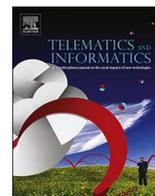




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## Quality in e-Government services: A proposal of dimensions from the perspective of public sector employees

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### ABSTRACT

The main objective of the work is to identify the key factors that must be considered by the Government when designing the web service portals used by its employees. To achieve these objectives, empirical work was then carried out to collect primary information, using the Delphi method and obtaining the opinion of 31 specialists who are experts in quality management in the university environment. The results of the study show that four dimensions must be considered to measure the quality of electronic services. These dimensions are: quality of information, technical efficiency, privacy and communication with the employee.

### 1. Introduction

The technological advances taking place in recent years have allowed organisations to improve their management processes. The emergence of the Internet has led to a revolution in the way that individuals, organisations and the Government carry out their tasks (Alawneh et al., 2013). It can also be seen that in recent years there has been an increase in recommendations from international organisations, encouraging Governments to use the new technologies and leading to the modernisation of the Government and an improvement in transparency and the services it provides to the public (European Commission, 2015).

Quality management in electronic services has been extensively studied, with definitions, models and measurement instruments being proposed, above all in the for-profit sector (Ladhari, 2010; Park and Gretzel, 2007; Sylvester et al., 2013; Verma et al., 2016). In this context, researchers are relatively unanimous in arguing that for these technological innovations to be effective and of benefit to both parties it is necessary to provide the best quality in the service. To achieve these improvements, it is very important that “managers of businesses with Web presences must first understand how consumers perceive and evaluate online customer service” (Parasuraman et al., 2005).

However, the studies carried out within the public sector have not examined the issue to the same extent (Alawneh et al., 2013; Papadomichelaki and Mentzas, 2012) and as indicated by Gutiérrez Rodríguez et al. (2009), there is an open debate about whether the concept of the quality of the services provided can be transferred from the private sector to the public sector.

Whilst scarce, some studies have been carried out on this issue in the areas of local government (Lee and Levy, 2014; Sá et al., 2016a), postal services (Águila-Obra et al., 2013), healthcare (Büyükožkan and Çifçi, 2012), tax management (Barnes and Vidgen, 2006; Belanche et al., 2014; Connolly et al., 2010; Lee et al., 2011), library services (Hernon and Calvert, 2005; O’Neill et al., 2001), etc. All these studies analyse, from the public’s perspective, their relationship with the Government. However, only Alawneh et al. (2013) study the problem from the perspective of the public employee, measuring the satisfaction of university employees in Jordan.

Our work aims to look at this area in more depth, specifically focussing on ensuring that the managers of university websites

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understand how their employees perceive the quality of these service portals, and in this way to contribute to improving the online services that public organisations provide to their employees.

The main objective of this article is to make a proposal on the dimensions or characteristics that a Government website must have if it is to be considered by its employees as high quality. To achieve this objective, a qualitative study was carried out using the Delphi method. To do this, surveys were conducted involving experts in the field of quality management in public services.

The article is structured as follows; in Section 2 we define and classify the e-Government concept. Section 3 then contains a clarification of the electronic service concept. Section 4 is dedicated to describing the methodology used in the study. Next there is an explanation of how the participants were selected and how the two rounds with the panel of experts were performed. The article continues with a proposal of dimensions and items for measuring quality in the services provided by the Government to its employees, and it ends with the main conclusions, recommendations and limitations of the study.

## 2. Defining and classifying e-Government

Various definitions for the e-Government concept have been proposed in recent years. The early definitions have a clear technological orientation and focus on the use of web technologies to provide services from the Government to the public (Holden et al., 2003; Kaylor et al., 2001; Kumar et al., 2007). Subsequently, the proposals by authors have focused on the use of the new technologies to achieve greater efficiency in the service, such as obtaining time savings, reducing costs, improving the response capacity, etc. (Evans and Yen, 2006). More recently, it has been recognised that these improvements must favour the many users of the Government (Zaidi and Qteishat, 2012; Zheng et al., 2014) and, for the first time, there is talk of the need to achieve a more responsible, transparent and effective government (Nguyen Manh Hien, 2014).

Combining the different contributions from the various authors, we propose a new definition of e-government as “a system for the management of public services that, based on Information and Communication Technologies (ICTs), aims to improve the quality of the services provided by the Government to its stakeholders (citizens, companies, employees, other governments, etc.), increase its transparency, make improvements to its operation and achieve more efficient management in the different environments in which it operates”.

From the above definition it can be seen that e-Government operates in various areas or contexts of activity and has relationships with different users, which allows us to make a double classification. The first, which we could call horizontal, depending on the relationships with the different stakeholders, and the second, which we could call vertical, depending on the different activity sectors in which it carries out its activities.

There are several authors who support this horizontal classification, see for example: Evans and Yen (2006), Zheng et al. (2014) and Sá et al. (2016b). Depending on the context in which the different activities and relationships with the different participants are developed, a distinction can be made between:

- 1) Activities by the *Government with business* (G2B), or in other words, relationships established between the Government and businesses.
- 2) Relationships between the *Government and its citizens or customers* (G2C), placing the emphasis on the ability of the government and the public to pass information between the parties in an efficient electronic manner.
- 3) Relationships between the *Government and its employees* (G2E), aimed at improving interaction between the different government bodies and their employees, with the intention of generating higher productivity when managing human resources.
- 4) Relationships from *Government to Government* (G2G). This point refers to the relationships between the different governments bodies, aimed at improving communication between them, achieving more efficient delivery and avoiding redundancies and duplication between them.

In addition, Evans and Yen (2006) add one more:

- 5) *Intra-government (IEE)*, whose purpose is to improve the flow of information within the Government to improve the efficiency of the supply chain, achieving significant cost savings, reducing stocks, achieving better prices when purchasing, as well as all the changes necessary to improve this efficiency.

Another classification of the Government, which we have called vertical, is that made from a sector viewpoint. e-Government may be directed towards such diverse fields as teaching, health and social services in general, public safety, public finance, museums and cultural heritage, justice, emergency services, postal services, transport services, etc.

