RESEARCH PAPER

Proposal for the formalization of the usability laboratory processes through a service life cycle

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Abstract

Among the objectives of any IT company is to offer its customers products with a high degree of satisfaction, particularly those whose market is the area of usability and UX. Among these laboratories is the UsaLab Usability Laboratory of the Universidad Tecnológica de la Mixteca (UTM), which has a wide compendium of good practices to manage IT services, being the result of its great experience in various academic and commercial projects at a national and international level. Following up on continuous improvement, it is necessary to update these good practices, because the laboratory processes have been transformed, as a result of current market needs. That is why this research shows the work carried out in the formalization of the processes, and that it is aimed mainly at laboratory personnel, allowing to improve the effectiveness and efficiency of the services offered. In addition, it is intended to make this a guide for those usability laboratories that wish to offer services at a commercial level.

Keywords:

Process management; Processes; Auditing; Good practices; ITIL.

1 Introduction

The generation of User Experience (UX) and Usability products and services have played an important role in companies and academia in recent years, due to the constant request to find improvements and thus achieve a higher quality in products or services.

The apparent increase in requests for services in UX and Usability has allowed a more noticeable appearance of companies and laboratories that offer this kind of services, of which only some of them have enough time in the market to consider themselves experts or have projects with companies important, allowing them to achieve a good position within them.

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2 UsaLab Usability Laboratory of the UTM

One of the most important laboratories in Mexico in the area of Human-Computer Interaction (HCI) is the UsaLab usability laboratory of the university, founded since 2002, the first laboratory of its kind in the country, training of human resources, research and development of commercial projects, this is based on the fact that in the university the study and practice of HCI is one of the key issues to achieve its objectives [1].

The current activities of the laboratory are based on three axes: Research and teaching; Participation in academic competitions; and Development of commercial projects.

2.1 Development of commercial projects in the laboratory

With the experience obtained in the academy, in 2006, the UsaLab began to offer its services to the industry. With this he made a leap from an academic laboratory to a commercial development laboratory, where his service was professionalized, implementing industry standards and managing to apply a business culture with academic origins.

Some of the reasons for starting to work with the industry was that, being the only usability laboratory in public universities, it was decided to advance in the professionalization of services in order to offer it to the constantly growing software industry. in the region and the country. In this way, students would have a better perspective on the real world, researchers would have the opportunity to create applied research, and the university would have additional revenue for services [2].

From this, the laboratory became a usability company within the UTM, achieving until today the participation in more than 35 projects with important companies at the national and international level [5]. These achievements have been possible, thanks to its experience in academic projects, but also due to its portfolio of services, facilities, human resources, technological resources, and the business focus of the Laboratory. As can be seen, the laboratory not only conducts research but also products for the industry.

3 Identifying opportunities for improvement

The goal of every company is to be the best option in the market and to be able to offer great satisfaction to its customers, and for the UsaLab it is no exception, one way to achieve this is through constant external and internal review. allowing to find all the necessary improvements, achieving a better effectiveness and efficiency of the services offered, and with this, when presenting

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the results, it is intended to give a high degree of satisfaction to customers, which is the ultimate goal of the laboratory.

One way to find the improvements to the laboratory is through an evaluation, for this an audit is used. This is due to the fact that the UsaLab has elements such as manuals, operating rules, financial statements, human resources, infrastructure, etc., which, in turn, are part of the inputs for the preparation of an audit, with which it is possible to know in a formal and structured way the current situation of the laboratory.

3.1 Analysis of the audit results to the UsaLab

Once the audit was carried out, the following points were found, in general: A formal documentation of the processes is necessary, mainly those that describe in greater detail the strategic, key and complementary processes, allowing the laboratory to better meet its objectives.

Although the general processes of the laboratory are reflected in a large number of publications between book chapters and articles, as well as the delivery of workshops and conferences at national and international level, this information can be considered academic and only as a reference.

The laboratory uses tools that have been adapted to the needs of each project, making it possible to streamline certain processes, but some of these processes have not been formalized, so that a non-formal compendium of good practices of the processes has been created service offered to customers.

