Department of Business

Doctorate in Entrepreneurship and Management

Doctoral Thesis

Quality, Efficiency and Customer Orientation

in Higher Education

Adriana Morales Rodríguez

Supervisors:

Joan-Lluís Capelleras   Víctor M. Giménez García

Bellaterra (Cerdanyola del Vallès)

September 2016

To my parents, José Víctor and María Lucila, to my husband, Sergio Enrique, to my sisters, Lucila, Lourdes, Lorena and my brother Andrés.

Acknowledgements

Abstract

Higher education institutions play an important role in the economy of any region or country as they contribute to the formation of human capital, new knowledge and entrepreneurship. Due to increased competition, universities are under constant pressure to improve their performance. In this vein, literature has long indicated that quality, productivity and customer orientation should be considered as key elements in order to achieve superior performance. However, assessing these concepts in the context of higher education is complex.

The purpose of this thesis is to examine the determinants of quality, efficiency and customer orientation in higher education and the possible relationship between these concepts. Thus, the specific objectives of this research are the following: to examine the impact of attributes of quality and reputation on the dynamic evolution of productivity in a sample of Latin American universities (Chapter 2); to examine the nature and determinants of student evaluations of teaching performance (Chapter 3); and to examine the influence of the student-customer orientation and other personal variables on the assessment of university teachers' performance (Chapter 4).

Our findings reaffirm the idea that more reliable results in productivity measurement are sought by grouping universities into more homogeneous subsets of institutions. The results also indicate that attributes of quality and reputation have an impact on productivity analysis. Findings also show that student evaluation of teaching is a complex phenomenon that depends on factors related to teacher, student and course profiles. Students basically assess the expertise, attitude and behavior of teachers. Findings also suggest that student-customer orientation enhances teachers' performance. This thesis integrates the literature on services marketing, operations management and higher education in order to provide a wider and deeper insight into the assessment of educational performance. From a practical perspective, this research may help managers to create a competitive advantage in higher education institutions.

Keywords: Higher education, quality, Malmquist productivity index, metafrontier, teaching performance, employee performance, reputation, customer orientation.

Table of Contents

List of Appendices

List of Figures

List of Tables

CHAPTER 1:
Introduction

1.1. Problem statement and objectives of the research

The role of higher education institutions (HEIs) is particularly relevant in the economy of any region or country as they add value in terms of educated workforce and enhanced entrepreneurship (Secundo *et al*. 2010). As Johnes (2006a) mentions HEIs contribute to the formation of human capital and new knowledge. Similarly, Miller (2010) argues that university's fundamental goal is the research, transfer and dissemination of knowledge to serve people and finally to contribute to society through research and quality education for students. Therefore, universities play a central role within society and should provide high quality services to students (Gnaldi and Ranalli, 2015).

Thus, universities provide services such as teaching and research, facing a greater demand from the different users of their services (Capelleras and Veciana, 2004). As Watjatrakul (2014) mentions, due to globalization and market pressure, universities are under constant review to improve their performance. Furthermore, in a results-oriented and measurement-oriented environment, policymakers, parents, and students look for evidence of institutional quality to differentiate institutions and guide decision making (Thomas and Galambos, 2004). This evidence includes objective outcome measures but also subjective measures that indicate institutional quality. As Gimenez Garcia (2000) mentions, among the different meanings of the concept of quality in higher education, there is the meaning of quality as the ability to meet the users' needs and the assessment of university quality from the point of view of service quality. Thus, Astin (1985) recognizes five different views of quality in higher education: (a) reputational, (b) resources, (c) outcomes, (d) content and (e) value added.

Service quality is often considered an essential element to achieve a competitive advantage (Grönroos, 1988; Hoffman and Bateson, 2002). However, being an effective service organization requires the consideration that perceived quality and productivity are inseparable phenomena (Grönroos and Ojasalo, 2004). As Looy *et al.* (1998) argue,

productivity and quality are both an appreciation of how well the resources in any activity are used. In order to be effective, one must take into consideration both concepts simultaneously. Therefore, when measuring productivity, it is necessary to consider quality, in order to guarantee that the improvement in productivity would not be achieved at the expense of a reduction in quality (Prior, 2006). Moreover, marketing literature has long indicated that in order to achieve superior performance, an organization must create superior value for its customers. Thus, Koris and Nokelainen (2015) suggest that as business organizations, universities should also practice the customer-oriented approach in order to be a successful organization.

However, assessing service quality, productivity and customer orientation in the context of higher education is complex. The higher education sector has characteristics which make it difficult to measure efficiency: it is non-profit making; there is an absence of output and input prices; and universities produce multiple outputs from multiple inputs (Johnes, 2006b). Furthermore, the intangible nature of services makes it difficult to use objective indicators of service quality in higher education (Capelleras and Veciana, 2004) and the existing literature on the topic of student-customer orientation is polarized and mainly conceptual (Koris *et al.,* 2015).

In this vein, the purpose of this thesis is to examine the determinants of quality, efficiency and customer orientation in higher education and the possible relationship between these concepts. This study is interesting for several reasons:

- With increased competition for students and changing demographic trends, higher education institutions are under constant pressure to improve their performance, where critical analysis concerning their productivity and efficiency has started to gain importance (Parteka and Wolszczak-Derlacz, 2013).

- Quality has been an important concern for study in higher education research. Also, recent literature shows a revitalized interest in university rankings which constitute a key example of international quality practices in higher education and a widespread

phenomenon (Blanco-Ramirez and Berger, 2014). However, according to Lehmann and Warning (2002), there are methodological problems with the use of performance rankings and most of them do not distinguish between input and output of universities.

- Although quality and efficiency are two concepts widely used, few studies have examined the relationship between these two concepts within the context of the service industry. In addition, there is no general agreement in the literature regarding whether they are compatible or not (Talluri *et al.,* 2013).

- There is a general agreement to consider students as customers (Marzo-Navarro *et al*., 2005) and teaching as the most important factor in defining service quality (Capelleras and Veciana, 2004; Hill, 1995; Thomas and Galambos, 2004).

- Higher education has been considered a business-like industry, where students' needs are actively pursued in order to guarantee higher levels of service quality (Kashif and Ting, 2014). Thus, Brady and Cronin (2001) indicate that customer orientation perceptions are positively associated with the evaluation of the quality of service.

Thus, the specific objectives of this research are the following:

1. *To examine the impact of attributes of quality and reputation on the dynamic evolution of productivity in a sample of Latin American universities.*

2. *To examine the nature and determinants of student evaluations of teaching performance.*

3. *To examine the influence of the student-customer orientation and other personal variables on the assessment of university teachers' performance.*

1.2. Contributions and implications

From an academic perspective, this research integrates the literature on services marketing, operations management and higher education in order to provide a wider and deeper insight into the assessment of educational performance. Regarding the dynamic analysis of productivity in universities, we have improved over previous studies by adopting an international perspective on the evolution of productivity, by using the concept of metafrontier to compare the productivity of universities that may be classified into different groups, and by including attributes of quality and reputation on this analysis. Regarding the assessment of teaching performance, this study explores the determinants of students' evaluations of teaching performance. This includes several factors that had not been previously considered, and examines the influence of student-customer orientation and other personal variables on self-ratings of teaching performance. To our knowledge, this is the first study that examines the employee customer orientation concept in the context of higher education and its impact on the assessment of university teachers' performance. From a managerial perspective, this research may help managers to generate substantial value for customers and create a competitive advantage in higher education institutions.

1.3. Structure of the research

This thesis is divided into five chapters. Chapter 1, as an introductory chapter, presents the problem statement and objectives of the research as well as the main contributions and aspects of each subsequent chapter. Chapter 5 presents the main conclusions and implications of the study and offers some suggestions for future research. Chapter 2, Chapter 3 and Chapter 4 are linked to the previously mentioned specific objectives of this thesis and will now be briefly described.

In order to achieve the first specific objective of this thesis, Chapter 2 examines the impact of attributes of quality and reputation on the dynamic evolution of productivity in a sample of Latin American Universities. The sample consists of 126 universities classified into three subsets by type of HEIs. A metafrontier Malmquist productivity index is employed in order to evaluate the performance of Latin American universities during the period 2011/2012-2012/2013 and three models of university performance are used in this study.

In order to achieve the second specific objective of this thesis, Chapter 3 analyzes the nature and factors that influence student evaluation of the teaching performance of university teachers. By integrating two areas of research: services marketing and higher education, a set of hypotheses were developed taking into consideration customer (student), employee (teacher) and service (course) characteristics. They were then tested using data from 952 courses for a three-year period and employing different multivariate techniques.

In order to achieve the third and last specific objective of this thesis, Chapter 4 explores the employee customer orientation concept in the context of higher education and its impact on the assessment of university teachers' performance. The sample consists of 221 university teachers employed in Mexico. The customer orientation measure was adapted from Brown *et al*. (2002) study. The teaching performance measure was elaborated after considering the findings of Chapter 3. Teacher demographic characteristics and job-related aspects are also included. Data analysis includes descriptive statistics and multivariate techniques.

It is important to mention that these three chapters entail the concept of quality in the context of higher education. In Chapter 2 we embrace three different views of quality: a) reputational, (b) resources, (c) outcomes. In Chapter 3 and 4 we adopt the concept of university quality from the point of view of service quality. More concretely, Chapter 2 takes into consideration the reputational assessments made by academics and employers, as well as input and output quality characteristics, such as the competence of the teachers and the quality of publications. Chapter 3 examines students' perceptions of teaching quality and Chapter 4, the teachers' perceptions of service quality. Thus, these three chapters offer the analysis of three concepts that are necessary for universities to achieve superior performance: quality, efficiency and customer orientation. The main aspects of each chapter are summarized in Table 1.1.

Table 1.1. Main aspects of the thesis

Aspects \ Chapters	Chapter 2	Chapter 3	Chapter 4
Title	Efficiency, quality and reputation in higher education: A dynamic analysis.	Teaching performance: Determinants of the student assessment.	Student orientation and teaching performance in higher education.

Purpose	To examine the impact of attributes of quality and reputation on the dynamic evolution of productivity in a sample of Latin American universities.	To identify the nature and factors that influence student evaluation of the teaching performance.	To examine the influence of the student-customer orientation and other personal variables on self-ratings of university teachers' performance.
Concept of quality	Attributes of quality: input and output characteristics. Reputational assessments made by academics and employers.	Students' perceptions of teaching quality.	Teachers' perceptions of service quality.
Unit of analysis	University	Course	Teachers
Methodology	• Sample: 126 universities classified into three subsets by type of HEIs during the period 2011/2012-2012/2013 • Three models of university performance. • Metafrontier Malmquist productivity index	• Sample: 952 courses for a three-year period. • A set of hypotheses were developed taking into consideration customer (student), employee (teacher) and service (course) characteristics. • Descriptive statistics and multivariate techniques.	• Sample: 221 university teachers employed in Mexico. • Customer orientation measure was adapted from Brown *et al.* (2002) study. • The teaching performance measure was proposed. • Teacher demographic characteristics and job-related aspects are also included. • Descriptive statistics, multivariate analyses and non-parametric tests.
Originality/ value	• International perspective. Different countries of Latin America • Metafrontier approach. Subsets by type of HEI. • Attributes of quality and reputation on this analysis.	• A wide range of service quality determinants, including several factors that had not been previously considered.	• First study that examines the employee customer orientation concept in the context of higher education and its impact on the assessment of teaching performance.

1.4. Publications arising from the thesis

The research work carried out for this thesis resulted in the following publications:

Publication in JCR Journal.

- Morales Rodríguez, A., Capelleras, J. L., & Gimenez Garcia, V. M. (2014). Teaching performance: Determinants of the student assessment. *Academia Revista Latinoamericana de Administración*, *27*(3), 402-418.

Publication in Proceedings of International Conference.

- Morales Rodríguez, A., Capelleras, J.L., & Gimenez Garcia, V. M. (2011, Mayo). *Calidad en el servicio generada por el desempeño de los empleados: Un análisis de la actividad docente del profesorado universitario.* Paper presented at the XV International Congress of Administrative Sciences Research (ACACIA), Veracruz, Mexico.

1.5. References

Astin, A. W. (1985). *Achieving Educational Excellence*. San Francisco: Jossey-Bass.

Blanco-Ramírez, G., & Berger, J. B. (2014). Rankings, accreditation, and the international quest for quality. *Quality Assurance in Education, 22*(1), 88-104.

Brady, M. K., & Cronin, J. J. (2001). Some new thoughts on conceptualizing perceived service quality: A hierarchical approach. *Journal of Marketing*, *65*(3), 34-49.

Brown, T. J., Mowen, J. C., Donavan, D. T., & Licata, J. W. (2002). The customer orientation of service workers: Personality trait effects on self-and supervisor performance ratings. *Journal of Marketing Research*, *39*(1), 110-119.

Capelleras, J. L., & Veciana, J. M. (2004). Calidad de servicio en la enseñanza universitaria: Desarrollo y validación de una escala de medida. *Revista Europea de Dirección y Economía de la Empresa*, *13*(4), 55-72.

Gimenez Garcia, V. M. (2000). *Eficiencia en costes y calidad en la universidad. Una aplicación a los departamentos de la UAB* (Doctoral thesis). Universitat Autònoma de Barcelona, Bellaterra, Barcelona.

Gnaldi, M., & Ranalli, M. G. (2015). Measuring university performance by means of composite indicators: A robustness analysis of the composite measure used for the benchmark of Italian universities. *Social Indicators Research*, 1-17.

Grönroos, C. (1988). Service quality: The six criteria of good perceived service quality. *Review of Business, 9*(3), 10-13.

Grönroos, C., & Ojasalo, K. (2004). Service productivity: Towards a conceptualization of the transformation of inputs into economic results in services. *Journal of Business Research, 57*(4), 414-423.

Hill, F. M. (1995). Managing service quality in higher education: the role of the student as primary consumer. *Quality Assurance in Education*, *3*(3), 10-21.

Hoffman, K. D., & Bateson, J. E. G. (2002). *Fundamentos de marketing de servicios: Conceptos, estrategias y casos*. Mexico: Thomson.

Johnes, J. (2006a). Measuring teaching efficiency in higher education: An application of data envelopment analysis to economics graduates from UK Universities 1993. *European Journal of Operational Research, 174*(1), 443-456.

Johnes, J. (2006b). Data envelopment analysis and its application to the measurement of efficiency in higher education. *Economics of Education Review, 25*(3), 273–288.

Kashif, M., & Ting, H. (2014). Service-orientation and teaching quality: Business degree students' expectations of effective teaching. *Asian Education and Development Studies*, *3*(2), 163-180.

Koris, R., & Nokelainen, P. (2015). The student-customer orientation questionnaire (SCOQ) Application of customer metaphor to higher education. *International Journal of Educational Management*, *29*(1), 115-138.

Koris, R., Örtenblad, A., Kerem, K., & Ojala, T. (2015). Student-customer orientation at a higher education institution: The perspective of undergraduate business students. *Journal of Marketing for Higher Education*, *25*(1), 29-44.

Lehmann, E., & Warning, S. (2002). *Doing the right things or the things right? Evidence from UK Universities* (Mimeo). University of Konstanz.

Looy, B. V., Gemmel, P., Desmet, S., Van Dierdonck, R., & Serneels, S. (1998). Dealing with productivity and quality indicators in a service environment: Some field experiences. *International Journal of Service Industry Management, 9*(4), 359-376.

Marzo-Navarro, M., Pedraja-Iglesias, M., & Rivera-Torres, P. (2005). A new management element for universities: Satisfaction with the offered courses. *International Journal of Educational Management, 19*(6), 505-526.

Miller, S. (2010). *The moral foundations of social institutions: A philosophical study*. New York: Cambridge University Press.

Parteka, A., & Wolszczak-Derlacz, J. (2013). Dynamics of productivity in higher education: Cross-european evidence based on bootstrapped Malmquist indices. *Journal of Productivity Analysis, 40*(1), 67-82.

Prior, D. (2006). Efficiency and total quality management in health care organizations: A dynamic frontier approach. *Annals of Operations Research, 145*(1), 281-299.

Secundo, G., Margherita, A., Elia, G., & Passiante, G. (2010). Intangible assets in higher education and research: Mission, performance or both?. *Journal of Intellectual Capital, 11*(2), 140-157.

Talluri, S., Kim. M. K., & Schoenherr, T. (2013). The relationship between operating efficiency and service quality: Are they compatible?. *International Journal of Production Research, 51*(8), 2548-2567.

Thomas, E. H., & Galambos, N. (2004). What satisfies students? Mining student-opinion data with regression and decision tree analysis. *Research in Higher Education, 45*(3), 251-269.

Watjatrakul, B. (2014). Factors affecting students' intentions to study at universities adopting the "student-as-customer" concept. *International Journal of Educational Management*, *28*(6), 676-693.

CHAPTER 2:

Efficiency, Quality and Reputation in Higher Education: A Dynamic Analysis.

Abstract

This paper evaluates the performance of Latin American universities using a metafrontier approach for measuring Malmquist productivity index and examining the impact of attributes of quality and reputation on the dynamic evolution of productivity. The sample consists of 126 universities classified into three subsets: Full Comprehensive, Comprehensive and Focused, during the period 2011/2012-2012/2013. Findings suggest as each group of universities has its own production technology, the productivity changes and its decomposed components also show these differences. The results also indicate that most of the variability in the augmented models is attributed to changes in quality and that the way we conceptualize and introduce quality into the productivity models is important. These findings contribute significantly to the existing literature on the assessment of higher education institutions' performance.

Keywords: Higher education, Malmquist productivity index, quality, reputation, rankings, metafrontier.

2.1. Introduction

Higher education institutions (HEIs) are important components of the economy as they contribute to the formation of human capital and new knowledge (Johnes, 2006a). Due to changing demographic trends and competition for students, higher education institutions are under constant pressure to improve their performance, where critical analysis concerning their productivity and efficiency has started to gain importance (Parteka and Wolszczak-Derlacz, 2013).

Being an effective service organization requires the consideration that productivity and perceived quality are inseparable phenomena (Grönroos and Ojasalo, 2004). As Looy *et al.* (1998) argue, productivity and quality are both an appreciation of how well the resources in any activity are used and in order to be effective, one must take into consideration both concepts simultaneously. Prior (2006: 281-282) suggests, "efficiency and quality jointly establish the level of effectiveness obtained. Taken in isolation, efficiency objectives hardly serve as a final outcome."

However, although quality and efficiency are two concepts widely used, few studies have examined the relationship between these two concepts within the context of the service industry. In addition, there is no general agreement in the literature regarding whether they are compatible or not (Talluri *et al.,* 2013). Also, it is necessary to have in mind that assessing quality and efficiency in a service context is complex. Grosskopf *et al.* (2014:19) mention, "measuring efficiency in services in general and education in particular is challenging".

With increased competition for students globally, the efficiency of universities is an international issue (Fernando and Cabanda, 2007). However, as Parteka and Wolszczak-Derlacz (2013) mention, there are several gaps in analyses of higher education productivity that need to be filled. Major attention should be focused on the analysis of productivity changes across universities from several countries within a common methodological framework.

Moreover, literature has also shown that more reliable and robust results in efficiency and productivity measurement are sought by grouping universities into more homogeneous subsets of institutions by objectives and operating environment (Agasisti and Salerno, 2007; Ahn *et al.,* 1988; Costa *et al.,* 2012; Johnes, 2008; Johnes *et al.*, 2008; Thanassoulis *et al.,* 2011). In the literature, Ahn *et al.* (1988) introduced the separation of doctoral-granting universities into institutions with and without medical schools, proving very important in uncovering substantial differences in behavior between the two groups. Thanassoulis *et al.* (2011) mention that HEIs in the UK have been traditionally treated as a homogenous group, although there is a lot of variety between HEIs. Owing to this considerable diversity, Johnes (2008) and Johnes *et al.* (2008) use in their estimations three groups of institutions: traditional universities, new universities (mainly former polytechnics) and colleges of higher education (specialist institutions concentrating on a particular discipline). By applying a Kruskal-Wallis test, Johnes (2008) finds that the overall efficiency and the technology change distributions of the three groups are significantly different. Thanassoulis *et al.* (2011) follow Johnes *et al.* (2008) and use four subsets for assessing efficiency and productivity of HEIs in England, finding differences in performance across the groups as well. Thanassoulis *et al.* (2011) consider well-founded to separate traditional universities into those with and those without medical schools. As a matter of fact, Daraio *et al*. (2015) explore whether efficiency is influenced by the specialization of universities, test the statistical significance of specialization, and find a significant nonlinear impact on the efficiency of the Humboldt model.

In the context of higher education, different methodologies have been used to evaluate the quality of the university such as: a) accreditation, b) academic program review, c) surveys of reputation and d) performance indicators. Quality has been an important concern for study in higher education research and recent literature shows a revitalized interest in quality practices including rankings. However, as Blanco-Ramírez and Berger (2014) mention, international rankings often compare reputation and it remains unclear what the relationship between reputation and quality is.

The purpose of this study is to examine the impact of attributes of quality and reputation on the dynamic evolution of productivity in a sample of Latin American Universities, which includes three subsets by type of HEIs. From an academic perspective, this paper will provide a wider and deeper insight into the assessment of educational performance. We have improved over previous studies by adopting an international perspective on the evolution of productivity in the best universities of Latin America from different countries. As Parteka and Wolszczak-Derlacz (2013) note, previous works have usually been conducted with units from only one country or exceptionally, two countries. Also, we use the concept of metafrontier to compare the productivity of universities that may be classified into different groups. Additionally, we follow an approach oriented towards effectiveness that includes attributes of quality and reputation on the evaluation of productivity. To our knowledge, this is the first study that applies Malmquist productivity indices on Latin American Universities from several countries and that include attributes of quality and reputation on this analysis. From a managerial perspective, this research may help managers create a competitive advantage in higher education institutions.

The reminder of this paper is organized as follows. The literature review on efficiency, productivity and quality in higher education is presented in the following section. Then, methodology, data and study variables are described. Subsequently, empirical findings are presented. Finally, conclusions are provided.

2.2. Review of the literature

2.2.1. Efficiency and productivity in higher education.

The higher education sector has characteristics which make it difficult to measure efficiency: it is non-profit making; there is an absence of output and input prices; and universities produce multiple outputs from multiple inputs (Johnes, 2006b). In a multi-output, multi-input production context, the data envelopment analysis (DEA) constitutes an attractive choice of methodology for measuring the efficiency of higher education institutions. This technique provides estimates of the distance function, which is a generalization of the single output production function (Johnes, 2006b). As Gimenez and Martinez (2006) mention, DEA methodology is an excellent instrument for university evaluation that is supported in various

studies. This technique has been used to assess the performance of higher education institutions in several countries like the U.K, Australia, U.S, Spain, Italy, Brazil, etc.

Literature on the efficiency of higher education has generally been focused on the efficiencies of universities in an individual country. Most studies compare activities carried out by different universities, while some analyze units that belong to the same institution such as university departments or programs (Martin, 2006). Thus, Ahn *et al.*(1988) compare relative efficiencies of public and private universities in the U.S; Breu and Raab (1994) measure the relative efficiency of the "best" 25 U.S. News and World Reported-ranked universities; Athanassopoulos and Shale (1997) examine the relative efficiencies of universities in the U.K; Avkiran (2001) and Abbott and Doucouliagos (2003) estimate efficiencies of Australian universities; and Johnes and Yu (2008) examine the relative efficiency in the production of research of 109 Chinese universities. Gimenez Garcia (2004), Gimenez and Martinez (2006) and Martin (2006) evaluate university departments in Spain; Tyagi *et al.* (2009); estimate relative efficiencies of academic departments in Indian context; Chang *et al.* (2012) evaluate tourism and leisure departments in Taiwanese universities; and Bessent *et al.* (1983) measure the relative efficiency of education programs in a community college in the U.S.

As an exception, Joumady and Ris (2005) perform a cross-country analysis of higher education institution efficiency. These authors use a large sample of young graduates interviewed three years after graduation to examine technical efficiency in European universities among eight countries (Australia, Finland, France, Germany, Italy, Netherlands, Spain and U.K). In this vein, Agasisti and Johnes (2009) compute and compare the technical efficiency of HEIs located in two European countries, Italy and England. They also look at the evolution of technical efficiency scores over a four-year period. Similarly, Agasisti and Haelermans (2016) conduct an efficiency analysis on 13 Dutch and 58 Italian public universities.

Recent studies on the assessment of higher education institutions' performance are of particular interest because they analyze efficiency and productivity changes over a period of time. Flegg *et al.* (2004) examine the change in productivity in 45 British universities in the

period 1980/81-1992/93; Fernando and Cabanda (2007) estimates relative efficiency and productive performance of 13 colleges in the Philippines from 1998-2003; Castano and Cabanda (2007) evaluate 30 educational institutions over the period 1999-2003; Johnes (2008) estimates productivity indexes for 112 English HEIs over the period 1996/97-2004/05 using three groups of institutions; Worthington and Lee (2008) examine productivity growth in 35 Australian universities from 1998–2003; Thanassoulis *et al. (*2011) assess productivity changes in 121 English HEIs over the period 2000/01-2002/03 using four subsets of institutions; and García-Aracil (2013) examines the productivity growth of 43 Spanish universities over the period 1994-2008. To our knowledge, there are two contributions that involve a cross-country analysis of the productivity changes. Agasisti and Pérez-Esparrells (2010) compute and compare productivity indexes of 57 Italian public institutions and 46 Spanish universities over the period 2000/01-2004/05; and Parteka and Wolszczak-Derlacz (2013) examine productivity changes in 266 HEIs in 7 European countries over the period 2001-2005.

In Latin American studies there has also been an interest in the evaluation of university efficiency. Mainly in Brazil, the analysis of the relative efficiency of federal universities of higher education has been intensified in the last decade (Costa *et al.,* 2012). Marinho *et al.* (1997) evaluate the relative efficiency in the main Brazilian federal universities for the year of 1994. Façanha and Marinho (2001) perform a comparative analysis in the context of Brazilian HEIs through subsets of federal, state, municipal and private institutions. França *et al.* (2010) estimate efficiency measures of 30 Brazilian federal universities for evaluating the impact of information asymmetry on organizational efficiency. Ramirez-Correa *et al.* (2012) estimate the efficiency for 34 Chilean universities. Costa *et al.* (2012) measure the educational efficiency of federal institutions of higher education in Brazil, observing them in two subsets. The results indicate that causes of inefficiency in educational production vary according to the two groups analyzed. Zoghbi *et al.* (2013) estimate the efficiency of public and private higher education institutions in Brazil. The findings indicate that public institutions are more inefficient than private ones. Cáceres *et al. (*2014) measure the technical efficiency of academic units in a Chilean university. Munoz (2016) measures the research efficiency of 39 universities in Chile.

On the other hand, a challenge in the evaluation of educational efficiency has been the notion that the quality of inputs and outputs are rarely measured or are imprecise for HEIs (Breu and Raab, 1994). Kao and Hung (2008) mention that there are at least two difficulties on the selection of input and output variables: one is the availability of data and the other one is the measurement of quality. Abbott and Doucouliagos (2003) notice that focusing on outputs without considering the quality of education provided might bias the efficiency scores.

Inputs indicators represent those factors employed in delivery of services (Martin, 2006). As Gómez (2005) argues, input factors for evaluating the performance of university are usually classified into two categories: human resources (teachers and students) and capital (financial resources and facilities). Teaching and research have been considered by most people as the two major tasks of higher education institutions (Kao and Hung, 2008). Nevertheless, with the concern for establishing deeper engagement with industry and society (Cesaroni and Piccaluga, 2016), universities have placed special emphasis on their role in knowledge transfer and industrial innovation (Kim, 2013) and recent works are emphasizing the need of adding a third mission regarding knowledge and technology transfer in efficiency studies (Berbegal-Mirabent *et al.,* 2013; García-Aracil, 2013; Ho *et al.*, 2014; Kim, 2013). Appendix 1 presents a summary of the main input and output variables commonly used in the literature for assessing the efficiency of HEIs. As listed in these tables, previous studies often include number of teachers, number of students, operating expenses and equipment as inputs; number of graduates as teaching output; number of publications and research grants as research outputs; and number of licenses and spin-offs created as knowledge transfer outputs. Although there is no general consensus about the selection of inputs and outputs in educational assessment, it is essential to develop a good understanding of these factors before interpreting results of any efficiency model (Avkiran, 2001).

Most recent studies have included measures of quality in inputs and outputs. As attributes of quality in inputs of educational assessment, qualification of faculty (Costa *et al.,* 2012; França *et al.,* 2010; Kuah and Wong, 2011; Martin, 2006) and entry qualification of students (Johnes, 2006a, 2006b, 2006c; Joumady and Ris, 2005; Kuah and Wong, 2011; Lehmann

and Warning, 2002) have been considered. As measures of quality in outputs, research quality (Gimenez Garcia, 2004; Gimenez and Martinez, 2006), number of graduates adjusted for quality (Flegg *et al.,* 2004; Johnes, 2006a, 2006b, 2006c; Lehmann and Warning, 2002) perceived teaching quality reflected in teaching evaluations of students (Gimenez Garcia, 2004; Gimenez and Martinez, 2006), survey of graduates (Colbert *et al.,* 2000; Joumady and Ris, 2005) and employer satisfaction (Chang *et al.,* 2012; Colbert *et al.,* 2000) have been used. As Thanassoulis *et al.* (2011) suggest, quantity and quality of teaching should be reflected in efficiency and productivity assessments.

