Estudio sobre la implementación del *software* Help Desk en una institución de educación superior

Study of the implementation of Help Desk software in an institution of higher education

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RESUMEN

El software *Help Desk* o sistema de Mesa de Ayuda proporciona un punto de apoyo y contacto entre el proveedor de tecnologías de la información y los usuarios finales. El contar con esta herramienta permite tomar decisiones diarias que influyen en la manera cómo se resuelven los incidentes tecnológicos, y con ello evitar que los procesos de las diferentes áreas se vean afectados por tiempo prolongado. En el Centro Universitario del Sur (CUSUR), de la Universidad de Guadalajara, esta herramienta se implementó durante ocho años –de 2008 a 2015–, y en el proceso se fue modificando para ajustarla a las características de la institución. Para conocer sus alcances, desarrollo, pertinencia y aceptación en los años que estuvo el servicio activo, en 2016 se realizó una investigación de corte mixto a través de la técnica de cuestionario tipo encuesta aplicado a 68 usuarios; la parte cualitativa consistió en el análisis de la pregunta abierta del cuestionario y la recuperación de la experiencia de la persona que estuvo al frente del proyecto, quien, a su vez, fue uno de los autores de este trabajo. Los resultados señalan que, en general, los usuarios del sistema *Help Desk* en el CUSUR estuvieron satisfechos con el servicio recibido, a pesar de que la mayoría desconocía su implementación; se observó una mejora en la dinámica del soporte tecnológico del centro.

ABSTRACT

The Help Desk software or Help Desk system provides a point of support and contact between the IT provider and the end users. Having this tool allows possible to make daily decisions that influence the way in which technological incidents are resolved and thus prevent the processes of the different areas from being affected for an extended period of time. At the Centro Universitario del Sur of the Universidad de Guadalajara, this tool was implemented during 8 years –from 2008 to 2015– and in the process was modified to fit the characteristics of the institution. In order to know its scope, development, relevance and acceptance in the years that the active service was, in 2016 a mixed-case investigation was carried out through the technique of questionnaire type survey applied to 68 users; the qualitative part consisted in the analysis of the open question of the questionnaire, and the recovery of the experience of the person who was in charge of the project, who is, in turn, one of the authors of this work. The results indicate that, in general, the users of the Help Desk system in the CUSUR were satisfied with the service received, despite the fact that most of them did not know the implementation, and an improvement in the dynamics of the center's technological support was observed.

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INTRODUCTION

One of the challenges in adopting information technologies in the daily organizational processes is to continue with daily tasks without interfering in the delivery time of the results whatever the contingencies that may arise, whether they be of human nature, experience or training of the personnel- technological – or equipment failures-.

Technological contingencies can be addressed by creating a single point of contact which should consider all requests and ensure that they are executed in the shortest time possible, by documenting the solutions to systematize the order and frequency of failures. These points of attention were named Help Desk or Technical Support Department. For Amschler, Beaver and Lucente (2016) the main objective of these helpdesks is to provide any organization efficient and timely information technology services, through a simple physical space, a telephone line, an email address or any other communication channel (More, Stieber and Liu, 2016).

Since its creation at the dawn of this century, help desks have had a continuous development and have improved solution processes; systems have been implemented to allow timely request follow-up, generating a cycle of attention, development, solution and evaluation of aid processes, because "the main objective of incident management systems is the processing of these incidents through the correct classification of information systems "(Leandro Baladrón, 2007, p.3). For Serbesta, Goksenb and Tokdemir (2015), these help systems help people to get to know the general structure and the incident response procedure through a process of frequently asked questions (FAQS).

An incident "is any event that is not part of the normal operation of a service and that causes or may cause an interruption or reduction in quality" (Leandro Baladrón, 2007, p.3), for which technological support is a requirement together with the use of technology, that is, the technological infrastructure needs both, a support made up of people who work to keep the services it provides in optimum condition, and specialized units for this purpose.

Applications or incidents of technology systems include various categories: computers, software, voice and data networks, connections and own services: email, applications, printers, Internet. For the attention of an incident Leandro Baladrón (2007) considers the sequence of the following steps:

- Incidence record.

- Classification of the incidence and its assignment to the technical support group.

- Investigation of the cause of the incidence and its comparison with other similar incidents.

- Document the solution by attaching the files with related information and closing the incident (pp. 3-4).

