Trade-offs between teaching and research activities as antecedents of student satisfaction

Jasmina Berbegal-Mirabent (jberbegal@uic.es)

Marta Mas (mmas@uic.es)

Frederic Marimon (fmarimon@uic.es)

Universitat Internacional de Catalunya

Purpose

Universities must ensure that academic staff is qualified and competent for their job. Indeed, different attempts can be found in the literature measuring their performance and capturing students' satisfaction. Metrics assessing academic quality are, however, not free of controversy. First, it is difficult to find consensus on the best proxies for academic quality. Second, different patterns are observed when examining teaching and research activities performed by lecturers. While some authors suggest that these two activities are complementing each other and are positively influencing students' satisfaction, some others argue that rivalry effects are shown. This paper aims at shedding new light on this debate by means of an empirical approach where we examine the relationship between research and teaching quality and its impact on students' satisfaction.

Design/methodology/approach

For the purpose of this study, 80 different subjects offered at the Universitat Internacional de Catalunya (UIC) have been considered. Different statistical methodologies have been used to test our hypothesis: test of Mann-Whitney, contingency analysis and Structural Equation Modelling (SEM).

Findings

Our results support those studies signalling that current incentive systems at universities might be research-biased, negatively impacting on teaching quality, and consequently on students' satisfaction. Findings also suggest that there is no relationship between research and teaching quality.

Originality/value

Trade-offs between teaching and research quality in the Spanish university setting are tested. Both teaching and research quality are desirable outcomes. Therefore, studies investigating their collateral effects are necessary. While universities would like their lecturers to excel in both dimensions, very little is known about how to effectively accomplish with this ideal standard.

Keywords: higher education, teaching quality, research quality, students' satisfaction

1. Introduction

With the rise of the evaluative state (Neave, 1998), the assessment of university quality has become a meaningful topic amongst academics and policy makers. Indeed, both public and private bodies, as well as universities, are designing and implementing strategies that ensure a proper performance of higher education institutions in their daily activities.

Universities are acknowledged to play a key role in human capital development, but also in the provision of new knowledge (D'Este and Patel, 2007). This means that, in addition to providing highly qualified graduates and researchers, universities are also expected to provide innovative solutions that address the challenges faced by organisations today. Teaching and research are, therefore, core activities that universities should looked at when carrying out quality assessment processes. In addition, there is growing awareness on how universities can contribute to regional development through collaboration with businesses, local and regional governments and other local actors which are closely linked to the concept of the universities' third mission or knowledge transfer activities (Laredo, 2007).

Different types of evaluations are envisioned; however, those adopting a lecturer-centred approach are gaining popularity. Lecturers are in charge of teaching students but also of actively participating in research activities. This suggests that both teaching and research quality are in their hands. Given this high responsibility that lecturers have acquired, university managers are in charge and must have the means to ensure that lecturers are qualified and competent for their job. Teaching, research, knowledge transfer, and to a lesser extent, administrative tasks are the four categories of academic work for which faculty members are usually evaluated. Different measuring systems can be found in the literature. However, these assessment models are not free of controversy as it is difficult to find consensus on which are the best proxies for each type of activity. This debate is accelerated when lecturers are

required to excel at all activities simultaneously, but especially on teaching and research ones (at least, for the Spanish case).

Based on the a foregoing, for the purpose of this paper, we only concentrate on teaching and research activities, which, for the Spanish higher education context, are those activities with the highest weight in the lecturers' evaluation processes for promotion purposes.

The relationship between research and teaching activities is a controversial issue in the field of higher education management (Halse et al., 2007;, the primary role of the medieval university was the Robertson & Bond, 2005). In its origins diffusion of knowledge rather than the advancement of science *per se*. Said differently, teaching was central to academic identity. Universities as teaching institutions existed until the mid-19th century when the specific teaching mission was linked to knowledge creation processes, following the Humboldtian model (Mora, 2001). The underlying reason behind this new model was that research and teaching, if combined, were believed to produce synergies. This paradigmatic shift entailed the introduction of research activities as a core function alongside with the dissemination of knowledge through teaching tasks.

Social and economic changes then occurred, followed by a massive incorporation of students into the higher education system. Universities evolved from a vertical conception to an open matrix one (Solé-Parellada et al., 2001) and in the 1970s a growing sense started to emerge placing research as the primary objective in university campuses (Elen et al., 2007). Over the years, teaching and research functions were increasingly acquiring separate identities, and nowadays there is as growing awareness that they have become separate activities of faculty work (Barnett, 2005; Jenkins & Zetter, 2003). However, when both activities are viewed from the standpoint of a learning process, it is easier to conceive that, at least conceptually and ideally, they should be mutually reinforcing (Becker & Kennedy, 2005; Brew, 2003; Burke & Rau, 2010).

Students' choice is found to be influenced by teaching quality and university's prestige (which is related to research quality) (Gautier & Wauthy, 2007). Although the existing literature provides well justified arguments for a positive, negative and even null effect between teaching and research activities, to the best of our knowledge, there is little evidence on how students' satisfaction is determined by lecturers' performance in these two activities. Based on this argument, in this paper we examine teaching and research acknowledgments (internal and external) obtained by faculty members as antecedents of students' satisfaction.

