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e-Society 2004

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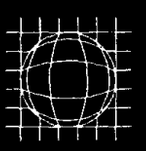

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e-Society 2004

Volume I

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FOREWORD

These proceedings contain the papers and posters of the IADIS International Conference e-Society 2004, which was organised by the International Association for Development of the Information Society, in Ávila, Spain, July 16 – 19, 2004.

The IADIS e-Society 2004 conference aims to address the main issues of concern within the Information Society. This conference covers both the technical as well as the non-technical aspects of the Information Society. Broad areas of interest are eGovernment / eGovernance, eBusiness / eCommerce, eLearning, eHealth, Information Systems, and Information Management.

The following Seventy-two topics have been object of paper and poster submissions:

- **eGovernment / eGovernance area**: Accessibility; Democracy and the Citizen; Digital Economies; Digital Regions; eAdministration; eGovernment Management; eProcurement; Global Trends; National and International Economies; Social Inclusion.
- **eBusiness / eCommerce area**: Business Ontologies and Models; Digital Goods and Services; eBusiness Models; eCommerce Application Fields; eCommerce Economics; eCommerce Services; Electronic Service Delivery; eMarketing; Languages for Describing Goods and Services; Online Auctions and Technologies; Virtual Organisations and Teleworking.
- **eLearning area**: Collaborative Learning; Curriculum Content Design & Development; Delivery Systems and Environments; Educational Systems Design; eLearning Organisational Issues; Evaluation and Assessment; Virtual Learning Environments and Issues; Web-based Learning Communities.
- **eHealth area**: Data Security Issues; eHealth Policy and Practice; eHealthcare Strategies and Provision; Legal Issues; Medical Research Ethics; Patient Privacy and Confidentiality.
- **Information Systems area**: Electronic Data Interchange (EDI); Intelligent Agents; Intelligent Systems; IS Security Issues; Mobile Applications; Multimedia Applications; Payment Systems; Protocols and Standards; Software Requirements and IS Architectures; Storage Issues; Strategies and Tendencies; System Architectures; Telework Technologies; Ubiquitous Computing; Virtual Reality; Wireless Communications.
- **Information Management area**: Computer-Mediated Communication; Content Development; Cyber law and Intellectual Property; Data Mining; ePublishing and Digital Libraries; Human Computer Interaction; Information Search and Retrieval; Knowledge Management; Policy Issues; Privacy Issues; Social and Organizational Aspects; Virtual Communities; XML and Other Extensible Languages.

The IADIS e-Society 2004 Conference had about 310 submissions from 41 countries. Each submission has been anonymously reviewed by at least two independent reviewers, to ensure the final high standard of the accepted submissions. Out of the papers submitted, 96 received blind referee ratings that signified acceptability for publication as full papers, while some others were published as short papers and posters. The best papers will be

selected for publishing as extended versions in the IADIS International Journal on WWW/Internet and other selected journals.

The conference, besides the presentation of full papers, short papers, posters, and doctoral consortium presentations, also includes keynote presentations and tutorials from internationally distinguished researchers, as well as corporate presentations. Special thanks go to Professors Simon Rogerson and Gunilla Bradley for their keynote presentations.

As we all know, a conference requires the effort of many individuals. We would like to thank all members of the Scientific Committee (about 230 top researchers in their fields) for their hard work in reviewing and selecting the papers that appear in this book. We would also like to thank all the authors who have submitted their papers to this conference. We wish to thank all members of our organizing committee.

Last but not least, we hope that everybody has a good time in Ávila, and we invite all participants for next year's edition of the IADIS International Conference e-Society.

June 2004.

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A FIRST PROPOSAL OF A PORTAL QUALITY MODEL

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ABSTRACT

Portals integrate all kinds of information, applications and services in a unique environment, according to the personal experience of each user. By using a portal, an enterprise can give accurate information to the correct person. Nowadays, portals are turned into the spine of the business, so it is very interesting to be able to control their quality. With the aim of clarify which factors can influence the quality of a portal, we have defined PQM (Portal Quality Model) that is composed by six dimensions. In order to apply this model to a given portal we have defined a questionnaire with 42 questions. In this paper we present the first application of our model and our questionnaire to the Castilla-La Mancha portal with the aim of knowing which factors must be improved and which factors can be considered corrects. As a result we have obtained that the best dimension for this portal is data quality and the worst is assurance.

