How do Students Measure Service Quality in e-Learning? A Case Study Regarding an Internet-based University

María Martínez-Argüelles[1], José Castán[2] and Angel Juan[1]
[1]Open University of Catalonia, Barcelona, Spain
[2]University of Barcelona, Spain
mmartinezarg@uoc.edu
jmcastan@ub.edu
ajuanp@uoc.edu

Abstract: This article discusses the importance of measuring how students perceive quality of service in online higher education. The article also reviews the existing literature on measuring users' perceptions about quality in e-services. Even when there are a lot of articles on this matter, none of them focuses on e-learning services, so this paper tries to fill that gap. The article proposes using the Critical Incident Technique to perform a qualitative analysis, which contributes to identify the main dimensions and categories that contribute to students' perception of service quality. A case study, regarding a completely online university, is presented and the proposed model is used to obtain some preliminary research results. Among these, key quality dimensions from a student point of view are identified. Some of these dimensions are: learning process, administrative processes, teaching materials and resources, etc. After discussing the research results, a list of recommendations for university managers is formulated. We believe that both the proposed methodology and the case-study recommendations can be of potential interest for managers of several universities offering online higher-education worldwide.

Keywords: online higher education, perceived service quality, critical incident technique, qualitative data analysis

1. Introduction and motivation

Universities worldwide must face, among other challenges, an increasingly differentiated demand for education, the need to carry out more commercial activities in order to obtain new sources of funding, and new competitors that make use of Information Technologies (ITs) to offer their educational services in a global market. All together, these factors are forcing universities to rethink their traditional roles, to develop new organizational structures and to reposition themselves through strategic direction setting (Moratis and van Baalen 2002). These trends and the widespread recognition that the university's invisible product, knowledge, is the most important factor in economic and social growth are the reasons for the increasing competitiveness inside the higher education market all over the world. To be successful in this environment, universities should focus on customers' perceptions of service quality –understanding 'service' in the broad sense, including both academic and non academic services– since those perceptions are a key influence on students' decisions when they are choosing or recommending a particular institution.

While there is little disagreement on the importance of service quality issues in higher education, the challenge is to identify and implement the most appropriate measurement tools in order to gain a better understanding of the quality issues that impact on students' service experiences (O'Neill and Palmer 2004). In other words, knowing what customers expect is the first and possibly most critical step in delivering quality (Zeithaml and Bitner 2003).

Following the general pattern set by service industries, the issue of service quality within the higher education sector has received increasing attention in recent years. The most dominant theme is the development of valid, reliable and replicable measures of perceived service quality (PSQ). In the early stages, most models designed to evaluate PSQ focused exclusively on teaching and learning. In the last decade, though, several studies have approached the evaluation of university services from a broad perspective, considering not only the core service but the peripheral or auxiliary administrative and backup services as well (Abdullah 2005).

This study continues this line of research by applying a holistic conception of service quality in online higher education.

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2. Related work and added value of our approach

The recent literature describes measurement tools and techniques for assessing PSQ within the higher education sector. For the most part they are extensions or adaptations of SERVQUAL models (Buttle 1996), where service quality is the result of a comparison between expectations and perceptions of performance, e.g.: SERVPERF (Oldfield and Baron 2000) or IPA (Ford et al. 1999, Joseph et al. 2005). While those models were initially designed to be applicable across a broad spectrum of service settings, many studies have stressed that the industry-specific characteristics of many services mean that these models should be adapted or supplemented to fit the characteristics of the particular service under analysis (Cox and Dale 2001, Chen 2002). Given these considerations, the relatively large number of articles on the subject of evaluating PSQ in higher education is in contrast to the almost total absence of such work with regard to higher-education in online environments.

