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Service Desk Software Usability Evaluation: The Case of Brazilian National Cancer Institute

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Abstract

The use of control tools to manage services in Information Technology (IT) is a reality in contemporary organizations, this can be stated on the understanding that the controls can generate financial results and contribute to reach organizational goals. Brazilian laws state the technology services should be executing by private companies, justifying the need to control and supervise the implementation of these services. Brazilian National Cancer Institute acquired a new Service Desk Manager Software in order to simplify support operations through narrow integration between service request management process, incident, problem, changes, knowledge, assets and configuration. This paper aim to measure how the usability of a service desk manager software can influence the efficiency of the service operation. This survey found that the change of application, particularly those that directly influence the performance of an activity in the organization, requires an effort on your deployment project. Factors such as usability can affect the success of the adoption of a system for a particular team.

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1. Introduction

The use of control tools to manage services in Information Technology (IT) is a reality in contemporary organizations, this can be stated on the understanding that the controls can generate financial results and contribute to reach organizational goals.

The existence of IT systems is increasingly widespread in daily life and their importance for organizations increase efficacy is recognized¹.

In last twenty year's Brazilian government has shown constant concern with IT management, especially regarding the use of its benefits as a tool to optimize administrative capacity. The creation of the Information and IT Resources Administration System of the Federal Government (SISP) in 1994 is proof that vision is already more than a two decade. The SISP target is organize the operation, control, supervision and coordination of information and computing resources of all Brazilian public administration.

Brazilian laws² state the technology services should be executing by private companies, justifying the need to control and supervise the implementation of these services, that technology activities include Service Desk services which the type of contract is by implementing a telephone exchange that register the ticket through a service management software. It's performance must be measured by the Service Level Agreement (SLA), which is the main way to measure if the contractor is properly paying the service, in that case the Brazilian government. That type of software must to provide reports, data and a real control platform of contracted activities, therefore should be simple and practical to use.

Currently SISP works with a large portfolio of projects and initiatives, but it essences is to focus on actions that optimize the use of technological resource for government, one of them is web standards in e-government (ePWG), and inside this theme usability is addressed. In 2010, Brazilian Government published the usability manual to be a guide in Brazilian public administration systems and websites³.

In SISP's view, usability is an essential discipline to the information and services provided by the Brazilian Public Administration, that are developed and maintained in accordance with the expectations and needs of citizens and for it to use information and services and full form satisfactory².

In 2015, Brazilian National Cancer Institute (INCA) acquired a new Service Desk Manager Software in order to simplify support operations through narrow integration between service request management process, incident, problem, changes, knowledge, assets and configuration. To achieve these goals usability must be discussed and measured.

This paper aim to measure how the usability of a service desk manager software can influence the efficiency of the service operation. Consequently, is expected to provide information to make the best and the most cost effective system of INCA.

This paper is organized into 5 sections. First one is the introduction that explains the problem and the goal of this paper. The second section describes usability, especially the Brazilian Government's view on the subject. The third one report the methodology used to justify this choice. The fourth shows the analysis and results, and section 5 presents the conclusions and the proposal of future studies.

1.1. Brazilian National Cancer Institute

The National Cancer Institute (INCA) plays a multiple role in all areas of cancer prevention and control in Brazil – prevention, epidemiological surveillance, treatment, information, education and research. As a technical division of the Federal Government, under the direct administration of the Ministry of Health, the Institute provides cancer care within the Integrated Public Health System (SUS)⁴.

Moreover, it formulates and coordinates public policies, develops research activities and disseminates practices and knowledge on medical oncology. Due to its patterns of excellence, which are comparable to the world's major cancer care centers, INCA has become a national and international model in cancer control. A key factor for INCA to fulfill its mission is the dedication of our professional staff whose integrated work is based on a participative management model. In 2004, this model was incorporated with success, involving all our employees and changing for the better the delivery of services to the Brazilian population⁴.

