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# QUALITY OF STUDENT–FACULTY INTERACTION AT UNIVERSITY: AN EMPIRICAL APPROACH OF GENDER AND ICT USAGE

Ana Criado-Gomis

University of Almeria, Spain, [anacriadog@hotmail.com](mailto:anacriadog@hotmail.com)

M. Angeles Iniesta-Bonillo

University of Almeria, Spain, [miniesta@ual.es](mailto:miniesta@ual.es)

Raquel Sanchez-Fernandez

University of Almeria, Spain, [rasanche@ual.es](mailto:rasanche@ual.es)

## Abstract

**Purpose**—*This paper studies the relationship of gender and ICT usage as significant variables in the formation of perceived value, satisfaction and loyalty to educational institutions, and in the quality of the student-faculty interaction to discuss how these variables determine the bond between students and the University, in order to improve this interaction.*

**Design/methodology/approach**—*The empirical research designed to test the proposed model was conducted in two Spanish universities (a random sample of 1000 graduates—500 from each university—from two academic years, all areas of knowledge and proportional for men/women). They were individually interviewed by personnel of an external market research institute, using CATI (Computer Assisted Telephone Interview).*

*For the measurement of the latent variables in the proposed model, we use an 11-point Likert scale (adapted to the particular context of the present study by means of several in-depth*

interviews with students and academics). ICT usage—classified in communication, author and administration tools, supporting the teaching, research and administrative management processes of the educational service—was measured with a scale of 7 items, which cover the main ICT used by students during their learning process and checked by an expert panel. These items were also examined more rigorously to validate their psychometric properties with the estimation of a confirmatory factor analysis via the maximum-likelihood method of structural equation modeling with LISREL 8.5.

The evaluation of discriminant validity was testing by the AVE for each construct, which exhibited all of the constructs, discriminant validity in the model. Moreover, it was also verified through analysis of the confidence interval for the correlation coefficient between ICT usage and quality of interaction, and performing a model with construct correlations constrained to 1.00 was compared to an unconstrained model.

**Findings**—Internal consistency of the scales and the results for discriminant validity allowed the estimation of the structural model, confirming the proposed hypothesis. Thus, ICT usage shows a positive influence on the quality of the student-faculty interaction, and there are significant differences in the quality of interaction by gender, since this one is higher in women than in men.

**Research limitations/implications**—The proposed model and associated measurement instruments can reliably and consistently be applied for higher educational institutions, providing useful information for strategic decisions of universities. It would be interesting to replicate and extend this study to other contexts, including other related and moderating variables.

**Practical implications**—These results have several academic and managerial implications for universities and nonprofit organizations. The findings show that the level of the student's ICT usage contributes to create and maintain the link or closeness between students and their University. Successful ICT integration is clearly related to the learning process in terms of the student-professor relationship, and that there are differences in the way men and women develop their academic relationships.

**Originality/Value**—This study contributes to the development of educational literature, providing a scale of the quality of the interaction in this context, which has never been tested before in this field. The same happens with the analysis of the effects of using ICT in the student perception of that interaction, as well as differences between men and women, tested for the first time in this context.

**Keywords:** higher education, quality of student-faculty interaction, gender studies, public institutions, ICT usage.

**Research type:** research paper.

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## 1. Introduction

Nowadays governments have realized the importance of developing the intellectual capital of its citizens, which is a key asset in the prevailing society. On this matter, public institutions, particularly universities, have to adopt measures, in its improvement processes, which help provide more suited training of professionals to social needs. For this purpose, the knowledge-based environment, which also highlights the Lisbon European Council as a framework for sustainable economic growth and greater social cohesion, raises the need for a more strategic approach in the management of educational institutions as centers of lifelong learning (Wong, 2005).

Educational institutions must be able to design and implement training programs and appropriate teaching methodologies in order to become innovative service organizations, since they are requiring market orientation, or service orientation to a society that demands this education (Flavian and Lozano, 2001) as a strategic imperative for each nation's development (Sebastian, 2004). In this context, students are described as customers or stakeholders of the education system (Chung and McLarney, 2000; Sakthivel and Raju, 2006), recognizing this system as a service industry focused on the analysis and study of the expectations and needs of their customers (Cheng and Tam, 1997).