The digital nature the interactions produced in an online environment is a source of some problems for applying the classical PSQ evaluation models:

- Most of the items used in these scales are linked to the direct interpersonal interaction that characterized 'traditional' services. Therefore, even those who advocate the use of these scales in virtual environments acknowledge that, in the absence of these traditional interactions, the scales need to be adapted to the specific e-service context (van Riel et al 2001).
- The absence of physical reference points or indicators of quality of service, such as premises, facilities, and service staff. In the traditional university these tangible elements make up what is known as the 'servicescape' which is a decisive factor in PSQ evaluations (O'Neill and Palmer 2004). In online learning environments, the student does not have at his/her disposal the conventional physical elements that act as indicators of the quality of service. In their place, the student can only use other variables, such as the aesthetics and ease of use of the online interface, referred to as 'e-scape' (van Riel et al. 2004).
- Students are not just users of university services, but are the universities' primary customers. Consumers are often part of the production and levier processes of services (Grönroos 1990), but in online higher-education the role of the student is even greater, since it is essential that he/she should be the centre of the teaching/learning process. Moreover, as the user of a digital interface, the online student will need a certain degree of skill and experience in working with ITs (Juan et al. 2008). Consequently, the students themselves contribute directly to the quality of service delivered and to his/her own satisfaction or dissatisfaction.

Although there are many models for assessing PSQ in online environments are available, they have been designed exclusively to assess service quality of web sites and, specifically, of online shopping sites. The aforementioned were not designed to evaluate the quality of pure and complex services, such as the educational ones, which do not involve just a single transaction, but multiple interactions that take place over a prolonged time span. Specifically, in the case of online higher education, important questions, both empirical and theoretical, have just begun to be addressed. Most of the published studies focus on specific services –e. g. an online university library (O'Neill 2003)– or on particular sections –as, for instance, teaching resources (De Lange et al. 2003)–, but to date no holistic evaluation of PSQ, that captures the online student's overall service experience in online learning environments has been carried out.

3. Research scenario: The Open University of Catalonia (UOC)

The Open University of Catalonia or UOC (http://www.uoc.edu/portal/english) is a fully online university with headquarters in Barcelona, Spain. It was founded in 1995 by the Catalan Government with the mission of "providing people with lifelong learning and education through intensive use of information and communication technologies". According to official data, the UOC offers educational services over the Internet to more than 50,000 students, distributed in several undergraduate and graduate programs. Figure 1 shows the distribution of students in Bachelors Degrees (23,671), Diplomas (16,593), Open Programmes (8,712), etc.

UOC students belong to different parts of the world, but they are mainly located in Spain and South America. About 60% of UOC undergraduate students are adult students (over 30 years old) that typically combine their professional activity and/or family responsibilities with their academic duties. Educational services are delivered by a team composed of more than 2,200 instructors –including

UOC faculty and UOC online collaborators, most of these professors from other Spanish universities– and 550 management staff. The UOC uses an asynchronous and student-centred educational model and has already received several international prizes, such as the 2001 ICDE Prize for the best virtual and distance university in the world or the 2004 OEA Prize for educational quality. Currently, up to 22 accredited degrees and official masters are offered via the UOC Virtual Campus, a learning management system entirely developed and maintained at the UOC (Figure 2). Some of the most popular degrees (in number of registered students) offered at the UOC are as follows: Computer Engineering, Business Administration and Management, Psychology, Telecommunications, Information and Communication Sciences, Law, and Humanities.