Every day, new demands has been present in volume and complexity resulting from more specific technological solutions of the hospital area which being installed in INCA units; growth INCA workforce with new members and employees and automation of hospital procedures.

The requirement of a better performance for IT area is increasingly intense, demanding the management of solutions, systems and equipment ensures the innovation, safety and permanent availability of services. Consequently, it is necessary a constant activity of prospecting, installation, maintenance, monitoring and improvement of the entire technological solution which requires technical services in IT. The IT Division (DTI), faces a challenge that goes beyond the currently capacity. The department has been adapting the new rules of the Brazilian government, together with the need to adapt to the emergence of new technologies.

Currently the Service Desk team attend more than six units located in Rio de Janeiro city. These units are in addition to hospitals, research facilities, administrative, hotels and warehouses. Therefore, control is necessary to ensure quality management of information and control software usability is critical for this to happen.

2. Usability

The literature presents different perspectives on usability. This section aims to present briefly some of the theoretical views on usability and deepening to the Brazilian government's view on this. The concept of usability is the system's ability or an interface that allows users to be able to easily reach their interaction with the system goals⁵, one of the most important qualities of an interface, and this is considered an usability problem if a particular group of users find it difficult to perform a task with it⁶. Usability has multiple components, and effectively it does not have uniform specific indexes.

Usability refers to the quality of a user's experience when interacting with products or systems, including websites, software, devices, or applications. Usability is about effectiveness, efficiency and the overall satisfaction of the user⁷. Problems with usability are frequent and occur, mainly, when the needs of users are not included in the definition and analysis of the requirements or when they are not considered in the development of software.

To understand the work in this paper is necessary to know the vision that the Brazilian government has on the subject. In addition, you need to see the quality of usability as an optimization through the provision of services relating to the Brazilian citizen. Usability is an essential topic for the information and services provided by Public Administration in Brazil with should be involved and maintained in accordance with the expectations and needs of citizens and for it to use the full information and satisfactory service².

The definition of usability is the study or application of techniques that provide the ease of use of an object, in this case, a site or a software. Usability aims to ensure that any person can use the site or software and that it functions as expected by the person².

2.1. CA Service Desk Manager

The process of maturity of service management, according the daily needs of cost savings, cannot have a complex software for the end user. Computer Associates Service Desk Manager tool (CA-SDM) allows an intuitive access to knowledge, collaboration, problem solving, request services and managing IT assets. This application covers fifteen ITIL framework processes that enables the effective management of a service through its life cycle. This tool reduces the business risk and cost associated with IT. The record of all changes and Delivery Orders for the lifecycle of applications on the Financial Entity are based on the use of CA-SDM tool.

CA Service Desk Manager tool has a queue where you can view service requests (RFF, RFC and RFR) which are carried out by various teams of the Insurer. Due to the confidentiality of the organization study, the image cannot be presented in detail.

The software was purchased by DTI in order to optimize the ticket system and ensuring that reports of accountability for IT infrastructure contracts are reliable.

3. Methodology

In March 2016 was started the data collection to evaluate CA Service Desk manager usability. The study was conducted with the entire team of DTI IT infrastructure, and proposed to all users who participate in the evaluation of the new system.

3.1. Data collection instruments

This research used three instruments for data collection for assessment of usability: (a) PSSUQ (the Post-Study System Usability Questionnaire), (b) CFU-US I (International Classification of Functionality – Usability I) and (c) CFU-US II (International Classification of Functionality – Usability II). These questionnaires were distributed to the employees, all CA-SDM users, and collected after filled. Every participant was informed about the purpose of the study and instructed on the questionnaires.

This paper used questionnaires and scales with instruments to collect subjective data from users and their application is reliable to access usability⁸. By consequent, the questionnaires used in this study (PSSUQ, CFU-US I and CFU-US II) are perfectly applicable to evaluate the usability of software and systems^{1,8,9,10,14}. These questionnaires were tested and approved as data collection tools to evaluate user satisfaction on many systems types, and are often used for this purpose.