With the information collected, it is verified that it is necessary to propose the unification of criteria and tasks to give formality to the good practices of the processes. One way to achieve this unification and formalization of good practices is to understand that the figure of the Laboratory is based mainly on processes, and that these are focused on aligning the IT services provided with the needs of the companies, emphasizing the benefits that can be perceived by the end customer, and which in turn is part of what is known as IT service management. The shared goals of IT and Lab service management are:

- Provide adequate quality management.
- Increase efficiency.
- Align business processes and IT infrastructure.
- Reduce the risks associated with IT Services.
- Generate business.

To achieve good IT service management, it is necessary to rely on some collection of "best practice" implemented by one of the different frameworks that exist. The selection of the most suitable framework is in relation to the objectives pursued by the company.

3.2 Comparison of models proposed for the laboratory

Based on the research carried out, a series of generic models were studied, such as Information Technology Infrastructure Library (ITIL) and Control Objectives for Information and related Technology (COBIT); specific Microsoft Operation Framework (MOF); and ISO / IEC 20000 reference standards, which allow the formalization of the processes present in the management of IT services, with the main characteristic that these are focused on the total or partial use of the concept of the service life cycle.

For the Laboratory, it is important to select a model or standard that best adapts to the processes and projects that are handled within it. With this, a proposal is sought for the formalization of the Laboratory's processes through a life cycle of services.

3.3 Selection of the model for the laboratory

In order to determine the best "alternative" among the models and standards previously studied, selection criteria were developed that must satisfy both the laboratory's goals and those of the University's Institutional Development Plan [3].

The selected criteria are:

1. **Suitability:** It is the capacity that the alternative has to fully comply with the specific tasks of the laboratory and the university's way of being, its purposes and its goals, coherently articulated with the institutional development plan.
2. **Coherence:** It is the degree of correspondence that allows the alternative between the areas of the Laboratory and the institution as a whole. It is also the possibility of adapting the objectives, policies and available resources. Likewise, the correlation that the alternative must reflect between what the Laboratory says it is and what it actually does.
3. **Relevance:** It is the capacity of the alternative for the laboratory to respond to the needs of the service presented by the client in a proactive way.
4. **Effectiveness:** It is the degree of correspondence that allows the alternative between the purposes formulated in this investigation and the mission of the laboratory.
5. **Efficiency:** It is the measure that allows the alternative to know how adequate is the use of the resources available to the laboratory to achieve quality in the management of its services.
6. **Customer focus:** It is the orientation that allows the alternative to achieve that all the laboratory activities are oriented towards its clients. For this purpose, it means understanding the current and future needs of customers, meeting their requirements and trying to exceed their expectations.
7. **Process Oriented:** The alternative should allow rapid identification of problems, structure the capabilities of the laboratory service to adapt to the changing environment of the institution, optimize its activities without affecting the rest of the structure.
8. **Methodological Support of the Processes:** The alternative should allow theoretically enriching the management model and the plans that compose it through activities, tasks, roles, responsibilities, planning processes, business perspective, etc. Clearly framing planning guidelines on service management and business perspective.

For the evaluation of the alternatives, ranges of 1: 5 were taken, 1 being the lowest value and 5 the highest, the Likert-type scale [4]. The selection of the alternative was made through the logical framework methodology [5], where each of the criteria for selecting the solution to the problem posed is prioritized under the following evaluation table (Table 1):

Table 1. Table captions should be placed above the table.

Criteria/ Alternative	1	2	3	4	5	6	7	8	Result
ITIL	4	4	5	5	4	5	5	5	37
COBIT	4	3	3	4	4	3	4	1	26
MOF	1	3	4	3	3	3	2	1	20
ISO/IEC2000	3	4	5	5	4	5	5	3	34

Given the results obtained, it was found that in order to solve the current problem and reviewing the different alternatives, the design of an IT service management model based on ITIL is suggested, which will allow strategically to promote the competencies that exist to respond to the environment.

This decision resides in the fact that ITIL is a compendium of publications, or library, that systematically describe a set of "good practices" for the management of IT services, which is why it is the model that best supports the planning processes of service management implementation, business perspective, application management and IT infrastructure, planning recommendations, implementation, daily use, role examples, processes, indicators and formats, above the ISO 20000 standard, an alternative that also obtained high scores in the evaluation criteria; in other words, ITIL reflects the dynamics of organizations and their need to continuously adapt in a constantly changing world [6].