KEYWORDS

Quality model, Portal.

1. INTRODUCTION

In the last decade, portals have been the most important business information management project and taking into account the success reached by them, it appears that it is true (Collins, 1999). Portals have evolved from simple providers of Web page access and corporate databases to support intelligent management, integration of applications and collaborative processing. Portals can be considered as an evolution of datawarehouses extending its application to Intranet giving access to all information resources and knowledge of a firm (Dias, 2001). The advantage of portals is their ability to integrate and personalize several technologies (groupware, databases, datawarehouses, e-mail, meta-data, intelligent management systems, etc.) in a unique business management tool.

Websites with static HTML, that predominated Internet in the last decade, have been replaced by websites with dynamic content, with abilities of searching based on databases and with analytical applications (Davydov , 2002).

Portals integrate all kinds of information, applications and services in a unique environment, according to the personal experience of each user. With a portal, a firm can give accurate information to the correct person. So, portals can be considered as the entry door to the firm (Kvitka, 2002).

In general, portals provide (Marshak and Seybold, 2003).

- A custom framework for presenting pages and components within each page and organizing information for specific communities.
- Personalization capabilities for individual users.

- A set of "portlets" (the component that integrates data, applications, content, and resources and presents the information to the portal user)
- A single sign-on to the set of applications accessed via the portal.
- Other features, such as search and collaboration.

Also, portals provide a point of access to a local or remote network, or to an enterprise in the case of a corporate portal or to general-interest topics and services in the case of a public portal.

According to (Marshak and Seybold, 2003) portals can be divided into generations:

- First generation *Access Portals* used to provide a set of links to other information and resources.
- Second generation *Aggregation Portals,* they bring information back to the portal so the user does not have to go anywhere.
- Other generations: *Workspace Portals* (where the portal becomes the users' work environment, including all of the appropriate information, tools, and resources) and *Adaptive Portals* (where the portal experience, itself, dynamically changes depending on the user's context and ongoing process).

During the rise of Internet, a portal worked as aggregator of content, as a mean of personalizing Web access, and as a conduit to several online communities. However, the integration of Web services into portal environments represented a major shift in how a portal is defined. At the beginning, portals could be thought as a combination of Yellow Pages and clipping services, however the evolution of portals transformed static aspect into largely dynamic and a content channel in a portal could be thought as an active content generator, driven by the user or external events (Stern, 2003).

In any case the only mechanism that makes users return is high quality (Offutt, 2002). In fact, quality has been an investigation issue in several fields:

In (Botella et al.,2003) a quality model for the selection of ERP systems is proposed. They choose as a framework the ISO/IEC 9126-1 quality Standard and suggest a methodology to adapt it to specific domains. In (Losavio, 2002) the authors show a systematic way to specify the relevant quality attributes involved in the architectural design process. In (Hangjung and Ramamurhty, 2002) the authors show a model to value and select the e-commerce websites in a B2C environment (Business-to-consumer). In (Park and Noh, 2002) a way to develop web design guidelines through a quality function is shown. In (Webb and Webb, 2002) a conceptual model and an instrument to measure website quality are developed and the websites quality factors important to consumers are defined. In (Ruiz et al. 2003) they suggest a Web quality model for the classification of metrics and web methodologies.

In (Parasuraman et al. 1998) the SERVQUAL model is described. This model contains five dimensions and 22 items used to measure the different elements of service quality across a broad spectrum of services. In (Li et al., 2002) authors develop a framework to measure service quality based on web using the SERVQUAL model as a starting point. Also, they make an online survey to collect web-based service quality information from an international customer's perspective. The results that they obtained show a need to modify SERVQUAL to adapt it to the context of the web-based service.

Although these studies, a specific framework to control the quality of portals does not exist. So, we have developed a first proposal of a portal quality model (PQM). This proposal has been made using as basis the model proposed by (Parasuraman et al. 1998).

