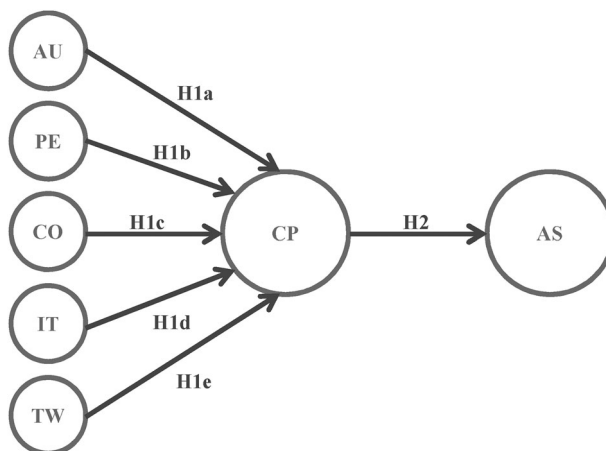


Figure 2. Model of competencies.

Note: AU, autonomy; PE, professional ethics; CO, communication; IT, the use of information and communications technology; TW, teamwork; CP, competency; and AS, assessment.

the formation of competencies and their influence on assessment depending on the academic year.

Results

First, the measuring instrument was assessed (i.e. reliability, convergent validity and discriminant validity) using PLS regression. Reliability was confirmed as follows. (a) Cronbach's α (Cronbach 1951) provided adequate levels above 0.7 (Nunnally and Bernstein 1994). (b) The compound reliability index exhibited values above 0.7 (Fornell and Larcker 1981). To confirm convergent validity, the loads were assessed to be significantly different from 0 and greater than 0.6 (Bagozzi and Yi 1988). It was noted that the average variance extracted (AVE) displayed values above 0.5 (Fornell and Larcker 1981) (Table 4). The non-collinearity of the formative constructs was ensured through the variance inflation factor with values below 3.3 (Petter, Straub, and Rai 2007). Discriminant validity was ratified when the AVE were greater than the correlation squares (Fornell and Larcker 1981).

Once the measuring instrument was assessed, the hypotheses of the structural model were tested. In Table 4, the standardized parameters, which ranged between -1 and 1 , are included (the greater the value, the stronger the influence of dimension on the construct). The sign reflects the direct (+) or inverse (-) effect exerted by the dimension on the construct formation. Beginning with the coefficients and their significance, hypothesis testing was performed. A direct and significant relationship was confirmed between professional ethics, use of information and communications technology, teamwork and competencies. Specifically, the use of information and communications technology (H1d) ($\beta = 0.540, p < .01$) is the main component, followed by teamwork (H1e) ($\beta = 0.188, p < .05$) and professional ethics (H1b) ($\beta = 0.150, p < .05$). The use of information and communications technology is considered a principal component, following previous studies. Asif et al. (2013) highlight the relevance of knowing the program design; Clemente-Ricolfe and Escribá-Pérez (2013), Marhuenda, Bernad, and Navas (2010) and Van Loo and Semeijn (2004) suggest the importance of IT. Teamwork is a relevant competency, as

Table 4. Measurement model: reliability and convergent validity.