This research, following the above classifications, will focus on the G2E context, studying the Government's relationships with its employees. It is specifically carried out in the area of university education in Spain.

## 3. High quality services in e-Government

There is currently no unanimous agreement regarding the electronic service concept, there being few researchers who have proposed a definition for this (Janita and Miranda, 2013). The first definition that we find regarding quality in electronic services (e-SQ), in the for-profit sector, is that of Zeithaml et al. (2000, p. 11) who indicate that, “e-SQ can be defined as the extent to which a Website facilitates efficient and effective shopping, purchasing, and delivering of products and services”. Subsequently, Santos (2003,

p. 235), from the field of marketing and the Internet and from the traditional literature on the quality of services, defines the quality of services in electronic commerce “as the consumers” overall evaluation and judgment of the excellence and quality of e-services offering in virtual marketplace”.

Since the first publications on the issue, referring to the for-profit sector and dating back to 1997, we see a significant group of researchers who define, measure and present a range of models on the quality of electronic services, known as e-quality: WebQual (Loiacono et al., 2007); e-SQ [e-SERVQUAL] (Zeithaml, 2000; Zeithaml et al., 2002); SITEQUAL (Yoo and Donthu, 2001); KQFs (Cox and Dale, 2002); PIRQUAL (Francis and Lesley, 2002); eTailQ (Wolfenbarger and Gilly, 2003); E-S-QUAL (Parasuraman et al., 2005); NetQual (Bressolles and Nantel, 2008); eSELFQUAL (Ding et al., 2011), etc. However, in the case of the public sector, fewer researchers have analysed these services. Some of these present original models and here we can highlight scales such as WEBQUAL 4.0 and E-QUAL (Barnes and Vidgen, 2003, 2006); E-GOVQUAL-RISK (Rotchanakitumnuai, 2008); E-GOV-SQUAL (Kaisara and Pather, 2011); PUBLIC VALUE OF E-GOVERNMENT (Karunasena and Deng, 2012); INFQUAL (Belanche et al., 2014). However, another group of authors use scales from the for-profit sector and here we can highlight those proposed by the traditional American school (Parasuraman, Zeithaml, Malhotra; Berry), whose scales and models (SERVQUAL, e-SERVQUAL and E-S-Qual) are used in several research projects on the public sector.

In the aforementioned studies, it is strongly emphasised that judgements on whether the service is high or low quality depend on how this is perceived by its users. So a customer will perceive a service as being of high quality when their experience equals or exceeds their initial expectations (Parasuraman et al., 1985).

Therefore, when a member of the public deals with the Government so that it can provide them with a service, there is a need to assess this interaction to ensure the quality of the service provided (Papadomichelaki and Mentzas, 2012; Sá et al., 2016b); in other words, the Government must know how the public perceives the e-service and which attributes or qualities are most highly valued by them.

#### 4. Methodology for the empirical study

Our empirical research has been carried out using the Delphi technique. This is a qualitative research method based on collecting primary information and has been applied over the years in different contexts (Gupta and Clarke, 1996), including the public sector (Preble, 1983; Sá et al., 2016a). It is an interactive process (Hsu and Ohio, 2007) that, through the use of a questionnaire, aims to obtain a consensus view from a group of experts who are guided by a person coordinating the process, known as the moderator (Hasson et al., 2000; Hsu and Ohio, 2007; Trespalacios et al., 2016). The fieldwork for this research was carried out from May to July 2017 and the project involved five stages:

1. Design of the questionnaire.
2. Selection of experts for the panel.
3. Completion of the first round.
4. Completion of the second round.
5. Analysis of results and proposal for the scale.

##### 4.1. Design of the initial questionnaire

For the design of the questionnaire, the literature on the management of quality in electronic services was reviewed, in both the for-profit and non-profit contexts. During this review, it was found that authors are unanimous in considering this a multidimensional construct (Fassnacht and Koese, 2006; Papadomichelaki and Mentzas, 2012). However, although, as outlined by Zeithaml (2000), users basically use the same dimensions when assessing the quality of the e-service given the type of product or service being assessed, there is no agreement in terms of the number of dimensions to be considered and wide variability was found. Thus, Mamaghani and Abbasi (2011) present only two dimensions whereas Sá et al. (2017) propose 32 dimensions, both within the context of the study of e-government.

We agree with Park and Gretzel (2007, p. 48) when they say that “not all researchers use the same terminology when referring to the different dimensions”, finding that the same dimension has different meanings for the different authors. To create some order among the different research projects, and following an exhaustive review, we believe that the quality of the university service portals can be measured through four dimensions and 38 items. Table 1 shows these dimensions along with the scales we have used for each of them.

##### 4.2. Selection of experts for the panel

Forty-eight quality management specialists in the Spanish university sector were selected. There is no generalised agreement among authors about the ideal sample size, so while for Okoli and Pawlowski (2004) an appropriate size would range between 10 and 18 experts, other authors suggest larger sample sizes in their publications (Trespalacios et al., 2016). According to Hsu and Ohio (2007, p. 4) “If the sample size of a Delphi study is too small, these subjects may not be considered as having provided a representative pooling of judgments regarding the target issue. If the sample size is too large, the drawbacks inherent within the Delphi technique such as potentially low response rates and the obligation of large blocks of time by the respondents and the researcher(s) can be the result”. The initial sample size selected seems to be sufficient to overcome these limitations.