2.2.2. Quality in higher education

The main service in higher education is the learning experience (Ng and Forbes, 2009) and its quality is largely determined by the performance of academic staff in their teaching and research activities (Capelleras, 2001). Astin (1985) recognized five different views of quality in higher education: (a) reputational, (b) resources, (c) outcomes, (d) content and (e) value added. The reputational view is based on a collective agreement about the quality of a given institution; this approach is used in rankings. The resources view is based on the assumption that, the better the inputs (students, teachers, facilities), the higher the quality of a university. The outcomes view is based on the idea that quality is to be judged by an institution's products: graduates, publications. The content view focuses in the quality of the program and finally, the value added perspective proposes that quality should be assessed based on the contribution to the student's intellectual and personal development.

In the literature, there is a general agreement to consider students as customers (Marzo-Navarro *et al.,* 2005). In the context of services in general, Bitner *et al.* (1997) argue, that the quality of the customers also contributes to the service quality, given that if they do not effectively perform their role, it will not be possible for the employee to deliver a result at the desired level. Thus, Kuah and Wong (2011) mention that the quality of students should be considered as an input of the educational process based on a general assumption that better entry qualifications will produce better quality products, in this case, the graduates. They capture quality of students by including average students' qualifications according the CGPA value. Johnes (2006a and 2006c) measure the academic ability of student on arrival at

17

university by total A level score. Athanassopoulos and Shale (1997) include average A level entry score over three years. Johnes (2006b) capture the quantity and quality of undergraduate inputs by including a composite measure which is the product of the number of undergraduates and the average A level score of undergraduate entrants. Joumady and Ris (2005) use the student qualification and grade when student enters the university.

Similarly, the competence of the teachers should be considered as an input that will affect positively on the educational process. Façanha and Marinho (2001), Martin (2006) and França *et al.* (2010) differentiate between the teachers who have a doctorate and those who do not, and include the number of professors with doctorate as a measure of quality in inputs. As Martin (2006) mention quality of output is clearly expected to be better in the doctoral group. Breu and Raab (1994) include this factor but as percentage of faculty with doctorates. Kuah and Wong (2011) estimate an average research staffs' qualifications based on a proposed scoring system which considers the academic rank position and last degree obtained by the professor. Costa *et al.* (2012) also apply a qualification index of faculty based on professor's last degree. As Berbegal-Migabent *et al.,* (2016:17) mention: "High-quality teaching and high levels of research intensity are both desirable outcomes."

On the other hand, teaching and research are considered the two major tasks of higher education institutions. Abbott and Doucouliagos (2003) note that estimating the value of research output of universities requires to capture the quantity and quality of the work. As Harris (1988) argues, the number of publications provide a quantity measure and citation measures provide an indication of quality. According to this author, citations as a measure of research quality have been used in a number of North American studies, based on the annual Social Sciences Citation Index (SSCI). Flegg *et al.* (2004) and Johnes (2006b) mention that research income and research grants are likely to reflect the perceived quality, as well as quantity, of research output. Athanassopoulos and Shale (1997) and Tyagi et al. (2009) assess research quantity and quality by constructing weighted indexes of research publications. Gimenez and Martinez (2006) capture the quantity and quality of the scientific production of departments by the measure new "research segments'' awarded.

Teaching is the university task that society most immediately perceives (Martin, 2006). As mentioned above, the number of graduates is clearly an important measure of output in higher education. However, a shortcoming of this measure is that it fails to include the quality of the degrees awarded (Flegg *et al.,* 2004). Johnes (2006a, 2006b and 2006c) captures both the quantity and quality of undergraduate teaching output by including the number of degree graduates weighted by their degree classification. Lehmann and Warning (2002), measure the quality output of students by considering the percentage of students who finished with a first-class honours degree and an upper-second-class honours degree.

Measures of perceived quality have also been considered as outputs of the production process of teaching. Perceived service quality is an abstract construct, which has been defined as the consumer's judgment about the overall excellence or superiority of a service (Zeithaml, 1987). Gimenez Garcia (2004) and Gimenez and Martinez (2006) measure teaching quality by the opinion of students. Joumady and Ris (2005) include graduate levels of generic and vocational competencies as output measures by using a survey of graduates. Chang *et al.* (2012) use employer satisfaction with graduate ability for assessing teaching performance in tourism and leisure departments. Bessent *et al.* (1983) use employer satisfaction to measure the relative efficiency of education programs in a community college.

To determine the relative efficiency of 24 top MBA programs in the Business Week ranking of MBA programs in the U.S, Colbert *et al.* (2000) use a reputational view of quality and include measures of student satisfaction and recruiter satisfaction taken from the Business Week surveys. The value of output student satisfaction is based on the survey of graduates and the recruiter satisfaction scores were taken from the survey of corporate recruiters. These authors also argue that new rankings based on DEA will result in a more complete, accurate representation of programs than publicized rankings.

University rankings constitute an important example of international quality practices in higher education (Blanco-Ramirez and Berger, 2014) and have become a widespread phenomenon. However, rankings are not intended as an instrument of internal quality assurance within institutions; they provide an external assessment (Federkeil, 2008). As

Colbert *et al.* (2000) argue rankings may have a significant impact on the decisions of recruiters and potential students. According to Lehmann and Warning (2002), there are methodological problems with the use of performance rankings and most of them do not distinguish between input and output of universities. Breu and Raab (1994) findings showed an inverse relationship between the U.S. News and World Report ranking and the ranking obtained by DEA. However, despite ongoing debates about their uses and validity, university rankings are a popular means to compare institutions within a country and around the world (Bowman and Bastedo, 2011) and have become a policy instrument and management tool (Hazelkorn, 2009)

Bowman and Bastedo (2011) found strong evidence that university rankings may have anchoring effects and a strong influence on the reputational assessments made by peers. Over time, rankings increasingly become reputation. Scholars agree that reputation is a perceptual phenomenon about an organization based on assessment of the organization's performance over time in areas observers deem important. A good reputation is considered one of the most valuable intangible assets an organization can possess (Vidaver-Cohen, 2007).

Rindova *et al.* (2005:1035) empirically demonstrate two distinct dimensions of reputation in their research. The first relates to perceived quality, capturing 'the degree to which stakeholders evaluate an organization positively on a specific attribute, such as ability to produce quality products'. The second pertains to prominence, determined by 'the degree to which an organization receives large-scale collective recognition in its organizational field'.

2.2.3. The relationship between efficiency and service quality
There can be diverse manifestations of the relationship between efficiency and service quality in different contexts. While sometimes the two dimensions have a negative rate of tradeoff, in other instances improvements in quality are related to improvements in productivity. As Talluri *et al.* (2013) mention literature has generally suggested that quality and efficiency cannot be improved at the same time. However, a growing body of practitioner literature challenges this traditional view and forwards the idea that efficiency and service quality can be improved simultaneously. These two approaches have been referred as the trade-off model

and the cumulative model. The trade-off model was pioneered by Skinner (1969) who contended that the achievement of one capability must come at the expense of another. The cumulative perspective proposes that capabilities can be pursued jointly, that is that they do not have to be a trade-off against each other. Ferdows and De Meyer (1990) are commonly associated with having forwarded this notion.

As Martin (2006) remarks, it should be considered that quality, as an attribute that affects user perception, can also modify the input/output relation of the productive process. Thus, Gimenez and Martinez (2006) apply a dual approach to teaching and research activities, which considers a quantitative approach (production) and a qualitative approach, based on the conviction that both analyses should be included in order to obtain a reliable image of reality.

2.3. Methodology

2.3.1. Malmquist productivity index

There has been some dynamic approximations with the objective of quantifying the evolution of productivity over a period of time. The most widely used in frontier analysis is the Malmquist productivity index. Malmquist (1953) used a ratio of input distance functions to define an input quantity index in the consumer context. Caves *et al.* (1982) proposed the Malmquist productivity index as "theoretical", based on distance functions defined on the production side. Later, Färe *et al.* (1994a) showed how the Malmquist index could be computed directly under constant returns to scale (CRS) and broke it down to recognize two sources of productivity change: a) the "efficiency change" (EFF) interpreted as "catching up" and shows whether production is getting closer to or further away from the efficiency frontier b) "Technical change" (TCH) which represents a shift in the frontier and its improvements are considered to be evidence of innovation. As Parteka and Wolszczak-Derlacz (2013) mention, in the context of higher education, the efficiency change reflects changes in the relative efficiency of universities, getting closer to or farther from the frontier, while technical change reflects effects that concern the higher education system as a whole.

There are two analytic options to study productivity: input orientation and output orientation. An output-oriented approach is commonly used in the context of higher education, because the quantity and quality of inputs are assumed to be fixed exogenously, universities can hardly influence their number or characteristics, at least in the short term, and they are asked to produce as much output as possible (García-Aracil, 2013; Parteka and Wolszczak-Derkacz, 2013).

The Malmquist index relates the movements between two time periods and establishes the specific position corresponding to each decision making unit (DMU) in the sample. The definition of the output-orientated Malmquist productivity index employed by Färe *et al.* (1994a) is:

$$M\ (t, t+1) = \left[\frac{D_0^t(x^{t+1}, y^{t+1})}{D_0^t(x^t, y^t)} \frac{D_0^{t+1}(x^{t+1}, y^{t+1})}{D_0^{t+1}(x^t, y^t)}\right]^{\frac{1}{2}} \tag{1}$$

Where M is the Malmquist productivity index, D_O the distance function, x represents the input, y the output, t the period of benchmark technology, $t+1$ the next period technology. The distance function is in essence a multiple output generalization of a production function which explicitly accounts for deviations from the best practice frontier (Färe *et al.*, 2006).

As mentioned above, Malmquist productivity index can be utilized as a tool for comparing productivity growth rates. If Malmquist index is less than 1, it denotes a declining performance, but if it is more than 1 it means an improved performance. However, this approach requires that the units being assessed operate with the same technology and as Oh and Lee (2010) mention, the results of productivity with this conventional approach may not be directly applicable into providing insights for improving performance when units in one specific technology group have different production possibilities from those in other groups.

In order to solve the incomparability of performances for different groups, Hayami (1969) and Hayami and Ruttan (1970) introduced the concept of a metaproduction function by estimating a common production function on cross-country data. Hayami and Ruttan (1970, p.898) define a metaproduction function as "the envelope of all known and potentially

discoverable activities". Oh and Lee (2010) introduce this concept to the non-parametric production analysis in order to compare productivity changes and the decomposed components for units under different technologies. These authors propose a metafrontier Malmquist productivity index based on the Malmquist Productivity Index suggested by Pastor and Lovell (2005). The metafrontier Malmquist productivity index is constructed from the distance functions calculated with respect to the defined metaproduction frontier and it is decomposed into three individual measures: a) within-group efficiency change interpreted as "catching up effect"; b) within-group technical change which represents "the innovation effect" and c) technical leadership change which reflect "the technology leading effect".

As Oh and Lee (2010) explain, three definitions of the technology set are needed for the calculation of the component distance functions: a contemporaneous benchmark technology set, an intertemporal benchmark technology set, and a global benchmark technology set. The convention of this methodology is as follows: under a panel of i = 1,...,K producers and t = 1,...,T periods, each producer produces M outputs, $y \in R_+^M$, by using N inputs, $x \in R_+^N$. All types of technologies considered are based on the definition of the production possibility set, i.e., P ={$(x, y)/x$ can produce y} with λP = P,λ>0. Oh and Lee (2010) suppose that there are J different groups within the whole sample that utilize different technological possibilities.

Thus, a *contemporaneous* benchmark technology of group R_j is defined as P_{Rj}^t ={$(x^t, y^t)/ x^t$ can produce y^t} with λP^t= P^t, t = 1,...,T, λ > 0. This technology set constructs a reference production set at each point in time t, from the observations made at that time only (Pastor and Lovell 2005; Tulkens and Vanden Eeckaut, 1995).

An *intertemporal* benchmark technology of group R_j is defined as P_{Rj}^I = conv{ $P_{Rj}^1 \cup P_{Rj}^2$ ....$\cup$ P_{Rj}^T} This technology set constitutes a single production set from the observations made throughout the whole set of observations and whole time period for group R_j (Tulkens and Vanden Eeckaut, 1995).

A *global* benchmark technology of all groups is defined as P^G = conv{ $P_{R1}^I \cup P_{R2}^I$ ....$\cup$ P_{Rj}^I } This technology set establishes a single production set from the observations throughout the

whole set of observations and whole time period for all groups. Thus, the intertemporal benchmark technology of a specific group envelopes its contemporaneous benchmark technologies and the global benchmark technology envelopes all the intertemporal benchmark technologies.

Therefore, the metafrontier Malmquist productivity index is defined and decomposed as:

$$M^G(x^t, y^t, x^{t+1}, y^{t+1})$$

$$= \frac{D^G(x^{t+1}, y^{t+1})}{D^G(x^t, y^t)}$$

$$= \frac{D^{t+1}(x^{t+1}, y^{t+1})}{D^t(x^t, y^t)} x \left\{ \frac{D^t(x^t, y^t)}{D^{t+1}(x^{t+1}, y^{t+1})} \ x \ \frac{D^G(x^{t+1}, y^{t+1})}{D^G(x^t, y^t)} \right\}$$

$$= \frac{D^{t+1}(x^{t+1}, y^{t+1})}{D^t(x^t, y^t)} x \left\{ \frac{D^t(x^t, y^t)}{D^{t+1}(x^{t+1}, y^{t+1})} \ x \ \frac{D^I(x^{t+1}, y^{t+1})}{D^I(x^t, y^t)} \right\} x \left\{ \frac{D^I(x^t, y^t)}{D^I(x^{t+1}, y^{t+1})} \ x \ \frac{D^G(x^{t+1}, y^{t+1})}{D^G(x^t, y^t)} \right\}$$

$$= \frac{D^{t+1}(x^{t+1}, y^{t+1})}{D^t(x^t, y^t)} x \ \frac{D^I(x^{t+1}, y^{t+1}/D^{t+1}(x^{t+1}, y^{t+1}))}{D^I(x^t, y^t/D^t(x^t, y^t))} x \ \frac{D^G(x^{t+1}, y^{t+1}/D^I(x^{t+1}, y^{t+1}))}{D^G(x^t, y^t/D^I(x^t, y^t))}$$

$$= \frac{TE^{t+1}}{TE^t} x \ \frac{BPG^{I,t+1}}{BPG^{I,t}} x \ \frac{TGR^{t+1}}{TGR^t}$$

$$= EC \ x \ BPC \ x \ TGC \tag{2}$$

where TE^s, $s = t, t + 1$, is the within-group technical efficiency, $BPG^{I,s}$ $s = t, t + 1$, is the best practice gap of an observation within a group relative to the intertemporal technology, and TGR^s, $s = t, t + 1$, is the technology gap between the technology level for the jth group relative to the potential technology level that is defined by the global technology set. EC is the efficiency change within a group and it is measured as presented by Färe *et al.* (1994a,b). $BPC \overset{\geq}{\underset{<}{}} 1$ is the best practice gap change measure between P^I_{Rj} and P^s_{Rj} measured along rays (x^s, y^s), $s = t, t + 1$, it provides a measure of technical change within a group and TGC is the change in technology leadership, the gap between the intertemporal benchmark technology and the global benchmark technology.

In order to calculate and decompose the productivity of producer k' between t and t+1, six linear-programming problems are needed to compute the distance functions: $D^t(x^t, y^t), D^{t+1}(x^{t+1}, y^{t+1}), D^I\left(x^t, y^t / D^t(x^t, y^t)\right), D^I\left(x^{t+1}, y^{t+1} / D^{t+1}(x^{t+1}, y^{t+1})\right),$ $D^G\left(x^t, y^t / D^I(x^t, y^t)\right), and D^G\left(x^{t+1}, y^{t+1} / D^I(x^{t+1}, y^{t+1})\right).$ These output distance functions are considered as the reciprocal of the output-based Farrell measure of technical efficiency (Farrell, 1957).

The output distance functions for $k' \in R_j$ in each time period $s=t$, $t+1$ relative to the contemporaneous benchmark technology are computed as follows:

$$\left[D^s(x^{k',s}, y^{k',s})\right]^{-1} = \max \emptyset_c^{k',s}$$

subject to

$$\sum_{k \in R_j} \lambda^k y_m^{k,s} \geq \emptyset_c^{k',s} y_m^{k',s}, m = 1, \dots, M$$

$$\sum_{k \in R_j} \lambda^k x_n^{k,s} \geq x_n^{k',s}, n = 1, \dots, N$$

$$z^{k,s} \geq 0 \tag{3}$$

The intertemporal distance functions $D^I\left(x^{k',s}, y^{k',s} / D^{k',s}(x^{k',s}, y^{k',s})\right), s = t, t+1,$ are computed as follows:

$$\left[D^I(x^{k',s}, y^{k',s} / D^{k',s}(x^{k',s}, y^{k',s}))\right]^{-1} = \max \emptyset_I^{k'}$$

subject to:

$$\sum_{k \in R_j, s \in \tau} \lambda^{k,s} y_m^{k,s} \geq \phi_I^{k'} \hat{\phi}_c^{k',s} y_m^{k',s}, m = 1, \dots, M$$

$$\sum_{k \in R_j, s \in \tau} \lambda^{k,s} x_n^{k,s} \geq x_n^{k',s}, n = 1, \dots, N$$

$$z^{k,s} \geq 0 \ \tau = \{1,2, \dots, T\}$$

$$\tag{4}$$

The global distance functions $D^G(x^{k',s}, y^{k',s} / D^I(x^{k',s}, y^{k',s})), s = t, t+1$ are calculated as follows:

$$\left[D^G(x^{k',s}, y^{k',s}/D^{k',s}(x^{k',s}, y^{k',s}))\right]^{-1} = \max \phi_G^{k'}$$

subject to

$$\sum_{k \in R, s \in \tau} z^{k,s} y_m^{k,s} \geq \phi_G^{k'} \hat{\phi}_I^{k',s} y_m^{k',s}, m = 1, \dots, M$$

$$\sum_{k \in R, s \in \tau} z^{k,s} x_n^{k,s} \geq x_n^{k',s}, n = 1, \dots, N$$

$$z^{k,s} \geq 0, R = R_1 \cup R_2 \cup \dots R_J, \tau = \{1, 2, \dots, T\} \tag{5}$$

As Oh and Lee (2010) explain, the optimal solutions of the above three equations are employed in the calculation and decomposition of the metafrontier Malmquist productivity index. Equation 3 relative to the contemporaneous benchmark technology exploits the observations within a specific group in each time period *s=t, t*+1. Equation 4 denoting the intertemporal distance functions, exploits all observations over all periods within a specific group. The global distance function, as presented in equation 5, exploits all observation and periods over all groups.

2.3.2. The introduction of quality into the Malmquist productivity index

It is necessary to consider quality when measuring productivity, in order to guarantee that the improvement in productivity would not be achieved at the expense of a reduction in quality (Prior, 2006). Fixler and Zieschang (1992) were the first to propose the introduction of attributes of quality in productivity indices. Subsequently, Färe *et al.* (1995) redefined the Malmquist productivity index in order to incorporate attributes of quality into the technology; among the outputs they distinguished between those that are marketable and those that are desirable attributes of quality. Later, Prior (2006) and Färe *et al.* (2006) suggest to include attributes of quality as inputs in the determination of Malmquist productivity indices. Thus, it was proposed for both input and output quality characteristics to be included into the Malmquist productivity index.

Färe *et al.* (2006) provide a technique of computing quality and quantity components of overall productivity of a service which does not have marketable outputs, the schools. The authors focused particularly on the need to measure productivity when outputs are not

marketed, and both inputs and outputs can vary in quality. They include quality characteristics in an overall index of productivity and derive an explicit quality change index as a component of productivity in the following way:

1. Quality attributes of inputs (a^t, a^{t+1}) and quality attributes of outputs (b^t, b^{t+1}) are introduced in terms of distance functions into the output-orientated Malmquist productivity index $M(t, t+1)$ employed by Färe *et al*. (1994a). The quality augmented productivity index becomes:

$$MQ\ (t, t+1) = \left[\frac{DQ_0^t(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{DQ_0^t(x^t, a^t, b^t, y^t)} \frac{DQ_0^{t+1}(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{DQ_0^{t+1}(x^t, a^t, b^t, y^t)}\right]^{\frac{1}{2}} \qquad (6)$$

2. Using these two productivity indices $M(t, t+1)$ which does not include quality characteristics and $MQ(t, t+1)$ which does, Färe *et al*. (2006) construct a quality index as:

$$Q(t, t+1) = \frac{MQ(t,t+1)}{M(t,t+1)} \qquad (7)$$

Following Oh and Lee (2010) and Färe *et al.* (2006) we use in this paper a metafrontier approach for measuring Malmquist productivity index and include quality characteristics on the evaluation of productivity to isolate a quality index as a component of productivity. Like Gimenez and Martinez (2006), we apply a dual approach which considers a quantitative approach (production) and a qualitative approach. In the qualitative approach we include attributes of quality and attributes of reputation considering these latter, from a reputational view of quality, as measures of perceived quality.

We assume that there are different groups of universities within the whole sample and calculate: the output distance functions relative to the contemporaneous benchmark technology D^S from all universities within a specific group in each time period *s=t, t+1*, the intertemporal distance functions D^I from all universities over all periods within a specific group, and the global distance functions D^G from all universities and periods over all groups.

The variables used in this study consist of input and output quantity data as well a number of variables representing the quality inputs and outputs. The quality attributes of inputs

(a^t, a^{t+1}) and quality attributes of outputs (b^t, b^{t+1}) are introduced into the metafrontier Malmquist productivity index, then the quality augmented productivity index is defined and decomposed as:

$$MQ^G(x^t, a^t, b^t, y^t, x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})$$

$$= \frac{DQ^G(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{DQ^G(x^t, a^t, b^t, y^t)}$$

$$= \frac{DQ^{t+1}(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{DQ^t(x^t, a^t, b^t, y^t)} x \left\{ \frac{DQ^t(x^t, a^t, b^t, y^t)}{DQ^{t+1}(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})} x \frac{DQ^G(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{DQ^G(x^t, a^t, b^t, y^t)} \right\}$$

$$= \frac{DQ^{t+1}(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{DQ^t(x^t, a^t, b^t, y^t)} x \left\{ \frac{DQ^t(x^t, a^t, b^t, y^t)}{DQ^{t+1}(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})} x \frac{DQ^I(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{DQ^I(x^t, a^t, b^t, y^t)} \right\}$$

$$x \left\{ \frac{DQ^I(x^t, a^t, b^t, y^t)}{DQ^I(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})} x \frac{DQ^G(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{DQ^G(x^t, a^t, b^t, y^t)} \right\}$$

$$= \frac{DQ^{t+1}(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{DQ^t(x^t, a^t, b^t, y^t)} x \frac{DQ^I(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1}/DQ^{t+1}(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1}))}{DQ^I(x^t, a^t, b^t, y^t/DQ^t(x^t, a^t, b^t, y^t))}$$

$$x \frac{DQ^G(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1}/DQ^I(x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1}))}{DQ^G(x^t, a^t, b^t, y^t/DQ^I(x^t, a^t, b^t, y^t))}$$

$$= \frac{TE^{t+1}}{TE^t} x \frac{BPG^{I,t+1}}{BPG^{I,t}} x \frac{TGR^{t+1}}{TGR^t}$$

$$= EC \ x \ BPC \ x \ TGC \tag{8}$$

Using the productivity index $M^G(x^t, y^t, x^{t+1}, y^{t+1})$ which does not include quality characteristics and $MQ^G(x^t, a^t, b^t, y^t, x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})$ which does, we follow Färe *et al*. (2006) and compute indirectly a quality index as:

$$Q^G(a^t, b^t, a^{t+1}, b^{t+1}) = \frac{MQ^G(x^t, a^t, b^t, y^t, x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1})}{M^G(x^t, y^t, x^{t+1}, y^{t+1})} \tag{9}$$

We first compute the metafrontier Malmquist productivity indexes with and without quality characteristics and use these to construct the quality index as the ratio of these two. These are computed for each university in our sample.

Three models of university performance are used in this study. A production model, which considers a quantitative approach and does not include quality characteristics, and two quality

augmented production models which capture the quantity and quality of inputs and outputs. In the first quality augmented production model we include quality attributes of inputs and outputs. In the second quality augmented production model we include, besides the above mentioned characteristics, attributes of reputation as measures of perceived quality and considering that reputation goes beyond quality. As Rindova *et al.* (2005) demonstrate reputation consists of two dimensions: perceived quality and prominence. The three models used in this study are labeled as:

1. Production Model (M), which does not include quality characteristics.
2. Quality augmented production model 1 (MQ1), which includes attributes of quality.
3. Quality augmented production model 2 (MQ2), which includes attributes of quality and reputation.

2.4. Sample and variables

The sample consists of 126 universities ranked in the QS University Rankings: Latin America, during the period 2011/2012-2012/2013. Table 2.1 shows the number of HEIs included in this study from each QS Classification.

Table 2.1. Number of HEIs by QS classification.

QS Classifications		Number of HEIs
Focus	Full Comprehensive (A11 5 faculty areas+medical school)	89
	Comprehensive (All 5 faculty areas)	19
	Focused (>2 faculty areas)	18
Country	Argentina	14
	Brazil	46
	Chile	17
	Colombia	14
	Costa Rica	2
	Mexico	25
	Peru	5
	Puerto Rico	1
	Uruguay	1
	Venezuela	1
Size	Small < 5,000	10
(FTE students)	Medium >=5,000	32

	Large >=12,000	51
	Extra Large >=30,000	33
Age	2- Young, < 25 years	6
(five bands based on foundation years)	3- Established, <50 years	33
	4- Mature, <100 years	63
	5- Historic >=100 years	24
Research Intensity	Low	9
(four levels based on number of documents retrievable from Scopus and dependent on size and subject of the HEI, where smaller institutions ought to produce less research than a larger one)	Medium	72
	High	33
	Very High	12

Based on the institution's provision of programs in five broad faculty areas and taking into account the radically different publication habits and patterns in medicine, QS university rankings recognizes four categories of universities: Full Comprehensive, Comprehensive, Focused and Specialist. In this paper, we will compute metafrontier Malmquist productivity indexes and its decomposed components in order to quantify the dynamic evolution of productivity of Latin American Universities classified into three subsets: Full Comprehensive, Comprehensive and Focused. Moreover, as mentioned above, three types of models are considered in our study. The variables included in each model are found in Table 2.2.

Table 2.2. Model specifications

Production Model M(t, t+1)	Quality augmented production model 1 MQ1(t, t+1)	Quality augmented production model 2 MQ2(t, t+1)
Output quantities	*Output quantities*	*Output quantities*
Papers	Papers	Papers
Graduates	Graduates	Graduates
	Output qualities	*Output qualities*
	Citations	Citations
		Academic Reputation (t)
		Employer Reputation (t)
Input quantities	*Input quantities*	*Input quantities*
Teachers	Teachers	Teachers
Students	Students	Students
	Input qualities	*Input qualities*
	Teachers with a PhD	Teachers with a PhD
		Academic Reputation (t-1)

The dataset regarding number of teachers, students and graduates, was obtained directly from each university on their website or by e-mail request but also from government ministries, agencies and other third-parties. Where possible data was checked against multiple sources to verify their authenticity. Where the total student numbers supplied to us are drawn in undergraduate and postgraduate numbers, we include only undergraduate students. Where this data is unavailable or incomplete, total student numbers are used. The number of papers were obtained from the Scopus database. The variables "teachers with PhD" and "Citations" are scores from the QS University Rankings: Latin America. The academic reputation index and employer reputation index, were also obtained from the website of the QS University Rankings: Latin America. The scores retrieved from the QS are in a scale between 1 and 100. Once the data is collected, standard z-scores are calculated and plotted on a normal curve. The resulting scores are finally scaled between 1 and 100 for each indicator. Descriptive statistics for all input and output variables are displayed in Tables 2.3 and 2.4 for all universities together and for each subgroup of HEIs.

Table 2.3. Summary statistics of the universities ranked in the QS University Rankings: Latin America, 2011/2012-2012/2013.

Variable and measurement	Mean	St. Dev.	Min	Max
Number of teachers	3,066	4,218	21	30,686
Number of students	29,982	38,437	74	351,200
Number of graduates	3,340	3,803	24	30,359
Number of papers	736	1,302	2	12,090
Teachers with a PhD (QS Score)	56	35	0	100
Citations (QS Score)	51	29	0	100
QS Academic reputation (Score)	54	32	0	100
QS Employer reputation (Score)	33	34	0	100

Table 2.4. Descriptive statistics by type of universities.