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The user may not identify the category to which the incident belongs at first glance, or if he does, it may help having a more accurate intervention from the help desk that must document all the information issued to consider what is causing the interruption in order to control and register the generated requests; in addition to being alert to possible failures that could have an impact not only one but several users. In case of a major failure, the problem must be addressed and solved. Problems tend to occur more frequently in services such as email, applications and Internet connections.

The change of a parameter or adjustment in the systems will allow the restoration of the services. If the failures are persistent, the permanent change should be evaluated[i]. In general, these changes must be executed after a process of analysis approved by the management or administrative staff. Every change made will ensure that the systems continue being executed. Ideally, these movements should be applied so that the user does not see their tasks interrupted, if it is executed successfully, attention to that common failure will be diminished and it will then be focused on other processes or other incidents.

The help desk is important to know the level of quality of the IT systems in the organization. When a user generates too many incidents it could be that his equipment is in need of a major repair or that it is obsolete. When this happens with the others systems and there are too many requests, a focus of attention is turned on.

At the Centro Universitario del Sur [University Center of the South] (CUSUR, [Spanish acronym]), a *Help Desk* system was implemented in 2008 to give attention to the incidents reported by the users of the different areas, whether the teachers, managers or administrative staff. The IT technicians thought of systematizing and sequencing the applications with the purpose of identifying the main technological problems that were occurring in the institution by taking into account the policies of technological improvement such as those expressed in the Development Plan of the University Center of the South, that was to focus on the infrastructure to: "create new academic units according to the observed trends, as well as modernize the spaces with those already accounted for and intensify the use of information and communication technologies in the different academic and administrative processes "(UdeG, 2014, p.28). Hence, the implementation of the system complied with one of the goals proposed in said plan.

This paper presents some of the results of the process as of the following research questions:

- As of the implementation of the Help Desk, what are the main changes that have occurred in the attention of the technological incidences at the CUSUR, and what perception do users have of this system?

- What are the advantages and disadvantages of having this tool as the only point of contact to solve IT incidents?

To answer both questions, we analyzed the responses of a closed questionnaire and an open question, as well as the rescue of the experience of the person in charge of the project. Even though the help desk system is no longer in force at CUSUR,[ii] the results

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can be useful for other educational institutions that seek to improve and speed up the service of technological incidents.

Review of the literature

In the educational processes more and more teachers, administrators and students interact in different ways through computers or electronic devices, and they are choosing these devices given the type of activity they carry out, the setting, the acquisition capacity or simply because said tools are the equipment offered by the institution. The diversity of technological uses in the activities of the institution has increased, which has generated greater dependence on these tools.

From this incremental standpoint, and as mentioned by Bulchand and Melian (2010), the information technology areas of all organizations are under two important pressures. On the one hand, the need to provide better infrastructure services increases day by day and, on the other, there is the need to keep costs down, especially in the area of human resources for the maintenance of equipment.

In regard to the implementation of technology in an organization, Lozano and Rodríguez (2011) point out that: "when selecting and adopting a standard or a set of best practices, there are several options and the decision is made depending on the priorities of each company or organization and the benefits and advantages it can provide "(page 14).

The truth is that the application and use of ICTs in higher education is an emerging challenge and it requires a new conceptual approach (Omona, Van der Weide and Lubega, 2010). For Pedersen (2003, cited in Omona, Van der Weide and Lubega, 2010), the analysis of the adoption of technology has been developed from three approaches:

a) Dissemination, since the media and communication influence the opinion and judgment of people about their decision to innovate.

b) Adoption, which suggests that when users are faced with a new technology there are a number of factors that influence their decision on how and when to adopt it.

c) Domestication, where technology becomes an integral part of everyday habits.

Based on the above arguments, Rodríguez Salas (2004) identifies that "[educational] organizations are undergoing profound changes and deploying notable efforts to adopt new forms of organization of their structures" (p.2), and the success in the competitiveness of an organization is governed by the ability it has to develop actions that generate new skills (Omona, Van der Weide and Lubega, 2010).

Berrocal and Pereda (2001) confirm the foregoing arguments by identifying that: "the success [...] will reside in the capacity of innovation of the organization; in its ability to surprise, to break the rules of use "(p.643). However, as Bates (2001) explains: "When it comes to organizational structures, the challenge is to develop a system that encourages teaching units to be innovative and capable of responding quickly to the

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changes that occur in the disciplines, the needs of the students and the technology" (p. 223).

Technological tools are exposed to an obsolescence that can sometimes be immediate given the progress and development being generated; if this is not taken into account, it can greatly affect the institution. Once the technological inclusion process has been completed, it becomes a priority for the institution to continually improve and update its infrastructure, which implies creating new administrative units according to the trends observed, as well as modernize existing spaces.