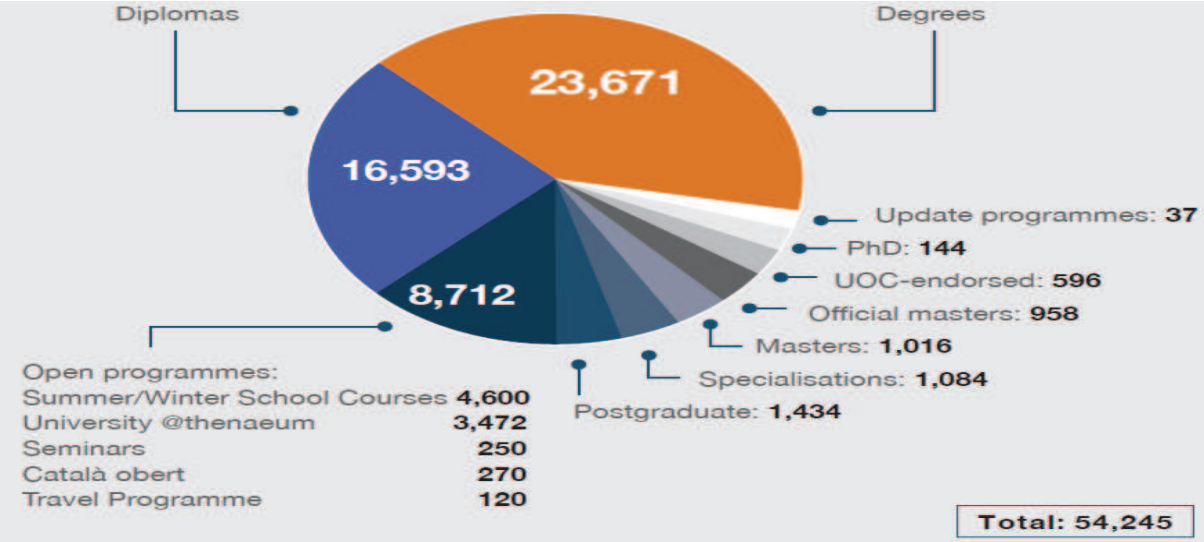

Figure 1: Distribution of UOC students by type of studies

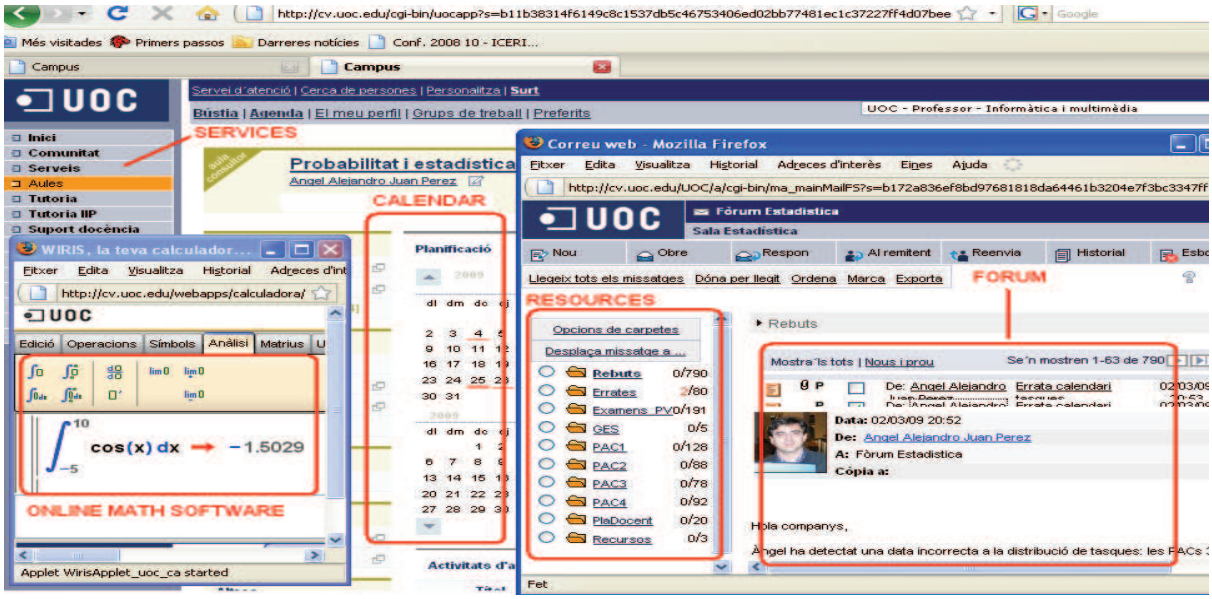

Figure 2: A screenshot of the UOC Virtual Campus with some of its functionalities

4. Research methodology

The identification of the qualitative functional sections of service quality was carried out using a qualitative method referred to as the Critical Incident Technique (CIT). CIT was introduced in the social sciences more than fifty years ago by Flanagan (1954) and has been used in a variety of contexts in recent years to explore service research issues. The critical incident technique aims to contribute to improving our understanding of the activity or phenomenon by using an original approach: the reporting of the events that make up a specific experience by the person or persons involved. The method uses a survey or a similar procedure to obtain a catalogue of critical incidents.