Previous studies have shown that understanding the behavior of the agents involved in student-university relationship is funded, among other things, on the study of the sources of the students' value (Sakthivel and Raju, 2006), considered as key strategic tools contributing to their intellectual, personal and professional development. Thus, student trust, the image of the university and the quality of the student-faculty interaction, the object of our study, influence perceived value, which in turn contributes to student satisfaction and loyalty in the educational service encounter (Iniesta et al, 2010). In this way, the creation and maintenance of the bond or closeness between student and university is an appealing relationship to users with a great potential for generating positive behavioral and emotional responses to the organization. Regarding this, improving interaction between students and faculty can be useful in generating a positive perception of value and loyalty, and greater user identification with the organization.

This paper attempts to provide a better understanding of student-university relationship management, deepening the quality of student-faculty interaction and its relationship to the use of new information and communication technologies (ICT) from a gender view. This analysis is implemented from a relationship marketing approach applied to educational management, whose presence in research literature is still scarce (Henning et al, 2001; Helgesen and Nettet, 2007). That is why we try to contribute to the growing body of research that has been developed around the client-company relationship (in this case, student-faculty) (Bergami and Bagozzi, 2000, Bhattacharya and Sen, 2003).

Firstly, the paper presents a brief theoretical review of the quality of student-faculty interaction and the ICT usage from the paradigm of relationship marketing and its relevance to educational research, reviewing all these concepts. Next, we analyze the influence of the factors establishing a relationship model which is verified through a

Structural equation modeling (SIM) and a descriptive study, whose results are presented below together with the implications for the management of educational institutions derived from research.

## 2. Theoretical Background

### 2.1. Relationship marketing

Universities are facing an increasingly competitive environment, political and social changes, changes in the age structure of the students, financial constraints and changes in the funding system (Alves, 2000; Marzo, 2007). Such a framework affects notably the need, on the one hand, to establish stable relationships between universities and their targets, so as to ensure the survival of higher education institutions, given their role as generators of services to society (Cave et al, 1997) and on the other hand, to create value through effective responses. It is therefore appropriate to apply a relational approach in the specific field of services marketing, given its proven efficacy in a variety of contexts (Arnett et al, 2003; Stauss and Neuhaus, 1997).

Since its conceptualization, relationship marketing has a special relevance in academia (Verhoef, 2003; Morgan and Hunt, 1994). Given that it is not a new thinking in marketing, this way of understanding management was not a priority for most organizations, nor was it the basis of the conceptual structure of the academic discipline in decades (Webster, 1992). Traditionally, relationship marketing has been based on an analysis of how companies manage customer loyalty, and in this sense, according to the theory of relationship marketing (Reichheld, 1996), lasting relationships with students are a competitive advantage for the university, as generally, attracting new students is more expensive than keeping them (Henning et al, 2001). In this way, there is the need to establish a strategy focused on strengthening the link between the target and organizations, generating in this relationship context more value for both suppliers and customers (Sánchez et al, 2001; Woodruff, 1997). So, recently, the marketing literature examines how identification relationships are a step further in identification, turning customers into enthusiastic promoters or sellers, because for these individuals the relationship with the company is so important that it even, explains part of their identity (Marín, 2006).

From this approach it is essential to analyze the relationship framework of students that receive these higher education services (Oplatka and Hemsley-Brown, 2004), using for this purpose strategic and marketing approaches that contribute to the diagnosis and implementation of suitable training programs.

### 2.2. The quality of student-faculty interaction

Relationship quality is conceived as a key element for successful relationships (Lindgreen and Wynstra, 2005). It is defined as the relationship appropriate degree to satisfy customer needs (Henning-Thurau and Klee, 1997). Relationship quality is different from product or service quality. Crosby et al. (1990) pointed out that service

quality is a necessary, but not sufficient condition for relationship quality, and Roberts et al. (2003), who also make this distinction, considers it as a better predictor of behavioral intentions than service quality.