For Hidalgo, León and Pavón (2002), the activities to follow in a process of incorporation of technologies in an organization are as follows:

1) Identification of the required technologies

2) Evaluation and selection

3) Acquisition

4) Assimilation

5) Utilization (p. 36)

The technological support staff can be located in a central department or in different campuses of the institution to meet the needs of each unit. In the context of higher education there are four support groups that fully exploit the technology and meet the needs that arise with its use:

• The support personnel for the technological infrastructure.

• The support staff for educational technology.

• The instructional design staff

• The personnel specialized on the subject (Bates, 2001, p.93).

Of these four groups, the first is undoubtedly key to the development of the functions of the remaining others; therefore, it is important that this level have the tools and inputs (training, technology, economic resources, systematization of processes) necessary for the proper development of its activities.

Technology Management and Help Desk System

Jaimes, Ramírez, Vargas and Carrillo (2011) explain that technological management is defined as: "a systematic set of processes oriented to the planning, organization and

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execution of activities related to the evaluation, acquisition and start-up of key technologies for the compliance with the strategic objectives of an organization" (p. 44).

In this sense, Hidalgo, León and Pavón (2002) point out that "the management processes related to technology do not end when it is acquired and incorporated into the projects that are executed. Generally, it is necessary to evaluate its use or proceed to optimizations" (p. 36). For Rizo and Pérez (2003), technological management should consider:

- The evaluation and selection of technologies

- The use, assimilation and adaptation of technologies

- The negotiation of technologies

- The generation of new technologies

The Help Desk system is a technological management process based on a set of technical and human resources that supports different levels of computer users of an entity by adapting to the needs of each organization.

The Help Desk is an area specialized in in-person, remote access or web page technical telephone support (Bulchand and Melian, 2010). It provides information and telecommunications equipment in order to solve all incidents and problems that users may have in their workplaces; they are computer-assisted environments in customer service centers that provide first-line assistance (Chan, Chen, Geng, 2000). For Bulchand and Melian (2010), this system is an ideal support for organizations as it is considered an area of low specificity in which it is easy to find service providers on the market.

In the process of implementing the Help Desk system, it is necessary to consider the composition of the work team, because if the reports of incidents of an organization are constant, sufficient staff is required. However, Amschler, Beaver and Lucente (2016) point out that we must also consider that there will be periods of low demand, so that a very large team may be unproductive in these periods; however, on the other hand, there will be incidents that can not be solved in the future at a more basic level and will need to be attended by a more experienced staff (More, Stieber and Liu, 2016). In general, the Help Desk carries out the following activities:

- Attend and record all calls made by users of computer services through their own system.

- Define the severity of the problem.

- Categorize and prioritize the case.

- Close the resolved cases.

- Respond to requests from users with appropriate information and in a timely manner.

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- Direct cases to the appropriate support groups together with the user's computer service providers.

- Inform the user about the cases that generate impact on their activities and on the situation of the cases still in progress (Samaniego and Campoverde, 2010, pp. 68-69).

Organizations can implement a Help Desk system based on ITIL infrastructure to proactively manage IT services and reduce downtime. Leandro Baladrón (2007) argues that:

> The ITIL infrastructure (Information Technology Infrastructure Library) was born out of a collection of the best practices observed in the IT service industry. ITIL provides a detailed description of a number of important IT practices through a comprehensive checklist, tasks, procedures and responsibilities that can be adapted to any IT organization (p. 15).

The ITIL infrastructure helps the technician and his team to solve problems more quickly and to work proactively to even prevent some from arising. Lozano and Rodríguez (2011) argue that:

> ITIL does not provide work instructions, it does not assign tasks to people or propose process maps, it is simply a guide that proposes how to implement IT processes correctly and how they should interrelate and communicate so that the flow of information between them flows continuously (p. 22).

An example of the implementation of a help desk system under ITIL technology occurred in the Bank of Mexico and the following problems were identifying:

- Rejection of its implementation by the IT staff given their:

  o Unawareness of the new scheme to be implemented.

  o Lack of training on the subject.

  o Greater administrative and control tasks.

  o Fear of change (have indicators that report satisfaction and solution times for each area and person).

- Lack of knowledge of the users' satisfaction status regarding the IT service.

- Users have trusted support staff and refuse to use the new scheme (Banco de México, 2011).