This catalogue is then compiled and analyzed to determine the key dimensions or sections that affect quality of service as measured by the consumers.

The data (critical incidents) collection process comprises two stages. In the first stage, consumers are interviewed and specific information about the service is obtained. In the second stage, data is classified in categories which are intended to represent different sections of service quality. In the first stage of our study, an e-mail was sent to a random sample of UOC students. The theory recommends interviewing a minimum between 10 and 20 consumers. That way, if one of them provides false or mistaken information, his/her point of view can be compared and contrasted with data from other individuals. The selected individuals are usually asked to report between 5 and 10 positive and 5 and 10 negative examples of their user experience regarding the analyzed service.

We sent students an e-mail with some standard examples of critical incidents (Figure 3), so that they had a better idea of the kind of feedback we were expecting from them. To avoid biased responses as much as possible, we decided that those standard examples should be related to a health service instead of an academic service. We sent this e-mail to a considerably larger number of students, asking them to record approximately five positive and five negative critical incidents related to the different services they received during a complete course. We did this because the response rate in online surveys tends to be low –typically between 10% and 30%– and because it was simpler to interview a larger number of subjects than to ask each student to record a higher number of incidents. In this way, we avoid the risk of presenting a complicated and time-consuming survey, which would have an even more negative effect on participation. The main aim of this stage was to obtain a minimum of 200 critical incidents, a number that is considered theoretically adequate. Eventually, a total of 41 (21 men and 20 women) took part, reporting 392 critical incidents, of which 12 were rejected because they had not been correctly formulated. The sample thus comprised 380 valid critical incidents.

Dear student,

We are currently conducting a research project aimed at analyzing the factors that determine students' perception on the quality of e-learning services.

The first stage of this study requires the collaboration of a group of randomly-selected students. We would like to kindly ask for your collaboration in this project. All you have to do is answer this message **reporting 5 positive** and **5 negative incidents** related with **services provided to you by UOC**.

Please, consider the following examples of incidents that might serve you to understand the kind of opinions we are looking for. Imagine that you visit your local health centre. Some examples of incidents related with the quality of the service you receive might be:

* Positive: (1) "the person at the information desk was helpful", (2) "the doctor carried out a thorough examination", …

* Negative: (1) "I had spent too much time in the waiting room", (2) "the doctor used a lot of technical terms that I could not understand".

We would like you to report specific situations, examples or experiences –either recent or from the past– regarding your relationship with the UOC. The situations can include any service provided by the UOC –not only the basic teaching service. Please, try to be as clear and specific as possible, avoiding abstract comments such as "the service was good".

Notice that all the information provided in this study will be completely confidential.

Thank you very much for your participation and your assistance in this matter.

Yours sincerely,

Figure 3: E-mail sent to students

The incidents were analyzed as follows: First, they were grouped according to type. For each type a sentence was written to describe the incident; both positive and negative incidents were included. Once all the critical incidents were grouped together the above process was repeated, now using the similarity between the sentences describing the incidents as the criterion. We thus obtained a hierarchical relation between critical incidents, their aggregate descriptions and, finally, the sections of quality.