In academia, and specifically in the student-university relationships, the study of the relationship quality takes on special relevance. According to Crosby et al (1990), analyzing relationship quality makes sense especially in the area of services, being of critical importance when services are complex, customized, and conducted along a series of transactions. Despite the importance of this issue, studies that have examined the quality settings in the university are scarce (e.g. Chung and McLarney, 2000; Venkatesh and Meamber, 2006), showing a gap in this research. The studies of Plewa et al (2005) and Plewa and Quester (2006) would be some of the few examples in this regard, as they analyze university-industry relationships from a qualitative and quantitative approach respectively, and integrating organizational environment variables, and variables referred to relationship quality, as trust, commitment and attention during the encounter, which constitute significant factors for student satisfaction (Price et al, 1995).

According to Chung and McLearn (2000) “education is a service encounter,” therefore the reform of the educational process requires treatment of the student as the consumer of a service (Krehbiel et al, 1997). In this regard, it is important that faculty considers the student as an active participant of the service encounter (Chung and McLarney, 2000). In fact, in marketing literature, a service encounter is defined as the dynamic interaction between a service operation and its customers (Surprenant and Solomon, 1987), whose strong understanding has been discussed in numerous studies (Gil et al, 2008; Wong, 2004).

In university education, the service encounter is multidirectional and dynamic. The main staff contact is undoubtedly the faculty as a provider of a service that continues over time. It is analyzed as a type of specific and particular service where extended encounters and provision of extras and special attention can be a significant factor that explains service satisfaction and positive feelings (Price et al, 1995). According to the findings of Chung and McLearn (2000) in many cases not only important is the functional quality of the relationship, but also the relational quality given to the student. This one goes beyond mere teaching of the program contents; this also involves creating complicity and intimacy with the student, giving that “extra” something to the relationship that involves the student in the process to perceive the learning experience as valuable for his life. These results have also been checked in other field studies (Price et al, 1995; Mattila and Enz, 2002; Mañas et al, 2008). We are referring to the quality of student-professor interaction, which is an important variable that positively influences the value perception students have about the service experience at the university. This value also affects their level of satisfaction, and contributes to the formation of loyalty to the institution (Iniesta et al, 2010).

### 2.3. ICT usage

As a great influential factor in changing societies (Moens et al, 2010), ICT is a key component of the reforms in the education systems. These are essential for a fully participative society of knowledge (Peeraer and Van Petegam, 2011), especially in the

context of higher education (Heemskerk et al, 2009; Jung, 2009; Moens et al, 2010). In this sense, innovation is not limited to the introduction and use of ICT, but to its role as a contributor to teaching and learning ways that offer significant opportunities for students and faculty (Barak, 2007; Barak and Dori, 2005; Stuart et al, 2009). And this is that way thanks to easy, regular and frequent access to high educational quality that characterizes the future of lifelong learning (Hawkey, 2002), given that investment in ICT in higher education not only helps developing the skills and knowledge that students need as lifelong learners who participate in the global community, but also contributes to the formation of satisfaction, commitment and loyalty in the customer-company relationships (Bauer et al, 2002).

As stated in the literature, like ICT, the quality of student-faculty interaction directly contributes to the generation of value, and indirectly contributes to the satisfaction and loyalty of the student in the educational service encounter (Iniesta et al, 2010). Given the importance stressed by some authors to understand how ICT adds value to the company and the client from the informative and interactive perspectives (Brady et al, 2008; Meyronin, 2004)—in the case of the student-university relationship, this last perspective is common in the student-faculty relationship—and due to the scarcity of theoretical and empirical research about the relationship of ICT with other variables, we propose the following hypothesis:

H1: ICT usage affects the quality of student-faculty interaction in the service encounter.