PSSUQ is a 19-item tools developed for the purpose of accessing users' perceived satisfaction with their computer systems. It has its origin in the SUMS Project (System Usability MetricS), an internal IBM project in the 80's. The purpose of the SUMS was to document and validate procedures for measuring system usability, as well as performance, usability problems, and user satisfaction¹³.

The PSSUQ Questionnaire is provided to the user after they have completed all normal condition scenarios. Its filling consists of selecting and marking one of the options that the software user deem appropriate to response each question based on a 7-point scale, where the lower response, the higher the subject's usability satisfaction with the system^{11,12}.

The PSSUQ can be used to produce the following measures^{11,12}: (a) SYSUSE – System usefulness (calculated by taking the average of the issues 1-8); (b) INFOQUAL – Information quality (calculated by taking the average of questions 9-15); (c) INTERQUAL – Interface quality (calculated by taking the average of questions 16-18); (d) OVERALL – General user satisfaction with the system (calculated based on the average of questions 1-19).

ICFs questionnaires are a comprehensive and multidisciplinary instrument focused on the individual and it is gaining recognition worldwide. The ICF Core Sets are practical tools that represent selections of categories from the whole classification. These ICF Core Sets were combined to create the Extended ICF Core Set to evaluate a series of human disabilities using instruments and systems¹⁵. Table 1 shows the answer key on questionnaire:

Table 1. Answer table.

Barrier			Facilitator		
Big	Medium	Small	Small	Medium	Big
-3	-2	-1	1	2	3

The ICF scale is classified as a barrier or a facilitator, considering a graduation of -3 barrier to a +3 facilitator. Since the user must take a positive or negative position for each item, the neutral qualifier was removed from the answer key⁸.

3.2. Sample

The questionnaire was applied to 11 users. Nine participant were male and two are female. The age of the participants was between 18 and 60 years. Nine of them are graduates in IT and two in other professions (Administration and Engineering). Three participants are INCA's employees and eight are outsourced to execute IT infrastructure jobs.

3.3. Methodological Procedures

The methodological procedures included the following steps:

- a) literature review aimed at lifting the state of the art on the subject researched (usability) and the selection of appropriate data collection instruments (PSSUQ, CFU-US I and CFU-US II);
- b) preparation of the data collection instruments to the local language (Brazilian Portuguese), including items on demographic data from participants, such as gender, age, education, etc. and instructions on filling out the questionnaire);
- c) pilot test of data collection instruments, with 3 participants, on the correct understanding of instructions and related issues;
- e) Distribution of questionnaires to fill and subsequent gathering for data collect;
- f) Statistical data analysis using the IBM SPSS software;
- g) Data analysis and discussion of results.

The next section based on the methodology will present the analysis and results. In addition to present the results, next stage seeks to offer solutions to improve the service, developing assumptions based on collected information.

4. Analysis and Results

Previously the analysis of results is important to highlight some features that relate to the subject analyzed. The tool was acquired by INCA to replace the one already used. Eight of respondents signaled that used SGST system (developed by DTI), in addition is significant report these same respondents had never used CA before.

4.1. System Usability Questionnaire and Important Topics (SYSUSE, INFOQUAL and INTERQUAL)

Generally, software use facility perception reaches medium levels, having as the worst and the best analysis between 2 and 6. Respondents said that the use of the software is not easy. This result suggests a requirement for user's qualification, so that topic there is evidence that prior training is essential for the system adoption.

One of the lowest averages concerns the influence of the system on compliance with the team tasks, but it wasn't satisfactory. If the software's usability is affecting the working capacity it means that this application need to be adapted to the organization's processes.

On the other hand, users signaled that to get a ticket through the software, they quickly managed to interpret the information, thus being able to perform the tasks with speed. This information focuses for understanding the operation of registering a ticket appears to be the most complex activity using the system.