To do this so, in this paper we propose an exploratory analysis in order to answer the following research question: What is the relationship between research and teaching quality and their impact on students' satisfaction? Focusing on the specific case of the Universitat Internacional de Catalunya, we use different methodological approaches, including structural equation modelling, to validate a set of hypotheses.

Following the introduction, the paper is organized as follows. Section 2 reviews the literature on the potential trade-offs between teaching and research activities from where hypotheses emerge. Section 3 provides an overview of the Catalan accreditation framework for the assessment of faculty members. Section 4 describes the methodological approach, and Section 5 lays out the results. The discussion of the findings and policy implications are put forward in Section 6.

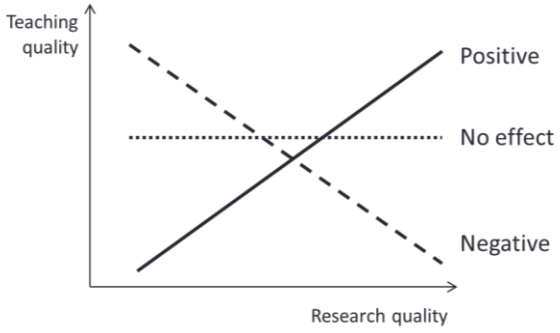
2. Literature review

2.1. Teaching quality versus research quality

Literature examining the tensions between research and teaching components of lecturers' daily activities have reported different conclusions. Different approaches can be found: some based mainly in theoretical ground, other from a qualitative methodology based on full

interviews, other based on empirical work or on data collected through surveys. Regardless the approach, we classify these studies in three distinct groups, according to the observed sign in this relationship: positive, negative or null (see Figure 1).

Figure 1. Potential scenarios resulting from the teaching-research nexus paradigm.



Positive effect

Several studies have reported a positive relationship in the teaching-research nexus (Durning & Jenkins, 2005; Elton, 2001; Griffiths, 2004; Healey, 2005; Robertson, 2007). The main premise from which positive effects are expected is based on the fact that the qualities underlying a good teaching and successful research outcomes are pretty similar. In both cases the lecturer should be creative (imagination, originality, inventiveness), highly committed with his/her tasks (perseverance, dedication, hard work), possess critical analysis, and be good in disseminating and communicating knowledge (Hattie & Marsh, 1996). That is, attitudes, values and competencies that lead to teaching excellence are also likely to lead to research quality (uz Zaman, 2004).

Another explanation is that teaching and research are found to reinforce each other because lecturers base their teaching on their research, and generate their research ideas from their course teaching (Shin, 2011). Reinforcing effects are therefore accepted in both directions. On the one hand, research contributes to teaching because research-active lecturers are at the cutting-edge of their fields, which translates in more accurate and updated material which

captures more easily students' attention (Marsh & Hattie, 2002). Likewise, presenting the researcher's own material adds a sense of authenticity that differs from presentations where teachers discuss the work of others with neither passion nor an active involvement (uz Zaman, 2004). On the other hand, there are also claims that research benefits from teaching. Preparation of teaching materials as well as students' ideas at class may help identify gaps in the literature and detect new research directions (Coate et al., 2001). Also, sharing the results of one's research efforts with an appreciative audience provides priceless feedback that could be used to improve research outcomes. In this regard, it is found that undergraduate and postgraduate students show different attitudes towards research activities (Lindsay et al., 2002). While both groups acknowledge the benefits of lecturers being highly involved in research activities, the latters (postgraduates) emphasised the importance of the relevance and utility of lecturer research to the content of their learning.

Negative effect

A second bunch of studies argued that teaching and research are conflicting activities, leading to a negative relationship between them (Parker, 2008; Serow, 2000). A divergent reward system model is one of the main arguments supporting this thesis (Hattie & Marsh, 1996).

Both teaching and research are time-consuming activities. As time and other resources are scarce, faculty members tend to prioritize those activities that are going to report them a greater benefit. Usually, this benefit is measured in terms of stability within the academia. Given the weight given to research in evaluation processes for tenure and promotion, young academics that need to carve out an academic career are more likely to reduce the time and effort spent on teaching in favour of that spent on research as this long-distance race is conditioned, to a great extent, to their research capacity (Marsh & Hattie, 2002).

Also, research activities may entail contracts with third parties, and this implies additional revenues. On the contrary, teaching does not usually significantly contribute towards overall salary. This situation might revert in those cases where lecturers are well-paid (such as in executive courses in a business school). Consequently, teaching might detract from conducting research activities (uz Zaman, 2004).

No effect

Finally, teaching and research have also been considered as separate activities with little impact on each other (Noser et al., 1996; Ramsden & Moses, 1992).

Authors supporting this position claim that in some research centres where there is no teaching, high quality research is performed (Ramsden & Moses, 1992). This means that teaching and research could be considered independently. Another argument is that these activities are different enterprises because they involve different tasks, which in turn, require different preparation and personality traits (Shin, 2011).

2.2. Mediating variables

As previously shown, there are a number of factors driving lecturers' decisions and shaping the relationships between teaching and research activities (Coate et al. 2001; Shin, 2011). These factors (also referred as mediating variables) can be classified according to whether they refer to background variables (personal goals, abilities, rewarding systems, etc.) or resources.