In academia there is a small number of approaches to the analysis of value creation to students (e.g. Baker et al, 2002; Sakthivel and Raju, 2006; Unni, 2005), and even more to its relationship with other variables. Following Sakthivel and Raju (2006), perceived value in the educational field is not the mere transmission of technical knowledge or the level obtained by the student, but also the opportunity to improve communication, interpersonal and leadership skills, and to acquire knowledge on the latest trends, being exposed to a working climate, and to face the different challenges that will happen throughout every individual's life.

A lifelong learning approach leads also to the need of analyzing other affected characteristics of students such as accessibility, culture and gender. In this regard, there is some empirical evidence in which gender significantly influences ICT usage (Ilomäki and Rantanen, 2007; Kennewell and Morgan, 2006; Vekiri, 2010; Volman et al, 2005). In the case of the perception of quality of interaction, there is no previous evidence about the existence of differences between men and women, but considering the interest of the knowledge of differences in the perception of relational variables by sex, an analysis of this fact will also be developed.

Following this study, it is important to determine the variables that motivate people with academic skills to continue their education and to stay in touch with their university. In order to generate a conceptual and developmental framework of the service encounter between students and the University, we propose a model of relationships that support these hypotheses (Figure 1). This integrative approach takes into account the theory of relationship marketing, and includes various aspects of relevance in educational and services research, considering the unique characteristics of higher education institutions and their relationship with students as primary customers.

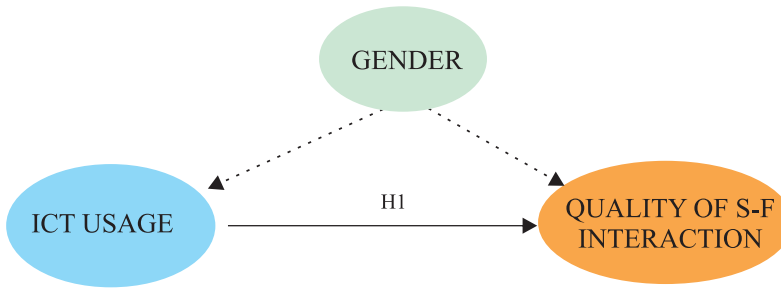


Figure 1. Model of relationships in education

### 3. Research Methodology

#### 3.1. Data collection and sample

The empirical research designed to test the proposed model was conducted in the context of higher education in Spain. The data was collected from a random sample of 1000 graduates in two Spanish universities: 500 from Almería, which is a young University, and 500 from Valencia, an old and comprehensive one. They were individually interviewed by personnel of an external market research institute, using CATI (Computer Assisted Telephone Interview). The sample included graduates from two academic years in order to avoid some potential biases derived from particular circumstances associated with a specific academic course.

Overall, the sample resembles the universe of graduates in the two universities analysed for the period considered. Graduates from all areas of knowledge (humanities, social sciences, experimental sciences, health and technical studies) were interviewed, and the sample maintains the proportion of men/women of the database of graduates (Table 1).

Table 1. Demographics % (N=1000)

<b>Gender</b>	Female	67.2
	Male	32.8
<b>Area of expertise</b>	Arts and Humanities	6.6
	Sciences	10.7
	Health Sciences	15.7
	Social and Legal Sciences	58.9
	Engineering and Architecture	8.1
<b>University</b>	University of Valencia	50.0
	University of Almería	50.0



### 3.2. Measures and Pretest

For the measurement of the latent variables in the proposed model, we use an 11-point Likert scale from “0—strongly disagree” to “10—strongly agree.” Generation of the measurement-scale items was based on our review of the previous literature. These items were adapted to the particular context of the present study by means of several in-depth interviews with students and academics.

ICT usage was measured with a scale of 7 items. Given the inexistence of scales for measuring this construct in the specific field of research, the proposed items cover the main ICT used by students during their learning process. Following the literature, ICT are classified as three types of tools: communication, author and administration tools, supporting the teaching, research and administrative management processes of the educational service. Moreover, an expert panel checked these items and proposed the final battery employed. Table 2 shows the 7 items composing the intensity of educational ICT usage measurement instrument: the first 3 items support the administrative management process and help communication among administrative personnel and teachers with students and graduates; the following 4 items mainly support the teaching and research process. For the measurement of the quality of student-faculty interaction, we used a scale adapted from Peiró et al (2005) (see Table 2).