Moreover, the model we propose is valid not only for corporative portals but also for public portals considering that nowadays public portals include public and private components, as corporate portals.

Our model consists of six quality dimensions that we try to evaluate through a questionnaire we have developed. This questionnaire consists of forty two questions and the values of each answer are among 1 and 5, where 1 means totally disagree and 5 means totally agree.

As a first application of our model and our questionnaire we have done a survey to the workers of the Castilla-La Mancha portal in order to know about its quality.

This paper is structured as follows: in section two we explain the Castillalamancha.es portal, the third section shows the quality model that we have developed, the fourth section explains the questionnaire that we have made. Section five shows how this questionnaire has been applied to the Castillalamancha.es portal, through the survey and the results that we have obtained. Finally, in section six conclusions and future work are shown.

2. THE CASTILLALAMANCHA.ES PORTAL

The Castilla-La Mancha portal (www.castillalamancha.es) is a corporative portal that is on operation from April, 2002. Its primary goal is to generate Internet projects in the region of Castilla-La Mancha helping in the assurance of their success.

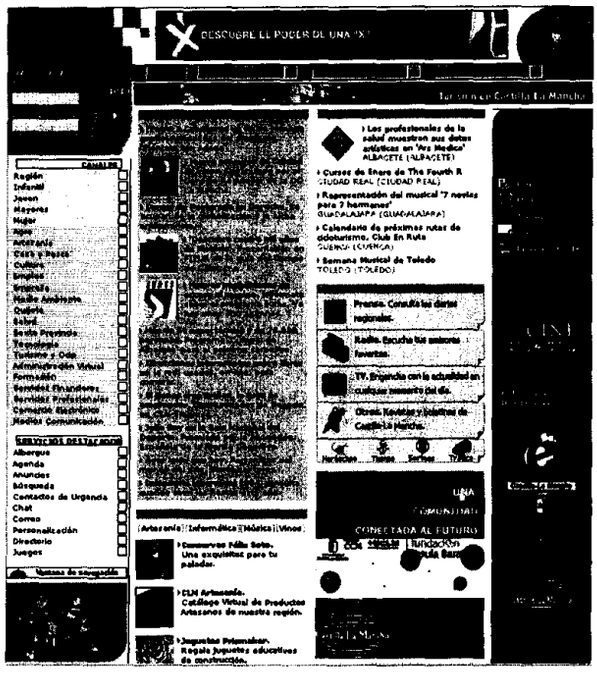

Figure 1. Main screen of Castillalamancha.es portal

We can distinguish several channels in this portal (each of them contain information related to a concrete topic):

- Technology channel: tries to announce scientific, technological, energy or astronomical issues among others.
- Sixth province channel: pretends establish contact with castellano-manchegos that now they are living outside.
- Enterprise channel: you can find events related to enterprise among other things.
- Employment channel: people can find situations vacant.
- Agro channel: contains information related to agriculture.
- Environment channel: deals with resources human, pollution, waste, animals, vegetation, water, etc.
- Women and elderly channel: issues interesting for this collective are presented.
- Child channel: basic knowledge about the region will be acquired by children.

These channels are focus on Castilla-La Mancha region. Moreover, there are e-commerce, links to others websites, e-learning, and others interesting things.

Respect to the portal workers, they develop their tasks in two profiles:

- Contents Responsible. They manage the contents that are published in the different channels of the castillalamancha.es portal.
- Technical Support. The personnel that work under this denomination is divided in two:
  - Programmers: they must maintain the technological aspects of the portal.
  - Designers: they are in charge of the image of the portal

Our idea was to find out the quality of this portal, so we decided to apply the questionnaire to the portal workers.

As a result we can obtain some information, for example, we could know about the best and the worst quality dimensions, or we could propose some guidelines for improving these aspects where we obtained the worst results and, in general, which were the impressions of the workers about the portal.

3. THE PORTAL QUALITY MODEL

In this section we are going to present the portal quality model that we have developed based on the model proposed by (Parasuraman et al. 1998).