As for the background variables, previous studies suggest that research does not have a direct influence on teaching to the same extent in all subjects areas and at all levels (Coate et al., 2001; Noser et al., 1996). While a positive but small relation is usually found for undergraduate level, a more diffuse link appears at the graduate level. Similarly, the direction and intensity of this relationship might differ across academic disciplines (Becher & Trowler, 2001; Kreber &

Castleden, 2009; Lindblom-Ylänne et al., 2006; Trigwell, 2005). For instance, in humanities this relationship is found to be more direct at the undergraduate level, whereas at a postgraduate level is strengthened in sciences.

Likewise, academics' ability may also condition research and teaching activities. In this sense previous studies indicate that those academics whose research efforts are in areas strongly related to teaching may be favoured in comparison to their counterparts who can more difficultly incorporate knowledge into their classroom practice (Shin, 2011). Further indicators of motivation are personal goals (Marsh & Hattie, 2002) which are modulated by the lecturer's beliefs about the teaching-research nexus.

Promotion incentives are also central to the debate on rivalry effects between teaching and research. It is well documented that research has outranked teaching in the university's faculty reward system (Parker, 2008). Indeed, reward structures (including tenure, promotion and faculty salaries) are clearly favouring research activities over teaching ones (Fairweather, 2005). Many academics attributed this to the impact of university rankings which had prompted universities to accentuate the importance of research (Taylor, 2006). Additionally, research outcomes are much easier to be quantified and compared than teaching ones.

Incentives are clearly affected by the career stage of the lecturer (Baldwin et al., 2005). For instance, academics in a weaker contractual position would have stronger incentives to conduct research in order to create reputational signals that are expected to increase their probability to be appointed by universities. To the contrary, full professors have few exogenous incentives to make visible their research (i.e. articles published in academic journals), being their only motivation endogenously determined by their own interest in conducting research in their knowledge fields, the enhancement or consolidation of research projects, or reputational factors. On the other hand, when looking at the specific weight that promotion assessments give to the teaching dimension of academic quality, we can observe

that it tends to be underscored. Indeed, maintaining a minimum standard in the student satisfaction surveys is enough. Consequently, instructors that are in their initial stages would not have such a strong incentive to deliver good lectures as they do have for conducting quality research. On the contrary, incentives to publish diminish as academics consolidate their careers as they have less extrinsic pressures to produce research outcomes. This means, that they can spend more time in preparing lectures than that spent when starting.

Lastly, resources should also be considered when analysing the tensions between teaching and research activities. Because time is a scarce resource, lecturers should manage it effectively according to their interests and needs (Gautier & Wauthy, 2007). Based on what precedes, it is reasonable to argue that time allocated to teaching and research tasks experiment significant fluctuations throughout the academic life of an instructor. Probably during the first stages research will be occupying most of the time. However, as the lecturer advances in the academic career, teaching but also administrative tasks will gradually gain importance.

2.3. Measures

There are important concerns on whether the measures employed to assess teaching and research performance are adequate proxies of quality in their respective dimensions. For instance, Shin (2011) finds that different signs were observed depending on the indicator used for research quality. Similar results are found when evaluating teaching quality.

Concerning research metrics, common indicators tend to use bibliometric data (Sarrico et al., 2010). Information of this type is widely available, including measures such as the number of papers published in scientific journals indexed in specific databases, papers published in high top journals (i.e. first quartile in their areas), or citations counts. All these metrics are accepted to reflect both the quantity and quality of the research activity (Abramo et al., 2008). However, these variables are usually criticised because they can be influenced by self-citation and friend-

citation practices (Toutkoushian et al., 2003) and might represent and incomplete picture of the research dimension of university quality incomplete (Van Raan, 2005). On top of that, these citation practices pattern differs from one knowledge area to another. Therefore, results should be taken with a grain of salt.

Perhaps a more convenient measure of research quality would be that one including weighted composites of different research outcomes (both quantitative and qualitative) (Daghbashyan, 2009; Turner, 2005; Tyagi et al., 2009). While some academics suggest that aggregate dimensions can be obviated for introducing biases (weights are not objective) and not being a substantive basis in the literature for making such judgments (Salerno, 2004), other authors argue that only composite indices can really reflect multiple dimensions of research quality (Tyagi et al., 2009).

As for assessment of teaching quality, student voice is now being heard more than ever. Students are the direct recipients of university teaching, becoming the primary consumers of the higher education system. Therefore, asking them directly about their perceptions is crucial, as there is a widespread agreement that they have the most first-hand information concerning their instructors' teaching behaviour (uz Zaman, 2004)

A common practice to obtain students' perceptions of lecturers consists in the use of surveys, where students are asked to fill in an evaluation sheet. Questions included in course evaluations typically refer to those characteristics that have been found to describe what constitutes an effective teacher. The literature is inconclusive in this sense, so items inquiring whether the lecturer is knowledgeable about, demonstrates a strong interest in the subject, is organized and prepared for class, is able to assist with and encourage student learning, is dynamic in the classroom with effective presentation skills, or is fair and equitable in the evaluation of students can be easily found. The reliability and internal validity of these questionnaires have been tested and there is a consensus among academics that data

obtained through these instruments is consistent (Gravestock et al., 2008; Kulik, 2001) and indispensable (Seldin, 2004; 2006).