Variable and Measurement	Statistic	Full Comprehensive	Comprehensive	Focused
Number of teachers	*Mean*	3,268	2,448	2,717
	Std. Dev.	4,358	2,679	4,815
	Min	280	485	21
	Max	30,686	10,137	20,772
Number of students	*Mean*	33,868	24,641	16,404

	Std. Dev.	42,034	29,575	20,924
	Min	3,238	1,837	74
	Max	351,200	107,542	83,090
Number of graduates	*Mean*	3,780	2,714	1,830
	Std. Dev.	4,046	3,370	2,276
	Min	138	209	24
	Max	30,359	14,104	11,578
Number of papers	*Mean*	958	285	117
	Std. Dev.	1,487	311	132
	Min	8	16	2
	Max	12,090	1,297	582
Teachers with a PhD (QS Score)	*Mean*	63	41	34
	Std. Dev.	34	32	28
	Min	0	0	0
	Max	100	100	100
Citations (QS Score)	*Mean*	54	51	32
	Std. Dev.	26	35	33
	Min	4	0	0
	Max	100	100	100
QS Academic reputation (Score)	*Mean*	54	74	51
	Std. Dev.	32	36	23
	Min	0	48	26
	Max	100	99	85
QS Employer reputation (Score)	*Mean*	32	37	50
	Std. Dev.	34	35	30
	Min	0	0	6
	Max	100	91	98

We note in Table 2.4 that there are some considerable variations in the values of input and output variables depending on the type of university. As Ahn *et al*. (1988) mention, in general, universities with medical colleges require significantly larger amounts of inputs and, in turn, generate significantly larger amounts of outputs than universities without medical colleges.

For the aim of the present study, we use data of the 126 universities in order to construct a Latin American frontier and specific frontiers with respect to universities from the same focus. The fact that each group of universities has its own production characteristics justifies the measuring of productivity change and its decomposed components based on the

metafrontier concept. In this vein, productivity change (PC) provides the most comprehensive summary of a university's performance. We performed analysis of frequencies and descriptive statistics broken out by whether the university realized progress or regress.

2.5. Empirical findings

Summary statistics for values of productivity change and its decomposed sources are included in Table 2.5. Note that values of indexes greater than one denote improvements and values less than one denote declines in productivity over time. By construction, $MQ^G(x^t, a^t, b^t, y^t, x^{t+1}, a^{t+1}, b^{t+1}, y^{t+1}) = M^G(x^t, y^t, x^{t+1}, y^{t+1}) *$ $Q^G(a^t, b^t, a^{t+1}, b^{t+1})$ it is possible to identify sources of overall productivity change and decompose it into productivity which excludes quality factors and changes in quality.

Table 2.5. Results – HEIs Productivity performance. PC and its components. Mean values of all indices.

Model		Focus	EC	BPC	TGC	PC
1. Production Model	M(t, t+1)	FC	1.0848	0.9526	1.0062	1.0298
		CO	0.8819	1.1990	0.9869	1.0306
		FO	0.8144	1.2031	1.0101	0.9463
		Total	1.0156	1.0256	1.0038	1.0180
2. Quality augmented production model 1	MQ1(t, t+1)	FC	1.0381	0.9813	1.0007	1.0126
		CO	0.9954	1.0443	0.9993	1.0365
		FO	0.8306	1.1160	1.0262	0.9355
		Total	1.0020	1.0100	1.0041	1.0052
	Q1(t, t+1)	FC	0.9765	1.0343	0.9953	0.9914
		CO	1.1644	0.8788	1.0198	1.0230
		FO	1.0807	0.9315	1.0290	1.0156
		Total	1.0197	0.9962	1.0038	0.9996
2. Quality augmented production model 2	MQ2(t, t+1)	FC	1.0101	1.0883	1.0169	1.1089
		CO	0.9788	1.0066	1.0943	1.0861
		FO	0.9849	0.9919	0.9628	0.9412
		Total	1.0018	1.0622	1.0209	1.0815
	Q2(t, t+1)	FC	0.9692	1.1508	1.0121	1.1020
		CO	1.1507	0.8473	1.1270	1.0759
		FO	2.0972	0.8280	0.9688	1.6742
		Total	1.1577	1.0589	1.0233	1.1798

The average change in the metafrontier Malmquist productivity index is 1.8 percent in the production model, 0.52 percent in the first quality augmented model and 8.15 percent in the second quality augmented model. These averages suggest that it is important the way we conceptualize and introduce quality into the productivity model. In the first quality augmented production model, which includes attributes of quality as: citations and teachers with PhD, we find a slight negative rate of tradeoff. However, in the second quality augmented model, which includes besides the above mentioned attributes a reputational view of quality, productivity and quality can be improved at the same time.

Moreover, according to the Kruskal-Wallis test, we can reject the null hypothesis of the equality of the distributions of the metafrontier Malmquist index among the different models defined. Since the only difference among the three models is based on the introduction of quality with different views: as attributes of quality and as a reputational view, these results confirm, as Prior (2006:293) suggests that "applying the Malmquist productivity indices without considering the movements in quality is a poor way to model the real changes in effectiveness." The results indicate that the distributions of Malmquist productivity change (PC) and BPC are significantly different at the 5% significance level. There is no significant difference between the models in the distributions of EC and TGC.

Results also reveal that the productivity growth of the universities was mainly due to technical change. The BPC measure shows the highest indexes in the three proposed models, which means that the sample universities have technically progressed on average. However, as each group of universities has its own production technology, the productivity changes and its decomposed components also show these differences. Results show that Full Comprehensive universities have an EC value more than unity and the Comprehensive and Focused universities have an EC value less than unity, which indicates that Full Comprehensive universities are better in their managerial performance in utilizing their resources than the others. In the production model and in the first quality augmented model, the most productive universities are the Comprehensive, in the second quality augmented

model the most productive are the Full Comprehensive. In three models, the least productive universities are the Focused. These findings showing differences in performance across groups of universities are in line with previous studies (Agasisti and Salerno, 2007; Ahn *et al.,* 1988; Costa *et al.,* 2012; Johnes, 2008; Johnes *et al.*, 2008; Thanassoulis *et al.,* 2011) and as Daraio *et al*. (2015) found, specialization has a significant impact on the performance of universities.

In order to determine whether there is significant difference between productivity changes and its decomposed components distributions across the groups of universities analyzed. The Kruskal–Wallis test was applied to each of the sets of indexes: EC, BPC, TGC and PC. The results indicate that BPC distributions of the three groups are significantly different at the 5% significance level. These findings are observed regardless of the model taken to estimate the indexes. EC distributions in production model and in the first quality augmented model are significantly different at the 5% significance level. PC distributions in the second quality augmented model are also are significantly different at the 5% significance level. There is no significant difference between groups in the distributions of TGC, regardless of the model taken to estimate the indexes, EC in the second quality augmented model and PC in production model and in the first quality augmented model.

In Table 2.6 we include averages and frequencies broken out by whether the university realized progress or regress. We note that progress was more frequent than regress, but particularly more frequent in the second quality augmented model. As can be seen in the production model and in the first quality augmented model, only for the Focused universities regress was more frequent than progress, but in the second quality augmented model progress was more frequent than regress for the three categories of universities.

Table 2.6. Average and frequency progress versus regress.

Model		Focus	PC	Progress	Count>1	Regress	Count<1
1. Production Model	M(t, t+1)	FC	1.0298	1.1436	47	0.9024	42
		CO	1.0306	1.1621	10	0.8845	9
		FO	0.9463	1.1765	8	0.7622	10
		Total	1.0180	1.1505	65	0.8768	61
	MQ1(t, t+1)	FC	1.0126	1.1194	45	0.9033	44

2. Quality augmented production model 1		CO	1.0365	1.1111	11	0.9339	8
		FO	0.9355	1.1674	7	0.7879	11
		Total	1.0052	1.1233	63	0.8870	63
	Q1(t, t+1)	FC	0.9914	1.0476	46	0.9313	43
		CO	1.0230	1.1014	11	0.9152	8
		FO	1.0156	1.1272	10	0.8762	8
		Total	0.9996	1.0683	67	0.9217	59
2. Quality augmented production model 2	MQ2(t, t+1)	FC	1.1089	1.1883	62	0.9266	27
		CO	1.0861	1.2116	12	0.8710	7
		FO	0.9412	1.0304	10	0.8297	8
		Total	1.0815	1.1728	84	0.8988	42
	Q2(t, t+1)	FC	1.1020	1.2265	55	0.9005	34
		CO	1.0759	1.3098	9	0.8653	10
		FO	1.6742	2.5377	9	0.8106	9
		Total	1.1798	1.3984	73	0.8786	53

Descriptive statistics of the data broken out by whether the university realized progress or regress are found in Table 2.7.

Table 2.7. Descriptive statistics. Mean values, progress versus regress.

	1. Production Model M(t, t+1)					
	Progress			**Regress**		
Variable	**FC**	**CO**	**FO**	**FC**	**CO**	**FO**
Number of papers	1,102	241	47	797	333	173
Number of graduates	4,022	1,994	2,416	3,509	3,514	1,361
Number of teachers	3,273	2,465	4,125	3,263	2,428	1,589
Number of students	34,195	21,555	22,907	33,503	28,070	11,201

	2. Quality augmented production model 1 MQ1(t, t+1)					
	Progress			**Regress**		
Variable	**FC**	**CO**	**FO**	**FC**	**CO**	**FO**
Number of papers	1,022	205	69	892	394	147
Number of graduates	3,801	1,793	2,051	3,758	3,979	1,690
Number of teachers	3,324	1,805	1,893	3,212	3,331	3,240
Number of students	36,618	14,637	13,649	31,057	38,398	18,157
Citations (QS Score)	54	42	25	54	63	36
Teachers with a PhD (QS Score)	61	40	25	65	43	40

| | Q1(t, t+1) | | | | | |
| | Progress | | | Regress | | |
Variable	**FC**	**CO**	**FO**	**FC**	**CO**	**FO**
Number of papers	874	296	165	1,048	270	57
Number of graduates	3,236	2,371	1,098	4,361	3,185	2,745
Number of teachers	3,164	2,162	1,344	3,380	2,840	4,433
Number of students	32,686	20,410	10,062	35,133	30,460	24,331
Citations (QS Score)	51	53	32	58	49	33
Teachers with a PhD (QS Score)	64	42	39	62	41	28

3. Quality augmented production model 2

| | MQ2(t, t+1) | | | | | |
| | Progress | | | Regress | | |
Variable	**FC**	**CO**	**FO**	**FC**	**CO**	**FO**
Number of papers	982	228	84	902	381	158
Number of graduates	3,304	1,443	2,051	4,872	4,893	1,554
Number of teachers	2,829	1,664	1,813	4,277	3,792	3,846
Number of students	30,826	13,357	14,218	40,854	43,986	19,136
Citations (QS Score)	53	57	23	57	40	43
Teachers with a PhD (QS Score)	62	45	30	66	35	40
QS Academic reputation (Score)	47	48	32	69	99	59
QS Employer reputation (Score)	26	36	59	45	39	40

| | Q2(t, t+1) | | | | | |
| | Progress | | | Regress | | |
Variable	**FC**	**CO**	**FO**	**FC**	**CO**	**FO**
Number of papers	772	352	149	1,258	224	85
Number of graduates	3,186	2,740	1,346	4,739	2,691	2,314
Number of teachers	2,903	2,466	1,688	3,860	2,432	3,745
Number of students	30,644	24,376	11,334	39,084	24,881	21,474
Citations (QS Score)	52	69	38	58	35	26
Teachers with a PhD (QS Score)	63	38	33	63	44	35
QS Academic reputation (Score)	49	48	45	61	99	54
QS Employer reputation (Score)	28	25	43	39	52	57

In Table 2.8 we can check for country-specific trends in productivity and its decomposed sources.

Table 2.8. Results by country. Changes in productivity (PC), efficiency (EC), technical change (BPC) and leadership (TGC). Mean values of all indices.

	HEIs	1. Production Model M(t, t+1)			
		EC	BPC	TGC	PC
FC	**89**	**1.0848**	**0.9526**	**1.0062**	**1.0298**
Argentina	7	1.0465	0.9795	0.9955	1.0211
Brazil	42	1.1357	0.9438	1.0050	1.0662
Chile	11	1.0010	0.9682	1.0307	0.9809
Colombia	8	1.0119	0.9771	0.9944	0.9836
Mexico	18	1.0657	0.9389	1.0056	0.9969
Peru	1	0.9566	0.9689	0.9942	0.9215
Puerto Rico	1	1.1399	0.9701	0.9797	1.0833
Uruguay	1	1.1370	0.9808	1.0016	1.1170
CO	**19**	**0.8819**	**1.1990**	**0.9869**	**1.0306**
Argentina	6	0.8555	1.2637	0.9303	0.9881
Brazil	4	0.9498	1.0934	1.0429	1.0804
Chile	2	0.7352	1.2501	0.9944	0.9070
Colombia	3	0.9013	1.2207	0.9804	1.0743
Costa Rica	2	0.9352	1.1033	1.0042	1.0361
Mexico	2	0.8894	1.2281	1.0298	1.1114
FO	**18**	**0.8144**	**1.2031**	**1.0101**	**0.9463**
Argentina	1	0.7835	1.3857	0.9950	1.0803
Chile	4	0.8158	1.1827	1.0421	0.9964
Colombia	3	0.5555	1.1505	1.1138	0.6693
Mexico	5	0.9755	1.1927	0.9437	1.0138
Peru	4	0.8296	1.2179	0.9850	0.9834
Venezuela	1	0.7494	1.2539	1.0193	0.9578
Total	**126**	**1.0156**	**1.0256**	**1.0038**	**1.0180**

	HEIs	2. Quality augmented production model 1							
		MQ1(t, t+1)				Q1(t, t+1)			
		EC	BPC	TGC	PC	EC	BPC	TGC	PC
FC	**89**	**1.0381**	**0.9813**	**1.0007**	**1.0126**	**0.9765**	**1.0343**	**0.9953**	**0.9914**
Argentina	7	1.1460	0.8812	0.9978	0.9873	1.0968	0.8994	1.0027	0.9760
Brazil	42	1.0574	0.9756	1.0009	1.0311	0.9496	1.0396	0.9958	0.9760
Chile	11	1.0148	1.0121	1.0155	1.0386	1.0691	1.0488	0.9907	1.0759
Colombia	8	0.9848	1.0368	0.9796	1.0022	0.9824	1.0610	0.9851	1.0214
Mexico	18	0.9730	1.0120	1.0035	0.9825	0.9224	1.0807	0.9985	0.9869
Peru	1	0.7960	0.9397	0.9144	0.6840	0.8321	0.9698	0.9197	0.7422
Puerto Rico	1	1.1322	0.9506	1.0008	1.0772	0.9933	0.9800	1.0215	0.9943
Uruguay	1	1.4707	0.6573	1.0486	1.0137	1.2935	0.6701	1.0469	0.9075
CO	**19**	**0.9954**	**1.0443**	**0.9993**	**1.0365**	**1.1644**	**0.8788**	**1.0198**	**1.0230**
Argentina	6	0.9720	1.0517	0.9932	1.0164	1.2002	0.8396	1.0790	1.0575

	HEIs	EC	BPC	TGC	PC	EC	BPC	TGC	PC
Brazil	4	0.9450	1.0765	1.0439	1.0588	0.9934	0.9857	1.0080	0.9861
Chile	2	1.0000	0.9890	1.0112	1.0005	1.3850	0.7924	1.0166	1.1127
Colombia	3	1.0588	1.0585	1.0089	1.1269	1.1828	0.8725	1.0303	1.0520
Costa Rica	2	1.0000	1.0000	1.0000	1.0000	1.0694	0.9075	0.9961	0.9667
Mexico	2	1.0625	1.0357	0.9015	0.9890	1.2455	0.8495	0.8773	0.9167
FO	**18**	**0.8306**	**1.1160**	**1.0262**	**0.9355**	**1.0807**	**0.9315**	**1.0290**	**1.0156**
Argentina	1	1.0000	1.0000	0.9556	0.9556	1.2763	0.7216	0.9604	0.8846
Chile	4	0.8184	1.1735	1.0506	1.0068	1.0164	0.9935	1.0081	1.0113
Colombia	3	0.6637	1.1690	1.1384	0.9290	1.2694	1.0162	1.0634	1.3137
Mexico	5	0.8195	1.0993	1.0134	0.8687	0.9101	0.9243	1.0946	0.9025
Peru	4	0.9514	1.0429	0.9508	0.9361	1.1770	0.8573	0.9641	0.9683
Venezuela	1	0.7822	1.2195	1.0284	0.9810	1.0437	0.9725	1.0089	1.0241
Total	**126**	**1.0020**	**1.0100**	**1.0041**	**1.0052**	**1.0197**	**0.9962**	**1.0038**	**0.9996**

		3. Quality augmented production model 2							
		MQ2(t, t+1)				**Q2(t, t+1)**			
	HEIs	**EC**	**BPC**	**TGC**	**PC**	**EC**	**BPC**	**TGC**	**PC**
FC	**89**	**1.0101**	**1.0883**	**1.0169**	**1.1089**	**0.9692**	**1.1508**	**1.0121**	**1.1020**
Argentina	7	1.0914	1.0375	1.0043	1.1346	1.0555	1.0591	1.0092	1.1236
Brazil	42	0.9884	1.1339	1.0070	1.1145	0.9036	1.2127	1.0032	1.0676
Chile	11	1.0108	1.0370	1.0367	1.0872	1.0772	1.0749	1.0096	1.1451
Colombia	8	0.9495	1.0559	1.0313	1.0290	0.9597	1.0805	1.0370	1.0703
Mexico	18	1.0612	1.0690	1.0332	1.1661	1.0377	1.1470	1.0292	1.1979
Peru	1	0.8330	0.9820	0.9535	0.7800	0.8708	1.0135	0.9591	0.8464
Puerto Rico	1	1.0991	1.0197	1.0078	1.1294	0.9641	1.0511	1.0287	1.0425
Uruguay	1	1.0000	0.8780	0.9681	0.8500	0.8795	0.8951	0.9665	0.7610
CO	**19**	**0.9788**	**1.0066**	**1.0943**	**1.0861**	**1.1507**	**0.8473**	**1.1270**	**1.0759**
Argentina	6	0.9881	1.0167	1.1529	1.1606	1.2237	0.8129	1.2540	1.2027
Brazil	4	0.9463	1.0163	1.2910	1.2735	1.0029	0.9331	1.2897	1.1954
Chile	2	1.0000	1.0000	1.0216	1.0216	1.3850	0.8017	1.0291	1.1249
Colombia	3	0.9613	0.9910	0.9558	0.9153	1.0747	0.8155	0.9762	0.8579
Costa Rica	2	1.0000	1.0000	1.0000	1.0000	1.0694	0.9075	0.9961	0.9667
Mexico	2	1.0000	0.9935	0.9001	0.8946	1.1885	0.8125	0.8757	0.8435
FO	**18**	**0.9849**	**0.9919**	**0.9628**	**0.9412**	**2.0972**	**0.8280**	**0.9688**	**1.6742**
Argentina	1	1.0000	1.0000	0.7032	0.7032	1.2763	0.7216	0.7067	0.6510
Chile	4	1.0127	1.0045	0.9826	1.0000	1.2760	0.8500	0.9473	1.0121
Colombia	3	0.9653	0.9624	1.0318	0.9695	2.0478	0.8381	0.9662	1.5660
Mexico	5	0.9562	0.9941	0.9589	0.9088	3.7848	0.8377	1.0375	3.1602
Peru	4	1.0000	0.9948	0.9955	0.9900	1.2418	0.8207	1.0116	1.0187
Venezuela	1	1.0000	1.0000	0.8255	0.8255	1.3344	0.7975	0.8099	0.8618
Total	**126**	**1.0018**	**1.0622**	**1.0209**	**1.0815**	**1.1577**	**1.0589**	**1.0233**	**1.1798**

Results support the idea that as each group of universities has its own production technology, the productivity changes also show these differences and it is interesting to note that universities from the same country but in different category of university have different results in productivity.

2.6. Conclusions

The purpose of this paper was to evaluate the performance of Latin American universities over the period 2011/2012-2012/2013, using a metafrontier approach and examining the impact of attributes of quality and reputation on the dynamic evolution of productivity. Empirical findings show that productivity growth is attributable mainly to technological progress, which suggests that most universities are operating near the best-practice frontier. However, as each group of universities has its own production technology, the productivity changes and its decomposed components also show these differences. Full Comprehensive universities are better in their managerial performance than the others. The most productive universities are the Comprehensive and the Full Comprehensive, the least productive universities are the Focused. Our analysis reaffirms the conclusion of previous studies (Agasisti and Salerno, 2007; Ahn *et al.,* 1988; Costa *et al.,* 2012; Johnes, 2008; Johnes *et al.*, 2008; Thanassoulis *et* al., 2011) that more reliable and robust results in efficiency and productivity measurement are sought by grouping universities into more homogeneous subsets of institutions. Although we performed our assessments using three different groups of universities, it is important to consider that there may still be some heterogeneity within these groups that can affect the findings.

Regarding the inclusion of attributes of quality and reputation on the productivity model, we find that these attributes matter and have an impact on the dynamic evolution of productivity in our sample. Particularly, the way we conceptualize and introduce quality into the productivity models which is important. We note that progress was more frequent than regress in quality augmented models, which included attributes of quality and reputation (seen as quality). Thus, from a point of view of effectiveness is important to examine quality and efficiency jointly. As Breu and Raab (1994:35) suggest, "just as perceived quality indicators are useful in the context of choosing a college, efficiency indicators are useful in

the context of administering these institutions." For administrators, it is important to assess the productivity change of the universities and their main drivers in order to maintain a level of good performance. To perform such analysis, administrators should consider that different subsets of universities may exist, that international comparison are needed and that more reliable results in efficiency and productivity measurement are sought by including attributes of quality and reputation.

We recognize some limitations of our study. First, although we analyzed efficiency and productivity changes over a period of time, in future work, data for a longer number of years could be used. Second, we introduce the competence of the teachers and the quality of publications as attributes of quality in the context of higher education but in future work more quality characteristics could be included, such as: entry qualification of students (Johnes, 2006a, 2006b, 2006c; Joumady and Ris, 2005; Kuah and Wong, 2011; Lehmann and Warning, 2002), number of graduates adjusted for quality (Flegg *et al.,* 2004; Johnes, 2006a, 2006b, 2006c; Lehmann and Warning, 2002) or teaching evaluations of students (Gimenez Garcia, 2004; Gimenez and Martinez, 2006). Finally, this study was focused on one continent, Latin America. As directions for future research, we propose to replicate this study to other continents and to analyze the impact of regulation and managerial practices on the dynamic evolution of productivity.

2.7. References

Abbott, M., & Doucouliagos, C. (2001). Total factor productivity and efficiency in Australian colleges of advanced education. *Journal of Educational Administration, 39*(4), 384-393.

Abbott, M., & Doucouliagos, C. (2003). The efficiency of Australian universities: A data envelopment analysis. *Economics of Education Review, 22*(1), 89-97.

Agasisti, T., Barra, C., & Zotti, R. (2015). Evaluating the efficiency of Italian public universities (2008-2011) in presence of (unobserved) heterogeneity. *Socio-economic Planning Sciences*, *55,* 47 -58.

Agasisti, T., & Johnes, G. (2009). Beyond frontiers: Comparing the efficiency of higher education decision-making units across more than one country. *Education Economics, 17*(1), 59-79.

Agasisti, T., & Haelermans, C. (2016). Comparing efficiency of public universities among European countries: Different incentives lead to different performances. *Higher Education Quarterly, 70*(1), 81-104.

Agasisti, T., & Pérez-Esparrells, C. (2010). Comparing efficiency in a cross-country perspective: The case of Italian and Spanish state universities. *Higher Education, 59*(1), 85-103.

Agasisti, T., & Salerno, C. (2007). Assessing the cost efficiency of Italian universities. *Education Economics, 15*(4), 455-471.

Ahn, T., Charnes, A., & Cooper, W. W. (1988). Some statistical and DEA evaluations of relative efficiencies of public and private institutions of higher learning. *Socio-Economic Planning Sciences, 22*(6), 259-269.

Astin, A. W. (1985). *Achieving Educational Excellence. S*an Francisco: Jossey-Bass.

Athanassopoulos, A. D., & Shale, E. (1997). Assessing the comparative efficiency of higher education institutions in the UK by means of data envelopment analysis. *Education Economics, 5*(2), 117-134.

Avkiran, N. K. (2001). Investigating technical and scale efficiencies of Australian Universities through data envelopment analysis. *Socio-Economic Planning Sciences, 35*(1), 57-80.

Barros, C. P., Guironnet, J. P., & Peypoch, N. (2011). Productivity growth and biased technical change in French higher education. *Economic Modelling, 28*(1), 641-646.

Berbegal-Mirabent, J., Lafuente, E., & Solé, F. (2013). The pursuit of knowledge transfer activities: An efficiency analysis of Spanish universities. *Journal of Business Research, 66*(10), 2051-2059.

Berbegal-Mirabent, J., Mas-Machuca, M., & Marimon, F. (2016). Is research mediating the relationship between teaching experience and student satisfaction?. *Studies in Higher Education*, 1-20.

Bessent A. M., Bessent E. W., Charnes, A., Cooper W. W., & Thorogood, N. C. (1983). Evaluation of educational program proposals by means of DEA. *Educational and Administrative Quarterly*, *19*(2), 82-107.

Bitner, M., Faranda, W., Hubbert, A., & Zeithaml, V. (1997). Customer contributions and roles in service delivery. *International Journal of Service Industry Management, 8*(3), 193-205.

Blanco-Ramírez, G., & Berger, J. B. (2014). Rankings, accreditation, and the international quest for quality. *Quality Assurance in Education, 22*(1), 88-104.

Bowman, N. A., & Bastedo, M. N. (2011). Anchoring effects in world university rankings: Exploring biases in reputation scores. *Higher Education, 61*(4), 431-444.

Breu, T. M., & Raab, R. L. (1994). Efficiency and perceived quality of the nation's "Top 25" national universities and national liberal arts colleges: An application of data envelopment analysis' to higher education. *Socio-Economic Planning Sciences, 28*(1), 33-45.

Cáceres, H., Kristjanpoller, W., & Tabilo, J. (2014). Análisis de la eficiencia técnica y su relación con los resultados de la evaluación de desempeño en una Universidad chilena. *Innovar, 24*(54), 199-217.

Capelleras, J. L. (2001). *Factores condicionantes de la calidad de la enseñanza universitaria: Un análisis empírico* (Doctoral thesis). Universitat Autònoma de Barcelona, Bellaterra, Barcelona.

Castano, M. C. N., & Cabanda, E. C. (2007). Performance evaluation of the efficiency of Philippine private higher educational institutions: Application of frontier approaches. *International Transactions in Operational Research, 14*(5), 431-444.

Caves, D. W., Christensen L. R., & Diewert, W. (1982). The economic theory of index numbers and the measurement of input, output, and productivity. *Econometrica, 50*(6), 1393-1414.

Cesaroni, F., & Piccaluga, A. (2015). The activities of university knowledge transfer offices: towards the third mission in Italy. *The Journal of Technology Transfer*, *41*, 753–777.

Chang, T. Y., Chung, P. H., & Hsu, S. S. (2012). Two-stage performance model for evaluating the managerial efficiency of higher education: Application by the Taiwanese tourism and leisure department. *Journal of Hospitality, Leisure, Sport & Tourism Education, 11*(2), 168-177.

Colbert, A., Levary, R. R., & Shaner, M. C. (2000). Determining the relative efficiency of MBA programs using DEA. *European Journal of Operational Research, 125*(3), 656-669.

Costa, E. M., De Souza, H. R., Ramos, F. S., & Da Silva, J. M. (2012). Eficiência e desempenho no ensino superior: uma análise da fronteira de produção educacional das IFES brasileiras /Efficiency and performance in higher education: A frontier analysis of the educational productivity of the Brazilian federal institutes of higher education. *Revista De Economia Contemporanea*, *16*(3), 415-440.

Daraio, C., Bonaccorsi, A., & Simar, L. (2015). Efficiency and economies of scale and specialization in European universities: A directional distance approach. *Journal of Informetrics, 9*(3), 430-448.

Façanha, L. O., & Marinho, A. (2001). Instituições de ensino superior governamentais e particulares: avaliação comparativa de eficiencia /Public and private higher education institutions: Comparative analysis of efficiency. *Revista De Administração Pública, 35*(6), 83-105.

Färe, R., Grosskopf, S., Forsund, F. R., Hayes, K., & Heshmati, A. (2006). Measurement of productivity and quality in non-marketable services. *Quality Assurance of Education*, *14*(1), 21-36.

Färe, R., Grosskopf, S., Lindgreen, B., & Roos, P. (1994a). Productivity developments in Swedish hospitals: A Malmquist output index approach. In A. Charnes, W.W. Cooper, A. Y. Lewin, & L. M. Seiford (Eds.), *Data Envelopment Analysis: Theory, Methodology and Applications* (pp. 253-272). Norwell, MA: Kluwer Academic Publishers.

Färe, R., Grosskopf, S., Norris, M., & Zhang, Z. (1994b). Productivity growth, technical progress and efficiency change in industrialized countries. *American Economic Review, 84*(1), 66-83.

Färe, R., Grosskopf, S., & Roos, P. (1995). Productivity and quality changes in Swedish pharmacies. *International Journal of Production Economics, 39*(1/2), 137–147.