Taking into account that the quality of a portal is difficult both to define and to measure, we are going to define our quality model in an iterative way making use of the feedback information obtained from several sources of information (surveys, expert opinion, validations, etc.). So, the model that we present may be considered like a first proposal. The model can be used to quantify the quality of a portal, knowing that the quality of a portal can be defined as the degree with which the portal facilitates services and relevant information to the customer. This model has been defined using the framework proposed in (Parasuraman et al. 1998).

The SERVQUAL model is composed of five dimensions: tangibles, reliability, responsiveness, assurance and empathy. As indicated in (Li et al., 2002), the dimensions and the attributes can be modified to adapt them to specific contexts.

In our case, we have adapted the different dimensions and we have added another one that seemed us necessary. The dimensions of SERVQUAL adapted to the portals have stayed at the following way:

- Tangible: This dimension indicates if "The portal contains all the software and hardware infrastructures needed according to its functionality".
- Reliability: is the "Ability of the portal to perform its functionality accurately". In addition this dimension will be affected by:
  - Availability: The portal must be always operative.
  - Search Quality: The results that the portal provides when doing a search must be appropriate to the request made by the user.
- Responsiveness: is "Willingness of the portal to help and to provide its functionality in an immediate form to the users". In this dimension we distinguish:
  - Scalability: it refers to the ability of the portal to smoothly adapt to increasing workloads whether as the result of additional users, an increase in traffic volume or the execution of more complex transactions (Gurugé, 2003).
  - Speed: Relates to the response times experienced by portal users (Gurugé, 2003).
- Assurance: is "The ability of the portal to convey trust and confidence". This dimension will be affected by:
  - Confidentiality: Ability to keep the privacy of the users.
- Empathy: We define this dimension as the "Ability of the portal to provide caring and individual attention ". In this dimension we distinguish:
  - Navigation: The portal must provide a simple and intuitive navigation when using it.
  - Presentation: The portal must have one clear and uniform interface.
  - Integration: All the components of the portal must be integrated in a coherent form.
  - Personalization: The portal must be capable of adapting to the user's priorities.

Furthermore, due to the great amount of data that are handled in a portal and taking into account that it is fundamental that these data must have quality, we think it is necessary to add a new dimension:

- Data Quality (DQ): defined as "Quality of the data contained in the portal ". According to (Dedeke and Kahn, 2002) we can distinguish four dimensions:
  - Intrinsic DQ: What degree of care was taken in the creation and preparation of information?
  - Representation DQ: What degree of care was taken in the presentation and organization of information for users?
  - Accessibility DQ: What degree of freedom do users have to use data, define and/or refine the manner in which information is inputted, processed or presented to them?
  - Contextual DQ: To what degree does the information provided meet the needs of the users?

Once explained the PQM in its first version, we will explain the survey that we have done to determine the quality of the Castilla-La Mancha portal based on the described model.

4. THE QUESTIONNAIRE

Questionnaires are, probably, the method of investigation more commonly used according to (Pfleeger and Kitchenham, 2001). By using a questionnaire we are trying to obtain the people opinion about different aspects in order to evaluate each dimension of the quality.

The questionnaire consists of forty two questions (see Appendix). The items that conform each of the dimensions (which is equivalent to indicate the dimension to which corresponds each of the questions asked in the questionnaire) are:

- In the Tangible dimension we classify the questions: Q26, Q39.
- In the Reliability dimension we have the questions: Q11, Q15, Q29, Q41.
- In the Responsiveness dimension we have: Q1, Q3, Q4, Q12, Q13, Q14, Q38.
- In the Assurance dimension we classify the questions: Q21, Q22, Q23.
- In the Empathy dimension we have: Q2, Q5, Q6, Q10, Q16, Q17, Q18, Q19, Q20, Q24, Q25, Q27, Q28, Q32, Q33, Q34, Q35, Q36, Q37, Q40, Q42.
- In the Data Quality dimension we classify: Q7, Q8, Q9, Q30, Q31.

5. SURVEY

In this section we present the results of the survey done by the Castilla-La Mancha portal workers. The goal of this survey is to evaluate the quality of the above mentioned portal depending on the described factors. The survey was done by ten workers of the portal of Castilla-La Mancha. From them, four were contents responsible, five programmers and one was designer.