**Table 1**  
dimensions, definitions and scales used in the initial questionnaire.

<i>Dimension (items)</i>	Definition in the current study	References in literature for the scales used
<b>Quality of the information</b> (10 items)	The website must provide the content necessary to carry out the process. The information must be complete with a high level of detail, in-depth, sufficient, and relevant. It must be presented in the right format and at the right time	Aladwani and Palvia (2002), Barnes and Vidgen (2002), Cox and Dale (2002), Cai and Jun (2003), Kim and Stoel (2004), Cao et al. (2005), Semeijn et al. (2005), Yang et al. (2005), Collier et al., 2006, Fassnacht and Koese (2006), Boshoff (2007), Loiacono et al. (2007), Herington and Weaven (2009), Ding et al. (2011), Papadomichelaki and Mentzas (2012)
<b>Technical Efficiency</b> (12 items)	Includes technical aspects related to accessibility, ease of use, design and system availability	Zeithaml (2000), Aladwani and Palvia (2002), Kim and Stoel (2004), Parasuraman et al. (2005), Fassnacht and Koese (2006), Boshoff (2007), Loiacono et al. (2007), Papadomichelaki and Mentzas (2012)
<b>Reliability-Security</b> (11 items)	When the website is used, the deliveries of services are performed successfully, what is offered and described by the service provider is actually delivered, no errors occur during the service provision, and services are delivered by the promised date or deadline. The website must also protect the personal and financial data of the participants	Zeithaml (2000), Barnes and Vidgen (2002), Janda et al. (2002), Cai and Jun (2003), Ribbink et al. (2004), Bauer et al. (2005), Lee and Lin (2005), Parasuraman et al. (2005), Boshoff (2007), Park and Gretzel (2007), Hu (2009), Papadomichelaki and Mentzas (2012)
<b>Communication</b> (5 items)	This is the user support service, referring to the help, assistance and response capacity provided by the Government to its users during transactions	Janda et al. (2002), Kim and Stoel (2004), Lee and Lin (2005), Parasuraman et al. (2005), Papadomichelaki and Mentzas (2012), Sá et al. (2016b).

The profile of the participants was varied, both in terms of skills and geographical area. To form the sample, those responsible for quality committees belonging to different degrees were selected: sciences, engineering, economics, labour relations and human resources, business administration and management, law, etc., along with experts with extensive publications in the field of quality management in electronic services, heads of university computer and information system services, as well as expert users in quantitative research methods. Representatives from various universities across Spain were also selected.

The initial contact with these experts took place in May 2017, by both telephone and email. In this first contact they were given an explanation of the research objectives and the importance of their involvement, encouraging them to participate in the study.

#### 4.3. Completion of the first round

The first round began with telephone contacts and the sending of questionnaires during the month of May. The questionnaire was sent via email to each of the candidates selected to participate in the panel. This email included a letter of introduction presenting the research team and explaining the Delphi technique, the main objectives of the research and what they wanted to achieve through the experts' participation. A deadline for delivering the questionnaire was also established. This letter also contained a link to an online self-administered questionnaire asking them to rate each of the items selected for the study.

In the questionnaire, the experts were asked to rate the importance of each of the 38 items comprising it. Each panellist was asked to use a 7-point Likert scale, where 1 indicated "very little importance", 4 "average importance" and 7 "very high importance". At the end of the questionnaire the panellists were given the opportunity to suggest other items or dimensions that they considered important. Finally, they were asked to give their identification details and email address, necessary for completing the second round of the Delphi method.

Responses were obtained from 39 experts, although after analysing these questionnaires eight were eliminated as a result of duplicates being sent, some questionnaires being incomplete or blank, and one not containing the participant's details, meaning that it was impossible to continue the interactive process involved in the Delphi technique. The final sample involved 31 experts, representing a response rate of 64.6%, a sample size deemed suitable for carrying out this technique (Hasson et al., 2000).

During the month of June 2017, the data from the completed questionnaires were edited and encoded into an Excel table. Next, descriptive statistics for each of the pieces of data were tabulated and calculated, calculating centralisation, position and dispersion measures, detailing the averages, standard deviation and median with details of each quartile. The content of the open questions was also analysed.

Three new items emerged from the comments made by three participating experts (see Table 2), two of these are related to the

**Table 2**  
New items proposed in the first round.

Item	Description
N1	The University's services portal has an adapted design that allows access from both personal computers and mobile devices.
N2	The services portal considers accessibility criteria for disabled people with a design adapted to all users.
N3	The University's services portal offers users the option to propose improvements.

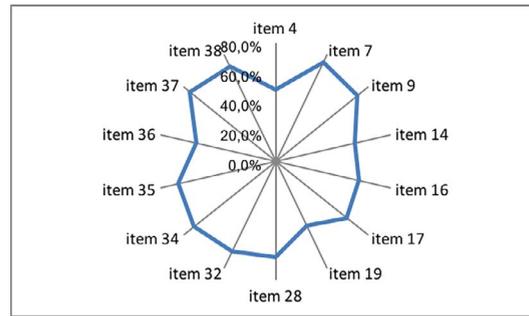


Fig. 1. Items with the lowest consensus (in percentages).

*Efficiency in use* dimension and the third is related to the *Communication* dimension.

In this first round, a consensus was obtained on 63% of the questionnaire's items. However, for the remaining 37% there was deviation from the central values of the median. Basically, consensus on a topic can be decided if a certain percentage of the votes falls within a prescribed range (Hsu and Ohio, 2007). In this study, it was considered that consensus was reached when the scores given by the participants did not deviate from the median by more than the limit of the standard deviation, in each of the questionnaire's items. The items where the lowest consensus was found appear in Fig. 1.

As can be seen from Fig. 1, the greatest discrepancy among experts was found in items 4, 19 and 36. Item 4 belongs to the information dimension and is related to the importance they place on usage tutorials to deal with any issues that arise. Almost half of the respondents gave average scores (median of 4 points), while in the other half, 11 participants thought that tutorials were annoying and gave low scores on the Likert scale (value of 2) and 5 participants considered them very useful and assigned them high scores (value of 6).

With regard to item 19, it belongs to the efficiency dimension and is related to the innovative and creative design of the university portal. In this question, a little under half of those surveyed, 48%, did not deviate from the median, but the remaining 52% were divided between the 10 experts who gave a low score to innovative design (between 1 and 2 points) and four panellists for whom design is very important, giving it a higher score of 6 points. In conversations with the latter, they stated that a good design clearly contributes to improving the efficiency and image of the organisation.

Finally, item 36 is related to the communication dimension and refers to the existence of a user support area to deal with any issues or comments that may arise during its use. In this case, there is also disagreement as just over half of the panellists, 54.8%, did not deviate from the median, which stood at an average value of 5 points. The other half was split between the seven participants who considered this item as of very little importance, giving it very low scores of between 1 and 2 points, and the seven remaining panellists who considered it very important and gave a score of seven points. To obtain greater consensus, a second round began.