Farrell, M. (1957). The measurement of productive efficiency. *Journal of the Royal Statistical Society. Series A (General), 120*(3), 253-290.

Federkeil, G. (2008). Rankings and quality assurance in higher education. *Higher Education in Europe, 33*(2/3), 219-231.

Ferdows, K., & De Meyer, A. (1990). Lasting improvements in manufacturing performance: In search of a new theory. *Journal of Operations Management*, *9*(2), 168-184.

Fernando, B. I. S., & Cabanda, E. C (2007). Measuring efficiency and productive performance of colleges at the University of Santo Tomas: A non-parametric approach. *International Transactions in Operational Research, 14*(3), 217-229.

Fixler, D., & Zieschang, K. (1992). Incorporating ancillary measures of process and quality changes into a superlative productivity index. *Journal of Productivity Analysis, 2*(4), 245–267.

Flegg, A. T., Allen, D. O., Field, K., & Thurlow, T. W. (2004). Measuring the efficiency of British universities: A multi-period data envelopment analysis. *Education Economics, 12*(3), 231-249.

França, J., Figueiredo, J., & Lapa, J. (2010). A DEA methodology to evaluate the impact of information asymmetry on the efficiency of not-for-profit organizations with an application to higher education in Brazil. *Annals of Operations Research, 173*(1), 39-56.

García-Aracil, A. (2013). Understanding productivity changes in public universities: Evidence from Spain. *Research Evaluation, 22*(5), 351-368.

Gimenez Garcia, V. M. (2004). Un modelo FDH para la medida de la eficiencia en costes de los departamentos universitarios. *Hacienda pública española*, *168*(1), 69-94.

Gimenez, V. M., & Martinez, J. L. (2006). Cost efficiency in the university: A departamental evaluation model. *Economics of Education Review*, *25*(5), 543-553.

Gómez, J. M. (2005). *La evaluación de la eficiencia productiva de las Universidades Públicas Españolas* (Doctoral thesis). Universidad de Zaragoza, Zaragoza.

Grönroos, C., & Ojasalo, K. (2004). Service productivity: Towards a conceptualization of the transformation of inputs into economic results in services. *Journal of Business Research, 57*(4), 414-423.

Grosskopf, S., Hayes, K. J., & Taylor, L. L. (2014). Applied efficiency analysis in education. *Economics and Business Letters, 3*(1), 19-26.

Harris, G. T. (1988). Research output in Australian university economics departments, 1974-83. *Australian Economic Papers, 27*(50), 102-110.

Hayami, Y. (1969). Sources of agricultural productivity gap among selected countries. *American Journal of Agricultural Economics, 51*(3), 564-575.

Hayami, Y., & Ruttan, V.W. (1970). Agricultural productivity differences among countries. *The American Economic Review, 60*(5), 895-911.

Hazelkorn, E. (2009). Rankings and the battle for world-class excellence. *Higher Education Management and Policy, 21*(1), 1-22.

Ho, M. H. C., Liu, J. S., Lu, W. M., & Huang, C. C. (2014). A new perspective to explore the technology transfer efficiencies in US universities. *The Journal of Technology Transfer, 39*(2), 247-275.

Johnes, J. (2006a). Measuring teaching efficiency in higher education: An application of data envelopment analysis to economics graduates from UK Universities 1993. *European Journal of Operational Research*, *174*(1), 443-456.

Johnes, J. (2006b). Data envelopment analysis and its application to the measurement of efficiency in higher education. *Economics of Education Review, 25*(3), 273–288.

Johnes, J. (2006c). Measuring efficiency: A comparison of multilevel modelling and data envelopment analysis in the context of higher education. *Bulletin of Economic Research, 58*(2), 75-104.

Johnes, J. (2008). Efficiency and productivity change in the English higher education sector from 1996/97 to 2004/5. *The Manchester School, 76*(6), 653-674.

Johnes, G., & Johnes, J. (2009). Higher education institutions' costs and efficiency: Taking the decomposition a further step. *Economics of Education Review*, *28*(1), 107-113.

Johnes, G., Johnes, J., & Thanassoulis, E. (2008). An analysis of costs in institutions of higher education in England. *Studies in Higher Education*, *33*(5), 527-549.

Johnes, J., & Yu, L. (2008). Measuring the research performance of Chinese higher education institutions using data envelopment analysis. *China Economic Review*, *19*(4), 679-696.

Joumady, O., & Ris, C. (2005). Performance in European higher education: A non-parametric production frontier approach. *Education Economics*, *13*(2), 189-205.

Kao, C., & Hung, H. T. (2008). Efficiency analysis of university departments: An empirical study. *Omega*, *36*(4), 653-664.

Katharaki, M., & Katharakis, G. (2010). A comparative assessment of Greek universities' efficiency using quantitative analysis. *International Journal of Educational Research*, *49*(4), 115-128.

Kim, Y. (2013). The ivory tower approach to entrepreneurial linkage: productivity changes in university technology transfer. *The Journal of Technology Transfer, 38*(2), 180-197.

Kuah, C. T., & Wong, K. Y., (2011). Efficiency assessment of universities through data envelopment analysis. *Procedia Computer Science,* 3, 499-506.

Laureti, T., Secondi, L., & Biggeri, L. (2014). Measuring the efficiency of teaching activities in Italian universities: An information theoretic approach. *Economics of Education Review, 42*, 147-164.

Lehmann, E., & Warning, S. (2002). *Doing the right things or the things right? Evidence from UK Universities* (Mimeo). University of Konstanz.

Looy, B. V., Gemmel, P., Desmet, S., Van Dierdonck, R., & Serneels, S. (1998). Dealing with productivity and quality indicators in a service environment: Some field experiences. *International Journal of Service Industry Management, 9*(4), 359-376.

Malmquist, S. (1953). Index numbers and indifference surfaces. *Trabajos de Estadistica, 4*(2), 209-242.

Marinho, A., Resende, M., & Façanha, L. O. (1997). Brazilian federal universities: Relative efficiency evaluation and data envelopment analysis. *Revista Brasileira de Economia*, *51*(4), 489-508.

Martin, E. (2006). Efficiency and quality in the current higher education context in Europe: An application of the data envelopment analysis methodology to performance assessment of departments within the University of Zaragoza. *Quality in Higher Education, 12*(1), 57-79.

Martinez Cabrera, M. (2000). Análisis de la eficiencia productiva de las instituciones de educación superior. *Papeles de Economía Española*, 86, 179-191.

Marzo-Navarro, M., Pedraja-Iglesias, M., & Rivera-Torres, P. (2005). A new management element for universities: Satisfaction with the offered courses. *International Journal of Educational Management*, *19*(6), 505-526.

Munoz, D. A. (2016). Assessing the research efficiency of higher education institutions in Chile: A data envelopment analysis approach. *International Journal of Educational Management, 30*(6), 809-825.

Ng, I., & Forbes, J. (2009). Education as Service: The understanding of university experience through the service logic. *Journal of Marketing for Higher Education, 19*(1), 38-64.

Oh, D. H., & Lee J. D. (2010). A metafrontier approach for measuring Malmquist productivity index. *Empirical Economics, 38*(1), 47-64.

Parteka, A., & Wolszczak-Derlacz, J. (2013). Dynamics of productivity in higher education: Cross-european evidence based on bootstrapped Malmquist indices. *Journal of Productivity Analysis, 40*(1), 67-82.

Pastor, J. T., & Lovell, C. A. K. (2005). A global Malmquist productivity index. *Economics Letters, 88*(2), 266-271.

Prior, D. (2006). Efficiency and total quality management in health care organizations: A dynamic frontier approach. *Annals of Operations Research, 145*(1), 281-299.

Ramírez-Correa, P., Peña-Vinces, J. C., & Alfaro-Pérez, J. (2012). Evaluating the efficiency of the higher education system in emerging economies: Empirical evidences from Chilean universities. *African Journal of Business Management, 6*(4), 1441-1448.

Rindova, V. P., Williamson, I. O., Petkova, A. P., & Sever, J. M. (2005). Being good or being known: An empirical examination of the dimensions, antecedents, and consequences of organizational reputation. *Academy of Management Journal, 48*(6), 1033-1049.

Sav, G. T. (2012a). Productivity, efficiency, and managerial performance regress and gains in United States universities: A data envelopment analysis. *Advances in Management & Applied Economics, 2*(3), 13-32.

Sav, G. T. (2012b). Data envelopment analysis of productivity changes in higher education for-profit enterprises compared to non-profits. *International Business Research, 5*(9), 1-9.

Skinner, W. (1969). Manufacturing-missing link in corporate strategy. *Harvard Business Review, 47*(May-June), 136-145.

Talluri, S., Kim. M. K., & Schoenherr, T. (2013). The relationship between operating efficiency and service quality: Are they compatible?. *International Journal of Production Research, 51*(8), 2548-2567.

Taylor, B., & Harris, G. (2004). Relative efficiency among South African universities: A data envelopment analysis. *Higher Education, 47*(1), 73-89.

Thanassoulis, E., Kortelainen, M., Johnes, G., & Johnes, J. (2011). Costs and efficiency of higher education institutions in England: A DEA analysis. *Journal of the Operational Research Society, 62*(7), 1282-1297.

Tulkens, H., & Vanden Eeckaut, P. (1995). Non-parametric efficiency, progress and regress measures for panel data: Methodological aspects. *European Journal of Operational Research, 80*(3), 474-499.

Tyagi, P., Yadav, S. P., & Singh, S. P. (2009). Relative performance of academic departments using DEA with sensitivity analysis. *Evaluation and Program Planning, 32*(2), 168–177.

Vidaver-Cohen, D. (2007). Reputation beyond the rankings: A conceptual framework for business school research. *Corporate Reputation Review*, *10*(4), 278-304.

Worthington, A., & Lee, B. (2008). Efficiency, technology and productivity change in Australian universities, 1998–2003. *Economics of Education Review, 27*(3), 285-298.

Zeithaml, V. (1987). *Defining and relating price, perceived quality, and perceived value* (Report No. 87-101). Cambridge, MA: Marketing Science Institute.

Zoghbi, A. C., Rocha, F., & Mattos, E. (2013). Education production efficiency: Evidence from Brazilian universities. *Economic Modelling*, *31,* 94-103.

Appendix.

Appendix 1. Inputs and outputs commonly used for assessing the efficiency of higher education institutions

Inputs commonly used for assessing the efficiency of higher education institutions	
Labor	
Number of staff	
Number of academic and non-academic staff	Abbott and Doucouliagos (2001) Tyagi, Yadav and Singh (2009) Katharaki and Katharakis (2010) Berbegal-Mirabent, Lafuente and Solé (2013)
Full-time-equivalent (FTE) academic and non-academic staff	Avkiran (2001) Abbott and Doucouliagos (2003) García-Aracil (2013) Agasisti, Barra and Zotti (2016)
Faculty employed, classified as: teaching, research or administrative	Sav (2012a)
Faculty employed, classified as: teaching or research	Kuah and Wong (2011)
Number of full-time teachers	Johnes (2006b) Chang, Chung and Hsu. (2012) Sav (2012b) Laureti, Secondi and Biggeri (2014)
Full-time-equivalent (FTE) academic staff	Bessent, Bessent, Charnes, Cooper and Thorogood (1983) Athanassopoulos and Shale (1997) Kao and Hung (2008) Parteka and Wolszczak-Derlacz (2013) Cáceres, Kristjanpoller and Tabilo (2014)
Number of permanent and temporary academic staff	Martinez Cabrera (2000)
Number of support and administrative personnel	França, Figueiredo and Lapa (2010) Cáceres, Kristjanpoller and Tabilo (2014)
Number of professors with PhD	Façanha and Marinho (2001) Martin (2006) França, Figueiredo and Lapa (2010) Munoz (2016)
Full-time technology transfer office staff	Kim (2013)
Expenditure on staff	
Expenditure on permanent and temporary academic staff	Gimenez Garcia (2004) Gimenez and Martinez (2006) Cáceres, Kristjanpoller and Tabilo (2014)
Average faculty salary	Ahn, Charnes and Cooper (1988) Athanassopoulos and Shale (1997) Sav (2012b)
Academic support, non-faculty labor expenditure	Sav (2012a)
Others	
Percentage of faculty with doctorates	Breu and Raab (1994)
Qualification index of faculty	Costa, de Souza, Ramos, and da Silva (2012)
Average research staffs' qualifications	Kuah and Wong (2011)
Faculty to student ratio	Breu and Raab (1994) Costa, de Souza, Ramos, and da Silva (2012) Zoghbi, Rocha and Mattos (2013)
Students	
Number of FTE students: under- and postgraduates	Athanassopoulos and Shale (1997)
Number of FTE undergraduate students studying for a first degree	Johnes (2006b)
Number of active registered students	Katharaki and Katharakis (2010) Sav (2012b)

Number of research students	Kuah and Wong (2011)
% Returning students	Sav (2012b)
Entry qualification score	Breu and Raab (1994) Athanassopoulos and Shale (1997) Lehmann and Warning (2002) Joumady and Ris (2005) Johnes (2006a) Johnes (2006b) Johnes (2006c) Kuah and Wong (2011) Munoz (2016)
Number of educational years in higher education	Barros, Guironnet and Peypoch (2011)
Expenses and Capital	
Total operating expenses	Ahn, Charnes and Cooper (1988) Gimenez Garcia (2004) Gimenez and Martinez (2006) Johnes (2006b) Kao and Hung (2008) Johnes and Johnes (2009) Tyagi, Yadav and Singh (2009) Kuah and Wong (2011) Thanassoulis, Kortelainen, Johnes and Johnes (2011) Chang, Chung and Hsu (2012) García-Aracil (2013) Agasti and Haelermans (2016)
Operating expenses, excluding labor	Abbott and Doucouliagos (2003) Katharaki and Katharakis (2010) Cáceres, Kristjanpoller and Tabilo (2014)
Expenditure on library and computing services	Athanassopoulos and Shale (1997) Johnes (2006b) Laureti, Secondi and Biggeri (2014)
Institutional assets	Sav (2012b)
Capital equipment	Sav (2012a)
Capital expenditure as a proxy for capital stock	Abbott and Doucouliagos (2001)
Total depreciation and interest payable	Johnes (2006b)
Educational and general expenditures per student	Breu and Raab (1994) Zoghbi, Rocha and Mattos (2013)
Physical support	Ahn, Charnes and Cooper (1988)
Value of non-current assets	Abbott and Doucouliagos (2003) Sav (2012b)
Auxiliary capital, expenditures on auxiliary enterprises	Sav (2012a)
Low-income students loans	Sav (2012b)
Research grants	Athanassopoulos and Shale (1997) Kuah and Wong (2011)
Research and development income	Berbegal-Mirabent, Lafuente and Solé (2013)
Funding from federal government	Ho, Liu, Lu, and Huang (2014)
Funding from industries	Ho, Liu, Lu, and Huang (2014)
Number of invention disclosures	Kim (2013)
Research expenditure excluding state government and foundation funding	Kim (2013)
Number of books owned by the department	Chang, Chung and Hsu. (2012)
Department floor space	Kao and Hung (2008) Chang, Chung and Hsu. (2012)
Facilities assigned to each program (square feet)	Bessent, Bessent, Charnes, Cooper and Thorogood (1983)
Number of majors offered	França, Figueiredo and Lapa (2010)
Number of taught course students	Kuah and Wong (2011)
Outputs commonly used for assessing the efficiency of higher education institutions	
Teaching	
Students	

Number of equivalent full-time students (EFTS)	Abbott and Doucouliagos (2001) Abbott and Doucouliagos (2003)
Full-time-equivalent (FTE) undergraduates and postgraduate students.	Ahn, Charnes and Cooper (1988) Avkiran (2001) Lehmann and Warning (2002) Johnes and Johnes (2009) Thanassoulis, Kortelainen, Johnes and Johnes (2011)
Number of graduates	França, Figueiredo and Lapa (2010) Katharaki and Katharakis (2010) Berbegal-Mirabent, Lafuente and Solé (2013) García-Aracil (2013) Parteka and Wolszczak-Derlacz (2013) Agasisti and Haelermans (2016)
Number of graduates within institutional time	Laureti, Secondi and Biggeri (2014)
Numbers of successful leavers (undergraduates) and higher degrees awarded (postgraduates)	Athanassopoulos and Shale (1997)
Number of graduates from taught courses	Kuah and Wong (2011)
Number of candidates registered	França, Figueiredo and Lapa (2010)
Number of students enrolled	França, Figueiredo and Lapa (2010) Costa, de Souza, Ramos, and da Silva (2012) Parteka and Wolszczak-Derlacz (2013)
Total equivalent enrolled students	Tyagi, Yadav and Singh (2009)
Number of first degrees awarded weighted by degree classification	Johnes (2006a) Johnes (2006b) Johnes (2006c)
Number of undergraduate degrees awarded, adjusted for quality; and the number of postgraduate degrees awarded.	Flegg, Allen, Field and Thurlow (2004)
Percentage of students who finished with first-class honors degree and upper second-class honors degree	Lehmann and Warning (2002)
Annual credit hour production	Taylor and Harris (2004) Sav (2012a) Sav (2012b)
Achievements of student certification	Kuah and Wong (2011) Chang, Chung and Hsu. (2012)
Graduation rate	Breu and Raab (1994) Lehmann and Warning (2002) Kuah and Wong (2011)
Student retention rate	Breu and Raab (1994) Avkiran (2001)
Student progress rate	Avkiran (2001)
Graduate full-time employment rate	Avkiran (2001) Lehmann and Warning (2002) Kuah and Wong (2011)
Wages of graduates	Barros, Guironnet and Peypoch (2011)
Progress: number of students hired and number of PhD degree awarded	Tyagi, Yadav and Singh (2009)
Number of graduates from research	Kuah and Wong (2011)
Scores in standardized tests	Zoghbi, Rocha and Mattos (2013)
Teaching load	
Teaching load	Gimenez Garcia (2004) Gimenez and Martinez (2006) Kao and Hung (2008)
Perceived quality	
Perceived teaching quality (student opinion)	Gimenez Garcia (2004) Gimenez and Martinez (2006)
Student satisfaction (survey of graduates)	Colbert, Levary and Shaner (2000)

Employer satisfaction with graduate ability	Bessent, Bessent, Charnes, Cooper and Thorogood (1983) Colbert, Levary and Shaner (2000) Chang, Chung and Hsu (2012)
Generic and vocational competencies (survey of graduates)	Joumady and Ris (2005)
Research and Knowledge Transfer	
Number of publications	Kao and Hung (2008) Kuah and Wong (2011) Chang, Chung and Hsu (2012) Berbegal-Mirabent, Lafuente and Solé (2013) García-Aracil (2013) Cáceres, Kristjanpoller and Tabilo (2014) Munoz (2016)
Number of publications, classified as: national or international journals and books.	Martinez Cabrera (2000) Gimenez Garcia (2004)
Weighted research rating	Athanassopoulos and Shale (1997) Tyagi, Yadav and Singh (2009)
Research quality, new research segments awarded	Gimenez Garcia (2004) Gimenez and Martinez (2006)
Number of awards from research	Kuah and Wong (2011)
Number of intellectual properties	Kuah and Wong (2011)
Number of teacher certifications	Chang, Chung and Hsu. (2012)
Research grants/quantum	Ahn, Charnes and Cooper (1988) Avkiran (2001) Lehmann and Wargning (2002) Abbott and Doucouliagos (2003) Johnes (2006b) Kao and Hung (2008) Johnes and Johnes (2009) Thanassoulis, Kortelainen, Johnes and Johnes (2011) Sav (2012a) Agasisti and Haelermans (2016) Munoz (2016)
Research income	Katharaki and Katharakis (2010)
Research income and consultancy	Flegg, Allen, Field and Thurlow (2004)
Industry grants	García-Aracil (2013) Agasisti, Barra and Zotti (2016)
Number of spin-offs created	Berbegal-Mirabent, Lafuente and Solé (2013)
Number of entrepreneurs created by technology transfer	Ho, Liu, Lu and Huang (2014)
Number of licenses	Kim (2013) Ho, Liu, Lu and Huang (2014)
Income created by licenses	Kim (2013) Ho, Liu, Lu and Huang (2014)
Income from other services	Thanassoulis, Kortelainen, Johnes and Johnes (2011) Cáceres, Kristjanpoller and Tabilo (2014)

Notes: In order to identify the works cited and listed in this Appendix, a search strategy in Trobador+ was developed using the subject terms "efficiency" and "higher education". Only full-text articles were included. The search was not limited by language of publication. Further studies were identified by examining the reference lists of the included articles.

CHAPTER 3:

Teaching Performance: Determinants of the Student Assessment.[1]

Abstract[2]

This paper identifies the nature and factors that influence student evaluation of the teaching performance of university teachers by integrating two areas of research: services marketing and higher education. A set of hypotheses were developed taking into consideration customer (student), employee (teacher) and service (course) characteristics. They were then tested using data from 952 courses for a three-year period and employing different multivariate techniques. Findings indicate that students basically evaluate the expertise, attitude and behavior of teachers. The results also indicate that this evaluation is a complex phenomenon that depends on factors related to teacher, student and course profiles. Based on the results of this paper, we recommend the following: to permit teachers to teach the same courses repeatedly, allowing them to consolidate their practice; to provide training in teaching techniques and ethics; to pay particular attention to those students who move to another degree program; and to maintain an appropriate class size.

Keywords: Higher education, service quality, employee performance, student evaluation, university teachers

---

[2] The abstract has been changed in order to keep the same format presented in the other chapters.

3.1. Introduction

Service quality is often considered an essential element to achieve a competitive advantage (Grönroos, 1988; Hoffman and Bateson, 2002). However, assessing service quality is complex, not only because of particular service characteristics (Parasuraman *et al.,* 1985), but also because there is currently no general agreement regarding the nature or content of the dimensions to be evaluated and their importance according to each industry (Brady and Cronin, 2001; Cronin and Taylor, 1992).

Nevertheless, as well as the result, customers also evaluate the service delivery process (Grönroos, 1982, 1984; Parasuraman *et al.,* 1985), in which employees play a key role given that they can significantly influence the customer perception of service quality (Parasuraman *et al.,* 1985; Zeithaml *et al.,* 1990). As Bitner (1995) suggests, the essence of generating beneficial relationships with customers is to keep the promises that are made and which can be either kept or broken by employees. Therefore, the performance assessment of service employees often depends on customer satisfaction or the level of service quality (Snipes *et al.,* 2006).

In the context of higher education, it is possible to appreciate that employee performance assessment – in this case of teachers – is an important element in each of the methodologies that have been used to evaluate the quality of the university, such as: accreditation, academic program review, peer review and performance indicators. Thus, accreditation emphasizes human capital (teachers and students) as a determinant of the quality of the results (Gómez, 2005); in academic program review the staff becomes the main agent of quality review (Capelleras, 2001); in peer review or surveys of reputation, teacher quality is the main source of department quality; and in performance indicators, more widespread studies identify the quality of the institution with the teacher quality (Mora Ruíz, 1991). It has also been found that among the different methods that have been used to assess teacher performance in higher education, student evaluations are the ones that provide the best criteria (Tejedor and García-Valcárcel, 1996). Therefore, it is relevant to investigate the factors that influence student evaluations regarding the teaching performance of university teachers.

In this vein, the purpose of this study is to examine the determinants of customer (student) evaluations of the performance of employees (teachers) in the context of higher education. With this in mind, this paper integrates the literature on services marketing and higher education, particularly service quality, employee-customer relationships and students' evaluations of teaching. Ng and Forbes (2009) argue that the study of universities in services marketing literature has not been widely approached, perhaps because literature in this area tends to consider services in general, whereas literature in the field of education tends to focus on the teaching aspect.

However, the study of service quality in higher education, particularly the assessment of teaching performance from a services marketing perspective, is interesting for several reasons. First, there is a general agreement to consider students as customers (Marzo-Navarro *et al.,* 2005) and teaching as the most important factor in defining service quality (Capelleras and Veciana, 2004; Hill, 1995; Thomas and Galambos, 2004). While many services require active consumer participation, in the field of education, students play a major role, given that without their participation it would not be possible for the institution to deliver a result at the desired level (Bitner *et al.,* 1997). The main service is the learning experience (Ng and Forbes, 2009) and its quality is largely determined by the performance of academic staff in their teaching and research activities (Capelleras, 2001). As Marsh and Hattie (2002:603) mention: "Ideally, teaching effectiveness and research productivity are complementary". Finally, higher education is one of the few areas that allows to match the individual responses of employees with those of their customers, and in which customers may be able to provide more accurate evaluations because of the amount and extent of the student − teacher interactions during the development of the courses (Snipes *et al.,* 2006).

Therefore, from an academic perspective, this paper will provide deeper insight into the assessment of teaching performance by including a wide range of determinants, taking into consideration the triad of factors related to the service encounter (Cook *et al.,* 2002; Roth and Menor, 2003). Thereby, determinants regarding the customer (student), the employee (teacher) and the service (course) are examined. It is important to mention that in comparison with previous studies, this research includes certain variables that had not until now been

contemplated, such as prior experience of teachers, their knowledge, their job tenure and their academic workload, as well as the students' background and current experience in their institution.

From a managerial perspective, this research may help managers to generate substantial value for customers and create a competitive advantage in higher education institutions. As Hoffman and Bateson (2002) note, service organizations often face the challenge of distinguishing themselves from other organizations, whether in the set of benefits offered or the way in which these are delivered. This can be seen in higher education institutions, with the offer of new services, such as e-learning, and seeking differentiation through accreditations and service quality. Therefore, managers of higher education institutions need to understand the dimensions that students assess in terms of the performance of their teachers, as well as the factors that influence this assessment.

The remainder of this paper is organized as follows. The literature review on service quality and employee-customer relationships is presented in the following section, after which a set of hypotheses are proposed. Then, the data and study variables are described. Subsequently, the results of the empirical analysis are presented. Finally, findings and practical implications of the work are discussed and future research directions suggested.

3.2. Theoretical background and hypotheses

3.2.1. *Service quality and customer-employee relationship*

Perceived service quality is an abstract construct, which has been defined as the consumer's judgment about the overall excellence or superiority of a service (Zeithaml, 1987). In the literature, there has been considerable progress on how service quality should be measured, mainly in the following two ways:

  (1) as the difference between consumers' expectations and perceptions of the service (Grönnroos, 1982, 1988; Parasuraman *et al.,* 1985, 1988, 1991); and

  (2) based solely on consumers' perceptions (Cronin and Taylor, 1992).

In the context of universities, it has been demonstrated that a scale based only on perceptions is a good measure for assessing service quality (Nadiri *et al.,* 2009; Oldfield and Baron, 2000).

However, regarding the nature or content of the dimensions of service quality, there is no general agreement in the literature because apparently the perceptions of service quality are based on multiple dimensions (Brady and Cronin, 2001). Thus, it has been found that service quality is perceived by consumers in two dimensions: technical and functional (Grönroos, 1982, 1984); three dimensions: product, delivery and environment (Rust and Oliver, 1994), outcome, interaction and physical environment, each with three sub-dimensions (Brady and Cronin, 2001); and five dimensions: tangibles, reliability, responsiveness, assurance and empathy (Parasuraman *et al.,* 1988, 1991). In the context of university quality, previous studies demonstrate the multidimensional nature of this concept (Marzo-Navarro *et al.,* 2005).

On the other hand, Chase and Stewart (1994) note that the dimensions of quality represent important service-related elements from the customers' perspective. However, they do not directly relate to activities in which the service provider can assure quality. Stewart (2003) notes that the task to be performed, the treatment of the customer and the tangible elements (the "three Ts" framework), are constructs for the design and management of the service encounter and they influence the dimensions of service quality. In this vein, Table 3.1 presents the relationship between the elements that the customer evaluates (dimensions) and the aspects for which the service provider can ensure the quality according to the "three Ts." The table shows that the product of the service (technical or outcome quality) is based on the task, the delivery of the service (functional or interaction quality) mainly reflects the treatment, and the environment is a result of the tangible elements.

Table 3.1. Conceptualizations of service quality

Customer: Dimensions of service quality	Service provider: Design and management of the service encounter

58

Grönroos (1982, 1984)	Parasuraman *et al.* (1991)	Rust and Oliver (1994)	Brady and Cronin (2001)	Chase and Stewart (1994)
Technical quality (outcome)	Reliability Responsiveness	Service product (technical quality)	Outcome quality	Task
Functional quality (process-related)	Assurance Empathy Responsiveness	Service delivery (functional quality)	Interaction quality	Treatment
	Tangibles	Service environment	Physical environment quality	Tangibles

It is important to mention that this study investigates the factors that influence the customer assessments of the quality of service delivery, also called functional quality or the quality of the customer-employee interaction. In this vein, customer-employee interactions occur frequently in services and have a critical impact on the perception of service quality (Grönroos, 1988). Roth and Menor (2003) define service encounters as those contact points at which the customers interact with the service provider.