Currently, several higher-level institutions have a first-class technological infrastructure. They are equipped with state-of-the-art computers that have productivity tools, specialized software and Internet access links at higher speeds, to access all the information available at the desired time.

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With these tools available to the community of the institution, it is necessary to have a system that helps solve failures and obtain technical assistance, in addition of having updated and complete information to know the details about the incidents and problems that may arise in the organization.

Once it has been decided to implement a Help Desk system or any other technological system, it is necessary to take into account the elements that will make up the process. Some of these elements may be:

- **Participants**. All those involved in the process are identified to determine whose participation will be more relevant or useful. It is important to note that everyone's opinions will be taken into consideration, as this will help making the process more rigorous process.

- **Coordinators**. It is of utmost importance to have one or two coordinators who take over the responsibility for planning and carrying out the work, as well as the consequent activities such as meetings and actions to achieve the goals set.

- **Resources**. It is important to determine, from the beginning, the resources available and the individuals who will be responsible for them. Taking time as a constraint is also important. The financial resources allocated must meet the objective of each item to ensure the completion of the phases of the process.

- **Stages**. The time spent on the project and its different stages must be determined before hand. A schedule of activities is drawn up establishing deadlines and the individuals responsible for each stage to achieve the objectives.

- **Goals**. The goals to be met on completion of the project must be outlined. The strategies and approaches of the organization must be taken into account (Bates, 2001).

The systematization model being proposed is based on an analysis of a higher education institution, and it is important that educational centers have the following characteristics:

- The institution must have a well-defined organizational structure with at least one board of directors and one chancellor who ensure compliance with the organizational objectives.

- The institution must be made up of administrative areas that support the educational management which also require the services of an IT area.

- The technology area should be made up of well-defined functional areas that facilitate the appointment of roles for the ITIL processes, for example: service desk, infrastructure, development (Lozano and Rodríguez, 2011, pp. 30-31).

In general, the importance of the integration of technology in an educational institution should be observed; it must be accompanied by specific support strategies and attention

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to the needs of users; the maintenance and permanent update of the equipment; the administrative planning that looks out for the needs that are being generated in the institution in regard to information technologies.

Study Setting

The University Center of the South (CUSUR [Spanish acronym]) was created on May 26th, 1994, as an expansion action of the University Network and decentralization of the University of Guadalajara. It is in charge of fulfilling the purposes of higher education in the southern part of the state, and serving 28 municipalities. At present, CUSUR has more than 8,000 students in educational programs, distributed as follows: two technicians, 18 bachelor's degrees, six master's degrees and two doctorate degrees. The teaching and the administrative staff consist of 523 professors and 203 employees respectively.

The CUSUR has services that use state-of-the-art technology such as: data network (optical fiber backbone), telephone network, wireless network (radio frequency), computer servers (mail, web, applications) and computer equipment (computer processing data). It has an infrastructure of 19 buildings, a library, two auditoriums, a computer center and various laboratories.

There are close to 900 computers distributed throughout the center, which are intended for administrative and academic use. When the CUSUR was created, different services were established that began to cover the needs of the university community; one of them was the IT service applied to the academic field. Consequently, a Computer Center was set up in a building that housed 20 computers.

In 1999, the Coordination of Technologies for Learning was created and, at the same time, the Instructional Multimedia Unit. The Computer Unit that had already been founded was added to this new coordination. Likewise, a building that would house seven computer rooms with a total of 160 computers was inaugurated. Table 1 shows the main changes that have emerged in the IT service at the CUSUR since 1997; when the center was connected to the Internet for the first time:

Table 1. Evolution of Information Technologies at CUSUR

Year	Link to internet - speed	Services
1997	DS0 – 54 Kbps	*Web,* users, printers, mail
1998	DS0 – 64 Kbps	
2000	E1 – 1 Mbps	Domains, *Exchange*, *Webmail*, *Web CT*
2003	*Frame Relay* – 1 Mbps	*Windows* 2000, AVA
2004	T1 – 2 Mbps	
2006	T1 / Telmex - 4 Mbps	Students, *Pharos*
2007		*Rosetta Stone*, *Moodle*, *Cacti*, IP *Audit*
2008	T1 / Telmex - 12 Mbps	*Service desk*
2009		

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2010	*Quantum Link* / Telmex - 15 Mbps	
2011		Financial management system
2012	Telmex - 36 Mbps	B.D. Dia, Contpaq
2013	Iusacell / Telmex - 60 Mbps	*Psicowin. LimeSurvey*
2014		Exinda
2015	Iusacell / *Quantum Link* - 110 Mbps	*GNU Health*

Source: Developed by the author.