Even respondents who have used the previous system, Technical Support Management System (SGST) do not feel comfortable using CA-SDM to control their activities, in addition to this information it is important to mention that one of the lowest average was one that deals with the ease of learning to use CA Service Desk Manager.

The highest average was identified that say about the accreditation of the respondent could become more productive when using the studied software. In the DTI environment this information can be seen as a valuable way since it is a sign that the team is resistant against CA, but the way in which it must be implemented. Responses analysis tends to point to a need higher qualification to use the system.

The average on error recovery fields point to an insensitive error reparability capacity on system. In order to provide a broader view of that step is presented on Figure 1, a chart with the responses average:

To support the data analysis was calculated the standard deviation average, with is important to quantify the amount of variation or dispersion of data values. This step found 1,710, which is considered low.

Considering the most optimistic answer would be 1, the chart reflects the assessment that step was not good. No response has been less 3, but this perception is not entirely pessimistic since questions about the system credibility had the best reviews.

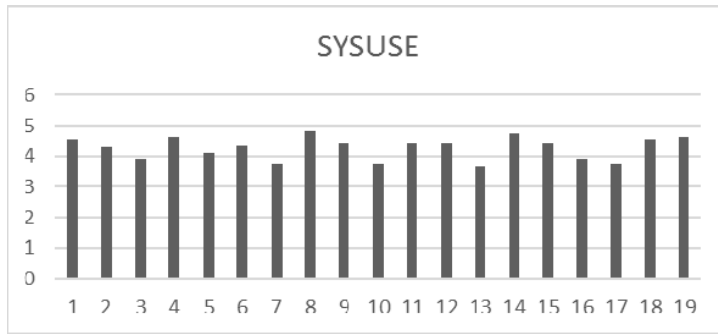


Fig. 1. SYSUSE step answers average.

4.2. Information and Interface Quality (IFC 1 and IFC 2)

For this step was used two analytical perspectives. First, on ICF1, analyzes individually each response, considering that the sum of responses is greater than 10, the evaluation is good, otherwise the evaluation is negative. In this perspective, the result can considered negative because 8 respondents totaled values than ten, and the others had values greater than 10.

In other analysis perspective, the data interpretation was differently from the previous step. In general, as Figure 2, the average of responses is above 0,01 which means a simplistic view there is a slight satisfaction with the system interface during this step.

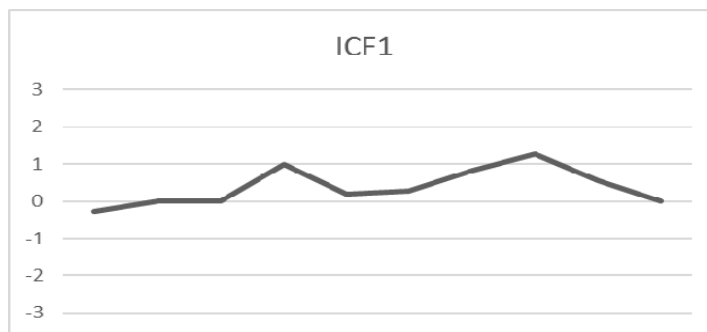


Fig. 2. ICF 1 step answers average.

At the beginning of this step, the questions deal with the software’s ease of use. The first three questions result averages below 0,01, especially the question that assesses the ease of system use. After that are addressed questions covering how the system affects the performance of tasks. Seven of the respondents consider that the software has some barrier to work, and these same respondents had some degree of dissatisfaction with the system.

Through the chart, previously presented, it is possible verify the average of the responses after the initial step is reason to assume that there is a relative quality in the final stages of the questionnaire. These steps address the knowledge generation using the software, and its documentation, interaction capacity and interactivity between the system tasks.

Most respondents recognized that the system help messages are effective and easy to understand. This information is important to assume that the documentation provided is satisfactory. Even with the difficulties reported about the system use, this research has shown clearly that the software can assists the respondents on their work objectives.