#### 4.4. Completion of the second round

With the descriptive data having been analysed, we continued with the iterative feedback process. Those items that deviated from the median were observed and, in the middle of June that same year, a personalised letter was sent to each of the 31 participating panellists via email. A questionnaire was attached to this letter that included the scores awarded to each item in the first round and the median obtained from the participants as a whole. They were asked to reflect and re-score each of the deviated items in light of this new information, either maintaining the same score or changing it. If their score remained the same they were asked to explain why their initial position was unchanged. The three new items (see Table 2) were also added and the participants were asked to score them on a 7-point Likert scale, the same scale used in the original questionnaire.

The data were obtained from the participants at the end of June and beginning of July. The data were resent by via email several times and in some cases telephone and personal contact was made until a 100% response rate was achieved.

In July the results obtained were analysed and a spreadsheet was created with the new scores, showing the general level of consensus. This had increased from 63% to 92.68% meaning that no further rounds were necessary.

In Fig. 2 we can see how the items that obtained lower scores in the first round have changed. As can be seen from this, 78.6% of these fourteen items exceeded 75% consensus and only three items remained below this percentage, namely items 4, 19 and 36, precisely those that had obtained the lowest scores in the first round. However, as can be seen from Fig. 2, the three items changed positively and their scores increased considerably in the second round, with their consensus levels being around or over 70%.

#### 4.5. Analysis of results and proposal for the scale

All dimensions to measure quality in electronic services receive that we propose high average scores, more than five points on a scale from one to seven (see Fig. 3). If we calculate the average scores for each dimension, we can see that the dimension scored highest by the panellists is security, with an average value of 6.2, followed by the information provided by the portal, with an average score of 5.9. Efficiency and communication have similar average values, of 5.5 and 5.4 respectively.

As shown in Fig. 4, which measures the importance placed on each of the quality dimensions in terms of central positions, we see

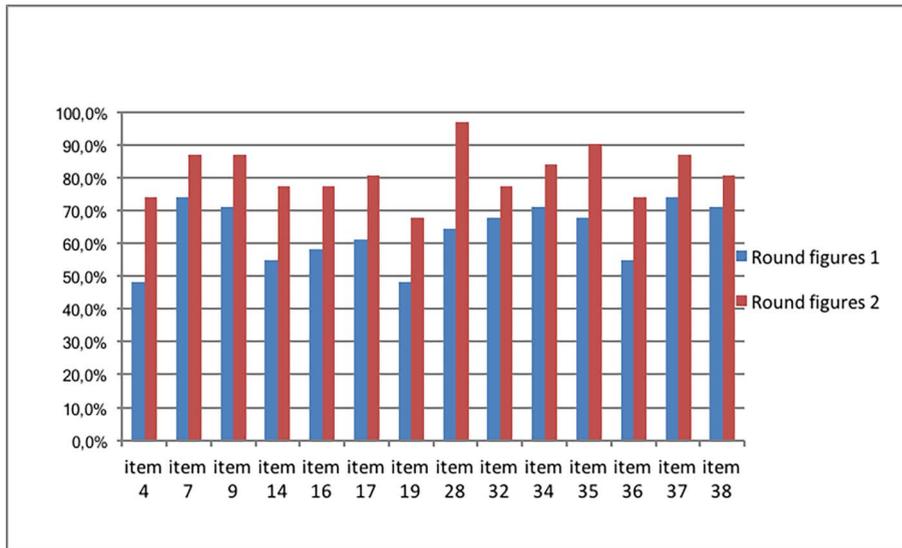


Fig. 2. Evolution of consensus on low score items.

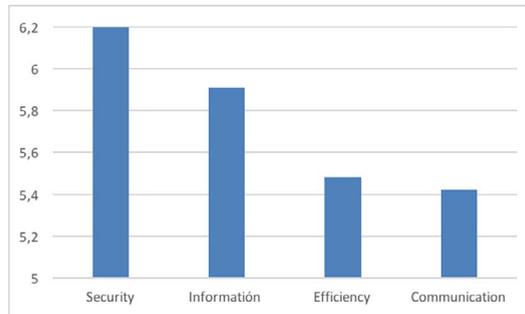


Fig. 3. Average scores awarded to each of the quality dimensions.

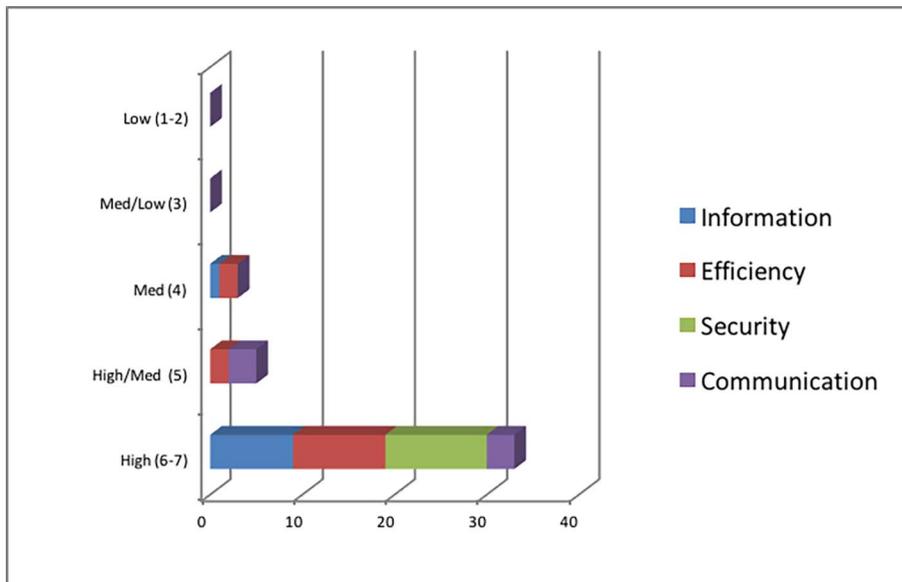


Fig. 4. Values of the median for each dimension.