Latent variable	Indicator		Loads			Cronbach's α ; CR; AVE
			Global	Academic year 2011/ 2012	Academic year 2012/ 2013	
Autonomy	AU1	'Has initiative and is creative'	0.990*** (497.056)	0.981*** (179.338)	0.994*** (506.383)	Global: 0.979; 0.990; 0.979 2011/12: 0.957; 0.979; 0.959 2012/13: 0.987; 0.994; 0.987
	AU2	'Works with autonomy'	0.989*** (402.752)	0.977*** (106.759)	0.994*** (482.380)	
Professional ethics	PE1	'Responsible and motivated'	0.995*** (670.810)	0.992*** (183.550)	0.996*** (799.567)	Global: 0.989; 0.994; 0.989 2011/12: 0.983; 0.992; 0.983 2012/13: 0.991; 0.995; 0.991
	PE2	'Ethical responsibility'	0.994*** (579.548)	0.991*** (145.582)	0.995*** (688.625)	
Communication	CO1	'Oral and written communication'	0.987*** (284.384)	0.979*** (110.518)	0.990*** (326.028)	Global: 0.971; 0.986; 0.972 2011/12: 0.955; 0.978; 0.957 2012/13: 0.979; 0.990; 0.979
Use of information and communications technology	CO2	'Explains ideas'	0.985*** (224.964)	0.978*** (95.991)	0.989*** (229.081)	
	IT1	'Technical skill'	0.996*** (962.642)	0.996*** (503.917)	0.997*** (873.959)	Global: 0.993; 0.996; 0.993 2011/12: 0.992; 0.996; 0.992 2012/13: 0.993; 0.997; 0.993
Teamwork	IT2	'Specific software'	0.996*** (940.930)	0.996*** (484.991)	0.997*** (863.592)	
Competency	TW1	'Teamwork'	0.991*** (405.654)	0.990*** (227.477)	0.991*** (324.839)	Global: 0.980; 0.990; 0.981 2011/12: 0.978; 0.989; 0.979 2012/13: 0.981; 0.991; 0.982
	TW2	'Planning'	0.990*** (327.662)	0.989*** (174.667)	0.990*** (261.804)	
	CP1	'Generic competencies'	0.988*** (511.669)	0.986*** (298.965)	0.990*** (469.532)	
Assessment	CP2	'Appropriate work'	0.987*** (418.631)	0.984*** (220.484)	0.989*** (386.387)	Global: 0.975; 0.988; 0.976 2011/12: 0.970; 0.985; 0.971 2012/13: 0.979; 0.989; 0.979
	AS1	'General assessment of placement'	0.979*** (236.339)	0.979*** (137.776)	0.979*** (221.912)	
	AS2	'Future work'	0.977*** (188.866)	0.975*** (75.598)	0.977*** (193.106)	

Note: (Bootstrap *t*-Value). CR, composite reliability and AVE, average variance extracted.

*** $p < 0.01$;

suggested by various authors (Clemente-Ricolfe and Escribá-Pérez 2013; Marhuenda, Bernad, and Navas 2010; Schulz and Starnov 2010; Vaatstra and De Vries 2007; Van Loo and Semeijn 2004; Villardón-Gallego et al. 2013), and professional ethics presents a positive aspect of the concept of competency, as argued by Boni and Lozano (2007), Cortés-Pascual, Cano-Escoriaza, and Orejudo (2014), Hamid et al. (2013), Marhuenda, Bernad, and Navas (2010) or Vaatstra and De Vries (2007).

However, autonomy (H1a) ($\beta = 0.017, p > .10$) does not contribute to the development of generic competencies, in spite of the fact that several authors (Clemente-Ricolfe and Escribá-Pérez 2013; Marhuenda, Bernad, and Navas 2010) believe it to be relevant. Moreover, communication contributes in a negative way, although not significantly (H1c) ($\beta = -0.091, p > .10$), as perceived by the professional supervisors, and despite the fact that some researchers (Marhuenda, Bernad, and Navas 2010; Schulz and Starnov 2010; Van Loo and Semeijn 2004; Villardón-Gallego et al. 2013) believe communication competency to be important.

It was also confirmed that generic competencies have a direct and significant effect on assessment (H2) ($\beta = 0.653, p < .01$), which confirms the nomological validity of the proposed model (Figure 3).

The structural model was assessed using the coefficients of determination R^2 and Stone-Geisser Q^2 (Geisser 1974; Stone 1974). All the R^2 values for each endogenous variable exceeded the recommended minimum value of 10% (Falk and Miller 1992). The Q^2 statistics displayed values above 0 (Chin 1998), ensuring the model's predictive relevance. The Cohen (1988) categorization and the AVE sufficient degree (Fornell and Larcker 1981) were used as a starting point by Sánchez, Martín, and Rondán (2010) to suggest three segments of goodness-of-fit (GoF): reduced ($0.1 < \text{GoF} \leq 0.25$), moderate ($0.25 < \text{GoF} \leq 0.36$) and high ($\text{GoF} > 0.36$). The total model also has two partial registered high GoF indexes (total: 0.373; academic year 2011/2012: 0.383; and academic year 2012/2013: 0.372).