Despite the proliferation of these instruments as tools for evaluating teaching quality, as Berk (2005) articulates, multiple sources can provide a more accurate, reliable and comprehensive picture of teaching than just one sole source. In this sense, evidences from the candidate for tenure or from peers constitute other ways of gathering information (Knapper, 2001; Knapper & Wright, 2001; Seldin, 2006).

First, self-assessments reports such as teaching dossiers provide reflective appraisal of how the instructor has designed and delivered the course. These reports are intended to clarify an instructor's approach to teaching. Certainly, one of the central evidences included in a teaching dossier is the philosophy statement. Other common elements comprised provide information on pedagogical strategies used, representative course materials, sample student work, a list of teaching responsibilities, and research in teaching, if any (Seldin, 2004).

Second, and similar to the peer-reviewing processes of publishing, the literature also stresses the importance of engaging peers in the process of evaluating teaching (Arreola, 2000; Berk, 2005; Johnson & Ryan, 2000; Paulsen, 2002; Seldin, 2004). Although these evaluations are less trustworthy than those made by students due to a potential "halo" effect, peer reviews can help identifying areas of teaching which students are not yet able to perceive (uz Zaman, 2004).

Undoubtedly, an interesting snapshot can be obtained by triangulating information from all these different sources.

2.4. Hypotheses and research model

Lecturers have a dual academic life. They are expected to perform both teaching and research activities, without one damaging the other. Although this is a very challenging task, lecturers

that possess good research skills but also have a teaching vocation succeed, regardless they have passed an evaluation process (either of their research or teaching activity). A teaching vocation implies lecturers to be very careful and meticulous with their work, that is, to be actively involved in the learning process of the students, to be near them and offer help when needed, to have good subject knowledge and prepare lessons in detail so that most pupils enjoy the lessons and are keen to participate, etc.

Both youth (i.e. a young faculty member) and maturity (i.e. a senior lecturer) can generate an interest for teaching. Reasons for engaging in teaching activities may be different throughout an academic career. While for the young lecturer motivations for performing a "good teaching" may include to emulate those professors they respected as students, not to disappoint the person that hired them, etc., over the years these motivations are transformed in something much more substantial, where teaching quality takes a greater dimension (Bailey, 1999; Norton et al., 2005).

Responses coming from students' surveys capture whether faculty members are interested and committed with their teaching activities, regardless the accreditation held by the instructor. This is so because students are rarely aware of how the accreditation system works, thus, they are concentrated on evaluating the performance of the instructor. Accordingly, we hypothesise that:

Hypothesis 1: *Students' satisfaction is the same whether faculty members are accredited or not.*

According to several authors (Noser et al., 1996; Ramsden & Moses, 1992), teaching and research should be considered as independent activities, because while teaching concentrates in the transmission of knowledge, research stresses the discovery of knowledge. Moreover, these two activities demand different abilities and preparation; consequently, they involve

different personality traits. An effective teacher may not be an effective researcher, and vice versa. As a result, one might expect a zero effect between these two activities.

Information regarding research activities is only available for those lecturers holding a research accreditation, thus, hypothesis 2 is formulated as follows:

Hypothesis 2: *For faculty members holding a research accreditation, research quality and teaching quality are not related.*

Instructors willing an academic career must pass an accreditation process (see Section 3). However, due to the current incentive system, their curriculums should be driven by research interests, therefore, time and efforts tend to be oriented towards research activities at the expense of their teaching. Consequently, little attention is given to education. This may lead to instructors less available for students, and less concerned about the opinions of their students. Also the design of the course and the activities (preparing the course, up-dating the material, designing new and stimulating class activities, etc.) may be negatively affected by this "research" focus. Undoubtedly, this situation is perceived by students, increasing a sense of carelessness towards teaching that can generate dissatisfaction. Based on this rationale, we hypothesize that:

Hypothesis 3: *For faculty members holding an accreditation, the level of the accreditation is negatively related to students' satisfaction.*

Those lecturers that are good communicators are motivated and feel what they teach, are therefore concerned with an effective student learning and are also interested in improving their teaching skills. All these efforts are positively valued by students, leading to high records in students' evaluations.

As teaching assessment procedures implemented in Catalan universities (either by the candidate or by their peers) are precisely based on the collection of evidences that cover the

aforementioned aspects of the teaching performance, we conclude that the level of teaching quality positively influences student satisfaction.

For the purpose of this paper, two hypotheses are tested, making a distinction between whether the lecturer holds a research accredited or not:

Hypothesis 4a: *When considering accredited lecturers, the level teaching quality positively influences student satisfaction.*

Hypothesis 4b: *When considering non-accredited lecturers, the level teaching quality positively influences student satisfaction.*

The resulting model is depicted in Figures 1 and 2. As shown, student satisfaction is expected to be explained by research and teaching assessments, performed at the individual level of the lecturer. Two models are envisioned: Model 1 (Figure 1) for those lecturers holding a research accreditation (and also, having been subjected to a teaching evaluation process), and Model 2 (Figure 2) for those being only evaluated in terms of teaching.