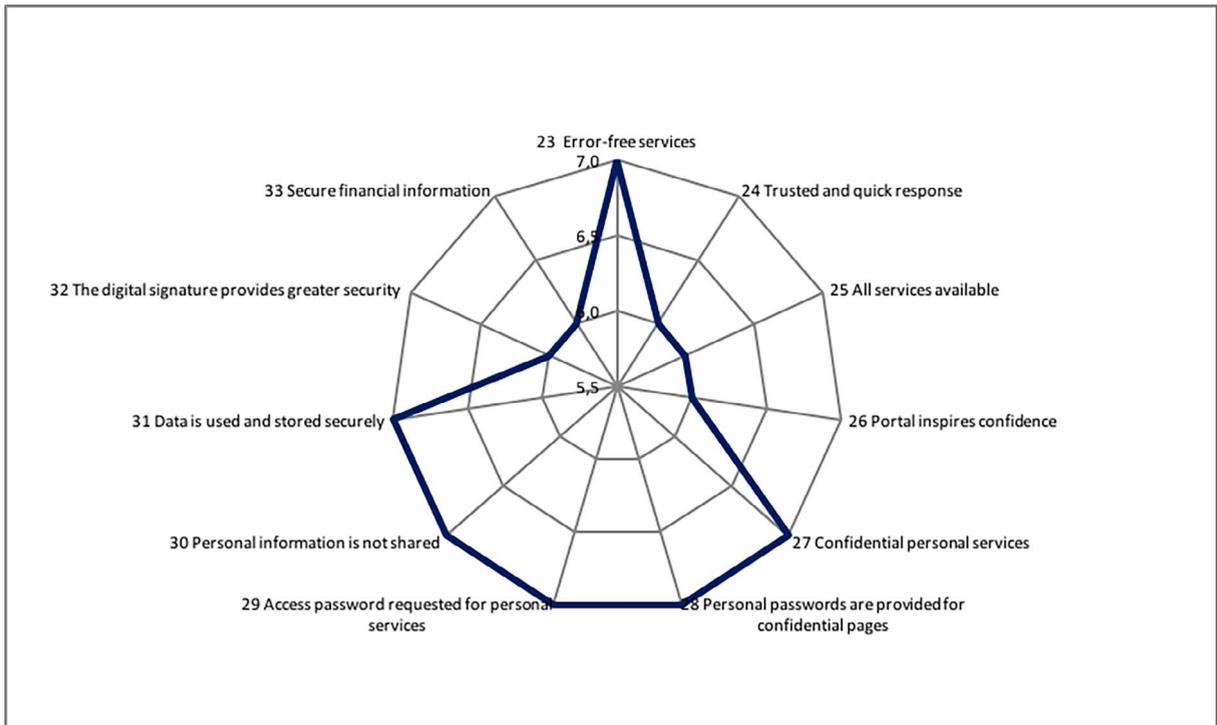


Fig. 5. Values of the median for each item in the security dimension.

the same trend as for average values. The highest scores corresponded to the security dimension, with high median values in all its items, ranging from 6 to 7 points. Information and efficiency follow this in order of importance, having high median values with high scores (between 6 and 7 points) in 90% and 71% of their items respectively. Finally, the communication dimension has its items equally split between high and medium-high median values. As can be seen in Fig. 4, no low or medium-low score was obtained for any of the medians calculated for the quality dimensions.

Taking into account the results obtained in the Delphi study with experts, and given the high scores obtained in each of the dimensions, we keep the initially proposed dimensions: quality of information, efficiency, security and communication, to measure the quality of the service portals offered by Universities to university lecturers.

#### 4.5.1. Security dimension

As mentioned above, the security of the university portal is the dimension that the panellists considered the most important. As can be seen in Fig. 5, all items have high scores and median values ranging between six and seven points. The most valued items, and those with a high level of consensus among all the participants, refer to the services provided being error-free, the personal services being confidential and passwords being provided and requested in the log-in process, personal information not being shared for other non-university purposes and data being used and stored securely.

Our results do not deviate from those seen in the bibliographic review on the subject. In the research studies carried out in recent years on the management of quality in electronic services, it has been shown that reliability-security is one of the most critical and determinant dimensions when rating the quality of services, in both for-profit sectors (Collier et al., 2006; Ho and Lee, 2007; Parasuraman et al., 2005; Wolfinbarger and Gilly, 2003) and in the context of the public sector (Alawneh et al., 2013; Belanche et al., 2014; Hernon and Calvert, 2005; Nguyen Manh Hien, 2014; Sá et al., 2016a).

#### 4.5.2. Information dimension

With regard to the information dimension, the panellists have deemed it the second most important dimension, after security, awarding an average score of 5.9 and a median of 6.2 for all items as a whole. The characteristics deemed most important by the panellists, as shown in Fig. 6, are that the information is relevant, useful, up-to-date, secure and presented in a personalised manner. Although all of these information attributes obtained relatively high scores (with medians between 6 and 7), as we mentioned above the only item in which different positions emerged was in the incorporation of tutorials into the university service portals. Although tutorials are seen as useful by some panellists, for others their presence is annoying, this item obtaining an average score of 3.9 out of 7. Some low-scoring users argue that “excess information is met with a certain dislike by individuals when reading the information (we want things quickly and simply)”. Another panellist says “I don't really mind whether there is one or not, I don't tend to use them and when I do, they don't usually solve anything and I feel like I have wasted my time”.