In the literature, it is possible to appreciate that the employee, the customer and the service concept are elements that influence the service encounter and, in turn, the perceived quality. As Grönroos (1994) notes, human resources (employees and customers) as well as technology and physical resources are resources that generate quality, and which have to be coordinated in a functional system that transforms the service concept – based on the mission of the company – into the desired quality of the services. Roth and Menor (2003) also propose a triad in service strategy, which includes the target market (customers), the service concept and the design of the service delivery system, which includes the employees. Cook *et al.* (2002) note that the service encounter can be seen as a triad in which customer and contact employee are exercising control over the service process in a defined environment by the organization.

Similarly, in the field of higher education, literature regarding the factors that influence student ratings suggests the existence of a triad. These three groups of factors include the characteristics of the teacher, the student and the course (Pounder, 2007). This study proposes that these factors are related to employee, customer and service concept characteristics.

3.2.2. Determinants of the assessments made by customers regarding the performance of employees in the context of higher education.

In line with the above, in the following paragraphs we develop a set of hypotheses regarding the factors that influence the customers' (students) assessments of the performance of the employees (teachers) in the context of the service (course).

First, a high level of service quality requires an institution to have employees with the ability and willingness to perform at the levels required (Bitner *et al.,* 1994; Zeithaml *et al.,* 1990). Thus, Brady and Cronin (2001) propose that the expertise, attitude and behavior of the employee are subdimensions of the quality of the customer-employee interaction. In this regard, the concept of attitude and behavior can be seen as being related given that attitudes put people into a particular frame of mind-that of liking or disliking an object or concept – which, in turn, leads people to behave in a fairly consistent way toward similar objects (Kotler and Keller, 2006). Expertise, however, is associated with the knowledge, skills and experience to ensure the desired outcome of the service (Czepiel *et al.,* 1985). In the field of higher education, Capelleras and Veciana (2004) suggest that the competence of teachers (the level of knowledge possessed by the teacher and their ability and clarity to transmit this knowledge) as well as their attitudes and behaviors toward students have a significant impact on the assessments made by students about teaching performance. Hence, the following hypothesis is proposed:

H1. Customer perceptions of the expertise, attitude and behavior of an employee are positively and significantly related to the overall customer assessment of employee performance.

Previous studies suggest that job tenure is positively and significantly related to organizational commitment. So, the longer the employee works for the organization, the more likely the employee is to be willing to provide a positive customer experience (Wang and Davis, 2008). In the case of teachers, the trend shows that the greater a teacher's experience and seniority, the better their evaluations (McPherson *et al.,* 2009). Similarly, teachers who offer student-centered teaching, because that is what they were trained to do, may achieve

better evaluations (Gibbs and Coffey, 2004). Therefore, the following hypothesis is formulated:

H2. Experience, knowledge and job tenure of an employee are positively and significantly related to customer perceptions of employee performance.

An aspect that can influence employee responsiveness is the number of customers the employee attends to. Thus, the more customers an employee has contact with, the more difficult it will be for him/her to meet the customers' demands (Zeithaml *et al.,* 1990). This is likely to negatively affect the customer ratings of employee performance. Hence, the following hypothesis is proposed:

H3. The number of customers with whom an employee has contact with is negatively and significantly related to customer perceptions of employee performance.

Second, besides the employee characteristics, it is also necessary to consider the customers' profiles. In this regard, every customer is different in terms of experience, personality and skills (Arnould *et al.,* 2004). In the field of higher education, the students' characteristics most frequently discussed are: age, gender and academic level (Boex, 2000; Centra and Gaubatz, 2000; Lavin *et al.,* 2012; Peterson *et al.,* 2008; Santhanam and Hicks, 2002). Some less-studied topics are related to the students' personality or background (Abrantes *et al.,* 2007; Grimes *et al.,* 2004). In this vein, the quality of the customers also contributes to the service quality, given that if they do not effectively perform their role, it will not be possible for the employee to deliver a result at the desired level (Bitner *et al.,* 1997). Lizzio *et al.* (2002) found that prior academic performance influences the future performance of students, but not their perception regarding the quality of education received. However, Marsh (1980) and Abrantes *et al.* (2007) note that the quality of education received by a student is positively related to his or her interest in the course. Hence, the following hypothesis is presented:

H4. The customer's quality characteristics are positively and significantly related to his/her own perceptions of employee performance.

All costumers learn from their experiences. LaTour and Peat (1979) suggest, using comparison-level theory, that the previous experiences of consumers are the source of their own expectations. In the context of higher education, the literature indicates that more favorable evaluations tend to be made for courses with advanced-level students (Boex, 2000; Grimes *et al.,* 2004; Peterson *et al.,* 2008; Santhanam and Hicks, 2002). Thus, the following hypothesis is presented:

>   *H5. Customer experience is positively and significantly related to his/her own perceptions of employee performance.*

Third and finally, a further aspect to be considered is that perceptions of service quality vary according to the type of service being evaluated (Cronin and Taylor, 1992).

Regarding the course characteristics, the variables most frequently discussed are: grades (Badri *et al.,* 2006; Centra, 2003; Isely and Singh, 2005; Marsh, 1980; McPherson *et al.,* 2009; Spooren and Mortelmans, 2006), class size (Badri *et al.,* 2006; McPherson *et al.,* 2009; Spooren and Mortelmans, 2006), content or type of course and class schedule (Badri *et al.,* 2006; DeCanio, 1986; Marsh, 1980; Peterson *et al.,* 2008; Santhanam and Hicks, 2002). Literature suggests that more favorable evaluations are given for classes with qualitative content in the disciplines of humanities or social sciences (Badri *et al.,* 2006; Santhanam and Hicks, 2002), with high degrees of difficulty and workloads (DeCanio, 1986; Marsh, 1980). Therefore the following hypothesis is formulated:

>   *H6. The characteristics of the type of service significantly influence customer perceptions of employee performance.*

Bitner *et al.* (1994) argue that according to attribution theory, people tend to take credit for success, but deny responsibility when something fails. So employee and consumer perspectives differ more when the service fails and when failure takes place the customer may blame the employee. Literature has shown a positive correlation between students'

evaluations and the grades they expect or receive from their teachers (Badri *et al.,* 2006; Centra, 2003; Isely and Singh, 2005; Marsh, 1980; McPherson *et al.,* 2009; Spooren and Mortelmans, 2006). Hence, the following hypothesis is formulated:

H7. The positive outcome of the service is positively and significantly related to customer perceptions of employee performance.

Grönroos (1988) argues that costumer perception may also be influenced by other costumers simultaneously consuming the same service. In the context of universities, previous studies suggest that the most favorable student ratings are given in small groups (Badri *et al.,* 2006; McPherson *et al.,* 2009; Spooren and Mortelmans, 2006). Hence, the following hypothesis is formulated:

H8. The number of customers simultaneously consuming the same service is negatively and significantly related to customer perceptions of employee performance.

Figure 3.1 shows, in brief, the model proposed in this paper. In addition to the factors identified in the hypotheses, the model includes age and gender of both the teacher and student as control variables (Badri *et al.,* 2006; Grimes *et al.,* 2004; McPherson *et al.,* 2009).

3.3. Data and variables

The data used in this study to examine the relationships proposed in the previous model was collected at the Tecnologico de Monterrey, a multi-campus university system with campuses throughout Mexico. As an instrument for assessing teaching quality, a national survey to students was used, applied in the last week of classes of each semester through the web system. The information was confidential and anonymous. Students answered the questions regarding teacher performance and other course aspects using a Likert scale, whereby 5 represented the best performance and 1, the worst. This instrument remained unchanged from January 2007. The data set contained information on 1,359 students, 125 teachers and 952 courses offered on one campus during the January 2007-December 2009 period. This study employed course-level data.

Figure 3.1. Nature and determinants of the student assessments of teaching performance
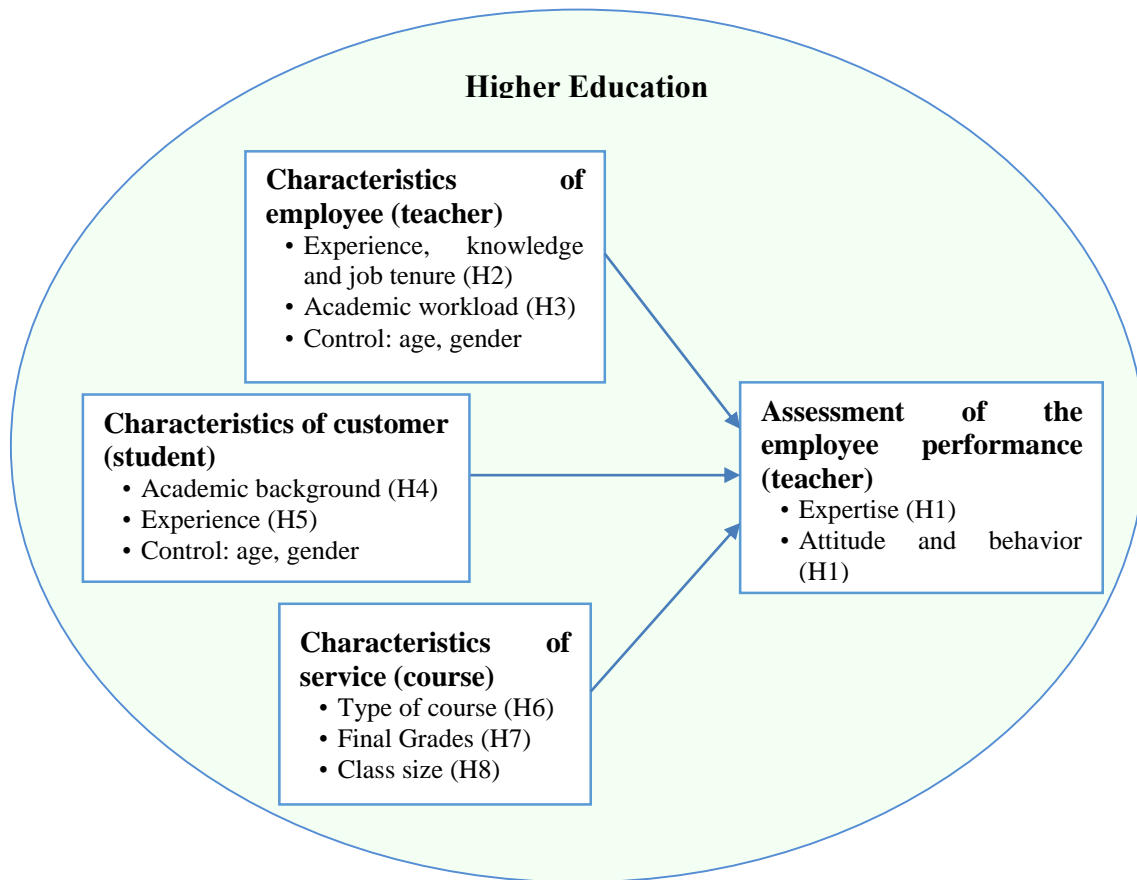
The selection and operationalization of the variables were defined considering services marketing literature. The dependent variable was the overall assessment of teacher performance, which is considered the average of the opinions of all students enrolled on the course, with regard to the question: "Overall, I think the teacher performance was:" so that 5 represented the best performance and 1, the worst. In the empirical analysis, nine other items of the instrument were included to assess the quality of teaching performance regarding the expertise, attitude and behavior of the teacher. Regarding the independent variables, the determinants of performance identified in the literature were contemplated. Table 3.2 shows these variables and their classification by teacher, student and course characteristics.

The data analysis was performed first with the analysis of frequencies and descriptive statistics in order to identify the profile of the teachers and students on the courses. Then, a factor analysis was performed to identify the underlying structure of the nine selected items of the assessment instrument, and correlations between the obtained factors were examined. Finally, using a multiple regression analysis, the relationship between the students' evaluations of teacher performance and the independent variables of the study, related to teacher, student and course characteristics was examined.

Table 3.2. Independent Variables

Teacher	
Experience, knowledge and job tenure	
Experience in the course	The number of times the teacher has taught this course since 2000.
Teaching techniques	Certified in any teaching technique = 1, no = 0.
Applied ethics training	Training in ethics =1, no = 0.
Job tenure	Number of times the teacher has taught at the institution.
Academic workload	
Number of students	Number of students by semester.
Demographics	
Age	Considering the date of birth on the database of the HR Department.
Gender	Men = 1, women = 0.
Student	
Academic Background	
Admission score	Mean of the average grade
Percentage of scholarship	Mean of the percentage of grant.
Experience	
Courses studied	Number of subjects the students have coursed
Program change	Percentage of students who have made a program change
Demographics	
Age	Average of the age of students enrolled in the course
Gender	Percentage of men students enrolled in the course.
Course	
Type of course	
Academic discipline	Business and Humanities = 1, Engineering and Sciences = 0.
Results	
Final grades	Average of the final grades of the course
Number of students	
Class size	Number of students enrolled in the course

3.4. Results

Insofar as teacher profiles, Table 3.3 shows that the mean age was 40 years and job tenure in the institution was 20 semesters. Teachers, on average, instructed classes to 58 students per semester and had taught each course four times. Totally, 49 percent of the courses were taught by men, 75 percent by teachers certified in teaching techniques, and 21 percent by teachers with training in applied ethics. Regarding the characteristics of the students enrolled in

courses, on average, the admission score was 86, a scholarship rate of 29 percent, 20 years of age, and 27 subjects studied in the institution. Totally, 14 percent of the students made a program change and 57 percent were men. Regarding the course characteristics, on average, the final grade was 83, the class size was of 20 students, and 57 percent of the courses belonged to the discipline of business and humanities.

Table 3.3. Descriptive statistics

	Mean	Frequency	%
Teacher			
Age	40.2		
Job tenure	19.8		
Number of times taught course	3.8		
Number of students	58.2		
Gender (female)		485	51
Teaching technique (yes)		717	75
Applied ethics training (yes)		202	21
Student			
Admission score	86.0		
Percentage of scholarship	29.1		
Courses studied	26.8		
Program change	13.5		
Age	20.3		
Percentage of men	57.1		
Course			
Final grades	83.19		
Class size	20.39		
Academic discipline (Business and humanities)		539	57

Note: *n*=952

Regarding the instrument of teacher performance evaluation, using principal component analysis and varimax rotation (see Table 3.4) and after verifying statistical validity, it was possible to distinguish two main dimensions: first, expertise to ensure the desired outcome of service; and second, attitude and behavior. It was also possible to confirm internal reliability of the instrument of teacher evaluation through Cronbach's α coefficient (0.972).

Table 3.4. Rotated factor loadings

Variable	Factor	
	1: Expertise	**2: Attitude and behavior**
In-depth knowledge	**0.845**	0.380
Theory and practice	**0.844**	0.404
Clear explanations	**0.821**	0.431
Monitory and tutoring	**0.756**	0.504
Fulfillment of the program	**0.753**	0.496
Fair assessment	**0.656**	0.605
Intellectual challenge	**0.655**	0.582
Respectful manner and supportive environment	0.400	**0.885**
Ethical behavior and values	0.469	**0.847**

As presented in Table 3.5, a correlation analysis of these two factors and the overall opinion was performed, confirming the first hypothesis of this study (H1), according to which customer perceptions of the expertise and attitude of employees are positively and significantly related to the overall customer assessment of employee performance. It was also found that teacher expertise is the factor that presents the highest correlation with the overall assessment.

Table 3.5. Correlation matrix. Overall opinion and dimensions

	Overall opinion	**Expertise**	**Attitude and behavior**
Overall opinion	1	0.749**	0.550**
Expertise	0.749**	1	0.000
Attitude and behavior	0.550**	0.000	1

Note: **sig<0.01

In order to identify that there was no excessive correlation between variables, a correlation matrix was performed and there were no highly significant relationships. It was also found that the VIF did not reach high values so multicollinearity problems were discarded in the model.

Table 3.6 presents the results of the multiple regression analysis that examined the relationship between each of the independent variables of the study and the student

perceptions regarding the overall teacher performance and the two identified dimensions (teacher expertise, and teacher attitude and behavior). H2 is supported insofar as the expected relationship between teacher experience and knowledge and student ratings. Thus, the number of times the teacher has taught the course, certification in teaching techniques and ethics training show a significant effect on the perceptions of the student. In contrast, job tenure is not significantly related with student ratings. H3 could not be supported because the effect of the number of students instructed during the semester on the student's evaluations is not significant. H4 could not be supported, due to the fact that the percentage of scholarship shows a significant effect on the assessments but, contrary to expectations, it is negative. H5-H8 are supported because the variables: number of courses studied, academic program change, academic discipline, final grades and class size, indicate a significant effect on student evaluations.

Table 3.6. Multiple regression analysis

	Overall Opinion			**Expertise**			**Attitude and Behavior**		
Teacher	**B**	**β**	**t**	**B**	**β**	**t**	**B**	**β**	**t**
Experience, knowledge and job tenure (H2)									
Experience in the course	0.011	0.128	3.502***	0.032	0.135	3.900***	0.002	0.010	0.257
Teaching techniques	0.073	0.087	2.347*	0.362	0.156	4.438***	-0.080	-0.035	-0.906
Applied ethics training	0.074	0.084	2.524*	0.094	0.039	1.224	0.086	0.035	1.029
Job tenure	0.002	0.081	1.473	0.006	0.084	1.607	0.002	0.026	0.461
Academic workload (H3)									
Number of students	0.001	0.065	1.722†	0.001	0.027	0.745	0.002	0.074	1.904†
Demographics									
Age	-0.002	-0.055	-1.066	0.007	0.060	1.246	-0.020	-0.163	-3.103**
Gender	-0.002	-0.003	-0.096	0.187	0.093	2.944**	-0.215	-0.108	-3.134**
Student	**B**	**β**	**t**	**B**	**β**	**t**	**B**	**β**	**t**
Academic Background (H4)									
Admission score	-0.007	-0.048	-1.223	-0.027	-0.066	-1.761†	0.000	-0.001	-0.029
Percentage of scholarship	-0.004	-0.095	-2.573*	-0.010	-0.100	-2.853**	-0.008	-0.075	-1.994*
Experience (H5)									
Coursed studied	0.008	0.328	2.211*	0.045	0.652	4.642***	0.003	0.046	0.3
Program change	-0.003	-0.097	-2.336*	-0.007	-0.081	-2.063*	-0.001	-0.007	-0.173

	B	β	t	B	β	t	B	β	t
Demographics									
Age	-0.092	-0.320	-2.124*	-0.423	-0.532	-3.734***	-0.078	-0.098	-0.632
Gender	0.000	-0.004	-0.104	-0.002	-0.042	-1.239	-0.003	-0.059	-1.601
Course	**B**	**β**	**t**	**B**	**β**	**t**	**B**	**β**	**t**
Type of course (H6)									
Academic discipline (Business and humanities)	0.097	0.133	3.406***	0.317	0.157	4.263***	-0.107	-0.053	-1.332
Result (H7)									
Final grades	0.008	0.142	4.081***	0.014	0.092	2.803**	0.024	0.159	4.466*
Number of students (H8)									
Class size	-0.006	-0.127	-3.477***	-0.008	-0.068	-1.958†	-0.014	-0.113	-3.014*
Summary	F=7.516*** R^2 =0.114 R^2 adjusted =0.099			F=15.359*** R^2 =0.208 R^2 adjusted =0.195			F=4.40*** R^2 =0.070 R^2 adjusted =0.054		

Notes: (†) sig < 0.10; *sig< 0.05; **sig <0 .01; ***sig< 0.001

Regarding demographics, the effect of the teachers' age and gender and the students' age on student perceptions is significant, but not the gender of the student.

3.5. Discussion and recommendations

The results of this study show that students assess two main dimensions of teacher performance: first, expertise to ensure the desired outcome of the service; and second, attitude and behavior. Of these two factors, the expertise of the teacher has the highest correlation with the overall assessment. This finding is in line with previous studies, which suggest that the attitude, behavior and expertise of the employee compose the quality of customer-employee interaction (Brady and Cronin, 2001) and, therefore, are employee characteristics that directly impact the consumer experience (Czepiel *et al.,* 1985).

By examining the explanatory power of the models (measured as adjusted R^2), it is possible to observe that the greatest R^2 is obtained by relating the independent variables to the expertise of the teacher (0.20), followed by the overall assessment (0.10) and finally the attitude and the behavior as dependent variable (0.05). This finding suggests that the variables enclosed in this study provide a further explanation to the phenomenon of students'

perceptions regarding the teacher's expertise and that besides these there are other variables that influence student perceptions.

As determinants related to the teacher, it was identified that teacher experience on the course and certification in teaching techniques are positively related to students' perceptions, particularly in aspects related to expertise. Also, it was noted that training in applied ethics is positively related to the overall evaluation, As Martínez *et al.* (2002) suggest, the role of the teacher should include being a model in dealing with ethical dilemmas, for which training is required. With regard to the gender of the teacher, students perceive that men perform better in terms of expertise, but women perform better in terms of attitude. Also, the younger the teacher, the better the students' perception of the teacher's attitude.

Regarding student characteristics, the percentage of scholarships had a negative relationship on student ratings, which can be interpreted as evidence of the level requirement that is generated when the student's profile is academically superior. Age and the experience of the students at the institution influence their own perceptions with regard to teacher performance, both overall and in the assessment of teachers' expertise. The students' stay at the institution is an aspect that must be analyzed carefully because findings propose that students perceived a better performance while they progress in their curriculum, but not if they stay at the institution longer than expected (older and more program changes).

The academic discipline to which the course belongs has an impact on the student evaluations, both overall and in the assessment of teachers' expertise. Courses in the area of business and humanities obtain more favorable assessments than those in engineering. Grades, the result of the service, have a positive correlation with students' perceptions in relation to teacher performance, overall and in the specific aspects of expertise and attitude. Class size is negatively associated with student perceptions of teacher performance, both overall and in the aspect of attitude.

From the results of the study, a series of implications for the management of higher education institutions are derived. Considering the three Ts model (Chase and Stewart, 1994) and its

relationship to strengthen the quality of the service encounter (Stewart, 2003), we suggest the following:

- Task: to promote the consolidation of teachers in their courses by identifying the subjects that the teacher has already taught and provide them with the opportunity to retrain in those areas in which they can continue to enhance their performance.

- Task-treatment: first, to promote teacher training in techniques and ethics covering not only aspects of expertise, but also in attitude and behavior, given that – as found in this study – students mainly evaluate these two dimensions; second, to pay special attention to students who made program changes, looking as far as possible to reduce the number of changes by monitoring student processes and providing the best treatment possible. As Stewart (2003) suggests, a better treatment for the client promotes better performance.

- Task-tangibles: first, to maintain adequate class sizes, through proper planning of the number of courses to offer as well as the timely monitoring of the number of students enrolled in the groups and analysis of the spaces available. The production process of services should be planned and conducted so as not to cause moments of truth that are managed poorly (Grönroos, 1994); second, to encourage teachers to use technology as a tool to improve their performance in class, given that, as mentioned above, teacher expertise is the dimension that has a higher correlation with overall assessment, the technology and other physical resources might support them in their task.

3.6. Conclusion and directions for future research

This study suggests that customer assessments in the context of higher education are the result of employee, customer and service characteristics. Overall, it can be concluded that student evaluations of teaching are a complex phenomenon that depends on factors related to the teacher, students and courses. Particularly, it is important to mention the factors concerning the teachers' training and experience, the students' background and current experience in their institution, as well as the specific characteristics relating to the course.

As directions for future research, we propose: first, to replicate this study, expanding it to other campuses and other institutions; second, to analyze not only the perceived quality or

"subjective" quality but also quality from an objective perspective; third, to conduct a longitudinal research in order to measure the service output throughout the academic program; fourth, to measure teachers' perceptions of their performance and identify the gap between these perceptions and the results of this study; and finally, considering that the teachers' activities in universities include research as well as teaching, we also suggest that the results achieved in their research should be incorporated as a factor in the students ratings, as should an evaluation of the usefulness and contribution of the research results in teaching. As Etzkowitz and Leydesdorff (2000, p. 117) note, "teaching is the university's comparative advantage, especially when linked to research and economic development."

3.7. References[3]

Abrantes, J. L., Seabra, C., & Lages, L. P. (2007). Pedagogical affect, student interest and learning performance. *Journal of Business Research, 60*(9), 960-964.

Arnould, E., Price, L., & Zinkhan, G. (2004). *Consumers.* New York, NY: McGraw-Hill.

Badri, M. A., Abdulla, M., Ain, A., Kamali, M. A., & Dodeen, H. (2006). Identifying potential biasing variables in student evaluation of teaching in a newly accredited business program in the UAE. *International Journal of Educational Management, 20*(1), 43-59.

Bitner, M. (1995). Building service relationships: It's all about promises. *Journal of the Academy of Marketing Science, 23*(4), 246-251.

Bitner, M., Booms, B., & Mohr, L. A. (1994). Critical service encounters: The employee's viewpoint. *Journal of Marketing, 58*(4), 95-106.

Bitner, M., Faranda, W., Hubbert, A., & Zeithaml, V. (1997). Customer contributions and roles in service delivery. *International Journal of Service Industry Management*, *8*(3), 193-205.

Boex, L. (2000). Attributes of effective economics instructors: An analysis of student evaluations. *Journal of Economic Education*, *31*(3), 211-227.

Brady, M. K., & Cronin, J. J. (2001). Some new thoughts on conceptualizing perceived service quality: A hierarchical approach. *Journal of Marketing*, *65*(3), 34-49.

---

[3] The format for the reference list has been changed in order to keep the same format presented in the other chapters.

Capelleras, J. L. (2001). *Factores condicionantes de la calidad de la enseñanza universitaria: Un análisis empírico* (Doctoral thesis). Universitat Autònoma de Barcelona, Bellaterra, Barcelona.

Capelleras, J. L., & Veciana, J. M. (2004). Calidad de servicio en la enseñanza universitaria: Desarrollo y validación de una escala de medida. *Revista Europea de Dirección y Economía de la Empresa, 13*(4), 55-72.

Centra, J. A. (2003). Will teachers receive higher student evaluations by giving higher grades and less course work?. *Research in Higher Education, 44*(5), 495-518.

Centra, J. A., & Gaubatz, N. N. (2000). Is there gender bias in student evaluations of teaching?. *Journal of Higher Education*, *71*(1), 17-33.

Chase, R. B., & Stewart, D. M. (1994). Make your service fail-safe. *Sloan Management Review*, *35*(3), 35-44.

Cook, L. S., Bowen, D. E., Chase, R. B., Dasu, S., Stewart, D. M., & Tansik, D. A. (2002). Human issues in service design. *Journal of Operations Management, 20*(2), 159-174.

Cronin, J., & Taylor, S. (1992). Measuring service quality: A reexamination and extension. *Journal of Marketing, 56*(3), 55-68.

Czepiel, J., Solomon, M., & Surprenant, C. (1985). *The service encounter*. Lexington, MA: Lexington Books.

DeCanio, S. (1986). Student evaluations of teaching: A multinominal logit approach. *Journal of Economic Education, 17*(3), 165-176.

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and 'Mode2' to a Triple Helix of university–industry–government relations. *Research Policy, 29*(2), 109-123.

Gibbs, G., & Coffey, M. (2004). The impact of training of university teachers on their teaching skills, their approach to teaching and the approach to learning of their student. *Active Learning in Higher Education, 5*(1), 87-100.

Gómez, J. M. (2005). *La evaluación de la eficiencia productiva de las Universidades Públicas Españolas* (Doctoral thesis). Universidad de Zaragoza, Zaragoza

Grimes, P. W., Millea, M. J., & Woodruff, T. W. (2004). Grades – who's to blame? Student evaluation of teaching and locus of control. *The Journal of Economic Education, 35*(2), 129-147.

Grönroos, C. (1982). *Strategic Management and Marketing in the Service Sector*. Helsinki: Swedish School of Economics and Business Administration.

Grönroos, C. (1984). A service quality model and its marketing implications. *European Journal of Marketing, 18*(4), 36-44.

Grönroos, C. (1988). Service quality: The six criteria of good perceived service quality. *Review of Business, 9*(3), 10-13.

Grönroos, C. (1994). *Marketing y gestión de servicios: La gestión de los momentos de la verdad y la competencia en los servicios*. Madrid: Editorial Diaz de Santos.

Hill, F. M. (1995). Managing service quality in higher education: The role of student as primary consumer. *Quality Assurance in Education*, *3*(1), 10-21.

Hoffman, K. D., & Bateson, J. E. G. (2002). *Fundamentos de marketing de servicios: Conceptos, estrategias y casos*. Mexico: Thomson.

Isely, P., & Singh, H. (2005). Do higher grades lead to favorable student evaluations?. *The Journal of Economic Education*, *36*(1), 29-42.

Kotler, P., & Keller, K. L. (2006). *Dirección de marketing.* Mexico: Pearson.

LaTour, S. A., & Peat, N. C. (1979). Conceptual and methodological issues in consumer satisfaction research. *Advances in Consumer Research, 6*(1), 431-437.

Lavin, A., Korte, L., & Davies, T. (2012). Student gender and perceptions of teaching effectiveness. *Research in Higher Education Journal*, *18*, 1-16.

Lizzio, A., Wilson, K., & Simons, R. (2002). University student's perceptions of learning environment and academic outcomes: Implications for theory and practice. *Studies in Higher Education, 27*(1), 27-52.