In 2008, the Help Desk system was implemented. In the previous year (2007) the Microsoft Groove program was tested as a tool to record and track reported incidents. The tests were satisfactory, as it was found that implementing this tool as a support to the activities would be a resource that would help improve the maintenance process. The background of the use of this help desk system in the university network (UdeG) can be seen below:

Table 2. Background of Use of Help Desk at the UdeG

Center	Implementation	Software used	Technicians (people)
CGTI	December 2005	*BMC Service Desk Express*	7
CUCEI	2004	*One OrZero Help Desk*	10
CUCI	2009	Own development	3
CUCSH	2013	GLPI	12
CUVALLES	February 2014	Own development	21.
CUSUR	2008	*Service Desk Plus*	5

Source: own elaboration based on the information gathered from the coordinators of Technologies for Learning of the university centers listed.

The increase in the number of users, computing equipment, networks and infrastructure in general has generated the need for a robust, well organized and prepared technical support in order to attend the constant help requests for technological incidents, which go from the most basic to the most complex levels.

Methodology

This research corresponds to a mixed method descriptive study with quantitative predominance and cross section design, validation and application of a survey type questionnaire with closed items and an open question to know the opinion of the users on the implementation of the help desk.

This, in turn, reclaims the experience of the person responsible for the implementation and development of the Help Desk system at CUSUR, who is one of the authors of this paper. It is worth mentioning that the people who answered the questionnaire are part of the areas or departments that have requested more attention from the technical support and service to oversee incidents.

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Design. The questions included in the sections of the instrument correspond to different categories such as the use of computer equipment; connection with telecommunications services; knowledge of Help Desk services; frequency; time of attention and solution of failures of IT and telecommunications services; quality of attention and level of satisfaction in the service to solve the faults; consolidation of the help desk system for attention and application in other departments; and general evaluation to the technical support department.

Validation. A pilot test was applied to 15 people, and a questionnaire was sent to them at the same time to know their perception regarding the order of the questions, sufficiency, pertinence and writing. They were asked to comment or make suggestions in order to make the necessary corrections. In addition to the suggestions of the users of the pilot test, the observations made by two experts in the area of technology and research were taken into account; they also added the necessary corrections. The modifications were made for the final writing of the instrument, which consisted of 29 closed questions and an open question.

Sample and Application. For the application of the questionnaire, we analyzed the areas that carry out the key processes for the organization. This included the staff of eight co-ordinations and five departments with a total of 698 individuals. The sample was calculated based on the statistical standards with a 6% margin of error and a 90% confidence level. The calculation yielded a sample of 150.

For the application of the instrument, an email was sent to the total of the calculated sample. The link was included in the message to access the instrument questions; the response time was four days. A period of five days was left open before closing the instrument but no other answers were obtained.

The total number of users who answered the questionnaire was 68 (45.33% of the calculated sample). The Google Drive in its online form section was chosen as platform. People took approximately ten minutes to answer the questions on the instrument. The time was recorded on the platform on completion of the instrument. The hours at which more records were obtained were between 7:00 a.m. to 3:00 p.m., schedule that corresponds to the working hours of the majority of the participants.

Results

Sixty-eight people answered the questionnaire, of which 59 were professors and nine administrative staff. In this section we analyze the results obtained in the different categories to answer the research question:

   a) As of the implementation of the Help Desk, what were the main changes in the attention to the technological incidences at the CUSUR?

In an organization, some day-to-day processes are hidden from the users' view, so their presence usually goes unnoticed. However, when a problem related to the process in

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question arises, its absence is immediately noticed. This was the case of technological support systems such as the help desk.

When asked about the difference in support services in comparison to the help desk, 57.4% of the informants answered that they had not noticed the presence of such system in attention to their incidents, while 42.6% who identified some changes, mentioned differences in the service:

Table 3. Differences in the Service as of the Use of the Help Desk

What have been the differences in the service? (percentage)	
Better care - shorter waiting time	66.2
Longer waiting time - worse attention	10.8
Minor incidents - better services	27
Worst services - biggest incidents	0

Source: Developed by the author.

They stated that incidents sometimes recurred due to the general service faults, obsolete equipment or lack of maintenance; and in some cases, due to the lack of training of the assigned personnel:

Table 4. Causes of Fault Recurrence

What do you think is the reason for the recidivism? (percentage)	
Obsolete equipment	34.3
Lack of maintenance	32.8
Manufacturing defects	1.5
Lack of training to resolve incidents	22.4
General failures in services	65.7

Source: Developed by the author.