In the literature review on this topic, there is significant consensus about including information as a key dimension when

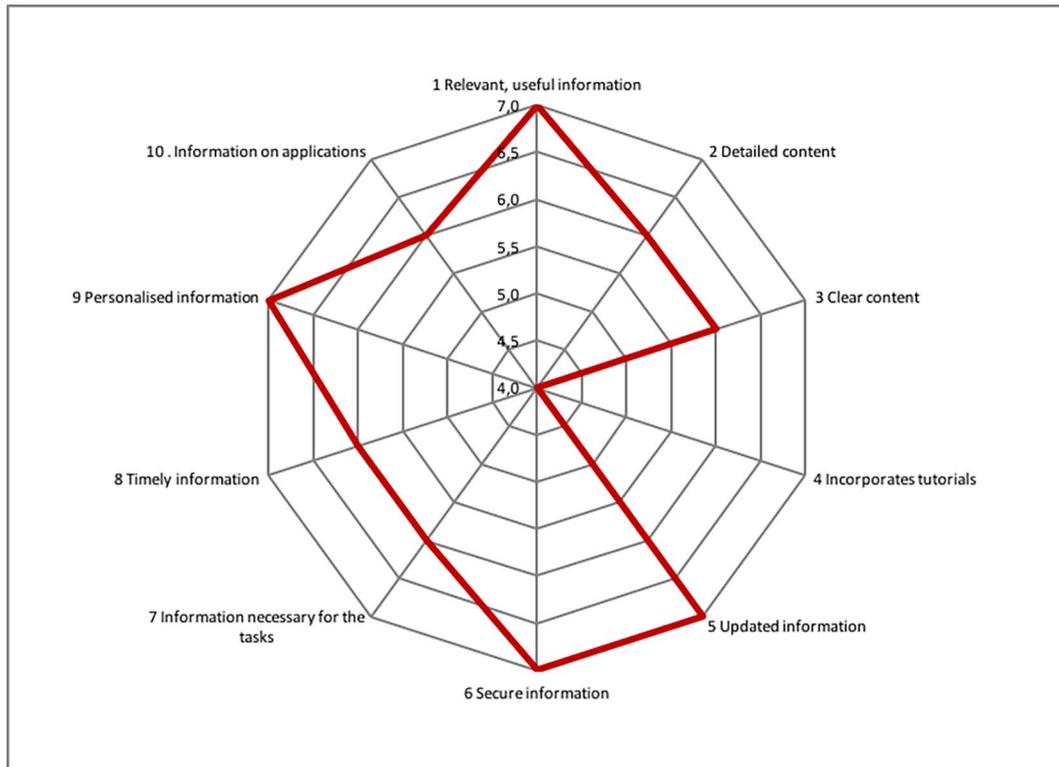


Fig. 6. Values of the median for each item in the information dimension.

measuring the quality of the service offered by the website, for both for-profit portals (Barrutia and Gilsanz, 2013; Cho et al., 2014; Kim and Stoel, 2004; Ladhari, 2010; Loiacono et al., 2007; Zeithaml, 2000) and in non-profit sectors such as e-government (Alanezi et al., 2010; Barnes and Vidgen, 2003; Jansen and Olnes, 2016; Kaisara and Pather, 2011; Zaidi and Qteishat, 2012).

#### 4.5.3. Efficiency dimension

This is the third dimension in order of importance, although very close to communication. The efficiency dimension is present in practically all studies reviewed. It is included by the traditional American school in its various scales, in both the e-SERVQUAL and e-S-QUAL scales, and is present in the most recent publications on both the for-profit and non-profit areas (Belanche et al., 2014; Jansen and Olnes, 2016; Sá et al., 2016a). In our study, the efficiency dimension, as shown in Fig. 7, covers items 11 to 22 in the questionnaire. Two new items have also been incorporated at the request of the participants. Most items obtained scores with values close to six points. The items that scored the lowest relate to the aesthetic aspects of the portal and items 17 and 19, which are both related to the design of the service portal.

The efficiency dimension includes four important aspects related to *access to the website* (Cristobal et al., 2007), covered by item 11. In addition, in this area two new items have been added at the request of the participants and these refer to the possibility of access from mobile devices and accessibility for disabled people. These two new items have obtained high scores with average values close to six points, on a scale with a maximum of 7, with quite high consensus levels in both cases, over 80% of participants. In the case of access from mobiles, some participants stated that they did not make enquiries through this device and so it was not that important for them.

This dimension also includes aspects related to *ease of use* (Ho and Lee, 2007), see items 12, 14, 16, 20, 22. Regarding item 22, relating to use generating a positive experience, some participants pointed out to us that in their opinion this is related to the “user experience” and proposed creating a new dimension related to “enjoying using the website”.

The efficiency dimension also includes questions relating to the *design of the website* (Fassnacht and Koese, 2006), detailed in items 14, 17, 18 and 19. As mentioned above, item 17 is the one that has obtained the lowest score. This item indicates that “the website’s design is attractive: the drawings, images, use of colour and fonts are appropriate, the symbols and icons are easy to identify”. There is strong consensus about this item, 80.6% of participants giving scores whose median is around 4, as occurred with item 19, although in this case with less consensus among the participants (see Table 1 of the Appendix).

The final aspect considered in the efficiency dimension is the *system’s availability* (Parasuraman et al., 2005), covered by two items (13 and 21), and these are important matters that obtained high median scores of six points.