McPherson, M. A., Jewell, R. T., & Kim, M. (2009). What determines student evaluation scores? A random effects analysis of undergraduate economics classes. *Eastern Economic Journal, 35*(1), 37-51.

Marsh, H. W. (1980). The influence of student, course, and instructor characteristics in evaluations of university teaching. *American Educational Research Journal*, *17*(2), 219-237.

Marsh, H. W., & Hattie, J. (2002). The relation between research productivity and teaching effectiveness: Complementary, antagonistic, or independent constructs?. *The Journal of Higher Education, 73*(5), 603-641.

Martínez, M., Buxarrais, M. R., & Esteban, F. (2002). La Universidad como espacio de aprendizaje ético. *Revista Iberoamericana de Educación, 29,* 17-43.

Marzo-Navarro, M., Pedraja-Iglesias, M., & Rivera-Torres, P. (2005). A new management element for universities: Satisfaction with the offered courses. *International Journal of Educational Management, 19*(6), 505-526.

Mora Ruíz, J.G. (1991). *Calidad y rendimiento en las instituciones universitarias*. Madrid: Consejo de Universidades, Secretaría General.

Nadiri, H., Kandampully, J., & Hussain, K. (2009). Students' perceptions of service quality in higher education. *Total Quality Management & Business Excellence*, *20*(5), 523-535.

Ng, I., & Forbes, J. (2009). Education as service: The understanding of university experience through the service logic. *Journal of Marketing for Higher Education, 19*(1), 38-64.

Oldfield, B. M., & Baron, S. (2000). Student perceptions of service quality in a UK university business and management faculty. *Quality Assurance in Education, 8*(2), 85-95.

Parasuraman, A., Zeithaml, V., & Berry, L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing, 49*(4), 41-50.

Parasuraman, A., Zeithaml, V., & Berry, L. (1988). SERVQUAL: A multiple-item scale for measuring customer perceptions of service quality. *Journal of Retailing, 64*(1), 12-40.

Parasuraman, A., Zeithaml, V., & Berry, L. (1991). Refinement and reassessment of the SERVQUAL scale. *Journal of Retailing, 67*(4), 420-450.

Peterson, R. L., Berenson, M. L., Misra, R. B., & Radosevich, D. J. (2008). An evaluation of factors regarding students' assessment of faculty in a business school. *Decision Sciences Journal of Innovative Education, 6*(2), 375-402.

Pounder, J. S. (2007). Is student evaluation of teaching worthwhile? An analytical framework for answering the question. *Quality Assurance in Education, 15*(2), 178-191.

Roth, A. V., & Menor, L. J. (2003). Insights into service operations management: A research agenda. *Production and Operations Management, 12*(2), 145-164.

Rust, R. A., & Oliver, R. L. (1994). *Service quality: New directions in theory and practice.* Thousand Oaks, CA: Sage Publications.

Santhanam, E., & Hicks, O. (2002). Disciplinary, gender and course year influences on student perceptions of teaching: Explorations and implications. *Teaching in Higher Education, 7*(1), 17-31.

Snipes, R., Thomson, N., & Oswald, S. (2006). Gender bias in customer evaluations of service quality: An empirical investigation. *Journal of Services Marketing, 20*(4), 274-284.

Spooren, P., & Mortelmans, D. (2006). Teacher professionalism and student evaluation of teaching: Will better teachers receive higher ratings and will better students give higher ratings?. *Educational Studies, 32*(2), 201-214.

Stewart, D. M. (2003). Piecing together service quality: A framework for robust service. *Production and Operations Management, 12*(2), 246-265.

Tejedor, F. J., & García-Valcárcel, A. (1996). La evaluación de la calidad de la docencia universitaria (en el marco de la evaluación institucional) desde la perspectiva del alumno. In F. J. Tejedor, & J. L. Rodríguez Diéguez (Eds.), *Evaluación educativa II, Evaluación institucional: Fundamentos teóricos y aplicaciones prácticas* (pp. 93-122). Salamanca: IUCE, Universidad de Salamanca.

Thomas, E. H., & Galambos, N. (2004). What satisfies students? Mining student-opinion data with regression and decision tree analysis. *Research in Higher Education, 45*(3), 251-269.

Wang, S., & Davis, L. (2008). Stemming the tide: Dealing with the imbalance of customer relationship quality with the key contact employee versus with the firm. *Journal of Services Marketing, 22*(7), 533-549.

Zeithaml, V. (1987). *Defining and relating price, perceived quality, and perceived value* (Report No. 87-101). Cambridge, MA: Marketing Science Institute.

Zeithaml, V., Parasuraman, A., & Berry, L. (1990). *Delivering quality service: Balancing customer perceptions and expectations*. New York, NY: The Free Press.

CHAPTER 4:

Student Orientation and Teaching Performance in Higher Education.

Abstract

By integrating two areas of research: services marketing and higher education, this paper evaluates the influence of employee customer orientation and other personal variables on self-rated performance in the context of higher education. The sample consists of 221 university teachers. Findings indicate that student orientation influences teacher's performance, suggesting that student-oriented teachers are regarded as better performers. The results also indicate that job tenure has a positive relationship on self-ratings of teaching performance, men are regarded as better performers in terms of expertise and women have demonstrated a greater customer orientation than men. These findings provide new insights into the literature in the fields of services marketing and higher education. To our knowledge, this is the first study that examines the employee customer orientation concept in the context of higher education.

Keywords: Higher education, customer orientation, teaching performance, employee performance.

4.1. Introduction

Due to globalization and market pressure, universities are under constant review to improve their performance (Watjatrakul, 2014). Marketing literature has long indicated that in order to achieve superior performance a business must create sustainable superior value for its customers. In this vein, higher education teaching is analogous to delivering services in the business sector (Desai *et al.,* 2001). As Kashif and Ting (2014:163) mention: "Higher education has been considered a business-like industry, where student needs are actively pursued in order to ensure higher levels of service quality."

Furthermore, Koris and Nokelainen (2015) suggest that since a vast amount of articles written on the marketing concept concede that any successful organization needs to be customer oriented, universities as business organizations should also practice the customer orientation approach. As Voon (2006:596) mention: "It is hard to deny that the customer is the foundation of why an organization exists". Nevertheless, Koris and Nokelainen (2015) also point out that the discussion about positioning a higher education institution (HEI) as a student-customer oriented institution has been extensive but stands fairly polarized and mainly on conceptual analysis and only a few empirical studies have been conducted.

Donavan *et al.* (2004) mention that the implementation of the marketing concept in service firms is accomplished through employees and their interactions with customers. Bitner (1995) proposes that the essence of generating beneficial relationships with customers is to keep the promises that are made, which can be either kept or broken by employees. In the context of higher education, there is a general agreement to consider students as customers (Marzo-Navarro *et al.,* 2005) and teaching as the most important factor in defining service quality in higher education (Capelleras and Veciana, 2004; Hill, 1995; Thomas and Galambos, 2004). The main service of a university is the learning experience (Ng and Forbes, 2009) and its quality is largely determined by the performance of academic staff in their teaching and research activities (Capelleras, 2001). As Kashif and Ting (2014) mention two roles are evident in higher education; students as customers, and faculty as primary service providers.

Thus, Desai *et al.,* (2001) mention that teaching is in essence a consumer service. It is mostly an intangible act, with the teacher as the provider and the student as the customer that it is similar to a buyer-seller arrangement. It is also assumed by these authors, that a customer orientation model puts the students' needs and wants at the center of teaching plans and that teachers, as service providers, are presumed to manage their customers' expectations, a common and necessary task in services marketing.

In this vein, the purpose of this study is to examine the influence of the student-customer orientation and other personal variables on self-ratings of employee performance. From an academic perspective this paper will provide new insights into the literature in the fields of services marketing and higher education. To our knowledge, this is the first study that examines the employee customer orientation concept in the context of higher education and its impact on the assessment of university teachers' performance. From a managerial perspective, this research may help managers create a competitive advantage in higher education institutions.

The remainder of this paper is organized as follows. The literature review on market orientation and customer orientation in higher education, employee customer orientation and teaching performance is presented in the following section. Then, methodology data and study variables are described. Subsequently, empirical findings are presented. Finally, conclusions are provided.

4.2. Literature review

4.2.1. Market orientation and customer orientation in higher education

To achieve superior performance, an organization must create sustainable superior value for its customers. This desire to create superior value for customer drives a business to create and maintain a market orientation (Narver and Slater, 1990). As Slater and Narver (1994:22) mention, an organization is market-oriented when "its culture is systematically and entirely committed to the continuous creation of superior customer value". According to these authors, there are three major components of market orientation – customer orientation,

competitor focus, and cross-functional coordination- which are long-term in vision and profit driven. Where "the heart of a market orientation is its customer focus." (p. 22)

However, it is important to mention that the concept of customer orientation as a component of market orientation is more than being customer-led. As Slater and Narver, (1998:1001) mention: "Customer-led philosophy, is primarily concerned with satisfying customers' expressed needs, and it is typically short term in focus and reactive in nature….market-oriented philosophy, goes beyond satisfying expressed needs to understanding and satisfying customers' latent needs and, this, is longer term in focus and proactive in nature"

Narver and Slater (1990) identified six items that characterize the hypothesized customer orientation component of market orientation. The items are related to: (a) customer commitment, (b) creation of customer value, (c) understanding of customer needs, (d) customer satisfaction objectives, (e) measurement of customer satisfaction, and (f) after-sales services.

Ng and Forbes (2009) argue that the study of universities in services marketing literature has not been widely probed, perhaps because services marketing literature tends to consider services in general, whereas literature in the field of education tends to focus on the teaching aspect. Voon (2006) mentions that especially in higher education there has been very little empirical investigation performed on the relationship between market orientation and service quality. Moreover, Koris *et al.* (2015) note that existing literature on the topic of student-customer orientation is polarized and mainly conceptual.

In the context of HEIs, there are a few empirical studies that involve the measurement of a market orientation (e.g., Hemsley-Brown and Oplatka, 2010; Voon, 2006, 2008; Webster and Hammond, 2011) or a customer orientation (eg. Alnawas, 2015, Bristow and Schneider, 2002; Koris and Nokelainen, 2015; Koris *et al.,* 2015; Pesch *et al.,* 2008). However, as Webster and Hammond (2011) mention a market orientation culture with the philosophy of providing superior value to customers should be applicable to universities as they have customers, competitors, external influences, and organizational goals.

Thus, Voon (2006) proposes a Service-Driven Market Orientation (SERVMO) scale and examines its consequences on customer-perceived service quality in higher education. This scale is adapted of Narver and Slater (1990) and includes 32-items with six components (customer orientation, competitor orientation, inter-functional coordination, performance orientation, long-term orientation and employee orientation). The six items correspond to customer orientation. Sample items include: "understanding of customer needs", "delivering quality service to customers" and "measuring customer satisfaction". Using a sample size of 558 students, Voon (2006) finds that the Service-Driven Market Orientation exerts a positive and significant effect on service quality in higher education.

Hemsley-Brown and Oplatka (2010) perform a comparative study of two national higher education systems, in order to explore whether there are significant differences between England and Israel, in terms of perceptions of market orientation in higher education. Using a sample of 68 academics and a 32-items questionnaire, it is categorized into three headings: customer (student) orientation, competitor orientation and inter-functional coordination. These authors find that academics in both countries indicated that their university is oriented towards meeting students' needs. The construct to measure customer (student) orientation comprises 18 items. Sample items include: "University measures students' satisfaction every academic year", "University cares about students' well-being", "Staff in this university are attentive to students' concerns", "A good teacher is one whose students are happy as satisfied"

Bristow and Schneider (2002) develop and empirically test a seven-item scale called the Collegiate Student Orientation Scale (CSOS) designed to measure students' perception of the degree to which a higher education institution is student oriented. According to them, "Student orientation means the degree to which a college/university takes actions and makes decisions based upon the needs of the student as well as the goals and objectives of the institution" (p.21). Sample items include: "University/College cares about students", "University/College takes the time to learn more about students" and "University/College is concerned with providing a satisfying educational experience for students". Later, Pesch *et*

al. (2008) develop the adaptation and application of CSOS in an AACSB accredited college of business.

Alnawas (2015) validate an instrument called Student Orientation (SO) using a sample of 295 heads of schools, heads of department and course directors. The instrument includes 53 items with nine components: measuring and adapting teaching practices, promoting best teaching practices, assessment and feedback, adopting outside-in-approach, student engagement, employer engagement initiatives, intra-functional coordination, inter-functional coordination and effective personal tutoring system. These authors, also test the effect of SO on student satisfaction and university reputation.

On the other hand, Koris and Nokelainen (2015) validate a model of educational experiences and a Student-customer orientation questionnaire (SCOQ) in order to explore the phenomenon of student-customer orientation at a deeper level by identify the categories of educational experience in which students expect a university to be student-customer oriented. Using a sample of 405 students and 34 items in the questionnaire, these authors find that students expect to be treated as customers in some, but not all categories of educational experience. Regarding students' expectations about their teachers, students expect to be treated as customers in terms of classroom teaching, course design and teaching methods. Thus, students expect teachers to employ methods which are interactive and entertaining, classes which are practical as opposed to theoretical. However, in terms of classroom behavior, students do not view themselves as customers and they expect teachers to establish certain rules and follow the rules throughout the course. Concerning the educational experience of grading, students stand rather indifferent and did not display specific expectations.

4.2.2. Employee customer orientation and performance

For service organizations, a market orientation is implemented largely through individual service employees, who spend considerable time with their customers (Brown *et al.,* 2002). The first attempt to directly measure employee customer orientation was performed by Saxe and Weitz (1982) who propose the Selling Orientation-Customer Orientation (SOCO) scale,

one of the most widely-used measures for customer orientation in sales research. Saxe and Weitz (1982:343) define customer orientation as "the practice of marketing concept at the level of individual salesperson and customer". Brown *et al.* (2002) adapted this work and proposed a new measure of customer orientation conceptualized as having two dimensions: a needs dimension and an enjoyment dimension. The needs dimension, which is comprised of 6 items, reflects employees' beliefs about their ability to satisfy customer needs and is based on Saxe and Weitz's (1982) scale. Sample items include: "I achieve my own goals by satisfying customers" and "I get customers to talk about their service needs with me". The enjoyment dimension is a 6-item measure and represents the degree to which service workers enjoy interacting with and providing service to customers. Sample items include: "I find it easy to smile at each of my customers" and "I really enjoy serving my customers". According to these authors, both components are necessary to fully understand a service employee's ability and motivation to serve customers by meeting their needs.

As Zablah *et al.* (2012) mention employee customer orientation has usually been conceptualized in one of two views: as a set of employee behaviors or as a psychological variable. Thus, the behavioral perspective's roots are in the work of Saxe and Weitz (1982) and the psychological perspective is largely grounded in Brown *et al.'s* (2002) conceptualization. In their work, Brown *et al.* (2002:111) define customer orientation as "an employee's tendency or predisposition to meet customer needs in an on-the job context" and consider this as a surface-level trait, which represents enduring dispositions to behave within specific situational context. As Licata *et al.* (2003) note, surface traits are proximate to behavior and have a direct effect on actual behaviors in the specific context. Nevertheless, they are not specific behaviors themselves and are distinguished from outcome variables, such as performance evaluations, which represent evaluative judgements of workplace behavior that occur at a specific point in time.

Thus, using their two-dimensional conceptualization of customer orientation, Brown *et al.* (2002) propose that customer orientation influences service worker-performance and demonstrate in the food services industry that self-ratings and supervisor ratings of overall performance are positively associated with customer orientation. In their study, performance

measures were comprised of two items that include "overall quality of work performed" and "overall quantity of work performed". Identical scales were used for self and supervisor performance evaluation.

Because customer oriented employees have an enduring predisposition to meet customer needs and will more consistently engage in the behaviors required to satisfy their customers, a positive relationship should be found between customer orientation and performance ratings (Licata *et al.,* 2003). Thus, employees high in customer orientation should have higher performance. This relationship has been found in the literature. Scholars have examined the positive influence of employee customer orientation on performance outcomes, such as: employee overall performance (Babakus *et al.,* 2009; Brown *et al.,* 2002; Cross *et al.*, 2007; Harris *et al.,* 2014; Licata *et al.,* 2003; Liaw *et al.,* 2010; Zablah *et al.,* 2012), performance of customer-oriented behaviors (Grizzle *et al.,* 2009; Stock and Hoyer, 2005) and objective performance (Harris *et al.,* 2014, Saxe and Weitz, 1982). Moreover, customer orientation has been related to other important individual-level outcomes such as: job satisfaction (Donavan *et al.,* 2004; Harris *et al.,* 2005), commitment to customer service (Peccei and Rosenthal, 1997), customers' satisfaction (Susskind *et al.*, 2003), organizational commitment and performance of organizational citizenship behaviors (Donavan *et al.,* 2004).

Licata *et al.* (2003) define self-rated job performance as: "individual judgments about one's service performance" (p.261). These authors examine the impact of customer orientation on self-ratings and supervisor ratings of performance using three different services industries. Respondents were employees at a midsize bank (study 1), restaurant employees (study 2) and nurses at a regional hospital (study 3). In the first study, the authors adapted the measure of customer orientation developed by Saxe and Weitz (1982) and use four items with the highest factor loadings. Sample items include: "I try to help customers achieve their goals" and "I am able to keep the best interest of the customers in mind". For the self-rated performance scale, they use a four-item scale concerning quality of performance regarding: customer relations, management of time, identifying customer needs, and planning needs. The supervisor-rated performance measure was a single-item obtained from the human resources department. In studies 2 and 3, Licata *et al.* (2003) use customer orientation and performance

scales developed by Brown *et al.* (2002). This work was unavailable when study 1 was conducted. The self-rated and supervisor-rated performance scales were changed to three items and include one item of "overall job performance". Identical scales were used for self and supervisor performance evaluation. The results of the three studies show that customer orientation exerted a positive significant effect on self-rated performance. However, a lack of effect for supervisor-rated performance was reported in the study 1. Similarly, Zablah *et al.* (2012) reported in their meta-analysis a positive significant influence of customer orientation on self-rated performance and a nonsignificant relationship on manager-rated performance. As Licata *et al.* (2003) also mention this lack of effects may not be that surprising, because supervisors are not always physically present to observe employee behavior.

Cross *et al.* (2007) examine that salesperson's customer orientation has a positive effect on performance and identify that a salesperson's customer orientation completely mediates the relationship between the company's customer orientation and salesperson performance. Customer orientation was measured using the 12-item scale developed by Saxe and Weitz (1982). The scale for performance evaluation comprises five items concerning the quantity of work (sales) performed, the ability to reach goals and the quality of performance regarding: customer relations, management of time, planning ability and management of expenses, as well as the knowledge of the products, the company, the competitors and customer needs. All the measures were self-reported by a single respondent in an anonymous form.

Harris *et al.* (2014) use customer orientation and performance scales developed by Brown *et al.* (2002) and examine in two distinct contexts, real estate and automobile, the influence of customer orientation on four outcomes: customer response ratings, self-rated performance, supervisor-rated performance and objective sales performance. The results of this study regarding the influence of customer orientation reveal: a positive influence on customer response in both groups; a positive influence on self-ratings only in real estate sample; a nonsignificant influence on supervisor evaluation in real estate sample and negative in the automobile sample; and the influence on objective performance was not supported in either sample.

Liaw *et al.* (2010) use the 5-item customer orientation scale developed by Susskind *et al.* (2003) and found that although customer orientation was not statistically related to employee service performance, a positive relationship did exist. Sample items of Susskind *et al.'s* (2003) scale include: "When performing my job, the customer is most important to me"; "If possible, I meet all requests made by customers"; and "I believe that providing timely, efficient service to customers is a major function of my job". The scale for employee service performance evaluation comprises 7 items. It was customer-rated and adapted from Liao and Chuang (2004). A sample item is: "This employee asks good questions and listens to find out what a customer wants". In Susskind *et al.'s* (2003) study, it was demonstrated that service providers' customer orientation was strongly related to customers' satisfaction with service.

Babakus *et al.* (2009) indicate that customer orientation has a significant and positive relationship with self-ratings of job performance. In their study, customer orientation was measured using a four-dimensional conceptualization of customer orientation developed by Donavan *et al.* (2004). This scale comprises 13 items into the following dimensions: need to pamper the customer, need to read the customers' needs, need for personal relationship, and need to deliver the service required. Sample items include: "I enjoy nurturing my customers"; "I generally know what customers want before they ask"; and "I find a great deal of satisfaction in completing tasks precisely for customers". The scale for job performance assessment comprises 4 items and it was adapted from Babin and Boles (1998). Sample items include: "I am a top performer" and "I consistently deliver better quality service than others".

In their work, Donavan *et al.* (2004) present three field studies considering two distinct contexts, financial services and food services. They validate the 13-item customer orientation scale and it was revealed in this study that customer orientation positively influences job satisfaction, commitment, and the performance of organizational citizenship behaviors (OCBs). These authors also compare their findings with those obtained using Brown *et al.'s* (2002) scale and the results were similar.

On the other hand, Grizzle *et al.* (2009) and Stock and Hoyer (2005) examine the influence of employee customer orientation on the performance of customer-oriented behaviors. As Hoffman and Ingram (1992: 69) mention: "behavior refers to what the job occupant does, that is, the tasks on which the individual expends effort while working". Thus, Grizzle *et al.* (2009:1228) refer to customer-oriented behaviors as "worker behaviors that are focused on engendering customer satisfaction". These authors adopt the Brown *et al.* (2002) two-dimensional conceptualization of customer orientation and suggest that customer orientation leads to the performance of customer-oriented behaviors because customer-oriented employees are motivated to satisfy their customers' needs. In this study the customer-oriented behaviors were assessed by the unit manager.

Stock and Hoyer (2005) provide empirical evidence for the influence of customer-orientated attitudes on the performance of customer-oriented behaviors. Customer-oriented attitude was measured based on the scale of "affective customer orientation" developed by Peccei and Rosenthal (1997, 2000). Customer-oriented behaviors were assessed by customers and measured with a reduced version of Saxe and Weitz's (1982) scale suggested by Michaels and Day (1985). Finally, Stock and Hoyer (2005) suggest that in order to fully implement a customer orientation, employees need to possess both customer-oriented attitudes and behaviors.

In their work, Peccei and Rosenthal (1997) consider four customer service orientations: affective, normative, calculative and altruistic. Also, it was found that commitment to customer service is primarily a non-calculative phenomenon driven above all by affective, normative and altruistic concerns.

Based on the literature review on employee customer orientation, Table 4.1 shows a summary of the scales developed for assessing employee customer orientation and the studies that adapted these scales in order to examine the influence of employee customer orientation on performance ratings. It is important to note that although these studies were devised from a diverse set of contexts, most of them were developed in the financial services and food

services industries and none of them have examined the influence of employee customer orientation on performance ratings in the context of higher education.

Table 4.1. Scales developed for assessing employee customer orientation (CO) and its consequences on individual-level outcomes.

Authors	Employee Customer Orientation Scale	Data (sample size & industry)	Individual-level outcome:	Studies that adapted this CO scale to examine the influence of employee customer orientation on performance ratings			
				Authors	*CO Scale*	*Data*	**Employee Performance Measures**
Saxe and Weitz (1982)	*(24 items)* Selling Orientation-Customer Orientation (SOCO) scale. Two dimensions: *Selling Orientation (12 items) *Customer Orientation (12 items)	95 salespeople. Industries: electronic components, motor vehicles and computer services.	Employee performance -*Sales performance*-	Brown *et al.* (2002)	Adapted 6 items from Saxe and Weitz (1982) and developed a new scale of *12 items.*	249 restaurant employees	-Self and Supervisor performance evaluation- *(2 items)*
				Licata *et al.* (2003)	-*Study 1*- Adapted SOCO by selecting *4 items.*	-*Study 1*- 215 bank employees	-*Study 1*- -Self-evaluation- *(4 items)* -Supervisor-evaluation- *(1 item).*
				Cross *et al.* (2007)	Adapted the *12-item* CO scale developed by Saxe and Weitz (1982)	283 business-to-business salespeople	-Self-evaluation- (*5 items* adapted from Brown and Peterson, 1994)
Peccei and Rosenthal (1997)	*(27 items)* Four Customer Service Orientations: *Affective *(2 items)* *Normative *(2 items)* *Calculative *(8 items)* *Altruistic *(15 items)*	717 employees of a major food-retailing organization.	Commitment to customer service (6 items) -*Self performance evaluation*-	Stock and Hoyer (2005)	Developed a *6-item* Customer-Oriented Attitude scale based on the affective customer orientation developed by Peccei and Rosenthal (1997, 2000)	173 employee-customer dyadic cases from different industries.	-Customer evaluation of employee Customer-Oriented Behaviors- *(7 items* adapted from SOCO scale)

Authors	Employee Customer Orientation Scale	Data (sample size & industry)	Individual-level outcome:	Studies that adapted this CO scale to examine the influence of employee customer orientation on performance ratings			
				Authors	*CO Scale*	*Data*	Employee Performance Measures
Brown *et al.* (2002)	*(12 items)* Two dimensions: *Needs dimension (6 items adapted from SOCO)* *Enjoyment dimension (6 items)*	249 service workers in the food services industry (restaurants)	Employee Performance Evaluation (2 items) *-Self and Supervisor performance evaluation-*	Licata *et al.* (2003)	*-Study 2 &3-* Adapted the *12-item* scale developed by Brown *et al.* (2002)	*-Study 2-* 278 restaurant employees. *-Study 3-* 142 nurses in a regional hospital.	*-Study 2&3-* -Self and Supervisor evaluation- *(3 items - 2 items* were taken from Brown *et al.,* 2002*)*
				Donavan *et al.* (2004)	Developed a *13-item* scale and compare their results with those obtained using Brown *et al.'s* (2002) measure.	*-Study 1-* 156 bank employees *-Study 2-* 207 restaurant employees. *-Study 3-* 253 restaurant employees.	-Self performance evaluation of Organizational Citizenship Behaviors *(OCBs)- (3 items)*
				Grizzle *et al.* (2009)	Adapted the *12-item* scale developed by Brown *et al.* (2002)	671 restaurant employees.	-Supervisor performance evaluation of employee Customer-Oriented Behaviors- *(7 items)*
				Harris *et al.* (2014)	Adapted the *12-item* scale developed by Brown *et al.* (2002)	*-Sample 1-* 107 sales associates of real estate companies. *-Sample 2-* 97 automobile salespeople.	-Self and Supervisor performance evaluation- *(2 items* adapted from *Brown et al., 2002)* -Customer response- *(3 items)* - Objective Performance- *(sales)*

Authors	Employee Customer Orientation Scale	Data (sample size & industry)	Individual-level outcome:	Studies that adapted this CO scale to examine the influence of employee customer orientation on performance ratings			
				Authors	CO Scale	Data	Employee Performance Measures
Susskind *et al.* (2003)	*(5 items)*	390 line-level service workers employed in service based facilities.	Customers' satisfaction (6 items) *-Customer evaluation-*	Liaw *et al.* (2010)	Adapted the *5-item* scale developed by Susskind *et al.* (2003)	212 employee-customer dyads from 55 service companies.	-Customer evaluation of Service Performance- *(7 items* adapted from Liao and Chuang, 2004)
Donavan *et al.* (2004)	*(13 items)* Four dimensions: *Need to pamper dimension *(4 items)* *Need to read customer's needs *(4 items)* *Need to deliver the service required *(3 items)* *Need for personal relationship *(2 items)*	*-Study 1-* 156 bank employees *-Study 2-* 207 restaurant employees. *-Study 3-* 253 restaurant employees.	Job satisfaction, organizational commitment and the performance of organizational citizenship behaviors (OCBs)	Babakus *et al.* (2009)	Adapted the *13-item* scale developed by Donavan *et al.* (2004)	530 bank employees.	-Self-evaluation of Job Performance- *(4 items* adapted from Babin and Boles, 1998)

4.2.3. Teaching performance

In the context of higher education, it is possible to appreciate that the assessment of teacher performance is an important element to evaluate the quality of the university. As Bitner *et al.* (1994) and Zeithaml *et al.* (1990) point out, a high level of service quality requires an institution to have employees with the ability and willingness to perform at the required level. The main service of a university is the learning experience (Ng and Forbes, 2009) and teachers manage this learning experience and are the main interface with students (Capelleras, 2005). It has also been found that among the different methods that have been used to collect information about teaching performance, student evaluation of teaching (SET) is one of the tools widely used in higher education (Desai *et al.,* 2001).

Thus, Capelleras and Veciana (2004) found that the competence of teachers (the level of knowledge possessed by the teacher and their ability and clarity to transmit this knowledge) as well as their attitudes and behaviors toward students have a significant impact on the assessments made by students about teaching performance. Similarly, Morales Rodríguez *et al.* (2014) indicate that students assess two main dimensions regarding teacher performance: (1) expertise to ensure the desired outcome of service and (2) the attitude and behavior. These authors also found that student perceptions of the expertise, attitude and behavior of teachers are positively and significantly related to the overall student assessment of teacher performance. As previous studies suggest, the attitude, behavior and expertise of the employee compose the quality of customer-employee interaction (Brady and Cronin, 2001) and therefore those are characteristics of employees that directly impact on the consumer experience (Czepiel *et al.,* 1985).