5.1 Results

Before the workers of the portal did the survey, it was submitted to evaluation by a small group of users in order to verify its understandability. According to the results, some modifications of aesthetic type were made in order to obtain a better understanding.

Due to the different profiles of the workers, not all the people answered all the questions that were raised. Therefore, the results of each question (figure 2) have been obtained depending on the people that answered it.

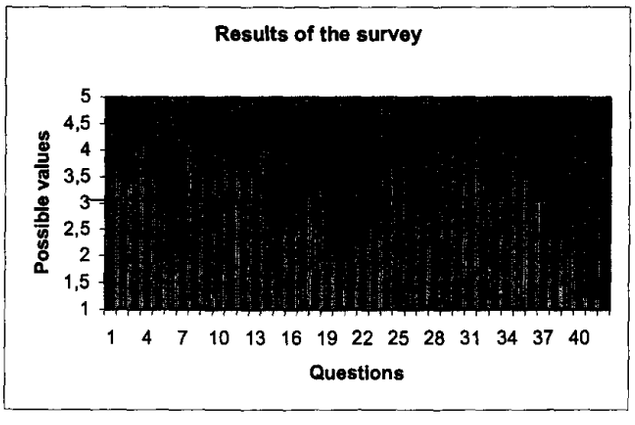

Figure 2. Results of the survey

As seen in figure 2, on average there are not values lesser than 2 and the greater average value obtained has been 4.7.

Attending to the questions that have obtained a value below the average, the activities to realize to obtain better results would be:

- Question 6: The portal offers language or geographic options.
  Action: The portal should offer the possibility of choosing among several languages and geographical options. The user should be able to change the language of the whole portal or of a part (as a channel or a new) because although the portal is focused on Castilla-La Mancha region it would be recommendable that it deals with different regions.
- Question 15: The achievable service level is stated on portal.
  Action: The portal should indicate the achievable service level.
- Question 20: The portal offers options on mode of payment.
  Action: It would be necessary to offer more options on the mode of payment. Furthermore, it will be appropriate to have a guide that indicates the necessary steps to perform the purchase.
- Question 22: The e-commerce operations guarantee security.
  Action: It will get improved achieving that the operations of e-commerce that are made in the portal assure the privacy.
- Question 23: Techniques are used to guarantee the security of the transactions.
  Action: It would be necessary to use more technologies to guarantee the transaction security, for example by using secure protocols.
- Question 27: Customers might be reminded electronically to repurchase and to be invited to special offers (the registered customers are sent information related with issues that are interesting for them).
  Action: To improve this aspect it would be necessary to have a list with the registered users and send them periodically information related to topics in which they are interested. However, we must be careful because we can not make the mistake of overwhelm users with too information.
- Question 39: Elements do not need equipment of high hardware capacity.
  Action: To improve this aspect is equivalent to re-define the services in such a way that they were not of high hardware capacity.

Furthermore, there are some items that exceed scarcely the average so we think that also for them it is necessary to incorporate some improvements:

- Question 17: Relevant FAQs (Frequently Asked Questions) help customer to solve problems by themselves
  Action: It would be necessary to take a list with the more frequently questions made and to put them at the disposal of the users for consultation. In this way, we can reduce the amount of e-mails sent and can facilitate to the users the resolution of their questions by themselves consulting the FAQ list.
- Question 18: Various FAQs help different customers.
  Action: The before action for the question 17 is valid for improving this aspect.
- Question 19: Online ordering process is simple.
  Action: It would be necessary to make easier the e-commerce or include only links to website with easy e-commerce.
- Question 21: Security and privacy are stated on the portal
  Action: It should be good to increase both the security and the privacy.
- Question 33: The framework of the portal is easily understandable.
  Action: The structure of the portal must be retouched to make it more understandable. The designer must perform this task. Maybe, it will be appropriated to reduce the information amount offered on the main screen.
- Question 41: Different ways lead to the same site.
  Action: The improvement of this aspect would be obtained making that different ways lead to the same site. For example, we can access to the same channel clicking on its name (on the left-hand side of the main screen) or we can choose it on a pull-down menu (on the top of the main screen).