A multi-group analysis was then performed in which the proposition by Henseler, Ringle, and Sinkovics (2009) was used to consider both academic years. The analysis of the influence of professional ethics (2011–2012: $\beta: 0.205, p < .10$; 2012–2013: $\beta: 0.198, p < .10$) and the use of information and communications technology (2011–2012: $\beta: 0.495, p < .01$; 2012–2013: $\beta: 0.536, p < .01$) on competency determined that there were no significant differences (professional ethics: $p\text{-value} = .483$; use of information and communications technology: $p\text{-value} = 0.402$). This result was also obtained for the influence of competency on assessment (2011–2012: $\beta: 0.674, p < .01$; 2012–2013: $\beta: 0.650, p < .01$). In the relationship between autonomy and competency, the values for the academic year 2011–2012 ($\beta: -0.099, p > .10$) are significantly inferior to those for the academic year 2012–2013 ($\beta: 0.115, p > .10$). Conversely, with regard to the influence of communication and teamwork on competency, the values for the academic year 2011–2012 (communication: $\beta: -0.009, p > .10$; teamwork: $\beta: 0.297, p < .05$) are significantly superior to those for the academic year 2012–2013 (communication: $\beta: -0.197, p < .01$; teamwork: $\beta: 0.098, p > .10$) (Table 5). The proposal regarding differences among academic periods is similar to that of other authors, such as Villardón-Gallego et al. (2013).

Conclusion and recommendations

From the theoretical perspective, this study contributes to the literature on new teaching methods that are linked to competencies within the EHEA. A rigorous analysis of the

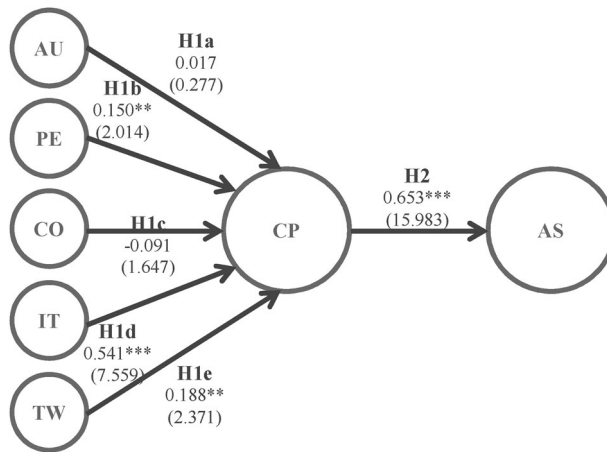


Figure 3. Results of the structural model.

Note: AU, autonomy; PE, professional ethics; CO, communication; IT, the use of information and communications technology; TW, teamwork; CP, competency; and AS, assessment.

major studies is presented that addresses the role of the university and its link to the business world, the study of competency-based learning and the contribution of placements to its development. In addition, models that use empirical analysis to measure competencies are identified, thus complementing the previous research on competencies and placements in several ways. Moreover, the analysis contributes to the study of social sciences competencies, and more than 30% of Spanish university students are studying social sciences in spite of the fact that the majority of the studies do not consider the particularities of each degree. This study represents an important contribution in its analysis of Spain, which is one of the 29 nations that participated in the Bologna Process from the beginning (1999).

First, this article helps to conceptualize competencies as an integration of diverse elements, thus facilitating a more efficient assessment. The specific objective of this

Table 5. Results of the multi-group model.