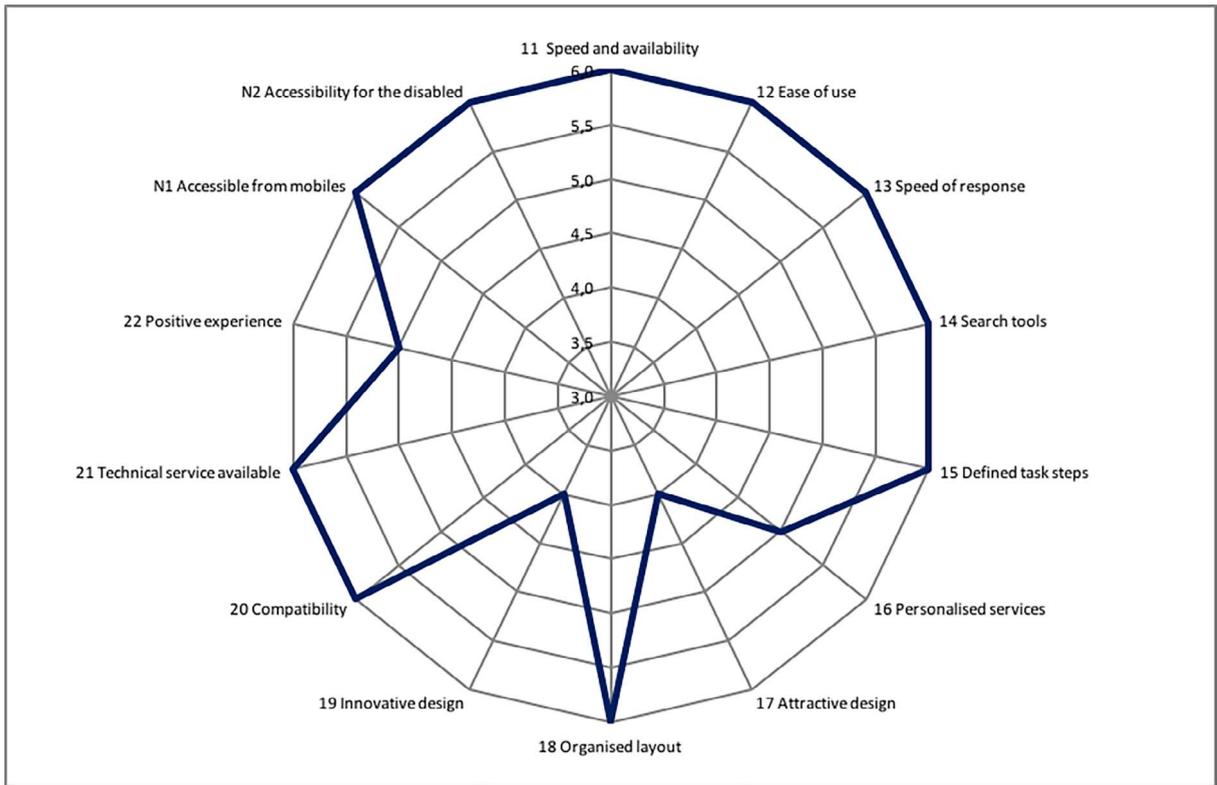


Fig. 7. Values of the median for each item in the efficiency dimension.

#### 4.5.4. Communication dimension

The communication dimension refers to the help, assistance and response capacity provided by universities to their employees when using the website. It is important for university lecturers to be able to interact with those responsible for the website during its use to resolve any problems that may arise, and for the institution to provide a quick response to any requests from these users

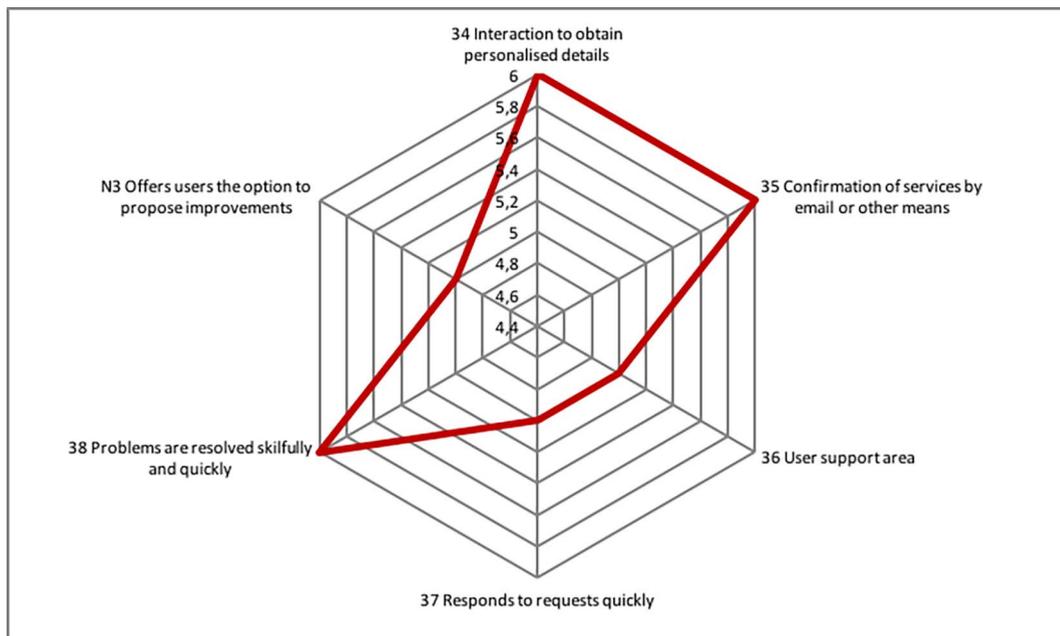


Fig. 8. Values of the median for each item in the communication dimension.

(Papadomichelaki and Mentzas, 2012).

In our study, these aspects are covered by items 34 to 38, and a new item (N3) was also added at a panellist's request, covering the option for the user to propose improvements. As shown in Fig. 8, the communication dimension is the one receiving the lowest score from users compared to the other dimensions. However, all its items are of medium-high importance, with values between five and seven points and an average score of 5.4 points.

## 5. Conclusions and recommendations

Providing high quality public services is a duty of the Government. The use of online channels is a way of improving efficiency and transparency when providing these services and communicating with the public. If the Government wants to achieve the satisfaction and trust of the public, it must first ensure that its own employees think that these e-services are of high quality.

In this regard, the main contribution of this paper is to present a proposal on the dimensions or factors a Government website must have if it is to be considered by its users as of high quality. In this research, we have focused on the G2E context to study websites where the Government interacts with its employees and, specifically, we have studied the dimensions affecting the quality of service offered by the web portals of university services. To the best of our knowledge, our work is pioneering in this field.

In this research we believe that, to improve the quality of the web service provided by the Government to its employees, it is necessary to know their needs and preferences and which aspects are most important when they are making their enquiries and requests. To do this, we have translated these elements into quality dimensions. To determine these dimensions, the literature on both the for-profit and non-profit sectors was extensively reviewed before then using the Delphi research technique to assess the degree of importance that the participants placed on each of the proposed dimensions.

Given the results obtained, we can state that the quality of electronic services in the G2E context is a multidimensional construct composed of four dimensions: reliability-security, quality of information, technical efficiency and communication or user support.