If we consider the values obtained for each dimension (table 1), the dimension with the lesser value is the assurance and, therefore it is necessary to improve it making the tasks previously indicated. Also we observe that, in general, almost all the dimensions values are about the average, so, we can do all the improvements previously described and later we can do the test again to verify if the quality of the portal has been improved. The dimension that obtains a greater value in average is the data quality, from which we can deduce that the information given by the portal turns out to be opportune, which agrees with the main goal of the portal that is to offer classified information through different channels.

Table 1. Average value for every dimension

DIMENSION	AVERAGE VALUE
Tangible	3.5
Reliability	3.03
Responsiveness	3.97
Assurance	2.71
Empathy	3.44
Data Quality	4.11

6. CONCLUSIONS AND FUTURE WORKS

Due to the wide increase of portals it is very important to assure their quality, since users will select portals that are the bests for their particular aims.

With this purpose we have developed a portal quality model in which we differentiate six dimensions that concern the portal quality.

On the other hand, we have developed a questionnaire composed by 42 items, each one classified into one dimension, in order to evaluate the quality of a portal depending on the defined dimensions. A survey was realized by the workers of the Castillalamancha.es portal obtaining that the assurance must be improved, that the data of the portal is considered to have quality and that the rest of dimensions, although they obtain good results, might be improved to win in quality.

As a future work, it is planned to continue refining the portal quality model and the Castilla-La Mancha portal. Moreover it is planned to make more empirical studies for validating it.

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APPENDIX

[1] Strongly desagree	[2] Slightly desagree	[3] Neutral	[4] Slightly agree	[5] Strongly agree
1.- The portal Web address is included in all existing documentation, publicity and advertising channels.				
2.- In the portal callback (that report about the result of certain service) exist.				
3.- The portal uses suitable names and multiple websites with an increasing speed and bandwidth service to maximize hit rate.				
4.- There exist other portals with links to the portal.				
5.- Graphics, sound and video to make the website visually appealing exist on the portal.				
6.- The portal offers language or geographic options.				

7.- Information contained on the portal is current and timely.
8.- Information contained on the portal is accurate and relevant.
9.- Information contained on the portal is detailed.
10.- Navigation on the portal is intuitive.
11.- Portal is available all the time.
12.- The result of a demand service is returned quickly to the customer independently of the kind of answer: e-mail, specific pages, etc.
13.- The response e-mails are relevant and accurate, and the portal content is appropriate to customer requirements.
14.- Callback or e-mail system tell customer the time of response necessary to perform a service.
15.- The achievable service level is stated on portal.
16.- The tone of messages is courteous.
17.- Relevant FAQs (Frequently Asked Questions) help customer to solve problems by themselves.
18.- Various FAQs help different customers.
19.- Online ordering process is simple.
20.- The portal offers options on mode of payment.
21.- Security and privacy are stated on the portal.
22.- The e-commerce operations guarantee security.
23.- Techniques are used to guarantee the security of the transactions.
24.- Web pages and answer to the e-mail are offered individually (Possibility of personalize the portal is offered)
25.- Feedback is continuously changing in response to customers.
26.- E-mail system is both inbound and outbound to deal with customer complaints.
27.- Customers might be reminded electronically to repurchase and to be invited to special offers (the registered customers are sent information related with issues that are interesting for them).
28.- E-mails and questionnaires are used to perform surveys to know satisfaction of the customers with portal.
29.- Several channels are available all the time.
30.- The amount of data that are offered on the portal is appropriate.
31.- Portal is objective and current.
32.- The design portal is solid and uniform.
33.- The framework of the portal is easily understandable.
34.- The visual appearance of the portal is carefully worked.
35.- Portal offers the possibility of personalize the interface.
36.- The portal offers a good accessibility.
37.- All clicks of the portal are necessary.
38.- The designs allow that the unload time will be minimum and relaxing.
39.- Elements do not need equipment of high hardware capacity.
40.- The portal maintain the same structure to the customer
41.- Different ways lead to the same site.
42.- The design of the portal offers minimum distractions.