The key stage in the process was the creation of two work teams. To monitor this process, responsibility for the task was assigned to two different teams (each of them composed by two professors from different knowledge areas): the first established the sections of quality following the generalization procedure described above and the second, using the sections established, directly assigned each of the critical incidents to one of these sections. The accuracy of the distribution process depends on the degree of agreement between the teams, that is, of the percentage of incidents that both place in the same section. Total agreement is represented by a score of 1. We obtained a score of 0.91, which should be considered satisfactory, taking into account that the literature considers an index of above 0.8 to be acceptable. Finally we checked the accuracy of the sections in order to determine whether they were able to define the construct of service quality in its entirety. To do this, we randomly extracted around 10% of the critical incidents (35) and then regrouped and reclassified the remaining incidents in the sections. We then re-assigned to these sections the 35 critical incidents that we had removed.

Since we were able to place all these incidents in the sections, we concluded that they presented a reliable reflection of the constructed model. The categorization process highlighted the need to reject incidents which did not contain specific examples or experiences of the service received but reflected more general impressions, such as the advantages of online learning –time saving, availability, ease of access, the opportunity to combine studies and work, etc.– and its drawbacks –the feeling of isolation, the need to adapt to the environment, etc. (Juan et al. 2009). Among these comments, the opportunity to combine studies and family and professional life was highly valued by a part of the population who otherwise would not be able to study. After this process of refinement we had 350 critical incidents, of which 184 were positive and 166 negative. Once the classification process was completed, and after checking the validity of the process, these critical incidents were finally grouped in 6 sections covering 33 definitions. Table 1 summarizes the sections or dimensions obtained.

Table 1: Critical incidents reported by dimension

Section or dimension	Positive critical incidents	Negative critical incidents	Total number of critical incidents	Percentage of critical incidents
Learning process	79	60	139	40%
Administrative processes	31	48	79	23%
Teaching materials and resources	26	21	47	13%
User's interface	23	23	46	13%
Relationships with the community network	25	5	30	9%
Fees and compensations	0	9	9	3%
Total	*184*	*166*	*350*	*100%*

5. Analysis of results

As can be seen in Table 1 the first dimension or section, learning process, accounts for about 40% of total critical impacts. This section represents the core service of any higher-education institution, and it includes categories such as the following ones: course design, learning planning, homework workload, instructors' guidance and support, homework contribution to learning, instructors' feedback, assessment system, instructors' responsiveness, accuracy of responses and instructors' courtesy. A total of 27 critical incidents were reported in this section referring to the guidance and support of the learning process by instructors. Some examples of these incidents are the following ones: "excellent guidance from instructors", "some of the instructors in this course just sent an e-mail on each important deadline, but they did not perform any other action to encourage or guide students in the meantime", etc. In this sense, students reported a large number of critical incidents (up to 9% being negative incidents) related with either the absence of personalized feedback from instructors. Another category that received a considerable number of critical incidents was the assessment process. From its 21 associated incidents, it can be derived that, on the average, UOC students have a positive view of our continuous assessment system, which "motivates to study regularly and to learn more about some advanced topics". However, students also seem to have a negative view of the "excessive number of tests and homework activities that they need to complete in some courses". Another two categories that can be considered as relevant in this section are those related to the course design and to the length of the response time-interval (i.e., the time between a student's request submission and its corresponding instructor's response).

The second section, in terms of relative importance, is the one related to administrative processes. It represents about 23% of the critical incidents reported, and it relates to the so-called 'facilitating services', that is, services that are indispensable for the rendering of the essential service even when they are not part of this essential service. In the case of our university, these services include all administrative processes, such as secretary's office (registration, certification, prior learning assessment, etc.), the organization of face-to-face final tests, the handling and shipping of documentation (both of academic and administrative nature) and the professional performance of our administrative staff in terms of responsiveness, courtesy and accuracy of responses.

The third section, teaching materials and resources, recorded 47 critical incidents (13% of the total number of incidents), 26 positive and 21 negative. According to the UOC pedagogical model, this section can be considered as being an integral part of the essential service. Nevertheless, it has been considered apart from the learning process because it has enough entity on its own. The section can be divided into the following three categories: contents (e.g. "it is good to use updated learning materials", or "materials seem too superficial to me"), library (covering both resources availability and library general performance) and format.