Figure 1. Model 1 (faculty members holding a research accreditation).

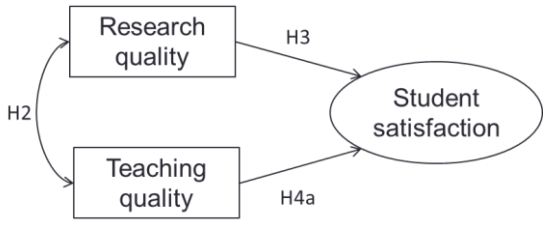
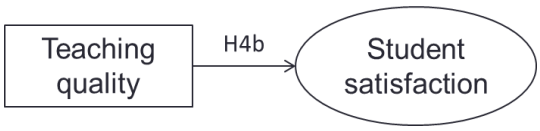


Figure 2. Model 2 (faculty members that do not hold any research accreditation).



3. Institutional programmes evaluating academic staff in Catalan universities

Quality assurance criteria and guidelines in the European Higher Education Area sponsored by the European Association for Quality Assurance in Higher Education (ENQA) include the assessment of academic staff in terms of the quality of their performance. Institutions must therefore have the means to ensure that academic staff is qualified and competent for the job. This implies that the assessment of the activities performed by faculty members (both internal and newly external candidates applying for a position) is a key issue.

In Catalonia, there are two external agencies in charge of performing these assessment processes: the Catalan University Quality Assurance Agency (AQU), which is specific for the Catalan region, and the National Agency for Quality Assessment and Accreditation of Spain (ANECA), with has a larger scope, and is in charge of evaluating the performance of universities and research from all Spanish regions.

AQU is a public entity with an internationally recognized status. Its mission is to assure the quality of the Catalan higher education system through compliance with the European standards of quality and to safeguard the interests of society in the quality of higher education. AQU represents the main instrument for the promotion and assurance of quality in the Catalan higher education system. Since 2003 AQU has been carrying out the pre-selection assessment of academic staff.

Lecturers in Catalonia can also be evaluated by the National Agency for Quality Assessment and Accreditation of Spain (ANECA). This agency has a broader scope. Its aim is to provide external quality assurance for the whole Spanish Higher Education System (including regional systems such as Catalonia, Galicia or the Bask Country, which have their own quality agencies) and to contribute to its constant improvement through evaluation, certification and accreditation.

When a Catalan university needs to replenish a vacant position, to be eligible, candidates must hold an issued accreditation by AQU or ANECA. Although these two agencies (AQU and ANECA) are operating under the same European principles, they assess lecturers using own standards. Yet, the names of the resulting categories (according to the level of achievement) are also different, because different criteria are used.

Table 1 summarises the academic categories (based on the accreditation awarded by AQU or ANECA) that exist in Catalan universities. These categories are ordered according to their level of exigency, being 0 the simplest one, and 7 the most demanding one.

Table 1. Types of accreditation awarded by the Spanish and the Catalan accreditation agencies, ordered according to their level of requirement.

Coding	Accreditation	Original name	Accreditation agency
0	Teaching staff at private university	Professor de universitat privada	AQU
1	Temporary lecturer	Profesor colaborador	ANECA
	Temporary lecturer	Professor col·laborador	AQU
2	PhD assistant lecturer	Profesor ayudante doctor	ANECA
	Tenure-track lecturer	Lector	AQU
3	PhD lecturer	Profesor contratado doctor	ANECA
	Teaching staff at private university	Profesor de universidad privada	ANECA
4	Senior lecturer	Profesor titular	ANECA
5	Tenured assistant professor	Professor agregat	AQU
6	Professor	Profesor catedrático	ANECA
7	Full professor	Catedràtic d'universitat	AQU

At this point it is worth mentioning that the aforementioned categories are substantially research-biased. This means that the assessment they provide is much more able to reflect the quality of research activities than that of teaching ones.

Both AQU and ANECA have established procedures exclusively devoted to evaluate candidates in terms of teaching quality. However, not all instructors are required to take this evaluation (as opposed to the accreditation process described before), having this assessment an optional character. Thus, aiming at guaranteeing a minimum level of quality in terms of teaching,

universities have developed their own mechanisms in order to assess the teaching quality of their academic staff.

4. Methodology

For the purposes of this study 80 different subjects offered at the Universitat Internacional de Catalunya (UIC) have been considered: 44 taught by lecturers holding an accreditation of their research activity, and 36 without any. The data set includes information for the academic year 2013/14. Different information sources are used: (1) results from students' satisfaction surveys; (2) research accreditations issued either by AQU or ANECA; and (3) teaching quality assessments performed by the Department of Innovation and Educational Quality (DIEQ) at UIC.

Questionnaires for students' evaluation of teaching activities have been considered to proxy student satisfaction. Based on Pratt (1997), student satisfaction has to consider three aspects of teaching: organization and planning (reading list, timing or workload), implementation and interaction (technical skills or class management, among others) and results (learning outcomes or effectiveness). In this respect, UIC created and assessed a scale taking in count these three topics (see Table 2). This scale was validated in 2007 using data gathered from two subjects taught at two different campuses. It includes 10 items and uses a five-point Likert scale. Items grouped in three dimensions: organization and planning (items 1 to 3); implementation and group interaction (items 4 to 9); and results (item 10).