4 ITIL implementation in universities

Universities are no exception to the issue of the need to manage Information Technology (ICT), although they are companies that do not have large budgets, their technological advances have led to changes regarding their infrastructure, administration, users, resources and services, being necessary to have a series of processes that facilitate the management of services. In most cases, many of these institutions already have such processes, but they are not standardized [7, 8, 9, 10, 11, 12, 13, 14].

That is why ITIL has been implemented at different levels and areas within universities, mainly in those that are directly related to the delivery of high-quality Information Technology (IT) services.

In relation to usability and UX laboratories, there is no evidence of ITIL process implementations using a structured model for the improvement of IT services that are aligned with the university's strategies.

5 Steps for the implementation of the ITIL model in the UsaLab

Once the ITIL model has been selected for the laboratory, it will be necessary to know the steps to follow for its implementation. To do this, we will propose a series of 10 steps that allows us to adapt the model to the needs of the UsaLab.

1. Preparation for ITIL implementation in the laboratory
2. Definition of the IT service structure
3. Selection of ITIL roles and role owners
4. Analysis of current processes (ITIL assessment)
5. Definition of the ITIL process structure
6. Definition of ITIL process interfaces
7. Establishment of ITIL process controls
8. Definition of ITIL process flows
9. Selection and implementation of application systems
10. Implementation of processes ITIL and training

6 Implementation

For the first step **Preparation for the implementation of ITIL in the laboratory**, it is necessary to familiarize the principles of the framework, as well as, the establishment of a system to manage the ITIL processes, these activities were achieved through an induction towards the concepts, through a review and alignment of all the specific organization manuals and the internal regulations of the laboratory, in such a way that ITIL can be implemented in the laboratory processes.

In the second step **Defining the structure of the IT service**, it is required to identify the commercial and support services, in addition to creating the service structure, determining the interdependence between the commercial services and the support services, this was achieved through a rigorous analysis and using the ITIL Service Portfolio Management and Service Catalog Management processes, identifying a total of 11 services out of 7 that were had in the beginning, which allows a greater scope of the laboratory.

For the case of the third step **Selection of ITIL roles and role owners**, it is important to identify the required functions of the framework, according to the ITIL processes to be introduced, in addition to assigning owners to the roles, these actions arise from the new portfolio of services obtained, and with the implementation of the Service Level Management processes, the roles of the laboratory staff have been identified, created and updated, which will allow better directing the processes avoiding duplication of activities.

In the fourth step **Analysis of the current processes (ITIL evaluation)**, the processes must be analyzed and the weaknesses and opportunities within the current processes must be determined, for this, a reorganization of the processes was carried out; This will make it possible to decide which current laboratory processes can be kept unchanged and where, on the other hand, those processes that require particularly urgent action are identified.

For the fifth step **Defining the ITIL process structure**, it is necessary to determine the service management processes to be introduced, in addition to breaking down the processes and sub-processes and finally creating a structured breakdown of the ITIL processes to be introduced, these actions will be achieved, by unifying, in the short term, the criteria and tasks in the formalization of good practices of the laboratory processes, thus allowing to improve the effectiveness and efficiency of the laboratory work groups, and thus be able to specify the processes that will be added to the structure. That is why the processes and sub-processes selected for the laboratory are mainly focused on reinforcing the development and maintenance of the service portfolio, as well as the management of events, requests and problems that arise in the laboratory.

The sixth step **Definition of ITIL process interfaces**, seeks to define the interfaces of all ITIL processes, before treating in detail the internal functioning of the processes, as well as taking into account the interfaces of the ITIL processes that will be introduced, this will be obtained, with the determination of the interfaces of the ITIL processes to be introduced, that is, what inputs each process should receive from the others, and what outputs each one should produce so that the subsequent ones can function in the best way.

In the seventh step **Establish the ITIL process controls**, you try to determine the metrics (KPIs) for the ITIL processes to be introduced, in addition to defining the measurement procedures for the KPIs and as well as the specification of the procedures of adequate report, this was achieved, determining the owner of each process, since the owners of the processes will establish objective quality criteria, the way in which it is going to be measured, the objective to be achieved in each one and the way in which they will be delivered their reports. These indicators will help you decide if there is a need for process improvements. It is important to mention that it is necessary to properly select the KPIs that are going to be used, taking only those that can really be measured, in addition, it is advisable to choose a reasonable and achievable number of variables, in such a way that work and time are not hindered. the laboratory teams, at the time of preparing the KPI reports.