The fourth section, user's interface, covers some service aspects related to the usability and technical performance of the UOC Virtual Campus and also of the university staff that provides online technical support to students and instructors. These categories are directly related with the fact that the kind of service being offered is an Internet-based one. Therefore, according to (Grönroos, 1990), it also reflects a facility service. The highest percentage of (positive) critical incidents in this section is found to be associated with the usability or browsing capabilities of the UOC Virtual Campus, that is, how simple and intuitive is the browsing inside the online learning environment (e.g. "Browsing the virtual learning environment is really easy"). The remaining two more representative categories of this section are those related to the reliability and connectivity levels of the UOC Virtual Campus. Some examples of positive critical incidents related to these categories are: "(...) everything works well: sending files and downloading materials (...)", or "access to the campus was problem-free". Also, some examples of negative critical incidents for these categories are: "I've suffered problems every time I've tried to download the materials for this course, especially at the beginning of the semester and Sunday evenings", or "I've had difficulties when trying to connect and access the campus during the last days". Within this section, only a small percentage of incidents (about 2%) refers to the responsiveness, accuracy of responses and courtesy of the technical staff.

Students have also reported 30 critical incidents, most of them positive, related to the section relationship with the community network. This section constitutes a 'supporting service', that is, an optional service that contributes to differentiate our offer from the service being offered at other universities. In particular, UOC students give positive credit to "the possibility of interact with students from all over Spain and Latin-America, who are professionals working on jobs similar to mine", and also to "the chance of making friends and working together in the learning process, performing online collaborative learning". Finally, we have to consider the fees and compensation section. This section is considered by Zeithaml et al. (2004) as being particularly relevant when online consumers do not receive the expected service. In this section, only negative incidents were recorded (about 3% of the total number of incidents). In fact, some students perceived the courses as "expensive" and stated that they did not receive any refunds or compensations for missing or underperformed services.

6. Lessons learned and recommendations to UOC managers

Figure 4 summarizes the data in Table 1 and presents it in a more visual format. From both sources, and according to the previous discussion of results, we can establish the following recommendations for UOC managers. Notice that most of these suggestions could probably be extended to other universities worldwide offering online courses and degrees:

- First of all, total quality management in a university implies to have a holistic view of the service being offered, which includes not only the learning process section but also other dimensions. Nevertheless, the learning process is considered by students as the main quality dimension, since it constitutes the *raison d'être* of the service being offered.
- Regarding the learning process, students give special attention to aspects such as: (a) the guidance and support received by instructors, (b) the assessment process, (c) helpfulness of the responses given by instructors to their requests, (c) associated response times, and (e) balanced workload and practical utility of the proposed homework activities. Therefore, these topics must

be carefully considered by the university and, in the case of our study, data seems to indicate that UOC students are generally satisfied with them. However, it becomes necessary to improve the feedback that our students receive from their instructors: students request a more personalized and complete feedback for each learning activity and not just a general feedback –as it is currently the case in most courses. Regarding the essential service, it is also important to highlight the section related to academic materials and resources. In this sense, the study results reinforce the idea that both materials and academic resources must be well-written, updated and especially suitable for being used in distance-education. Also, the library performance must be efficient and it must offer resources oriented to facilitate the online learning process.