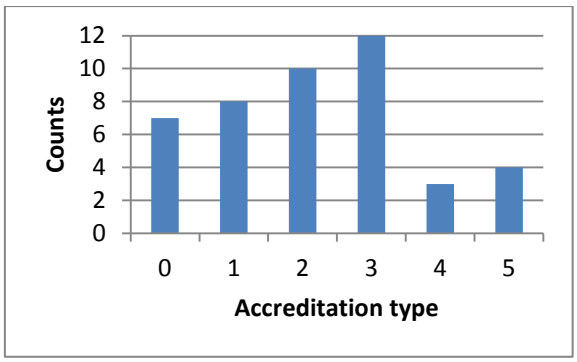
Table 2. Items included in the students' satisfaction survey.

Organisation & Planning
1. The reading list and additional materials for the course contributed to improving my appreciation and understanding of the subject.
2. The course organisation and activities were well prepared and thoroughly explained by the lecturer.
3. The workload of this course was appropriate to set time for learning.

Implementation & Interaction
4. The lecturer clearly presents and highlights the most important points of the course.
5. The students were encouraged by the lecturer to take part in the class discussions.
6. The lecturer properly answers students' questions and guides students in the development of the different tasks to be completed.
7. The lecturer uses didactic resources that facilitate the learning process.
8. The content of the exams and other assessed assignments matched the course content and the emphasis placed on each topic by the lecturer.
9. The lecturer showed a genuine interest in all of the students and was readily available to students outside of class time.
Results
10. The task performed by this lecturer has helped me to improve my knowledge, skills or attitudes.

As for the research accreditation type, following the classification in Table 2, research quality has been operationalized through a seven-point Likert scale, from 0 (meaning having no accreditation of any type) to 7 (accreditation as a full professor). Figure 3 graphically illustrates the descriptives for the sample considered. From the graph, it can be interfered that none of the professors evaluated held an accreditation neither as a professor nor as a full professor.

Figure 3. Classification of lecturers according to accreditation type.



Data reporting information on teaching quality was gathered from the DIEQ. This department is in charge of assessing lecturers in their teaching activities. In order to decide whether the lecturer is capable of performing high quality teaching three different types of evidences are collected. First, the viewpoint of students is considered through the students' satisfaction survey. Reports form peers are also taken into account. In this case, a report from the supervisor of the candidate is required. Finally, the candidate has to prepare a self-assessment

report, emphasizing his/her strengths and points of improvement and provide an example of a course syllabus he/she has designed.

Once these evidences are collected, a committee is designated who will be in charge of assessing the quality and suitability of the candidate in terms of teaching. A final decision is then made, which can range from unfavourable to highly favourable, as shown in Table 3.

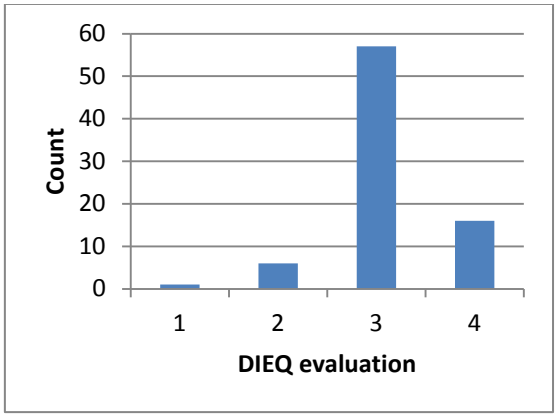
To operationalise the teaching quality dimension a scale including 4 different categories has been used. Thus, for each lecturer, a level is assigned according to the last assessment he/she has received from the DIEQ. The resulting scores are summarised in Table 3.

Table 3. Items included in the teaching quality scale.

1 Unfavourable
2 Favourable with conditions
3 Favourable
4 Highly favourable

Figure 4 shows the results for the sample considered. As it can be observed, most of the lecturers evaluated by the DIEQ achieved a "favourable" assessment.

Figure 4. Classification of lecturers according to the results obtained in the DIEQ evaluation.



To verify the hypothesis proposed we used different statistical methodologies. For the first hypothesis, an analysis of contingency is used in order to identify a potential interaction between student satisfaction and research quality. For the second hypothesis, we apply a

Mann-Whitney test, comparing the 10-items included in the student satisfaction survey. Two groups are considered: one including those lecturers holding any type of accreditation and a second group for those that do not possess any. Finally, in order to test hypotheses 3 and 4, structural equation modelling (SEM) is used. SPSS v20 and EQS statistical programmes were used for data analysis.

5. Results

5.1. Testing H1

We analysed if student satisfaction is the same whether faculty members are research accredited or not. Two subsamples or groups are analysed: a first group of 44 accredited academics and a second group of 36 non-accredited academics.