Of the four dimensions in our proposal, reliability-security is the dimension that the panellists in the study scored the highest. Therefore, we believe that the portal's security is a key point when designing and implementing a web portal and, specifically, in the case of public e-services. We also believe that security is an attribute of high added value that contributes to users perceiving a university services portal as being of high quality.

In this regard, public managers and those responsible for technology in the public sector must strive to ensure that errors do not occur in processes, that passwords are provided, that services are confidential and that the personal and financial data of the public employees are protected.

The second dimension, which users considered almost as important as security, was the quality of information. University lecturers access services portals in search of information or to make requests or carry out transactions. Therefore, it is very important for them to be offered relevant, updated and personalised information when required. One way of encouraging the use of these portals is to take care with their content, resolving problems and providing the necessary information. In short, the lecturer must think that the website is useful when performing their university tasks.

Moreover, the dimensions deemed the least important by university lecturers, despite the scores obtained also being high, are technical efficiency and communication. Whilst technical efficiency and web design play an essential role in the for-profit sector, where they are the key dimension in attracting customers who make queries and perform transactions through the website (Marimon et al., 2012; Türk et al., 2012), for university lecturers, while this is still important it is not the main issue when scoring the website. The highest scores in the efficiency dimension are related to ease of use, as outlined by Aljukhadar and Senecal (2015, p. 337), "the ease of use of an organization's website is central to determining user's experiences and behavioral intentions". The layout of the website is also important, or in other words, the tasks and steps must be well defined and there must be search tools.

One of the strengths of the study conducted using the Delphi technique is that it allows us to interact with the participants, obtain the opinions and suggestions of experts in this field and thus improve the study for the future. Thus, as a result of the comments made by the experts in the first round, three new interesting items were proposed and these were scored by all the participants in the second round. Specifically, two of the new items correspond to the efficiency dimension and a third to the communication dimension. The first two items, which the participants awarded very high scores, are related to accessibility. The first is related to the possibility of accessing from different devices (mobiles, tablets, computers, etc.), and the second item to the possibility of people with some kind of disability being able to access the public e-services, in order for the Government to be able to contribute to a more equal society. The final proposal, also scored highly by the experts, although with a lower score than the others, is related to the possibility of users being able to propose improvements to the website of the university services portal, as a continuous improvement to the quality of the service provided by the Spanish university.

In future papers, our scale should be applied to users of services portals to validate its use and allow us to extrapolate the results to the entire population.

Moreover, given that the study has taken place in Spain, it would be very interesting to ask these questions in other geographical areas and cultures. It has also been conducted in the context of university education, so it would also be interesting to identify the perceptions of public employees in other sectors where the Government has responsibilities, to see if there are differences in the perceptions of those employees.

With regard to the future, it would be interesting to conduct inferential studies and present models relating the quality perceived by the public employee to other variables such as trust in the service, added value, satisfaction, the intention to continue using the service, etc.

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## Appendix A

INFORMATION DIMENSION	MEAN	STANDARD DEVIATION	MEDIAN	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE
1. Relevant, useful information	6.5	0.9	7	6	7	7
2. Detailed content	5.5	1	6	5	6	6
3. Clear content	6.1	1.2	6	6	6	7
4. Incorporates tutorials	3.9	1.2	4	3	4	5
5. Updated information	6.2	1.2	7	6	7	7
6. Secure information	6.7	0.7	7	7	7	7
7. Information necessary for the tasks	5.9	1.2	6	5	6	7
8. Timely information	6.2	1.2	6	6	6	7
9. Personalised information	6.3	1.3	7	6	7	7
10. Information on applications	5.8	1	6	5	6	6
AVERAGE WEIGHT	5.9		6.2			

EFFICIENCY DIMENSION	MEAN	STANDARD DEVIATION	MEDIAN	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE
11. Speed and availability	5.9	1.3	6	5	6	7
12. Ease of use	6.2	1	6	6	6	7
13. Speed of response	5.7	1.2	6	5	6	7
14. Search tools	5.4	1.2	6	5	6	6
15. Defined task steps	5.8	1.2	6	5	6	7
16. Personalised services	5.1	1.4	5	4	5	6
17. Attractive design	4.3	1.1	4	4	4	5
18. Organised layout	6.1	1.2	6	5	6	7
19. Innovative design	4	1.3	4	3	4	5
20. Compatibility	6.1	1.1	6	6	6	7
21. Technical service available	5.6	1.4	6	5	6	7
22. Positive experience	4.9	1.3	5	4	5	6
N1. Accessible from mobiles	5.7	1.4	6	5	6	7
N2. Accessibility for the disabled	5.9	1	6	5	6	7
AVERAGE WEIGHT	5.5		5.6			

SECURITY DIMENSION	MEAN	STANDARD DEVIATION	MEDIAN	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE
23. Error-free services	6.7	0.8	7	7	7	7
24. Trusted and quick response	5.8	1	6	5	6	7
25. All services available	5.7	1.3	6	5	6	7
26. Portal inspires confidence	6.3	0.9	6	6	6	7
27. Confidential personal services	6.4	1	7	6	7	7
28. Personal passwords are provided for confidential pages	6.7	0.8	7	7	7	7
29. Access password requested for personal services	6.4	1	7	6	7	7
30. Personal information is not shared	6.4	1	7	6	7	7
31. Data is used and stored securely	6.5	0.9	7	6	7	7
32. The digital signature provides greater security	5.7	1.6	6	5	6	7

33. Secure financial information	5.6	1.1	6	5	6	6
AVERAGE WEIGHT	6.2		6.5			
COMMUNICATION DIMENSION	MEAN	STANDARD DEVIATION	MEDIAN	1ST QUARTILE	2ND QUARTILE	3RD QUARTILE
34. Interaction to obtain personalised details	5.6	1.1	6	5	6	6
35. Confirmation of services by email or other means	5.8	1.2	6	5	6	7
36. User support area	5.4	1.3	5	5	5	6
37. Responds to requests quickly	5.3	1	5	5	5	6
38. Problems are resolved skilfully and quickly	5.7	1	6	5	6	6
N3. Offers users the option to propose improvements	4.9	1.3	5	4	5	6
AVERAGE WEIGHT	5.4		5.5			

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