Considering the original items as candidates for the measurement instrument, they were examined more rigorously to validate their psychometric properties. For that purpose, a confirmatory factor analysis was estimated via the maximum-likelihood method of structural equation modeling with LISREL 8.5. After this refinement, the final set of 10 items appears in Table 2. Reliability was calculated with several indexes: Cronbach’s Alpha (0.86 for ITC usage and 0.94 for quality of interaction), above the minimum of 0.70 accepted (Nunnally, 1978); Bagozzi and Yi’s (1988) composite reliability index (all values were higher than 0.8); and Fornell and Larcker’s (1981) average variance extracted index (higher than 0.5 for all the measures) (see Table 2). The overall fit indices provide support for the fit of the proposed conceptual model ( $\chi^2(34) = 216.49$ ;  $p < 0.001$ ; CFI=0.92; RMSEA=0.07; SRMR=0.03; NNFI=0.97; CFI=.098; IFI=0.98). The analysis of the measurement model revealed high loadings for all scales and provided support for convergent validity (Table 2; Bagozzi et al, 1991).

At the construct level, discriminant validity was evaluated by testing whether the AVE for each construct (the average variance shared between a construct and its measures) was greater than the shared variance between the two constructs of the model (square of the correlation between the two constructs) (Fornell and Larcker, 1981). The AVEs of the constructs were all higher than their shared variances, and thus all constructs in the model exhibited discriminant validity. Moreover, it was also verified through analysis of the confidence interval for the correlation coefficient between ICT usage and quality of interaction, as they do not include the unit ( $\phi_{21} = [0.12; 0.24]$ ) (Anderson and Gerbing, 1988), and performing a model with construct correlations constrained to 1.00 was compared to an unconstrained model. This led to a significant increase in shi-square, and Lagrangian multiplier tests revealed that these constraints should be removed. Thus, all constructs exhibited discriminant validity.



Table 2. Confirmatory factor analysis and scale reliability

Variables and items	Standardised Load	t-value	Reliability
<b>ICT usage</b>			
ICT1. Access to the website of the University to search for information	2.12	37.12	Alpha = 0.86 ρ <sub>c</sub> = 0.87 AVE = 0.52
ICT2. Virtual secretary of the University (to check marks, registration fees, schedules, books)	2.10	35.42	
ICT3. University e-mail	2.07	28.93	
ICT4. Virtual classroom (to download documents, forums, activities, etc.)	2.05	26.32	
ICT5. Electronic resources of the University (journals, databases, etc.)	1.48	17.96	
ICT6. Usage of projectors for classroom presentations	0.94	9.84	
ICT7. Usage of Internet for the learning process	1.80	28.23	
<b>Quality of interaction</b>			
QI1. In general, professors gave me something extra, more than strictly academic	1.37	40.32	Alpha = 0.94 ρ <sub>c</sub> = 0.93 AVE = 0.82
QI2. In general, professors who had contact with were interested in teaching their students.	1.37	38.99	
QI3. Overall, there was a close relationship between professors and me.	1.19	31.36	
a Scale composite reliability: $\rho_c = (\sum \lambda_i)^2 / (\sum \lambda_i)^2 + \sum Var(\delta_i)$			
b Average variance extracted: $AVE = \sum \lambda_i^2 / \sum \lambda_i^2 + \sum Var(\delta_i)$			

### 4. Results and Findings

Internal consistency of the scales and the results for discriminant validity allowed the estimation of the structural model. Thus, considering the standardized coefficients for the structural relations compared to their associated t-value, H1 was confirmed. Thus, ICT usage shows a positive influence on the quality of the student-faculty interaction as predicted in the hypothesis ( $\gamma=.12$ ;  $p<.01$ ).