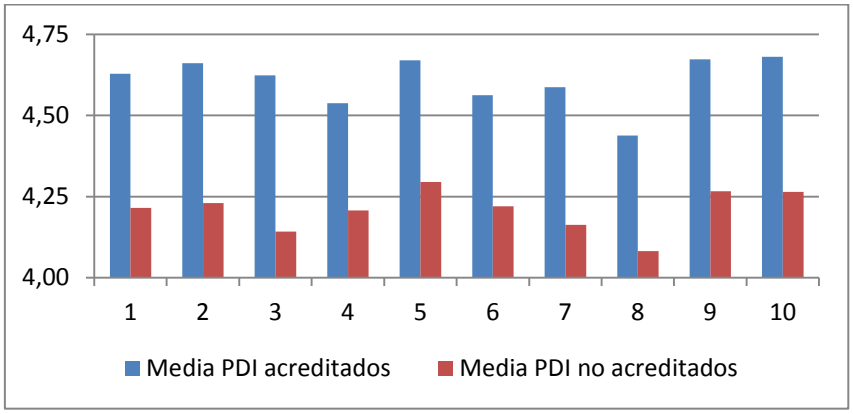
The U-test of Mann-Whitney reveals that the distribution of all 10-items is the same in the two categories (see Table 4). This result prevents us to confirm our hypothesis suggesting that student satisfaction is condition by a research accreditation.

Table 4. Items included in the teaching quality.

Item	1	2	3	4	5	6	7	8	9	10
Significance level	.896	.981	.545	.688	.612	.720	.938	.931	.911	.692

In order to examine this result in more detail, we decided to plot the results for the two groups and compare them qualitatively. Although hypothesis 1 has been rejected, Figure 5 seems to indicate that accredited lecturers are achieving higher scores compared to non-accredited counterparts.

Figure 5. Mean of accredited and non-accredited academics.



5.2. Testing H2

Hypothesis 2 aims at assessing the relationship between teaching and research quality. A contingency analysis was performed. Here, the sample included the subsample of lecturers holding a research accreditation, that is, 44. Given its small size results must be analysed with caution. Results are presented in Table 5.

Table 5. Contingency table of research quality and teaching quality.

		Teaching quality			
		"2"	"3"	"4"	
Research quality	"0"	1	6	0	7
	"1"	2	3	3	8
	"2"	1	8	1	10
	"3"	0	10	2	12
	"4"	0	2	1	3
	"5"	0	3	1	4
		4	32	8	44

Statistics show a low association level. Particularly, the Spearman correlation is of .213 at .165 level of significance. R of Pearson is of .219 at .153 significance level, and the Gamma index is .303 at a significance level of .132. All these figures allow us validating hypothesis 2.

5.3. Testing H3 and H4

5.3.1. Validation of "organisation" and "interaction with the group" factors of satisfaction

Two exploratory factor analysis were performed in order to confirm the unidimensionality of the factors "organisation" and "interaction with the group" (Table 6). Consequently, other two confirmatory factorial analysis were afterwards conducted. The reliability of these factors was then assessed in accordance with Hair et al. (1998). Cronbach's alpha coefficient and composite reliability exceeded the threshold value of 0.7 for internal consistency in all cases. In addition, the variance extracted for each scale was greater than 0.5. Similarly, the convergent validity was confirmed for both scales as all variables were high and significant at 0.05 level.

Table 6. Confirmatory Factor Analyses of the two satisfaction constructs.

F1 Organisation & planning				F2 Implementation & interaction			
	Standardized loads	t-statistic	R2		Standardized loads	t-statistic	R2
Item 1	.902		.813	Item 4	.862		.742
Item 2	.899	12.122	.808	Item 5	.813	6.396	.661
Item 3	.958	17.088	.918	Item 6	.917	11.570	.842
				Item 7	.920	14.264	.847
				Item 8	.869	11.405	.754
				Item 9	.781	6.604	.609
Fit indices							
Just identified model: fitness cannot be assessed.				Satorra-Bentler scaled χ^2: 3.301			
				Degrees of freedom: 9			
				CFI: 1.000			
Reliability and Convergent validity							
Cronbach's alpha: .941				Cronbach's alpha: .944			
Average Variance Extracted (AVE): .847				Average Variance Extracted (AVE): .743			
Composite Reliability (CR): .943				Composite Reliability (CR): .945			

5.3.2 Structural equation models (Models 1 and 2)

Model 1 and 2 (as defined in Section 2.4) were estimated with the robust maximum likelihood method from the asymptotic variance-covariance matrix. EQS 6.1 software was used for this purpose. The fit indices obtained in the two models corroborate their goodness of fit (Table 7).

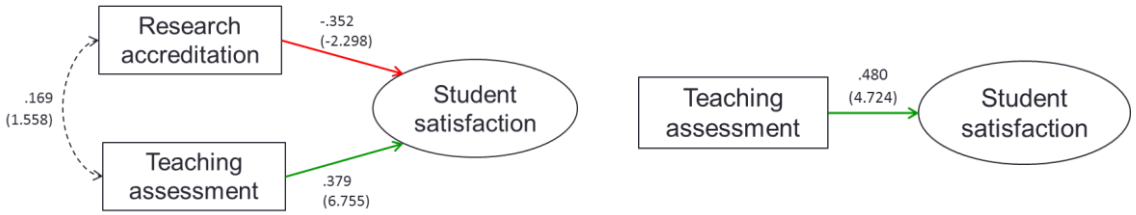
Table 7. Results of the two models tested using SEM.