On the other hand, the performance of university teachers has also been assessed using the Williams and Anderson's (1991) in-role performance questionnaire. Guan *et al.* (2014) use five items based on participants' self-reports of faculty members at Chinese universities. Sample items include: "I can competently complete assigned work" "I can perform the duties of my job description" and "I never neglect my job responsibilities". Oyetunji (2013) uses 4 items based on self-reports of teachers in Botswana private universities. Gregory *et al.* (2010) and Camps and Rodríguez (2010) measure in-role performance of university faculty assessed by the teacher's supervisor using the 7-item scale. However, as Williams and Anderson (1991) mention, in-role behaviors dimension of performance is a measure of an individual's performance of behaviors that are expected as part of the requirements defined in job description and are tied to the formal reward systems of the organization. These authors also mention that in-role behaviors is a specific dimension of performance that may actually reflect the task aspects of an individual's work.

In this vein, this study does not investigate the impact of employee customer orientation on in-role behaviors, because we believe that the magnitude of the effects of customer orientation go well beyond that of in-role behaviors performance. As Donavan *et al. (*2004)

91

report customer orientation exert a positive effect on organizational citizenship behaviors (OCBs), which are employee behaviors that go beyond specified job requirements, in promoting positive outcomes for an organization.

Thus, the aim of this study is to examine the influence of the student-customer orientation and other personal variables on self-ratings of teacher performance, considering an overall assessment and the two main dimensions that students assess: (1) expertise to ensure the desired outcome of service and (2) the attitude and behavior.

As mentioned above, literature suggests that a positive relationship should be found between customer orientation and self-ratings of job performance (Babakus *et al.,* 2009; Brown *et al., 2002;* Cross *et al.*, 2007; Harris *et al.,* 2014; Licata *et al.,* 2003). Therefore, the following hypothesis is formulated:

H1: Student-customer orientation is positively and significantly related to self-ratings of teaching performance.

Previous studies suggest that job tenure may have an impact on performance evaluations. So, the longer the employee works for the organization, the more likely the employee is to be willing to provide a positive customer experience (Wang and Davis, 2008). Macintosh (2007) found that employee expertise is significantly related to relationship quality and according to O'Hara *et al.* (1991) employees' expertise could be related in part, to the experience level of the employee with the organization. Thus, the following hypothesis is formulated:

H2: Job tenure is positively and significantly related to self-ratings of teaching performance.

It is also found in the literature that the type of job that the employee does may significantly influence performance evaluations. Thus, more favorable evaluations are given for classes with qualitative content in the disciplines of humanities or social sciences (Badri *et al.*, 2006; Santhanam and Hicks, 2002). Thus, Morales Rodríguez *et al*. (2014) found that courses in

the area of business and humanities obtain more favorable assessment than those in engineering. Therefore, the following hypothesis is formulated:

H3: Teachers' academic discipline significantly influence self-ratings of teaching performance.

In this study we use teacher demographic characteristics (age and gender) as control variables. Demographic characteristics of employees are often used as control variables to formulate alternative explanations for the relationship between two hypothesized variables (Guan *et al*., 2014). Regarding the age and gender of the teacher, literature shows mixed results; however, it seems that older teachers receive better evaluations (Kinney and Smith, 1992) and that gender exerts an effect on assessments (Feldman, 1993; Husbands, 1996; Kierstead *et al*. 1988). Thus, Morales Rodríguez *et al*. (2014) found that students perceive men have a better performance in terms of expertise, but women in attitude; and that the younger the teacher is, the better the student's perception regarding the teacher's attitude.

Figure 4.1, shows, in brief, the model proposed in this paper. It is important to note that besides analyzing the effect of job-related aspects (job tenure and academic discipline) and demographic characteristics (age and gender) on self-performance assessment, we examine the influence of these variables on customer orientation. As O'Hara *et al.* (1991) mention, a clear understanding of which personal characteristics influence a customer oriented approach is important because it can help managers in the selection and training of new employees. Prior research has found some support for the effects of gender and job tenure on customer orientation (Babakus *et al.,* 2009; O'Hara *et al.,* 1991; Widmier, 2002). Thus, job tenure, under certain circumstances, has been found to be negatively related to customer orientation (O'Hara *et al.,* 1991; Widmier, 2002) and women have demonstrated a greater customer orientation than men (Babakus *et al.,* 2009; O'Hara *et al.,* 1991). Hence, the following hypothesis is formulated:

H4: Teacher demographic characteristics (age and gender) and job-related aspects (job tenure and academic discipline) are positively and significantly related to student-customer orientation.

Figure 4.1. Student orientation and teaching performance in higher education
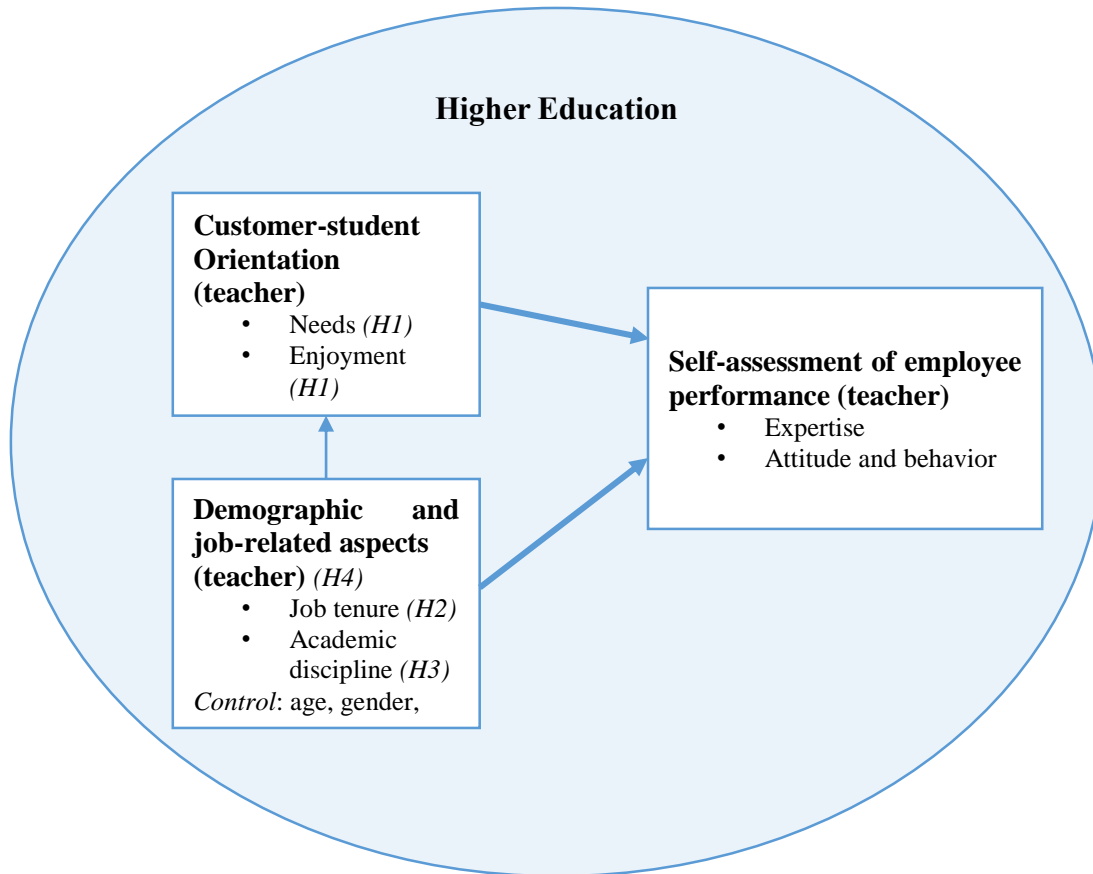
4.3. Sample and variables

A total of 221 university teachers employed in Mexico were sampled for this investigation. Demographic and job-related questions were included in the questionnaire to provide a good description of the background and characteristics of respondents. The participants were 42% male and 58% female, were between the ages of 25 and 80 years, had worked for the university at the time of the survey administration for an average of 12 years, and represented 13 different universities in 15 states of Mexico. Data were collected by developing an internet version of the survey on google forms, which lasted for 1 month. The web-based survey instrument was distributed by e-mail in March 2016 to department heads and faculty of

Mexican universities. A total of 85 department heads and faculty were initially contacted to participate in this survey and were invited to share the instrument and the initial covering letter with their colleagues. The survey instrument along with the initial covering letter, is presented in Appendix 2 (Spanish version) and Appendix 3 (English translation). Considering the size of the academic departments invited to participate, the target population was approximately 700 teachers (the exact count is unknown because some participants sent the survey directly to their colleagues). A total of 239 teachers started the survey, 231 responses were received, and after listwise deletion 221 responses were left for a response rate of 32%. Table 4.2 shows the analysis of frequencies and descriptive statistics in order to identify the profile of the participants.

Table 4.2. Descriptive statistics

	Min	Max	Mean	Frequency	%
Age (years)	25	80	44		
Job Tenure (months)	4	492	149		
Gender (female)				129	58.4
Academic discipline (business and humanities)				170	76.9
Work status					
Part-time teacher				109	49.3
Full-time teaching				32	14.5
Full-time teaching +administrative duties				63	28.5
Full-time teaching +research duties				17	7.7
Type of university (private)				196	88.7

Note: $n=221$

Measures

Customer-Student Orientation. The customer orientation measure was taken from Brown *et al.* (2002) study. Following these authors, we proceed from the point of view that employee customer orientation is psychological. Thus, this scale asks teachers for self-reflective assessments of an internal psychological state using strongly disagree and strongly agree anchors. Teachers have to indicate their level of agreement with each question on a 5-choice metric with anchors ranging from 1=strongly disagree to 5= strongly agree. The survey questions were translated into Spanish and slightly adapted to reflect students as customers. This measure is comprised of 12 items: six items for the "needs" dimension and six items for

the "enjoy" dimension. Sample items includes: "I enjoy remembering my students' names", "I am able to answer a student's questions correctly" and "I really enjoy serving my students". Thus, the survey questions reflect a teacher's tendency or predisposition to meet student needs, which would lead to a good teaching. Desai *et al.,* (2001) explore the beliefs of students and faculty about what constitutes good teaching on higher educational setting and the following are some indicators of good teaching: "Learning the name of each student and use it in class" "Give appropriate and considerate response to questions" "Show enthusiasm for students and subject matter"

Teaching Performance. The teaching performance measure was elaborated considering services marketing and higher education literature, as well as on the basis of personal interviews with teachers and academicians specializing in the areas services marketing who evaluated the items for face validity. As Torres Ortega (2016) mentions, it is found in the literature that in the process of item generation, scholars mainly use literature review and interviews to generate the items of the scale and that it is necessary to have the items reviewed by experts to assess their quality.

The teaching performance measure is comprised of 3 items: an overall assessment, and the two main dimensions of teacher performance: (1) level of expertise and (2) attitude and behavior towards students. Teachers have to indicate their self-assessment with each question on a 5-choice metric with anchors ranging from 1=worst to 5=outstanding.

Job tenure. The job tenure measure was obtained using an open-ended question that asked how long (years and months) the teachers have been employed by the university. Responses were converted to a monthly scale for data analysis.

Academic discipline. Two academic disciplines were identified for data analysis (business and humanities=1, engineering and sciences=0)

Control variables. We controlled for teacher gender (men=1, women=0) and age (in years) to ensure that these demographic factors did not influence employee performance.

The questionnaire was pre-tested with a pilot sample of 8 teachers and because the survey requested no identifying information, we hope that that anonymity helped to reduce social desirability bias. A listing of the measurement items for each construct appears in the Appendix 4.

The data analysis was performed first with the analysis of frequencies and descriptive statistics in order to identify the profile of the teachers. Then a Cronbach reliability test was conducted for each scale and subscale to confirm internal reliability. Subsequently, factor analysis was performed for all the perceptual measures of customer orientation in order to confirm the underlying structure of the scale and subscales. Then using multiple regression analysis, the influence of employee customer orientation and other personal variables on self-assessment of teacher performance was examined. Finally, using non-parametric tests, additional analyses were performed in order to investigate the impact of university type (public versus private) and teachers' work status on customer orientation and self-performance evaluations. Four categories of work status are considered: part-time; full-time teaching, full-time teaching and administrative job; and full-time teaching and research position. According to Wotruba's (1990) study there are differences in performance among full-time and part-time employees, where part-time salespeople were better performers.

4.4. Results

To evaluate the reliability of the scales and subscales, Cronbach reliability tests were conducted on the survey data. Cronbach's alpha coefficients ranged from 0.67 to 0.81. Overall, the constructs identified indicated satisfactory levels of internal reliability. Table 4.3 shows the Cronbach's Alpha coefficients.

Table 4.3. Reliability analysis

	Customer Orientation *(12 items)*	Customer Orientation Needs Dimension *(6 items)*	Customer Orientation Enjoyment Dimension *(6 items)*	Performance *(3 items)*
Cronbach's Alpha	0.807	0.666	0.713	0.804

Regarding the instrument of customer orientation, after verifying internal validity and using principal component analysis and varimax rotation, it was possible to confirm the underlying constructs. This analysis supported the use of Brown *et al.'s* (2002) scale and subscales. Table 4.4 shows factor loadings.

Table 4.4. Factor analysis for customer orientation.

		Customer Orientation *(12 items)*	Customer Orientation -Needs Dimension- *(6 items)*	Customer Orientation -Enjoyment Dimension- *(6 items)*
1	Helping students to achieve goals	0.649	0.647	
2	Achieving own goals by satisfying students	0.647	0.701	
3	Getting students to talk about their needs	0.589	0.697	
4	Problem-solving approach	0.492	0.603	
5	Interests of the student in mind	0.574	0.673	
6	Answer student's questions correctly	0.337	0.305	
7	Smile at students	0.506		0.577
8	Remembering students' names	0.514		0.611
9	Empathy for students	0.695		0.742
10	Quick response to students' requests	0.509		0.550
11	Satisfaction from making students happy	0.616		0.691
12	Enjoy serving	0.738		0.722
	Kaiser-Meyer-Olkin measure	**0.857**	**0.731**	**0.769**
	Bartlett's test of sphericity Sig.	**0.000**	**0.000**	**0.000**

Tables 4.5 and 4.6 present the results of the multiple regression analysis that examined the relationship between each of the independent variables of the study and the self-assessments regarding the overall teacher performance and the two main dimensions: (1) level of expertise and (2) attitude and behavior towards students. In table 4.5 customer orientation was included as a one-dimensional construct. In table 4.6 customer orientation was conceptualized as having a needs dimension and an enjoyment dimension. In both analyses the VIF did not reach high values so multicollinearity problems were discarded.

Table 4.5. Multiple regression analysis for teaching performance. Customer orientation as a one-dimensional construct.

	Teaching Performance								
	Overall opinion			Expertise			Attitude and behavior		
	B	β	t	B	β	T	B	β	t
Customer Orientation (H1)	0.170	0.309	4.724***	0.216	0.360	5.574***	0.227	0.421	6.677***
Gender	0.031	0.028	0.411	0.162	0.134	2.018*	-0.020	-0.019	-0.286
Age	-0.001	-0.025	-0.296	0.003	0.041	0.482	-0.005	-0.081	-0.979
Job tenure (H2)	0.001	0.226	2.669**	0.001	0.135	1.622	0.001	0.166	2.036*
Academic discipline (H3)	0.035	0.027	0.416	-0.100	-0.070	-1.119	0.018	0.014	0.228
	F=7.072***			F=8.341***			F=10.860***		
	R^2=0.142			R^2=0.164			R^2=0.203		
	R^2 adjusted=0.122			R^2 adjusted=0.144			R^2adjusted=0.184		

Notes: (†) sig <0.10;*sig<0.05; **sig<0.01;***sig<0.001

Table 4.6. Multiple regression analysis for teaching performance. Customer orientation as having two dimensions.

	Teaching Performance								
	Overall opinion			Expertise			Attitude and behavior		
	B	β	t	B	β	t	B	β	t
Customer (H1) Orientation_Needs	0.051	0.092	1.083	0.069	0.115	1.361	0.077	0.142	1.732†
Customer (H1) Orientation_Enjoy	0.133	0.242	2.793**	0.165	0.275	3.221**	0.171	0.317	3.810***
Gender	0.036	0.032	0.476	0.168	0.139	2.076*	-0.014	-0.013	-0.193
Age	-0.002	-0.028	-0.328	0.002	0.038	0.445	-0.005	-0.084	-1.019
Job tenure (H2)	0.001	0.228	2.696**	0.001	0.138	1.654†	0.001	0.169	2.074*
Academic discipline (H3)	0.024	0.018	0.285	-0.113	-0.079	-1.242	0.006	0.005	0.076
	F=5.885***			F=6.929***			F=9.135***		
	R^2=0.143			R^2=0.164			R^2=0.205		
	R^2 adjusted = 0.119			R^2 adjusted =0.140			R^2 adjusted =0.183		

Notes: (†) sig <0.10;*sig<0.05; **sig<0.01;***sig<0.001

As presented in these tables H1 is supported as the student orientation is positively and significantly related to self-ratings of teaching performance. H2 is also supported as job

tenure is significantly related to self-assessments of teacher performance. H3 could not be supported because the academic discipline does not indicate a significant effect on self-ratings of teaching performance. Regarding teacher demographic characteristics (age and gender), the effect of teachers' gender on self-assessments of teacher performance is significant, but not the age of the teacher.

On the other hand, the effect of teacher demographic characteristics (age and gender) and job-related aspects (job tenure and academic discipline) on customer orientation constructs, was also analyzed and H4 is supported insofar as the expected relationship between teachers' gender and customer orientation. Thus, Table 4.7 presents the results of the multiple regression analysis that examined the influence of personal variables (age, gender, job tenure and academic discipline) on customer orientation. Customer orientation was considered as a one-dimensional construct and as having two main dimensions: needs and enjoyment. As presented in this table and consistent with prior research, gender had a significant impact on customer orientation, where women exhibited more customer orientation than men.

Table 4.7. Multiple regression analysis for customer orientation.

	Customer-Student Orientation								
	Customer Orientation			Needs			Enjoyment		
	B	β	T	B	β	t	B	B	t
Gender (H4)	-0.482	-0.239	-3.498***	-0.345	-0.171	-2.478*	-0.524	-0.259	-3.806***
Age (H4)	0.005	0.046	0.514	0.003	0.025	0.273	0.006	0.061	0.683
Job tenure (H4)	0.000	0.012	0.130	0.000	0.028	0.316	0.000	-0.008	-0.090
Academic discipline (H4)	-0.092	-0.039	-0.583	-0.228	-0.096	-1.429	0.050	0.021	0.315
	F=3.222*			F=2.074 †			F=3.777**		
	R^2=0.057			R^2=0.037			R^2=0.066		
	R^2 adjusted=0.039			R^2 adjusted=0.019			R^2adjusted=0.048		

Notes: (†) sig <0 .10;*sig<0.05; **sig<0.01;***sig<0.001

While not hypothesized, the impact of university type and teachers' work status on customer orientation and self-performance evaluations was also examined. Mann-Whitney U and

Kruskal–Wallis tests were performed to this end. In Table 4.8, the results of Mann-Whitney U test show significant differences in customer orientation among teachers in public and private universities. Considering the average ranks of the groups, teachers of private universities show the greatest customer orientation, seeing it as a one-dimensional construct and in terms of the enjoyment dimension. There are no differences in terms of teaching performance among teachers in public and private universities.

Table 4.8. Mann-Whitney U Test between public and private universities.

		Teaching performance					
		Overall Opinion		**Expertise**		**Attitude and behavior**	
University Type	**n**	**Mean Rank**	**Sum of Ranks**	**Mean Rank**	**Sum of Ranks**	**Mean Rank**	**Sum of Ranks**
Public	25	102.70	2567.50	106.10	2652.50	97.84	2446.00
Private	196	112.06	21963.50	111.63	21878.50	112.68	22085.00
Total	221						
U de Mann-Whitney		*2242.500*		*2327.500*		*2121.000*	
Z		*-.787*		*-.460*		*-1.285*	
Asymp sig.		*.431*		*.646*		*.199*	

		Customer-Student Orientation					
		Customer Orientation		**Needs**		**Enjoyment**	
University Type	**n**	**Mean Rank**	**Sum of Ranks**	**Mean Rank**	**Sum of Ranks**	**Mean Rank**	**Sum of Ranks**
Public	25	82.46	2061.50	93.20	2330.00	77.30	1932.50
Private	196	**114.64**	22469.50	113.27	22201.00	**115.30**	22598.50
Total	221						
U de Mann-Whitney		*1736.500*		*2005.000*		*1607.500*	
Z		*-2.370*		*-1.480*		*-2.835*	
Asymp sig.		**.018**		*.139*		**.005**	
		Reject				***Reject***	

In table 4.9, the results of the Kruskal-Wallis test show that there is a significant difference between teacher performance and customer orientation in the different work status presented. Considering the average ranks of the groups, part-time teachers have the greatest customer orientation, seeing it as a one-dimensional construct and in terms of the needs dimension. Full-time teaching faculty have the greatest performance in terms of expertise.

Table 4.9. Kruskal-Wallis Test between teachers' work status.

		Teaching performance			Customer-Student Orientation		
		Overall Opinion	Expertise	Attitude and behavior	Customer Orientation	Needs	Enjoyment
Work status	**n**	Mean Rank	Mean Rank	Mean Rank	Mean Rank	Mean Rank	Mean Rank
Part-time teacher	109	115.16	114.94	114.57	**124.17**	**122.87**	121.62
Full-time teaching	32	122.58	**130.25**	105.41	93.88	103.19	92.05
Full-time teaching +administrative duties	63	96.21	92.45	106.35	99.68	96.13	106.21
Full-time teaching +research duties	17	117.35	118.24	115.88	100.74	104.71	96.32
Total	221						
Chi-Square Test		6.590	11.267	1.407	*9.334*	7.821	7.254
df		3	3	3	*3*	3	3
Asymp sig.		.086	**.010**	.704	*.025*	**.050**	.064
			Reject		*Reject*	*Reject*	

4.5. Discussion and recommendations

This study has examined the employee customer orientation concept in the context of higher education and the impact of this approach and other personal variables on the assessment of university teachers' performance. The results of this study show that student orientation is positively and significantly related to self-ratings of teaching performance, suggesting that student-oriented teachers are regarded as better performers. This finding is in line with previous studies, which suggest that customer orientation exerted a positive and significant effect on self-rated performance (Babakus *et al.,* 2009; Brown *et al.,* 2002; Harris *et al.,* 2014; Licata *et al.,* 2003; Cross *et al.,* 2007; Zablah *et al.,* 2012).

The influence of employee customer orientation on self-rated performance in the context of higher education has been examined considering customer-student orientation as a one-dimensional construct and as having a needs dimension and an enjoyment dimension. Considering customer-student orientation as a one-dimensional construct, it was identified that student orientation exerts a positive and significant effect on self-rated performance, overall and in the specific aspects of expertise and attitude. Seeing customer orientation, as conceptualized by Brown *et al.* (2002), having two main dimensions: needs and enjoyment, it was noted that the needs dimension is only related to the self-assessment in the aspect of

attitude. The needs dimension is conceptualized as the teachers' beliefs about their ability to satisfy students' needs. The enjoyment dimension, which represents the degree to which teachers enjoy interacting with and providing service to students, is positively related to self-ratings of teaching performance, overall and in the specific aspects of expertise and attitude. This finding suggests that teachers' perception about the students' needs is an aspect that must be analyzed carefully. As Desai *et al.* (2001:138) suggest: "Employing a consumer or marketing orientation only suggests that the educator remembers the human interaction aspect of teaching and the notion that it all begins with student needs and wants but not at the expense of lowered teaching standards. The teacher may find that the instruction improves, for example, because students feel more involved."

By examining the explanatory power of the models it is possible to observe that the greatest adjusted R^2 is obtained by relating the independent variables of the study to the attitude and behavior dimension (0.18), followed by the expertise dimension (0.14) and finally, by the overall assessment (0.12). This finding suggests that the variables enclosed in this study provide a further explanation to the phenomenon of self-ratings of teaching performance regarding the attitudes and behaviors and that besides these, there are other variables that influence self-performance assessment.

About job-related aspects, it was identified that job tenure had a positive relationship on self-ratings of teaching performance in aspects related to overall assessment and attitude. This finding is in line with previous studies that suggest that the longer the employee works for the organization, the more likely the employee is to be willing to provide a positive customer experience (Wang and Davis, 2008).

Regarding teacher demographic characteristics, gender had a positive relationship on self-assessments of teacher performance, particularly in aspects related to expertise. Thus, men are regarded as better performers in terms of expertise. Similarly, Morales Rodríguez *et al.* (2014) identified that students perceive men have a better performance in terms of expertise. Therefore, students' and teachers' perceptions of men's expertise seem to agree.

By analyzing the effect of personal variables on customer orientation constructs, gender had a significant impact on customer orientation. This finding is in line with prior research where women have demonstrated a greater customer orientation than men (Babakus *et al.,* 2009; O'Hara *et al.,* 1991). By examining the explanatory power of the models, findings suggest that teacher demographic characteristics (age and gender) and job-related aspects (job tenure and academic discipline) provide a further explanation to the enjoyment dimension of customer orientation (0.05), followed by the overall customer orientation (0.04) and finally, by the needs dimension (0.02)

Furthermore, the results of non-parametric tests revealed significant differences in customer orientation among teachers in public and private universities and in the different work status presented. Thus, the greatest level of customer orientation is presented on teachers of private universities and part-time teachers while full-time teaching faculty have the greatest performance in terms of expertise. This result suggests that apparently, in order to provide a positive customer experience, full-time teachers have placed more emphasis on improving their performance in terms of expertise than in terms of attitude and behavior.

4.6. Conclusion and directions for future research

The results of this study suggest that student-customer orientation enhances teachers' performance. This research also highlights the importance of improving our understanding of the personal characteristics affecting employee performance and customer orientation. Thus, it was revealed that job tenure has a positive relationship on self-ratings of teaching performance, men are regarded as better performers in terms of expertise and women have shown a greater customer orientation.

We acknowledge several limitations of our study. First, all the measures were self-reported by a single respondent, the teacher. We did not measure the teacher performance by asking the students or the head of department. Second, the universities examined here were mainly private and we had a relatively small sample size of public universities. Finally, this study was focused on one country, Mexico. As a direction for future research, we propose to replicate this study in another country. An international comparison is also recommended in

order to examine the impact of customer orientation on teaching performance at universities of different countries. Future studies should extend the measurement of teacher performance to other sources, such as supervisor, co-workers and students. We also encourage future studies to examine which mechanisms could motivate teachers to equally improve their performance in both attitude and behavior and expertise terms. Finally, we suggest to examine the impact of customer orientation, at the levels of both the university and the teacher, on teaching performance.

4.7. References

Alnawas, I. (2015). Student orientation in higher education: Development of the construct. *Higher Education*, *69*(4), 625-652.

Babakus, E., Yavas, U., & Ashill, N. J. (2009). The role of customer orientation as a moderator of the job demand–burnout–performance relationship: A surface-level trait perspective. *Journal of Retailing*, *85*(4), 480-492.

Babin, B. J., & Boles, J. S. (1998). Employee behavior in a service environment: A model and test of potential differences between men and women. *Journal of Marketing, 62*(2), 77-91.

Badri, M. A., Abdulla, M., Kamali, M. A., & Dodeen, H. (2006). Identifying potential biasing variables in student evaluation of teaching in a newly accredited business program in the UAE. *International Journal of Educational Management*, *20*(1), 43-59.

Bitner, M. (1995). Building service relationships: It's all about promises. *Journal of the Academy of Marketing Science, 23*(4), 246-251.

Bitner, M. J., Booms, B. H., & Mohr, L. A. (1994). Critical service encounters: The employee's viewpoint. *Journal of Marketing, 58*(4), 95-106.

Brady, M. K., & Cronin, J. J. (2001). Some new thoughts on conceptualizing perceived service quality: A hierarchical approach. *Journal of Marketing*, *65*(3), 34-49.

Bristow, D. N., & Schneider, K. C. (2002). The collegiate student orientation scale (CSOS): Application of the marketing concept to higher education. *Journal of Marketing for Higher Education*, *12*(2), 15-34.

Brown, S. P. & Peterson, R. A. (1994). The effect of effort on sales performance and job satisfaction. *Journal of Marketing*, 58(2), 70-80.

Brown, T. J., Mowen, J. C., Donavan, D. T., & Licata, J. W. (2002). The customer orientation of service workers: Personality trait effects on self-and supervisor performance ratings. *Journal of Marketing Research*, *39*(1), 110-119.

Camps, J., & Rodríguez, H. (2011). Transformational leadership, learning, and employability: Effects on performance among faculty members. *Personnel Review*, *40*(4), 423-442.

Capelleras, J. L. (2001). *Factores condicionantes de la calidad de la enseñanza universitaria: Un análisis empírico* (Doctoral thesis). Universitat Autònoma de Barcelona, Bellaterra, Barcelona.

Capelleras, J. L. (2005). Attitudes of academic staff towards their job and organisation: An empirical assessment. *Tertiary Education and Management*, *11*(2), 147-166.