Hypothesis	Academic year 2011/ 2012		Academic year 2012/ 2013		Comparison	
	<i>B</i>	<i>t</i> -Value	<i>B</i>	<i>t</i> -Value	<i>p</i> -Value	Result
H3a AU _n →CP _n	-0.099	0.938	0.115	1.557	0.050	11-12 < 12-13
H3b PE _n →CP _n	0.205*	1.799	0.198*	1.908	0.483	11-12 = 12-13
H3c CO _n →CP _n	-0.009	0.089	-0.197***	2.740	0.070	11-12 > 12-13
H3d IT _n →CP _n	0.495***	4.187	0.536***	5.481	0.402	11-12 = 12-13
H3e TW _n →CP _n	0.297**	2.538	0.098	1.004	0.094	11-12 > 12-13
H4 CP _n →AS _n	0.674***	9.275	0.650***	13.803	0.388	11-12 = 12-13

Note: AU, autonomy; PE, professional ethics; CO, communication; IT, use of information and communications technology; TW, teamwork; CP, competency; and AS, assessment.

**p* < .10.

***p* < .05.

****p* < .01.

Table 6. Proposal for a formative plan during placements: monitoring roles and competencies by sector and area.

Sector	Areas	Roles or tasks	Knowledge	Skills	Personal skills	Competencies
Banking	Finance administration	Understanding the business	x		x	PE and TW
		Knowing the regulations	x			PE
		Using software	x	x		IT
		Collection management	x	x		PE and CO
		Sales management: Attracting and retaining	x	x	x	AU and CO
		Banking operations and loans	x			SP
		Statements and accounts control	x			SP
		B-S international operations	x			SP
	Foreign trade	Selling products (such as insurance)	x	x	x	CO
		Identifying needs and advising	x	x	x	AU and TW
		Documentation (LC. guarantees)	x			SP
	Marketing	Commercial management	x	x	x	AU and CO
		CRM business reports	x	x	x	AU
		Campaigns management	x		x	AU and TW
		Campaigns implementation	x	x	x	SP
Company process		x	x	x	PE and TW	
Other sectors	Administration tax law and accounting	Call center	x	x	x	CO
		Software system		x		IT
		Billing and accounting	x	x		SP
		Fiscal and labor law	x	x	x	SP
		Cash flow control	x	x		AU
	Foreign trade	Stock management	x	x		AU
		Software system	x	x		IT
		Documentation	x	x		SP
	Marketing	Management tools	x	x		AU and IT
		Market research	x	x		AU
		Cooperation with commercial network	x		x	TW
		Customers / sales channels negotiation	x	x	x	AU and CO
		Database development	x	x		AU
		Campaign management	x		x	SP

Note: AU, autonomy; PE, professional ethics; CO, communication; IT, use of information and communications technology; TW, teamwork; SP, specific; other sectors, consulting and advisories, construction, legal, notary and registration, leisure, public, health and others.

study was to assess a construct composed of five dimensions, although only three of the competencies were significantly positive: use of information and communications technology, professional ethics and teamwork. The results of this research partly support the findings of Frasquet, Calderón, and Cervera (2012) and Villardón-Gallego et al. (2013), who developed a procedure with which to design a tool for the evaluation of competencies. This support was found by testing structural models to discover the main strengths and weaknesses of the system. A reflective–formative type model was also successfully tested.

Second, a relatively new approach (PLS) for multi-group comparison was used in the research to test the differences between two academic years. The long-term results may be enhanced over time by understanding the most unfavorable values: communication and teamwork.

Third, this paper contributes to the literature by providing the opinions of professionals in an attempt to bring the university to the firm (Van Loo and Semeijn 2004). This research also adds additional information in the form of the evaluations of some companies from the secondary sector inasmuch as the majority of the previous studies are based solely on tertiary activities (Frasquet, Calderón, and Cervera 2012).

Our results show that the primary business implications for universities, teachers' assessment bodies and collaborating companies are related to the assessment of competency acquisition. Specifically, it is a question of ascertaining students' main strengths and weaknesses as identified by professionals at the firms at which the students' were placed. According to proposals such as those of Abramo, D'Angelo, and Di Costa (2011), the alliance between universities and workplaces should be enhanced by adapting the educational system to the demands of the marketplace. Universities and companies have different cultures and objectives that require efficient communication and sharper understanding, which, in turn, mandates knowledge of the needs of firms, efforts to sensitize university staff and common projects such as those that occur between American universities and companies.