	Model 1 Sample: 44 accredited (a)	**Model 2** Sample: 36 non accredited (a)	**Hypothesis**
Correlation research level – teaching quality	.169 (1.558)	----	H2: Rejected
Path: Research accreditation → Satisfaction	-.352 (-2.298) (b)	----	H3: Accepted
Path: Teaching quality → Satisfaction	.379 (6.755) (b)	.480 (4.724) (b)	H4: Accepted
Path: F3-organisation&planification	1.000 (2.437) (b)	.996 (12.852) (b)	
Path: F3-implementation&interaction	1.000 (2.664) (b)	1.000 (6.347) (b)	
Path: F3-results	.878 (2.893) (b)	.849 (1.0E+38) (b)	
Fit indices			
Satorra-Bentler scaled χ^2	69.230	71.562	
Degrees of freedom	50	41	
p-value for the χ^2	0.037	0.002	
CFI	.773	.905	
RMSA	.095	.146	

(a) Each cell contains: standardized solution and t-statistic in brackets
(b) Significant at the 5% level.

Results for the first model (see Figure 6 and Table 7) indicate a negative relationship (-.352) between the level of the research accreditation and student satisfaction. That is to say, a lecturer with a higher professional category, would have a worse evaluation by students. In the light of this finding, hypothesis 3 is accepted.

Figure 6. Results of SEM.



To validate the relationship between teaching quality and student satisfaction, both models have been taken into account. In the case of non-accredited lecturers, the relationship between teaching quality and student satisfaction is found to be positive (.480) and significant. For accredited lecturers (model 1), it is clear that teaching quality is also positively related to student satisfaction (. 379). Consequently, hypothesis 4a and 4b can be accepted.

As expected, results show that the research level achieved by the lecturer has a negative impact on student satisfaction. Moreover, when comparing the two models it is possible to interfere that although passing the evaluation process of the DIEQ, teaching quality exerts a highest (and positive) influence on students' satisfaction when the lecturer does not hold a research accreditation.

Our results are in accordance with those of Serow (2000), signalling that research outputs are the most relevant merits of any lecturer for internal professional career. We insist on the fact that our sample is from only one university, and the size is not really big enough to vouch for reliable analysis. The conclusions drawn from it have to be taken with caution. Thus, based on our particular results, findings suggest that current incentive systems at universities negatively impacts on student satisfaction.

6. Discussion

Universities are expected to be centres for high quality education and hubs of research and innovation. Therefore, examining how students' satisfaction is affected by the profile of the lecturer in terms of teaching and research is of great interest.

This paper contributes to the literature that examines the trade-offs between teaching and research quality. One of the main findings of the research is that the level of teaching quality does not depend on the level of research, as no correlation has been found between these two variables. Moreover, students' satisfaction is the same for both groups of accredited and non-accredited lecturers.

Within the group of accredited lecturers, our findings indicate that the highest the engagement in research activities, the worst the evaluations of the teaching performance coming from students' surveys. This situation can be explained by several reasons. First, there

is a limited time and energy for lecturers to do both teaching and research tasks in a high level of quality. Second, teaching and research require diverse abilities or skills, and therefore, it is difficult to find both in the same person. Third, current incentive systems are research-biased. In this sense, accredited lecturers have more stable labour contracts compared to non-accredited ones. Promotion of lecturers on the basis of research sends a signal to young academic staff to reduce their motivation to teach and increase students' learning. This situation provides a clear incentive for lecturers to render careless attention to teaching activities in favour of research ones. Future research efforts are needed in this direction in order to confirm our intuitions. Direct interviews with lecturers may report interesting findings that could help us to obtain a more comprehensive picture of the motivations of lecturers throughout their academic career.

Our results also indicate that teaching quality exerts a positive impact on student satisfaction. In this respect, differences arising from holding a research accreditation or not, seem not to be determinant. Particularly, when analysing the group of faculty members holding a research accreditation, research quality and teaching quality are not related. Yet, when considering the group of non-accredited faculty members, our findings indicate that the level of teaching quality has a stronger effect on student satisfaction in comparison with the one of those lecturers holding a research accreditation.

Our findings also signal to research-biased incentive systems, which are negatively impacting on teaching quality, and consequently on learning outcomes. Indeed, given the weight that research productivity has in evaluation systems, it becomes clear that for those faculty members who want to carve out an academic career, their incentives will be conditioned, to a great extent, by their capacity to perform research activities rather than by their ability in teaching. This leads us to conclude that current accreditation systems are not obtaining the expected results in terms of teaching. While these two activities should be complementing and

enriching each other, empirical evidence suggests that students perceive disadvantages from staff involvement in research activities.

High quality teaching and high quality research are both desirable outcomes. Undoubtedly, universities expect their lecturers to excel in both dimensions; nevertheless, there is very little evidence on how this ideal could be effectively accomplished.

Probably the main limitation of this study relates to the specific analysis of a Catalan private university and the reduced sample considered. Future studies should be conducted with bigger samples and in other universities with similar regulatory frameworks. Another limitation deals with the measures selected to capture teaching and research quality. Although it was possible to create valid and reliable measures that consider viewpoints from different stakeholders, university quality is a broad term that, while in theoretical models seems to be relatively easy to be measured, its practical operationalization is constrained by the availability and feasibility of obtaining the appropriate data.

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