Some elements such as the lack of training and the failure of Internet services reported by the respondents though the open question and shown in Table 4, are picked up in the item of the disadvantages.

b) What are the advantages and disadvantages of having the tool as the only point of contact to solve IT incidents?

According to the experience in the implementation, the system allowed to know which users requested attention more frequently, the most common types of failures, besides the schedules when more requests were generated. This allowed us to take decisions to make changes in services or computer equipment, as well as to analyze the statistics and their causes.

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It is important to note that the technical staff was sometimes exceeded by the number of requests generated. This was due to the obsolescence of some computers or failures of the active equipment in the network that needed to be replaced. This process changed over time, because we worked to improve the core services: permanent Internet connection, email, telephony and access to the university's own services.

It was understood which areas required more attention. We identified the actions that were taken to keep services as stable as the infrastructure would allow. According to the responses of the survey and the comments of the respondents (open question), we identified some advantages and disadvantages of the tool:

Advantages

• The time of attention of incidents decreased (see table 5).

Table 5. Time Elapsed for the Attention and Solution of Incidents

Question	Amount (percentage)			
	Less than 10 minutes	**10 to 30 minutes**	**30 to 60 minutes**	**More than 60 minutes**
How much time elapses from when you report your fault until it is answered?	0	36.8	30.9	32.4
How much time elapses until the fault is resolved?	22.1	44.1	22.1	11.8

Source: Developed by the author.

• Some users have identified the systematization of incident reports, which they consider an advance in the organization of the Technical Support Department (see table 6).

Table 6. Data on generating and solving the Incident: Number, Technical Problem, Solution and Cause

Question	Cantidad (porcentaje)				
	Always	**Usually**	**Sometimes**	**Hardly ever**	**Never**
At the moment of reporting the failure, are you informed what is the incident number with which you will be attended?	33.8	27.9	25	8.8	4.4

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At the time of reporting the failure are you informed who will be the technician assigned to attend to your incident?	4.4	13.2	26.5	25	30.9
Are the failures that you have reported resolved?	61.8	30.9	7.4	0	0
When the technician resolves the fault, is the reason for it or the cause that caused it explained?	25	30.9	30.9	10.3	2.9

Source: Developed by the author.

We note that when reporting a failure, in 44.15% of the cases, the technician assigned to repair the failure is unknown to the user; 86.8% of the time, the user will not be given any explanation of the reason or cause of the incident. Recurring failures of specific equipment can be identified to keep track of the needs being detected, whether to solve the problem or to change the equipment.

Disadvantages

> • Reference is made to the lack of training of support or social service personnel and their integration within the institution's environment, as well as the absence of supervision of the staff in charge.

> • The users mentioned that one of the main problems of the University Center is the connection to the Internet given its recurrent failures, and although it is not directly related to the Help Desk system, they considered that until the basic technological needs are met, it does not make sense to implement innovations of this type.

The number of equipment connected to the network had been increasing year after year; therefore, new wiring was made in spaces that were not suitable for this service. More active equipment were set up to support these new services; this was done in parallel with the attention given to the users.

During all those years, the students of social service or professional practices provided their support, even though they did not receive any induction course to the technical area, they accompanied the technicians who provided them with on-site instruction as they observed how the incidents were solved. After a while they performed the service on their own, which meant that in some cases the service provider or trainee could fail in the process, and this in turn, would cause the user to complain or make comments on the uselessness of the service, since more time and resources were invested in solving incidents.

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Implementation Constraints

- Mistrust was the key work when implementing the system since the proper operation of the system as well as the use of the tool by the technicians had to be overseen. At the beginning, there was a kind of resistance in using it. It seemed too bureaucratic and time would be lost in using it so, it was decided that one single person would be responsible in entering the data into the system and a technician would be notified immediately of an incident. Said technician would then be assigned to the person requiring the solution. After a while, everybody understood the dynamic of the tool.

- The official implementation of the system represented another constraint to overcome. Although a quotation was made, the advantages of its use were shown to the other departments of the organization so they would adopt the system unfortunately the correspondent resources were not allotted to do so.

- Since this tool was in a pilot phase, other options that would generate incidents were not activated. The tool was not recognized officially in the institutional planning; therefore, not all the users knew it existed despite knowing there was a system being used to follow up incidents.