Based on the factors that develop generic competencies in the social sciences, students should be able to understand the significance of professional ethics in business, properly implement computer and technological skills, demonstrate the ability to work as part of a team, communicate appropriately and be self-organizing. However, teachers and professionals should also reflect on how they might influence the degree of autonomy that students require with regard to improving oral and written communication. Teamwork should also be strengthened, as this was the worst aspect in the most recent year. New techniques that allow an equitable distribution of the work throughout groups and the creation of confidence in colleges should therefore be enhanced.

On the one hand, teachers should shift a certain amount of the learning responsibility to students so that they can make their own decisions, which would increase the role played by students. Various dynamics should also be implemented to improve oral and written communications. Aspects such as developing a scheme, rehearsing with a friend or recording presentations can be effective learning methods for oral communication. Classical formulas, such as penalizing misspellings in written assignments or examinations may also be perfectly valid ways to improve written communication. Such initiatives might be part of new teaching innovation projects in which new goals for teacher learning are defined.

On the other hand, considering that placements can strengthen competencies, the business standpoint suggests developing a tool (e.g. a dashboard) that enables

control of those competencies that can be acquired through placements as part of the learning process. As shown in Table 6, based on the analysis of the study sample, there is a distinction between the banking sector and others sectors. In each case, the primary areas with the most common roles or tasks are linked to the most important skills. In addition, the table identifies whether these competencies are more related to knowledge, skills or personal and social skills. Therefore, this proposal may help control competencies that might be strengthened during placement.

This study has several limitations that could lead to future research. First, the study has been analyzed from the perspective of professional supervisors. However, it might also be assessed from the student perspective by means of reports that are delivered at the end of the placements. Second, this study involves a collaboration with the social sciences department within a single university. This limitation is justified because of the wide variety of firms that collaborate with the University of Castilla-La Mancha. However, analyzing other degree programs, other universities and/or even other countries would help to determine any differences in competency acquisition. Third, only generic competencies were considered in the competency model, although specific skills were included in the proposed learning tool. Fourth, only two academic years were measured, and this quantity should be expanded to make new multi-group comparisons and to possibly consider future educational changes that will occur in Spain. Future research should confirm the development of competency acquisition while considering the process of ongoing teacher improvement. Moreover, future research might include a cluster analysis to identify different types of students aligned with the competencies being studied.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

- Abramo, G., C. D'Angelo, and F. Di Costa. 2011. "University-industry Research Collaboration: A Model to Assess University Capability." *Higher Education* 62 (2): 163–81.
- Altbach, P. G. 2014. "University-industry Research Collaboration: A Model to Assess University Capability." *Studies in Higher Education* 39 (8): 1306–20.
- Asif, M., M. Usman, M. Khalid, and N. Ahmad. 2013. "A Model for Total Quality Management in Higher Education." *Quality & Quantity* 47 (3): 1883–904.
- Auburn, T., A. Ley, and J. Arnold. 1993. "Psychology Undergraduates' Experience of Placements: A Role-Transition Perspective." *Studies in Higher Education* 18 (3): 265–85.
- Bagozzi, R., and Y. Yi. 1988. "On the Evaluation of Structural Equation Models." *Journal of the Academy of Marketing Science* 16 (1): 74–94.
- Ballesteros, B., N. Manzano, and J. A. Moriano. 2001. "Seguimiento y evaluación en la UNED del sistema de práctica de los alumnos en empresas." *Revista Electrónica de Investigación y Evaluación Educativa* 7(1). http://www.uv.es/RELIEVE/v7n1/RELIEVEv7n1_1.htm.
- Beazley, H., J. Boenisch, and D. Harden. 2002. *Preserving Corporate Knowledge and Productivity When Employees Leave*. Hoboken, NJ: John Wiley & Sons.
- Becker, G. S. 1980. *Human Capital, a Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago, IL: The University of Chicago Press.
- Bollen, K. A., and R. Lennox. 1991. "Conventional Wisdom on Measurement: A Structural Equation Perspective." *Psychological Bulletin* 110 (2): 305–14.
- Bologna Declaration. 1999. "The Bologna Declaration of 19 June 1999: Joint Declaration of the European Ministers of Education." http://www.bologna-berlin2003.de/pdf/bologna_declaration.pdf.