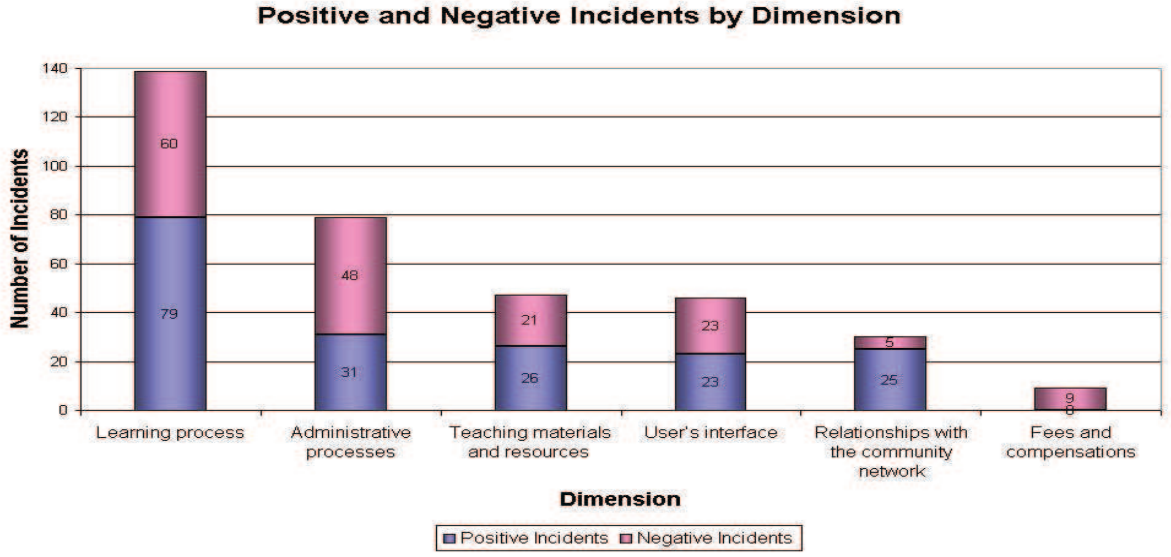

Figure 4: A graphical representation of the number of incidents by section or dimension

- The section regarding administrative processes is the only one that shows more negative than positive critical incidents. Therefore, it is a section that requires priority attention. It is convenient not to forget that this section refers to services that are fully necessary for the correct development of the core service. Some categories need improvement in this section: responses from administrative staff should be more accurate, some administrative processes should be simplified and more transparent (that is, less bureaucratic), and handling and shipping of administrative documentations should be more efficient. A positive aspect of this section is the courtesy employed by administrative staff in their responses to students' requirements.
- Regarding the user's interface section, we can see that there are as much positive as negative incidents. Among the positive incidents, we can highlight the facility to browse the UOC Virtual Campus. Among the negative incidents, we can cite the reliability and connectivity problems that some students have suffered when accessing this Virtual Campus, especially at the beginning of each semester.
- Another positive aspect, from the students' point of view, is the existence of an online learning community that provides support to the e-learning process and enriches it. This, in turn, contributes to reduce the risk of abandonment or drop-out and, at the same time, favours the creation of a real university community.
- Finally, university's managers should work on the fees and compensation dimension, so that students do not perceive the service being received as an expensive one and, moreover, they can be compensated whenever any of the services they have paid for does not perform as well as expected.

7. Conclusions

This paper shows how students perceive online higher-education services and which quality sections or dimensions they consider important in their evaluation. The study applies a holistic conception of service quality, considering not only the core service (the learning process) but also the auxiliary administrative and backup services as well. Furthermore, based on the specific critical incidents reported by students, we have established some recommendations for university managers. On the

one hand, they should maintain and strengthen those aspects which have been referred to as positive critical incidents by students and, on the other hand, they should improve the quality of service from those reported as negative critical incidents. These actions will help to significantly improve the overall quality of service perceived by students and, consequently, students' satisfaction with the services offered by the university. The results obtained are not only aimed at clarifying the determinants of perceived service quality in online higher education, but also show the advantages of the Critical Incident Technique over other exploratory inductive methods, particularly when research is conducted in online environments, as is the case analyzed in this article. This technique has been widely used to assess the underlying sources of satisfaction and dissatisfaction of consumers of services (Bitner *et al.*, 1990; Edvardsoon, 1988; 2001), but as far as we know it has never been applied before in the context of e-services (Sweeney and Lapp, 2004). We think that the use of this technique in online environments offers clear advantages over other qualitative techniques. For instance, organization of discussion groups is not easy to manage since students enrolled on online programs rarely meet face-to-face. Additionally, online students usually combine their courses with their professional activity, which do not give them too much free time to participate in discussion groups or face-to-face interviews.

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