- The tool lacked official technical support; hence, its operation was constantly under revision. The system collapsed at one time and it had to be reinstalled completely. I t was then configured from the base. This occurred only once and since then, it has not failed again.

Conclusions and Discussion

In the study conducted on the implementation of the tool known as Help Desk at CUSUR, we sought to find out if the users knew it or not; the advantages and disadvantages in having a single point of contact; and if, in general, they perceived any change in the attention and perception of the service besides requesting their opinion to include other service areas in the use of the tool.

We observed that 97.1% of the users surveyed knew the means to report computer, Internet or telephony equipment related failures, however, only 32.4% knew about the existence of the Help Desk, despite the fact that the institution was informed in different occasions of the implementation of said system through a general e-mail.

According to 67.7% of the interviewees, the time elapsed between reporting a failure and receiving attention was 10 to 60 minutes with the implementation of the Help Desk, while 66.2% of the interviewees said the failure was solved within a period of 10 to 60 minutes. González, Giachetti and Ramírez (2005) found that in different hospital organizations, the time in attending calls of low priority was improved in 57.9%, 64.5% for average priority and 52.2% for high priority with the Help Desk system.

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Chan, Chen and Geng (2000) observed that this system contributes to both shorten the response time and to reduce the training time of new technical support employees. In regard to failure recurrence, we found that 65.7% of the users attributed said recurrence to the general failures of the services, and only 22.4%, to the lack of training of the personnel to solve the incidents.

People calling the Help Desk analysts to solve the technology information problems must have knowledge of the information technologies supported by the Help Desk system (González, Giachetti and Ramírez, 2005), an essential datum for users since the technical support is most important when evaluating the service (Foo, Cheung, Chor and Liu, 2000).

Based on the first objective on the effects of the implementation and the perception that users have of the tool, it is inferred that:

- The users recognize the frequency at which failures show up, the time the support department takes to attend and solve them, as well as the treatment they receive and the cause that originated their incident.

- Users do not notice any difference between before and after the implementation of the Help Desk, but they do recognize that the attention and response time have improved (Foo, Cheung, Chor and Liu, 2000), as well as the means of contact to receive attention to incidents (Bulchand and Melian, 2010).

- The users perceive the service of attention to their incidents positively, since 69% qualified said service of excellent to very good; 89.7% approved the treatment received and considered that the level of satisfaction when being attended was high most of the time. Moreover, they satisfactorily acknowledge the technical support department, which coincides with the findings of other researchers such as González, Giachetti and Ramírez 2005; Foo, Cheung, Chor and Liu, 2000.

The second objective mentions identifying the advantages and disadvantages of having the tool as the only point of contact for solving incidents, among which the following stand out:

- The tool can be useful in knowing statistical data that help making decisions and adjust the resources of the department, project expenses and plan the necessary budget (Amscheler, Beaver and Lucente, 2016).

- Another of its advantages lies in knowing which services require more attention in order not affect the users' activities, for example, if reports of a particular failure are received at the same time and location, this indicates that an intervention is needed to know what is going on and to solve the problem.

- One of the disadvantages is not having the sufficient number of technical staff required to solve the incidents. If the incidents are too many and the number

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of assigned personnel too little, there will be a delay in the attention and solution of failures which in turn, will cause stagnation or "queue of attention". Therefore it is important to have sufficient staff (Bulchand and Melian, 2010), well trained in the different IT services (More, Stieber and Liu, 2016). It is mandatory that someone be in charge of keeping these services active, assign incidents and generate statistics, because an efficient solution is needed to minimize the users' waiting time (Amschler, Beaver and Lucente, 2016).

We observed that the users agree to consolidate the system to solve incidents and improve results. They also approve the inclusion of other departments to optimize their services. The proposal to consolidate and to integrate the Help Desk tool again in CUSUR is the following:

a) Before implementing the tool that will meet the users' current response needs and adapt it to the environment, it is necessary to consider the implementation time, costs and due training of both technicians and support staff as well as users.

b) To guarantee the continuity of the tool in case of administrative or personnel changes -as is the case at hand- it must be included as a critical process of the institution, a service that must be maintained for generations of users to come, taking into account institutional development plans and the specificity of the center

c) When considering the impact of attention to users in the institution, especially when intervening in a process that had not been systematized previously, the tool can be a concrete solution to facilitate the control, attention, management and evaluation of the incidents, elements that must be considered in the institutional planning.

d) Once the tool has been consolidated, it is very important to include the Departments that need to improve their attention process. To do so, a greater effort must be made to keep the tool in good condition, train new users and deal with ways to solve the demands under the new scheme.