- Boni, A., and J. F. Lozano. 2007. "The Generic Competences: An Opportunity for Ethical Learning in the European Convergence in Higher Education." *Higher Education* 54 (6): 819–31.
- Caballero, G., P. Piñeiro, and A. García-Pintos. 2008. "Las prácticas en empresas en la universidad española: ¿Cómo son los centros universitarios más involucrados?" *Cuadernos de Estudios Empresariales* 18: 229–42.
- Capó-Vicedo, J., F. X. Molina-Morales, and J. Capó. 2013. "The Role of Universities in Making Industrial Districts More Dynamic. A Case Study in Spain." *Higher Education* 65 (4): 417–35.
- Chen, S. H. 2012. "The Establishment of a Quality Management System for the Higher Education Industry." *Quality & Quantity* 46 (4): 1279–96.
- Chen, J. K., and L. S. Chen. 2012. "Critical Creativity Criteria for Students in Higher Education: Taking the Interrelationship Effect among Dimensions in Account." *Quality & Quantity* 46 (4): 1057–75.
- Chin, W. W. 1998. "Issues and Opinion on Structural Equation Modelling." *MIS Quarterly* 22 (1): 7–16.
- Clemente-Ricolfe, J. S., and C. Escribá-Pérez. 2013. "Análisis de la percepción de las competencias genéricas adquiridas en la universidad." *Revista de Educación* 362: 535–61.
- Cohen, J. 1988. *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Copenhagen Declaration. 2002. "The Copenhagen Declaration of 29 November 2002." http://ec.europa.eu/education/policy/vocational-policy/doc/copenhagen-declaration_en.pdf.
- Cortés-Pascual, P. A., J. Cano-Escoriaza, and S. Orejudo. 2014. "The Work Values of First Year Spanish University Students." *Higher Education* 68 (5): 733–47.
- Cronbach, L. J. 1951. "Coefficient Alpha and Internal Structure of Test." *Psychometrika* 16 (3): 297–334.
- Delamare, F., and J. Winterton. 2005. "What is Competence?" *Human Resource Development International* 8 (1): 27–46.
- Durán-Aponte, E., and M. Durán-García. 2012. "Competencias sociales y las prácticas profesionales. Vivencias y demandas para la formación universitaria actual." *Cultura y Educación* 24 (1): 61–76.
- Falk, R. F., and N. B. Miller. 1992. *A Primer for Soft Modeling*. Akron, OH: University of Akron Press.
- Fornell, C., and D. F. Larcker. 1981. "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error." *Journal of Marketing Research* 18 (1): 39–50.
- Frasquet, M., H. Calderón, and A. Cervera. 2012. "University-industry Collaboration from a Relationship Marketing Perspective: An Empirical Analysis in a Spanish University." *Higher Education* 64 (1): 85–98.
- Freire, M. J., M. M. Teijeiro, and C. Pais. 2013. "La adecuación entre las competencias adquiridas por los graduados y las requeridas por los empresarios." *Revista de Educación* 362: 13–41.
- García, J. 2009. "Bolonia y la buena práctica de las prácticas." *La Cuestión Universitaria* 5: 82–90.
- Geisser, S. 1974. "A Predictive Approach to the Random Effect Model." *Biometrika* 61 (1): 101–7.
- Gutiérrez-García, C., A. Pérez-Pueyo, M. Pérez-Gutiérrez, and A. Palacios-Picos. 2011. "Percepciones de profesores y alumnos sobre la enseñanza, evaluación y desarrollo de competencias en estudios universitarios de formación de profesorado." *Cultura y Educación* 23 (4): 499–514.
- Hamid, M. R. A., Z. Mustafa, N. R. M. Suradi, F. Idris, and M. Abdullad. 2013. "Value-based Performance Excellence Measurement for Higher Education Institution: Instrument Validation." *Quality & Quantity* 47 (6): 3019–30.
- Harvey, L., W. Locke, and A. Morey. 2002. *Enhancing Employability Recognizing Diversity*. London: Universities UK.
- Henseler, J., C. M. Ringle, and R. R. Sinkovics. 2009. "The Use of Partial Least Squares Path Modeling in International Marketing." *Advances in International Marketing* 20: 277–319.
- Jackson, D. 2014. "Employability Skill Development in Work-Integrated Learning: Barriers and Best Practice." *Studies in Higher Education*. <http://dx.doi.org/10.1080/03075079.2013.842221>.