For the eighth step **Defining the ITIL process flows**, it is necessary to define the individual activities within the ITIL processes ("ITIL Process Flows"), as well as, determine the guides / checklists to support the execution of the processes. and finally specify the outputs of the processes, these actions were carried out detailing the processes that are going to be implemented, for this, the sequences of activities to be executed within each process must be determined. This activity requires considerable effort to implement, so it is essential to focus on the essential areas of the laboratory. To establish the sequence of activities to be executed, it is extremely important to carry out a detailed definition of individual activities within each of the processes to be introduced; in addition to defining the guides or checklists that support the execution of the project; and finally detail the process outputs.

For the ninth step **Selection and implementation of application systems**, it is necessary to define the requirements for the new or modified application systems; developing a system requirements document so that the applications are modified or achieved, as well as, sending to the providers of IT service management systems, an adequate systematic evaluation based on the list of requirements. In this step, it will be considered if there is a need to create or modify application systems to support and support the ITIL processes implemented in the laboratory, which must be acquired or developed, and implemented. It is important to consider functional and non-functional aspects when specifying the system requirements.

Finally, for the tenth step **Implementation of the ITIL processes and training**, it seeks to develop knowledge about ITIL, in addition to training the work groups that participate in the new processes in the use of new or modified application systems, instructing and informing customers and make new processes part of daily laboratory work practice. This was achieved through two training activities, in the first, the laboratory staff were involved during the implementation development and the second training, is through additional courses at different levels:

- ITIL basic course. It will take place at the beginning of the project for key personnel, so that you can communicate the ITIL principles to other project participants.

- Specific course. This will be given to those key members of the laboratory staff who need more intensive training, depending on their ITIL roles.

- Course of use of the tool. After the implementation of the tool developed in the previous step, training on its operation should be necessary.

Increase efficiency.

7 Results
From the implementation of the ten steps, the result is the generation of deliverables that will help to better implement the ITIL framework, in the case of the UsaLab the following material was generated:

- Bibliographic material and glossary of basic ITIL Terms.

- Identification and location of all the documents that the laboratory has.

- List of business services, which includes brief descriptions of the current and new services identified, as well as the customers who use them.

- List of support services, including brief descriptions of current and new services, as well as the Service Owners responsible for them.

- Service structure, relationship between business services and support services.

- Initial list of ITIL roles, which consists of an assignment of these roles to certain owners.

- ITIL self-assessment of laboratory processes.

- Structured breakdown of the ITIL processes and sub-processes to be introduced, as well as the owners of each of them (roles), as well as the Interfaces (inputs and outputs) and their CSI metrics (KPIs).

- Flowchart of the sequence of activities.

- Documents related to each of the processes of the Usability Studies service.

- Functional and non-functional requirements of the Usability Studies service.

- Generation of the software tool that will allow to automate the laboratory processes and in particular those that belong to the Usability Study service that is part of the service portfolio. This selection is mainly due to the fact that this service has the largest number of processes, sub-processes, roles, inputs and outputs to implement.

As can be seen, these deliverables are based on the laboratory's own needs, but they can be modified and adapted to other work environments, as the case may be.

8 Conclusion
The UsaLab, as a service provider in the UX and Usability area, must adapt to changes in the market, therefore it has to be updated in the new tools, methodologies, methods or criteria that are currently used in the market.

That is why the implementation of this 10-step guide will allow offering quality services to the work group to improve their efficiency and effectiveness in the laboratory processes, since having a formalized compendium of the processes will make it possible, among other things, to create or train new human resources, since keeping trained personnel at any stage of a project is of utmost importance.

An effective way to formalize processes is through the generation of a service life cycle. This topic in the area of IT and service management is broad, but in the area of UX and Usability it does not seem to be the case, that is why a service life cycle is sought that is adequate and gives a formalization to laboratory processes, since it will be very important to unify criteria that have been added to the services it offers.

The issue of the lack of information on service life cycles for UX and Usability imposes a challenge for new companies or laboratories, due to the lack of knowledge of some important processes or tools that limit the development of their services. That is why the adaptation of this life cycle will greatly help these types of companies.

The application of a framework such as ITIL, for the management of a usability laboratory is an important step, since it will allow to generate more specific documentation of processes and with it help more universities or companies, to the creation of more laboratories of this kind.

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