In order to evaluate the possible differences or proximities in the quality of the student-faculty interaction considering the gender of the students, one-way ANOVA mean comparison tests were conducted. Table 3 lists the results obtained, recording the mean, the standard deviation, the value of statistic F and the significance threshold for the construct. Results indicated that there were significant differences in the quality of

interaction by gender, since this one is higher in women than in men. Similar results are obtained with the ICT variable: use of ICT among women is higher than in men.

Table 3. Differences among students by gender (ANOVA)

Quality of the interaction	Gender	Mean	N	SD	F	p
	Male	6.64	328	1,50303	9.712	0.002
Female	6.92	672	1,27539			
ICT use	Gender	Mean	N	SD	F	p
	Male	6.14	328	2.05742	10.684	0.001
Female	6.57	672	1.87956			

## 5. Conclusions

This work attempts to provide a better understanding of the quality of the student-professor interaction in higher education, considering the influence of ICT usage and gender on this variable. Results confirm previous findings in this field, showing that the quality of the interaction is influenced by the ICT usage of the students/graduates. Findings also reveal that the quality of interaction and ICT usage present significant differences considering the gender of the students. Therefore, the proposed model and associated measurement instruments can reliably and consistently be applied for higher educational institutions, providing useful information for strategic decisions of universities. Thus, this study reinforces previous analysis about the quality of the interaction in education (Chung and McLarney, 2000; Plewa et al, 2005; Venkatesh and Meamber, 2006).

These results have several academic and managerial implications for universities and nonprofit organizations. Thus, the findings show that the level of the student's ICT usage contributes to create and maintain the link or closeness between the student and the University. This analysis offers some answers to successful integration of ICT in higher education, and should encourage universities to dedicate effort and invest resources to reinforce the link with one of its main stakeholders: students and, therefore, to get a higher identification with the educational institution and in their retention. Moreover, findings have provided insights into the interrelated nature of students' ICT usage, the quality of the interaction between student-professor, and the gender in the higher education context. The results suggest that successful ICT integration is clearly related to the learning processes in terms of the student-professor relationship, and that there are differences in the way men and women develop their academic relationships.

Considering these results, it would be interesting to replicate and extend this study to other contexts or institutions of higher education, including other related variables such as trust, commitment or student-university identification. Additionally, it is necessary to delve into the conceptualization and measurement of the quality of interaction. Also, it

is important to extend the research by including other moderating variables such as the student's age or the area of expertise.

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## STUDENTŲ IR DĖSTYTOJŲ SĄVEIKOS UNIVERSITETE KOKYBĖ: EMPIRINIS POŽIŪRIS Į IRT NAUDOJIMĄ PAGAL LYTĮ

Ana Criado-Gomis

Almerijos universitetas, Ispanija, anacriadog@hotmail.com

M. Ángeles Iniesta-Bonillo

Almerijos universitetas, Ispanija, miniesta@ual.es

Raquel Sánchez-Fernández

Almerijos universitetas, Ispanija, rasanche@ual.es

**Santrauka.** *Studentų ir dėstytojų sąveika turi teigiamą poveikį studentų suvokimo apie universiteto vertybes universitete formavimui, savęs identifikavimuisi su universitetu ir lojalumu jam. Todėl labai svarbu analizuoti santykius, besiformuojančius tarp studentų ir universiteto kaip specifinės paslaugos teikėjo. Atlikus aprašomąjį tyrimą dviejuose Ispanijos universitetuose, šiame straipsnyje analizuojami ryšiai tarp lyties ir IRT naudojimo, kaip svarbaus informacijos apie vertybių suvokimą, pasitenkinimą ir lojalumą švietimo institucijoms, studentų ir dėstytojų sąveikos veiksnio. Straipsnyje diskutuojama, kaip šie veiksniai daro poveikį santykiui, egzistuojančiam tarp studentų ir universiteto, ir kaip pagerinti jų sąveiką.*

**Raktiniai žodžiai:** *aukštasis išsilavinimas, studentų ir fakulteto sąveikos kokybė, lyčių studijos, viešosios įstaigos, IRT naudojimas.*