- Jarvis, C. B., S. B. MacKenzie, and P. M. Podsakoff. 2003. "A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research." *Journal of Consumer Research* 30 (2): 199–218.
- Kucel, A., and M. Vilalta-Buñi. 2013. "Why Do Tertiary Education Graduates Regret Their Study Program? A Comparison Between Spain and the Netherlands." *Higher Education* 65 (5): 565–79.
- Kuntz, A. M. 2012. "Reconsidering the Workplace: Faculty Perceptions of Their Work and Working Environments." *Studies in Higher Education* 37 (7): 769–82.
- La Vonne, F., D. Doan-Crider, and A. Fedynich. 2012. "Undergraduate Experiential Learning in the Natural Sciences at a Hispanic Serving Institution." *Research in Higher Education Journal* 15 (3): 1–12.
- Latorre, M. J. 2007. "El entrenamiento práctico universitario de los futuros profesionales de la educación musical: aproximación a sus creencias desde la Universidad de Granada." *Revista Psicodidáctica* 12 (2): 257–68.
- León, B., and C. Latas. 2007. "La formación en técnicas de aprendizaje cooperativo del profesor universitario en el contexto de la convergencia europea." *Revista Psicodidáctica* 12 (2): 269–78.
- Levi-Orta, G. C., and E. Ramos-Méndez. 2013. "Componentes de las competencias en los nuevos grados de algunas universidades españolas." *Revista de Educación* 362: 623–58.
- MacKenzie, S. B., P. M. Podsakoff, and C. B. Jarvis. 2005. "The Problem of Measurement Model Misspecification in Behavioural and Organizational Research and Some Recommended Solutions." *Journal of Applied Psychology* 90 (4): 710–30.
- Marcelo, C., C. Yot, C. Mayor, M. Sánchez, P. Murillo, J. M. Rodríguez, and A. Pardo. 2014. "Las actividades de aprendizaje en la enseñanza universitaria: ¿hacia un aprendizaje autónomo de los alumnos?" *Revista de Educación* 363: 334–59.
- Marhuenda, F., J. C. Bernad, and A. Navas. 2010. "Las prácticas en empresa como estrategia de enseñanza e inserción laboral: Las empresas de inserción social." *Revista de Educación* 351: 139–61.
- Matthew, S. M., R. M. Taylor, and R. A. Ellis. 2012. "Relationships Between Students' Experiences of Learning in an Undergraduate Internship Programme and New Graduates' Experiences of Professional Practice." *Higher Education* 64 (4): 529–42.
- Melton, R. F. 1994. "Competences in Perspective." *Educational Research* 36 (3): 285–94.
- Meng, C., and H. Heike. 2005. *Student Time Allocation, the Learning Environment, and the Acquisition of Competencies*. Maastricht: Maastricht University.
- Navío, A. 2005. "Propuestas conceptuales en torno a la competencia profesional." *Revista de Educación* 337: 213–34.
- Nunnally, J. C., and I. H. Bernstein. 1994. *Psychometric Theory*. New York: Mc Graw Hill.
- Ogilvie, C., and G. Homan. 2012. "Everybody Wins? Using the Workplace as an Area for Learning." *Higher Education, Skills and Work-Based Learning* 2 (2): 102–20.
- Pérez, P. J., and L. E. Vila. 2013. "La adquisición de competencias para la innovación productiva en la universidad española." *Revista de Educación* 361: 429–55.
- Petter, S., D. Straub, and A. Rai. 2007. "Specifying Formative Constructs in Information Systems Research." *MIS Quarterly* 31 (4): 623–56.
- Plewa, C., and P. Quester. 2007. "Key Drivers of University–Industry Relationships: The Role of Organizational Compatibility and Personal Experience." *Journal of Services Marketing* 21 (5): 370–82.
- Qazi, W., S. Ali, and S. Tehseen. 2014. "Higher Education and Growth Performance of Pakistan: Evidence from Multivariate Framework." *Quality & Quantity* 48 (3): 1651–65.
- Ringle, C. M., S. Wende, and A. Will. 2005. "SmartPLS 2.0 (M3) Beta." <http://www.smartpls.de/Hamburg>.
- Rodríguez, J., V. Álvarez, J. Gil, and S. Romero. 2011. "Necesidades del profesorado de la Universidad de Sevilla respecto a la enseñanza que requiere el EEES." *Cultura y Educación* 23 (3): 323–40.
- Sánchez, M. J., F. A. Martín, and F. J. Rondán. 2010. "Estética y calidad de relación. Una aplicación en los servicios de música online entre jóvenes europeos." *Revista Española de Investigación de Marketing ESIC* 14 (1): 25–56.
- Savage, S. 2005. "Urban Design Education: Learning for Life in Practice." *Urban Design International* 10 (1): 3–10.