A scheme was designed from the triangulation of all the results obtained, consisting of aseries of sequential actions to follow for the future implementation of the Help Desk in the CUSUR (figure 1).

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Figure 1. Phases to implement the Help Desk in an organization, integrating it in several departments
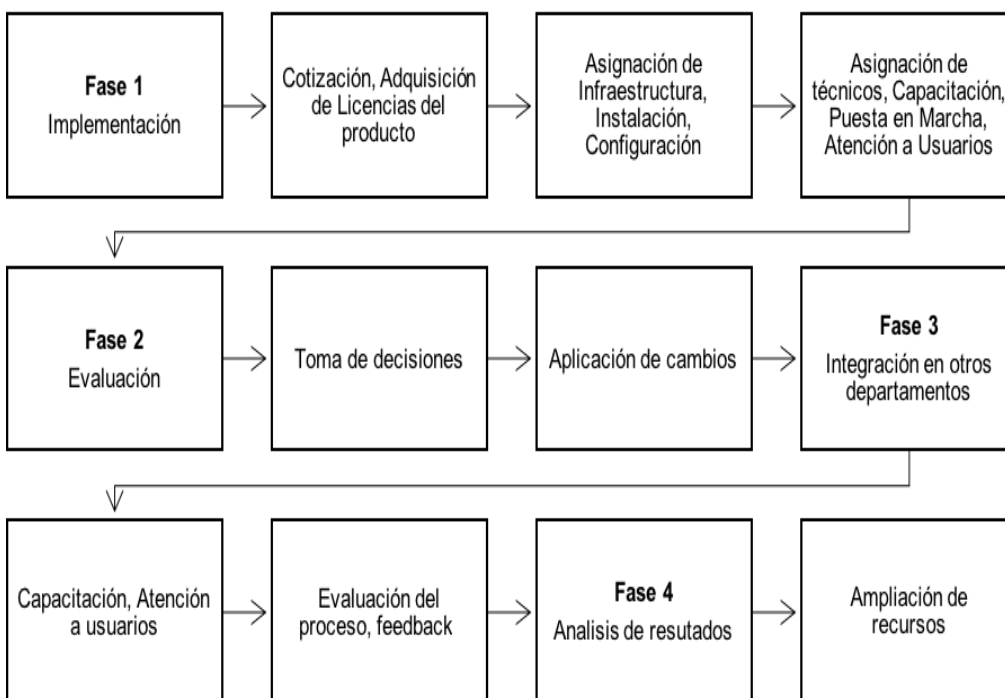
Source: own elaboration based on the model presented by Lozano and Rodríguez (2011).

Through the evaluation and analysis of results, the opportunity to move to a new level opens up: "…when a spiral of knowledge ends, another begins, but at a higher level; hence, the basis of knowledge of the organization expands more and more through the individuals' constant learning" (Berrocal and Pereda, 2001, p.649).

It is generally inferred that "for many companies, strengthening information managers in order for them to react in a more agile manner to the constant changes organizational environments undergo, is a priority issue" (Febles, Febres, Estrada and Díaz, 2012, p.4). Since the use of the Help Desk in the educational field has proven to be of great benefit in applying the tool, different institutions have adapted its functions to the characteristics of the community and the IT services they offer.

We are in search of technicians to support them and the users to whom these services are aimed at, provided "there is training at all levels in the IT area" (Banco de México, 2011). Therefore, technical support is essential to foster the participation of higher education teachers in information technology initiatives (Bulchand and Melian, 2010) as the aid system described hereto, as well as other processes that help improve the services offered, such as the allocation of resources to the infrastructure; technicians who operate and solve incidents; hardware and software update; among others.

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Study limitations

- Notwithstanding the fact that the collected data mentions that the Help Desk tool has been adopted only in some centers and in the General Coordination of Information Technologies as part of its processes, it is necessary to mention that in the case of CUSUR, the tool has been used for eight years at a trial or development status. Since the project is currently latent and its implementation in a more specialized development phase has been postponed to a near future, we present the results of its active period only.

- One of the limitations of this study is the size of the sample, only 45.33% of the sample was calculated; hence, the perception of the users in relation to the Help Desk system can not be generalized to the University Center of the South.

We observe that if the technological advances have permeated all the educational spaces, it is necessary to consider that the increase in the use of technology brings a diversity of problems. We consider that the elements presented in this work can serve other educational institutions that seek to improve the management of technology from the application of systems such as the Help Desk.

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