IFC required different analysis than that made to the IFC 1. At this stage are observed aspects of system interface and menu bars, separators, component sizes, icons quality and other aspects. The result of this evaluation was

positive, but some caveats should be highlighted, the main thing is relative to the size of components. All respondents reported some barrier caused by the components size in the system screens.

Next table summarizes the answers of ICF2 step. For each item, it shows the lowest and highest in the evaluation. The best evaluation of all items was the menu bar spatial position. The other items were the maximum variations in the evaluation possibilities, but it is worth noting that only one of the subjects evaluated with the highest score aspects of system interface.

Table 2: Higher and lower response for each ICF 2 item.

Interface Component - (analyzed aspects)	Menu Bar	Sub-menus	Separators	Information on the screen	Functions of Support
The spatial position of this component in the monitor was	+1; +2	-2; +1	-1; +2	-2; +3	-2; +3
The size of this component was	-2; +2	-2; +2	-2; +3	-1; +3	-2; +3
The size of this component relative to the other was	-3; +3	-3; +3	-3; +3	-3; +3	-3; +3
The correspondence of the icons to the respective action was	-1; +3	-1; +3	-1; +3	-2; +3	-1; +3
The size and quality of the icons were	-1; +3	-1; +3	-1; +3	-1; +3	-3; +3

The less items variation shows homogeneity between the answers, and the opposite shows heterogeneity. The size of the components relative to others was the most heterogeneity answer. The conclusion of this analysis shows difficulties with learning about the system use. Support functions do not have large variation, which indicates availability of these tools and presupposes a direct difficulty of the user.

Next section will present all steps synthesized analysis, as well as assumptions and improvements to the system suggestions.

4.3. Assumptions of the analysis

Table 3 is intended to make assumptions based on previous analyzes and so elaborate possible suggestions to optimize the problems encountered.

Table 3: Synthetic analysis with suggestions.

Topic	Analysis Result	Assumption	Suggestion
Documentation	Satisfactory	The system has an understandable and accessible documentation	Extend knowledge management and manuals
Acceptance	Not Satisfactory	Users did not accept the tool exchange	Follow users on the use of the system, helping if necessary
Use facility	Not Satisfactory	Initially is not easy to use	Application customizations are necessary for the work in DTI.
Effectiveness	Satisfactory	Even with negatives analysis, software enabled continuity of work activities	Perform a measurement of how much the work activity improved with acquisition and deployment of the system
System Usability	Satisfactory	With exceptions the usability of the system was satisfactory	It is necessary start a project to improve the system usability
Resistance	Not Satisfactory	The team is resistant to use the system	Use special system to measure user's ability to operate the system

5. Conclusion

It's expected that the work could enabled a realistic analysis of the software's use on DTI. This type of analysis can be used in other organizations with reservations, but it is suggested that its implementation be adapted of the

studied sector. The low amount of respondents did not permit generalizations, so it is suggested that future researches is carried out with more respondents.

This survey found that the change of application, particularly those that directly influence the performance of an activity in the organization, requires an effort on your deployment project. Factors such as usability can affect the success of the adoption of a system for a particular team.

All users have indicated they do not feel comfortable using the CA-SDM. In addition, they indicated that they had difficulties in learning the software. For them, the CA-DSM functionality should be more intuitive.

The overall software usability was evaluated negatively by the users, but was not found strong resistance about ability to learn to use the appliance.

It is also possible to conclude from this study that analyzed software presents a performance that needs to be improved as far as regards the efficiency of its usability.

Data collection instruments were efficient from effectiveness perspective, but there was a lot of difficulty with the dissemination by digital media, requiring visits to assist the respondents. The different analysis perspectives suggested similar results which proved the reliability of the research.

As final considerations it is worth mentioning that the common concept of usability only addresses the user's view. This paper therefore suggests the vision of various stakeholders such as users, organization and development team of supplier.

For future researches intend to apply the questionnaire to evaluate interconnected systems and the analysis of the interactions between them.

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