- Schaeper, H. 2009. "Development of Competencies and Teaching-Learning Arrangements in Higher Education Arrangements in Higher Education: Findings from Germany." *Studies in Higher Education* 34 (6): 677–97.
- Schulz, M., and C. Starnov. 2010. "Informal Workplace Learning: An Exploration of Age Differences in Learning Competence." *Learning and Instruction* 20 (5): 383–99.
- Stasz, C. 1997. "Do Employers Need the Skills They Want? Evidence from Technical Work." *Journal of Education and Work* 10 (3): 205–23.
- Stone, M. 1974. "Cross-validators Choice and Assessment of Statistical Predictions." *Journal of the Royal Statistical Society* 32 (2): 111–47.
- Tejada, J. 2005. "El trabajo por competencias en el practicum: cómo organizarlo y cómo evaluarlo." *Revista Electrónica de Investigación Educativa* 7. <http://redie.uabc.mx/vo7no2/contenido-tejada.html>.
- The Secretary's Commission on Achieving Necessary Skills (SCANS). 1991. "What Work Requires of Schools." <http://wdr.doleta.gov/SCANS/whatwork/whatwork.pdf>.
- Tierno, J. M., P. Iranzo, and C. Barrios. 2013. "El compromiso organizativo e institucional para diseñar y evaluar competencias en la universidad." *Revista de Educación* 361: 223–51.
- Triventi, M. 2014. "Higher Education Regimes: An Empirical Classification of Higher Education Systems and its Relationship with Student Accessibility." *Quality & Quantity* 48 (3): 1685–1703.
- Tuning Project. 2007. *Tuning Education Structures in Europe*. Bilbao: Universidad de Deusto.
- Vaatstra, R., and R. De Vries. 2007. "The Effect of the Learning Environment on Competences and Training for the Workplace According to Graduates." *Higher Education* 53 (3): 335–57.
- Van Loo, J., and J. Semeijn. 2004. "Defining and Measuring Competences: An Application to Graduate Surveys." *Quality & Quantity* 38 (3): 331–49.
- Villardón-Gallego, L., C. Yániz, C. Achurra, I. Iraurgi, and M. C. Aguilar. 2013. "Learning Competence in University: Development and Structural Validation of a Scale to Measure." *Revista de Psicodidáctica* 18 (2): 357–74.
- Wilton, N. 2012. "The Impact of Work Placements on Skills Development and Career Outcomes for Business and Management Graduates." *Studies in Higher Education* 37 (5): 603–20.