Capelleras, J. L., & Veciana, J. M. (2004). Calidad de servicio en la enseñanza universitaria: Desarrollo y validación de una escala de medida. *Revista Europea de Dirección y Económía de la Empresa, 13*(4), 55-72.

Cross, M. E., Brashear, T. G., Rigdon, E. E., & Bellenger, D. N. (2007). Customer orientation and salesperson performance. *European Journal of Marketing*, *41*(7/8), 821-835.

Czepiel, J., Solomon, M., & Surprenant, C. (1985). *The service encounter*. Lexington, MA: Lexington Books.

Desai, S., Damewood, E., & Jones, R. (2001). Be a good teacher and be seen as a good teacher. *Journal of Marketing Education, 23*(2), 136-144.

Donavan, D. T., Brown, T. J., & Mowen, J. C. (2004). Internal benefits of service-worker customer orientation: Job satisfaction, commitment, and organizational citizenship behaviors. *Journal of marketing*, *68*(1), 128-146.

Feldman, K.A. (1993). College students' views of male and female college teachers: Part II--Evidence from students' evaluations of their classroom teachers. *Research in Higher Education*, *34*(2), 151-211.

Gregory, B. T., Albritton, M. D., & Osmonbekov, T. (2010). The mediating role of psychological empowerment on the relationships between P–O fit, job satisfaction, and in-role performance. *Journal of Business and Psychology*, *25*(4), 639-647.

Grizzle, J. W., Zablah, A. R., Brown, T. J., Mowen, J. C., & Lee, J. M. (2009). Employee customer orientation in context: How the environment moderates the influence of

customer orientation on performance outcomes. *Journal of Applied Psychology*, *94*(5), 1227.

Guan, X., Sun, T., Hou, Y., Zhao, L., Luan, Y. Z., & Fan, L. H. (2014). The relationship between job performance and perceived organizational support in faculty members at Chinese universities: A questionnaire survey. *BMC medical education*, *14*, 50.

Harris, E. G., Brown, T. J., Mowen, J. C., & Artis, A. (2014). Exploring the role of productivity propensity in frontline employee performance: Its relationship with customer orientation and important outcomes. *Psychology & Marketing*, *31*(3), 171-183.

Harris, E. G., Mowen, J. C., & Brown, T. J. (2005). Re-examining salesperson goal orientations: Personality influencers, customer orientation, and work satisfaction. *Journal of the Academy of Marketing Science*, *33*(1), 19-35.

Hemsley-Brown, J., & Oplatka, I. (2010). Market orientation in universities: A comparative study of two national higher education systems. *International Journal of Educational Management*, *24*(3), 204-220.

Hill, F. M. (1995). Managing service quality in higher education: The role of the student as primary consumer. *Quality assurance in education*, *3*(3), 10-21.

Hoffman, K. D., & Ingram, T. N. (1992). Service provider job satisfaction and customer-oriented performance. *Journal of Services Marketing*, *6*(2), 68-78.

Husbands, C. T. (1996). Variations in student's evaluations of teachers' lecturing and small-group teaching: A study at the London school of economics and political science. *Studies in Higher Education*, *21*(2), 187-206

Kashif, M., & Ting, H. (2014). Service-orientation and teaching quality: Business degree students' expectations of effective teaching. *Asian Education and Development Studies*, *3*(2), 163-180.

Kierstead, D., D'Agostino, P., & Dill, H. (1988). Sex role stereotyping of college professors: Bias in students' ratings of instructors. *Journal of Educational Psychology*, *80*(3), 342.

Kinney, D. P., & Smith, S. P. (1992). Age and teaching performance. *The Journal of Higher Education, 63*(3), 282-302.

Koris, R., & Nokelainen, P. (2015). The student-customer orientation questionnaire (SCOQ) Application of customer metaphor to higher education. *International Journal of Educational Management*, *29*(1), 115-138.

Koris, R., Örtenblad, A., Kerem, K., & Ojala, T. (2015). Student-customer orientation at a higher education institution: The perspective of undergraduate business students. *Journal of Marketing for Higher Education*, *25*(1), 29-44.

Liao, H., & Chuang, A. (2004). A multilevel investigation of factors influencing employee service performance and customer outcomes. *Academy of Management Journal, 47*(1), 41-58.

Liaw, Y. J., Chi, N. W., & Chuang, A. (2010). Examining the mechanisms linking transformational leadership, employee customer orientation, and service performance: The mediating roles of perceived supervisor and coworker support. *Journal of Business and Psychology, 25*(3), 477-492.

Licata, J. W., Mowen, J. C., Harris, E. G., & Brown, T. J. (2003). On the trait antecedents and outcomes of service worker job resourcefulness: A hierarchical model approach. *Journal of the Academy of Marketing Science*, *31*(3), 256-271.

Macintosh, G. (2007). Customer orientation, relationship quality, and relational benefits to the firm. *Journal of Services Marketing*, *21*(3), 150-159.

Marzo Navarro, M., Pedraja Iglesias, M., & Rivera Torres, P. (2005). A new management element for universities: Satisfaction with the offered courses. *International Journal of educational management*, *19*(6), 505-526.

Michaels, R. E., & Day, R. L. (1985). Measuring customer orientation of salespeople: A replication with industrial buyers. *Journal of Marketing Research*, *22*(4), 443-446.

Morales Rodríguez, A., Capelleras, J. L., & Gimenez Garcia, V. M. (2014). Teaching performance: Determinants of the student assessment. *Academia Revista Latinoamericana de Administración*, *27*(3), 402-418.

Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, *54*(4), 20-35.

Ng, I. C., & Forbes, J. (2009). Education as service: The understanding of university experience through the service logic. *Journal of Marketing for Higher Education*, *19*(1), 38-64.

O'Hara, B. S., Boles, J. S., & Johnston, M. W. (1991). The influence of personal variables on salesperson selling orientation. *Journal of Personal Selling & Sales Management*, *11*(1), 61-67.

Oyetunji, C. O. (2013). The relationship between followership style and job performance in Botswana private universities. *International Education Studies*, *6*(2), 179-187.

Peccei, R., & Rosenthal, P. (1997). The antecedents of employee commitment to customer service: Evidence from a UK service context. *International Journal of Human Resource Management, 8*(1), 66-86.

Peccei, R., & Rosenthal, P. (2000). Front-line responses to customer orientation programmes: A theoretical and empirical analysis. *International Journal of Human Resource Management*, *11*(3), 562-590.

Pesch, M., Calhoun, R., Schneider, K., & Bristow, D. (2008). The student orientation of a college of business: An empirical look from the students' perspective. *The Marketing Management Journal*, *18*(1), 100-108.

Santhanam, E., & Hicks, O. (2002). Disciplinary, gender and course year influences on student perceptions of teaching: Explorations and implications. *Teaching in Higher Education*, *7*(1), 17-31.

Saxe, R., & Weitz, B. A. (1982). The SOCO scale: A measure of the customer orientation of salespeople. *Journal of Marketing Research, 19*(3), 343-351.

Slater, S. F., & Narver, J. C. (1994). Market orientation, customer value, and superior performance. *Business Horizons*, *37*(2), 22-28.

Slater, S. F., & Narver, J. C. (1998). Customer-led and market-oriented: Let's not confuse the two. *Strategic Management Journal, 19*(10), 1001-1006.

Stock, R. M., & Hoyer, W. D. (2005). An attitude-behavior model of salespeople's customer orientation. *Journal of the Academy of Marketing Science*, *33*(4), 536-552.

Susskind, A. M., Kacmar, K. M., & Borchgrevink, C. P. (2003). Customer service providers' attitudes relating to customer service and customer satisfaction in the customer-server exchange. *Journal of Applied Psychology*, *88*(1), 179-187.

Thomas, E. H., & Galambos, N. (2004). What satisfies students? Mining student-opinion data with regression and decision tree analysis. *Research in Higher Education*, *45*(3), 251-269.

Torres Ortega, R. (2016). *From market orientation to orientation towards international markets (OIM) of born global firms: Evaluating the impact of OIM on born global firms' performance* (Doctoral thesis). Universitat Autònoma de Barcelona, Bellaterra, Barcelona.

Voon, B. H. (2006). Linking a service-driven market orientation to service quality. *Managing Service Quality*, *16*(6), 595-619.

Voon, B. H. (2008). SERVMO: A measure for service-driven market orientation in higher education. *Journal of Marketing for Higher Education*, *17*(2), 216-237.

Wang, S., & Davis, L. (2008). Stemming the tide: Dealing with the imbalance of customer relationship quality with the key contact employee versus with the firm. *Journal of Services Marketing*, *22*(7), 533-549.

Watjatrakul, B. (2014). Factors affecting students' intentions to study at universities adopting the "student-as-customer" concept. *International Journal of Educational Management*, *28*(6), 676-693.

Webster, R. L., & Hammond, K. L. (2011). Are students and their parents viewed as customers by AACSB-International member schools? Survey results and implications for university business school leaders. *Academy of Educational Leadership Journal*, *15*(2), 1-17.

Widmier, S. (2002). The effects of incentives and personality on salesperson's customer orientation. *Industrial Marketing Management*, *31*(7), 609-615.

Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of management*, *17*(3), 601-617.

Wotruba, T. R. (1990). Full-time vs. part-time salespeople: A comparison on job satisfaction, performance, and turnover in direct selling. *International Journal of Research in Marketing, 7*(2), 97-108.

Zablah, A. R., Franke, G. R., Brown, T. J., & Bartholomew, D. E. (2012). How and when does customer orientation influence frontline employee job outcomes? A meta-analytic evaluation. *Journal of Marketing*, *76*(3), 21-40.

Zeithaml, V. A., Parasuraman, A., & Berry, L. L. (1990). *Delivering quality service: Balancing customer perceptions and expectations*. The Free Press, New York, NY.

Appendix

Appendix 2. Initial covering letter and web-based survey instrument (Spanish version).

Estimado Profesor,

Mi nombre es Adriana Morales Rodríguez, soy estudiante del Programa de Doctorado en Creación y Gestión de Empresas por la Universitat Autònoma de Barcelona y Directora del Departamento de Negocios en el Tecnológico de Monterrey Campus Tampico. Actualmente me encuentro en la fase de elaboración de la tesis doctoral y agradecería mucho contar con tu valiosa participación para responder una breve encuesta. La información que proporciones será anónima, no te llevará más de 5 minutos en contestarla y representará información valiosa en la investigación que estoy realizando en el área de orientación al cliente y calidad en el servicio en el contexto de Instituciones de Educación Superior.

El objetivo de esta encuesta es examinar si existe una relación entre el grado de orientación al cliente (alumno) que presenta el profesorado universitario en México y su desempeño como profesor, considerando una valoración global y dos dimensiones de su desempeño:(1) el nivel de competencia para asegurar el resultado deseado del servicio y (2) la actitud y comportamiento hacia sus alumnos. Por favor considera que por "servicio" nos referimos a la experiencia del aprendizaje que brindas como profesor a tus alumnos.

Muchas gracias por dedicar unos minutos de tu valioso tiempo y completar esta encuesta, la cual estará disponible hasta el 7 de abril del 2016. Tu opinión es muy importante, si eliges participar por favor selecciona el siguiente enlace:

http://goo.gl/forms/waea39IS1Y

¡Muchas gracias!

Adriana Morales Rodríguez

Orientación al alumno y desempeño docente

De antemano agradezco tu valiosa participación para responder esta breve encuesta. La información que proporciones será anónima, no te llevará más de 5 minutos en contestarla y representará información valiosa en la investigación que estoy realizando en el área de orientación al cliente y calidad en el servicio en el contexto de Instituciones de Educación Superior.

El objetivo de esta encuesta es examinar si existe una relación entre el grado de orientación al cliente (alumno) que presenta el profesorado universitario en México y su desempeño como profesor. Por favor considera que por "servicio" nos referimos a la experiencia del aprendizaje que brindas como profesor a tus alumnos.

¡Muchas gracias!
Adriana Morales Rodríguez.

NEXT

Never submit passwords through Google Forms.

Orientación al alumno y desempeño docente

* Required

Nombre de la Universidad en la que laboras *

Your answer

Entidad federativa: *

Your answer

Selecciona el área académica en la que impartes clases: *

○ Negocios, administración y finanzas

○ Humanidades y ciencias sociales

○ Ingeniería y arquitectura

○ Tecnologías de la información y electrónica

○ Ciencias de la salud

○ Other : _____

Antigüedad en la universidad (años y meses) *

Your answer

Orientación al alumno

En el siguiente bloque de preguntas, indica que tan de acuerdo estás con cada una de las siguientes afirmaciones:
(De 1 hasta 5, donde 1="Totalmente en desacuerdo", 5="Totalmente de acuerdo")

1. Intento ayudar a mis alumnos a lograr sus metas. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

2. Logro mis propias metas al ayudar a mis alumnos. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

3. Logro que mis alumnos hablen acerca de sus necesidades de servicio conmigo. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

4. Utilizo un enfoque de resolución de problemas con mis alumnos. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

5. Tengo presente los mejores intereses de los alumnos. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

6. Logro responder correctamente las preguntas del alumno. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

7. Me es fácil sonreírle a cada uno de mis alumnos. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

8. Me gusta memorizar los nombres de mis alumnos. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

9. Es natural en mí el tener empatía con mis alumnos. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

10. Me gusta responder rápidamente a las solicitudes de mis alumnos *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

11. Es satisfactorio para mí el hacer felices a mis alumnos. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

12. Verdaderamente disfruto el servir a mis alumnos. *

	1	2	3	4	5	
Totalmente en desacuerdo	○	○	○	○	○	Totalmente de acuerdo

BACK   NEXT

Never submit passwords through Google Forms.

This form was created inside of Tecnológico de Monterrey. Report Abuse - Terms of Service - Additional Terms

Google Forms

Orientación al alumno y desempeño docente

* Required

Desempeño docente

Evalúa tu desempeño en los siguientes aspectos:
(De 1 hasta 5, donde 1="Pésimo", 5="Excelente"

1. Asumiendo que el nivel de competencia de un profesor integra: conocimientos teóricos, prácticos y actualizados, así como la capacidad y claridad para transmitirlos. Considero que mi desempeño como profesor con relación al nivel de competencia que demuestro a mis alumnos es: *

	1	2	3	4	5	
Pésimo	○	○	○	○	○	Excelente

2. Asumiendo que los siguientes ejemplifican actitudes y comportamientos que los profesores demuestran hacia los alumnos: preocuparse por su aprendizaje, motivar su participación e interés por la materia, estar disponible para orientarles, generar un ambiente de aprendizaje respetuoso y fomentar la comunicación entre ambos lados. Considero que mi desempeño como profesor con relación a las actitudes y comportamientos anteriormente señalados es: *

	1	2	3	4	5	
Pésimo	○	○	○	○	○	Excelente

114

3. En general, considero que mi desempeño como profesor es: *

	1	2	3	4	5	
Pésimo	○	○	○	○	○	Excelente

Datos generales

Edad (en años) *

Your answer

Género: *

○ Femenino

○ Masculino

Contrato laboral *

○ Profesor de cátedra-tiempo parcial

○ Profesor de tiempo completo

○ Profesor de tiempo completo con funciones administrativas

○ Profesor de tiempo completo con funciones de investigación

○ Other :

BACK   SUBMIT

Never submit passwords through Google Forms.

Appendix 3. Initial covering letter and web-based survey instrument (English translation).

Dear Professor,

My name is Adriana Morales Rodríguez, I am a student of the Doctoral Program in Entrepreneurship and Management at the Universitat Autònoma de Barcelona and Head of Business Department at the Tecnológico de Monterrey in Tampico. I am currently conducting research for my doctoral thesis and I would greatly appreciate your valuable participation in a short survey. The information you provide will be anonymous, the survey should take you no more than 5 minutes and it will represent valuable insights on the research I am doing in the area of customer orientation and service quality in the context of Higher Education Institutions.

The objective of this survey is to examine whether there is a relationship between faculty's student-customer orientation and teaching performance, considering an overall assessment and the two main dimensions that students assess: (1) expertise to ensure the desired outcome of service and (2) the attitude and behavior. Please note that by "service" we mean the learning experience you offer your students as a teacher.

Thank you for taking a few minutes of your valuable time to answer this survey. It will be available until April 7th, 2016. Your opinion is important, if you choose to participate please click on the following link:

http://goo.gl/forms/waea39IS1Y

Thank you!

Adriana Morales Rodríguez

Web-based survey instrument (English translation)

Thank you for your valuable participation in completing this short survey. The information you provide will be anonymous, the survey should take you no more than 5 minutes and it will represent valuable insights on the research I am doing in the area of customer orientation and service quality.

The objective of this survey is to examine whether there is a relationship between faculty's student-customer orientation and teaching performance, considering an overall assessment and the two main dimensions that students assess: (1) expertise to ensure the desired outcome of service and (2) the attitude and behavior. Please note that by "service" we mean the learning experience you offer your students as a teacher.

Thank you!
Adriana Morales Rodríguez.

Please enter the name of the university at which you are currently working: _____

Federal entity: _____

Please choose the academic area you are teaching: _____

- ☐ Business administration and finance.

- ☐ Humanities and social science

- ☐ Engineering and Architecture

- ☐ Information Technologies and Electronics

- ☐ Health Sciences

- ☐ Other: _____

How long have you been employed by the university (years and months): _____

Student-customer orientation.

For the following questions please indicate how much you agree with each of statements.

(On a scale from 1 to 5, where 1 means "Strongly Disagree'' and 5 ''Strongly Agree.'')

1. I try to help students achieve their goals.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

2. I achieve my own goals by satisfying students.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

3. I get students to talk about their service needs with me.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

4. I take a problem-solving approach with my students.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

5. I keep the best interests of the student in mind.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

6. I am able to answer a student's questions correctly.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

7. I find it easy to smile at each of my students.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

8. I enjoy remembering my students' names.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

9. It comes naturally to have empathy for my students.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

10. I enjoy responding quickly to my students' requests.

	1	2	3	4	5	
Strongly Disagree						Strongly Agree

11. I get satisfaction from making my students happy.

	1	2	3	4	5

Strongly Disagree | | | | | | Strongly Agree

12. I really enjoy serving my students.

| | 1 | 2 | 3 | 4 | 5 | |
Strongly Disagree | | | | | | | Strongly Agree

Teaching Performance

Assess your own performance in the following aspects:

(On a scale from 1 to 5, where 1 means "Poor'' and 5 ''Outstanding'')

1. Assuming that the level of expertise of a teacher integrates: theoretical, practical and up-to-date knowledge and the ability to give clear explanations. I consider my performance as a teacher in relation to the level of expertise I show it is:

| | 1 | 2 | 3 | 4 | 5 | |
Poor | | | | | | | Outstanding

2. Assuming the following are examples of attitudes and behaviors that teachers demonstrate to students: concern about students' learning, motivate students to participate and be interested in the class, availability for tutoring, create a respectful learning environment, and promote bilateral communication. I consider my performance as a teacher in relation to the attitudes and behaviors outlined above it is:

| | 1 | 2 | 3 | 4 | 5 | |
Poor | | | | | | | Outstanding

3. Overall my performance as teacher is:

| | 1 | 2 | 3 | 4 | 5 | |
Poor | | | | | | | Outstanding

General data:

Age: _____ years

Gender:

☐ Female

☐ Male

Work status:

☐ Part-time teacher

☐ Full-time teaching

☐ Full-time teaching and administrative position.

☐ Full-time teaching and research position.

☐ Other: _____

Appendix 4. Measures used for assessing student orientation and teaching performance in higher education.

Employee Customer Orientation *(5-point Likert scale ranging from 1 ''Strongly Disagree'' to 5 ''Strongly Agree.'', α =.81)*

Employee Customer Orientation—Needs Dimension *(5-point Likert scale ranging from 1 ''Strongly Disagree'' to 5 ''Strongly Agree.''; α =.67)*

1. I try to help students achieve their goals.
2. I achieve my own goals by satisfying students.
3. I get students to talk about their service needs with me.
4. I take a problem-solving approach with my students.
5. I keep the best interests of the student in mind.
6. I am able to answer a student's questions correctly.

Employee Customer Orientation—Enjoyment Dimension *(5-point Likert scale ranging from 1 ''Strongly Disagree'' to 5 ''Strongly Agree.''; α =.71)*

1. I find it easy to smile at each of my students.
2. I enjoy remembering my students' names.
3. It comes naturally to have empathy for my students.
4. I enjoy responding quickly to my students' requests.
5. I get satisfaction from making my students happy.
6. I really enjoy serving my students.

Performance *(5-point Likert scale ranging from 1 ''Poor'' to 5 ''Outstanding'; α =.80)*

1. Level of expertise (theoretical, practical and up-to-date knowledge, ability to give clear explanations)
2. Attitudes and behaviors towards students (concern about students' learning, motivate students to participate and be interested in the class, availability for tutoring, create a respectful learning environment, promote bilateral communication)
3. Overall performance as teacher is:

CHAPTER 5:

Conclusion

5.1. Main conclusions

In this thesis we examined the determinants of quality, efficiency and customer orientation in higher education and the possible relationship between these concepts. Three specific objectives of research were stated:

1. *To examine the impact of attributes of quality and reputation on the dynamic evolution of productivity in a sample of Latin American universities.*

2. *To examine the nature and determinants of student evaluations of teaching performance.*

3. *To examine the influence of the student-customer orientation and other personal variables on the assessment of university teachers' performance.*

In order to achieve these objectives, Chapter 2 examined the impact of attributes of quality and reputation on the dynamic evolution of productivity in a sample of Latin American universities. Chapter 3 explored the determinants of service quality in higher education, and Chapter 4 examined the employee customer orientation concept in the context of higher education and the impact of this approach and other personal variables on the assessment of self-ratings of teaching performance.

In Chapter 2, we provided a wide and deep insight into the assessment of educational performance by examining the impact of attributes of quality and reputation on the dynamic evolution of productivity in a sample of Latin American universities classified into three subsets by type of HEIs. Findings suggested as each group of universities has its own production technology that the productivity changes and its decomposed components also show these differences. The results also indicated that quality matters and that most of the variability in the augmented models is attributed to changes in quality.

By integrating the literature on services marketing and higher education, in Chapter 3 we developed a set of hypotheses regarding the determinants of student evaluations of teaching performance. We applied a quantitative approach to explore the nature and factors that influence student assessments of university teachers and found that students basically assess two main dimensions: (1) level of expertise to ensure the desired outcome of service and (2) the attitude and behavior. The results also indicated that this evaluation is a complex phenomenon that depends on factors related to teacher, student and course profiles.

In Chapter 4, based on the results of the previous chapter, we examined the employee customer orientation concept in the context of higher education and its impact on self-ratings of teaching performance. The student-customer orientation measure was taken from the Brown *et al.* (2002) study. The teaching performance measure was developed in line with the findings of the previous chapter, and was comprised of 3 items: an overall assessment, and the two main dimensions of teacher performance: (1) level of expertise and (2) attitude and behavior towards students. Findings suggest that student-customer orientation enhances teachers' performance. The results also indicated the effect of job tenure on teaching performance and the influence of teachers' gender on student orientation and teaching performance, where women demonstrated a greater customer orientation than men, and men are regarded as better performers in terms of expertise.

The main findings of each chapter that integrates this thesis are described below in table 5.1.

Table 5.1. Main findings

Aspects \ Chapters	Chapter 2	Chapter 3	Chapter 4
Title	Efficiency, quality and reputation in higher education: A dynamic analysis.	Teaching performance: Determinants of the student assessment.	Student orientation and teaching performance in higher education.
Purpose	To examine the impact of attributes of quality and reputation on the dynamic evolution of productivity in a sample of Latin American universities.	To identify the nature and factors that influence student evaluation of the teaching performance.	To examine the influence of the student-customer orientation and other personal variables on self-ratings of university teachers' performance.

Concept of quality	Attributes of quality: input and output characteristics. Reputational assessments made by academics and employers.	Students' perceptions of teaching quality.	Teachers' perceptions of service quality.
Unit of analysis	University	Course	Teachers
Methodology	• Sample: 126 universities classified into three subsets by type of HEIs during the period 2011/2012-2012/2013 • Three models of university performance. • Metafrontier Malmquist productivity index	• Sample: 952 courses for a three-year period. • A set of hypotheses were developed taking into consideration customer (student), employee (teacher) and service (course) characteristics. • Descriptive statistics and multivariate techniques.	• Sample: 221 university teachers employed in Mexico. • Customer orientation measure was adapted from Brown *et al.* (2002) study. • The teaching performance measure was proposed. • Teacher demographic characteristics and job-related aspects are also included. • Descriptive statistics, multivariate analyses and non-parametric tests.
Main Findings	• Productivity changes and its decomposed components show differences according the type of HEI. • Quality matters	Student evaluations of teaching performance: • Two dimensions: (1) expertise, (2) attitude and behavior. • A complex phenomenon that depends on factors related to teacher, student and course profiles.	• Student-oriented teachers are regarded as better performers. • Job tenure has an impact on teaching performance. • Teachers' gender has an impact on student orientation. • Teachers of private universities and part-time faculty exhibited the greatest level of customer orientation.

Thus, the three chapters of this thesis entail the concept of quality in the context of higher education and examined three concepts that are necessary for universities to achieve superior performance: quality, efficiency and customer orientation.

5.2. Implications and suggestions for future research.

As a result of our research, we suggest that when analyzing universities in terms of efficiency and productivity, one should point out that different subsets of universities may exists (Agasisti and Salerno, 2007; Ahn *et al.,* 1988; Costa *et al.,* 2012; Johnes, 2008; Johnes *et al.*, 2008; Thanassoulis *et* al., 2011), that cross-country analysis of the productivity changes are needed (Agasisti and Pérez-Esparrells, 2010; Parteka and Wolszczak-Derlacz, 2013) and that

more reliable results in efficiency and productivity measurement are sought by including attributes of quality and reputation. Thus, from a point of view of effectiveness is important to examine quality and efficiency jointly (Prior, 2006).

This study also suggests that student evaluations of teaching are the result of several factors that the management of higher education institutions should take into account. More concretely, it is important to promote teachers' training and experience and to pay special attention to the students' background and current experience in their institution, as well as the specific characteristics relating to the course.

Furthermore, the results of this study reveal the importance of improving our understanding of the personal characteristics affecting teachers' performance and student orientation. As O'Hara *et al.* (1991) mention, it is essential because it can help managers in the selection and training of new employees. It is also recommended to recruit teachers possessing high levels of customer orientation, because this approach enhances teaching performance.

As directions for future research, we propose to expand the measurement of teaching performance to different sources, such as supervisor, co-workers and students; to analyze not only the perceived quality or "subjective" quality but also quality from an objective perspective; to identify the gap between teachers' perceptions and students' perceptions of teaching performance; to include research duties in the assessment of teachers' activities in universities. We also propose to replicate this study to other countries and to analyze the impact of regulation and managerial practices on the dynamic evolution of productivity.

5.3. References

Agasisti, T., & Pérez-Esparrells, C. (2010). Comparing efficiency in a cross-country perspective: The case of Italian and Spanish state universities. *Higher Education, 59*(1), 85-103.

Agasisti, T., & Salerno, C. (2007). Assessing the cost efficiency of Italian universities. *Education Economics, 15*(4), 455-471.

Ahn, T., Charnes, A., & Cooper, W. W. (1988). Some statistical and DEA evaluations of relative efficiencies of public and private institutions of higher learning. *Socio-Economic Planning Sciences, 22*(6), 259-269.

Brown, T. J., Mowen, J. C., Donavan, D. T., & Licata, J. W. (2002). The customer orientation of service workers: Personality trait effects on self-and supervisor performance ratings. *Journal of Marketing Research*, *39*(1), 110-119.

Costa, E.M., De Souza, H.R., Ramos, F.S., & Da Silva, J.M. (2012). Eficiência e desempenho no ensino superior: uma análise da fronteira de produção educacional das IFES brasileiras /Efficiency and performance in higher education: A frontier analysis of the educational productivity of the Brazilian federal institutes of higher education. *Revista De Economia Contemporanea*, *16*(3), 415-440.

Johnes, J. (2008). Efficiency and productivity change in the English higher education sector from 1996/97 to 2004/5. *The Manchester School, 76*(6), 653-674.

Johnes, G., Johnes, J., & Thanassoulis, E. (2008). An analysis of costs in institutions of higher education in England. *Studies in Higher Education, 33*(5), 527-549.

O'Hara, B. S., Boles, J. S., & Johnston, M. W. (1991). The influence of personal variables on salesperson selling orientation. *Journal of Personal Selling & Sales Management*, *11*(1), 61-67.

Parteka, A., & Wolszczak-Derlacz, J. (2013). Dynamics of productivity in higher education: Cross-european evidence based on bootstrapped Malmquist indices. *Journal of Productivity Analysis, 40*(1), 67-82.

Prior, D. (2006). Efficiency and total quality management in health care organizations: A dynamic frontier approach. *Annals of Operations Research, 145*(1), 281-299.

Thanassoulis, E., Kortelainen, M., Johnes, G., & Johnes, J. (2011). Costs and efficiency of higher education institutions in England: A DEA analysis. *Journal of the Operational Research Society, 62*(7), 1282-1297.