

Environmental Management Software Administered with ISO 9001:2008 and ISO 14001:2004

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ABSTRACT— *The aim of this project is the creation, design and implementation of managed software with ISO 9001:2008 and ISO 14001:2004, which will optimize the process of material resources department in the shopping area in Higher Education Institution.*

A study was conducted to identify the weaknesses of the department found that in filling the formats is done traditionally, with the result that it is susceptible to errors at the time of capture, the time spent is high paper costs and ink are unnecessary and also not have an effective management and control of the data required by the query difficult formats.

The developed software covers the weaknesses found, and was implemented under tools provided by the Institute by making the cost of it is relatively minor compared to commercial software, and the software itself is administered with ISO quality and environment therefore is functional for both the Higher Education Institution to any Technology of Mexico.

Based on the research results, the software will be implemented on a trial period of six months in the material resources department, in the shopping area in Higher Education Institution evaluate the results and to use the software for and care for the environment and be able to promote to the Dirección General de Educación Superior Tecnológico.

Keywords— Software engineering, sustainability, environmental management.

1. INTRODUCTION

At the elapse of recent years is clearly important that the general public attaches to the protection of the environment. Schools, as organizations with a strong training cannot be alien to this protection.

In today's world the purpose of any business is not only to produce and monetize; now every company in the development of their activities should pursue a relationship with its stakeholders to demonstrate the commitment to the social inclusion and environmental sustainability atmosphere.

Having an environmental management system takes the set of activities to control the impact on the environment arising from activities, products or services of an organization.

According Jordy Michel (2002), environmental policy in Mexico was established during the eighties and nineties, step by step neoliberal reforms of the economy. And as mentioned by Jessica (2007), in 1983 he created the Ministry of

Urban Development and Ecology (SEDUE), but this progress is delayed at the seriousness of urban environmental pollution and ecological degradation in the country.

Currently in Mexico there is, at least in the Institutos Tecnológicos a tool that helps manage processes, and to top it off there is no software that processes helpers departments in research centers. For this reason it is started this project, create, design and implement a tool to help you manage the processes managed by the international standard ISO 14000 and ISO 9000.

It is worth mentioning that this project will be planned and executed under the objectives of the Kaizen philosophy, using the Deming cycle, as the Deming cycle is a continuous improvement strategy that allows a comprehensive improvement of the competitiveness of products and services, continuously improving the quality of these, reducing costs, optimizing productivity.

2. PROBLEM

In every business, resources are limited, so these resources should be managed efficiently to give good service. For Higher Education Institution, specifically in the Purchasing Office department material resources and services, there is a limited amount of resources considered necessary to support their administration and activities. By making it very important that activities are developed there are as efficient as possible.

Currently, the Procurement Office within the department of Material Resources is managed by a single person, and this is what is responsible for the filling of the following formats: Format for Supplier Selection, Format for Supplier Evaluation, Format for Approved Suppliers Catalog, Purchase Order Format for the good or service, which makes impressions generate an amount of these formats. When a requisition for a purchase, the manager of the Purchasing Office fills a format and print three copies, more other copies of other formats, so it's a waste of money.

The amount that would be lost would be \$ 4.671 pesos; and even from time to other activities performed in your area as there is someone to help, and the unnecessary use of paper for each request; and if it be an error in filling out a form, you have to use more paper and filling time making an issue of time and money. For this reason it was decided to undertake this project.

3. PURPOSE OF THE INVESTIGATION

Develop the Management Plan for the project creation, design and implementation of a software managed to ISO 9000 and ISO 14 000M for management, control and consolidation of office Purchasing Department Purchasing Material Resources and Services in Higher Education Institution.

4. METHODOLOGY

The methodology followed is the circle of Deming or PDCA (Plan, Do, Check, Act), and its emphasis on senior management to constantly participate in quality improvement programs within the organization.

4.1 PHASE: PLANNING

At this phase, the following activities:

- First set the target of improvement.
- Once the target continued to make a description of your current situation, referring to all aspects and determine the areas that are problematic or enhancements, also made a selection of the most outstanding and high impact.
- Having done this, we defined a roadmap for an implementation plan to test the theory of solution, see Table 1.

Table 1. Project Work Plan

Activity	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Responsible
<ul style="list-style-type: none"> • Assignment of responsibilities and activities. • Development Current Diagnostic. • Development of Work Plan. 								<ul style="list-style-type: none"> • Project Team (Phase: Planning)
<ul style="list-style-type: none"> • Development of Analysis of Software. • Developing Create Database. • Project Progress Review 								<ul style="list-style-type: none"> • Project Team (Phase: Do)
<ul style="list-style-type: none"> • Programming Development and Interface Design. • Development of debugging and testing. • Project Progress Review. 								<ul style="list-style-type: none"> • Project Team (Phase: Check)
<ul style="list-style-type: none"> • Validation of Software. • Development Conclusions and Recommendations. 								<ul style="list-style-type: none"> • Project Team (Phase: Act)
<ul style="list-style-type: none"> • Project Presentation 								<ul style="list-style-type: none"> • Project Team

4.2 PHASE: DO

At this phase, we carried out the planned work plan, implementing a tracking control to make sure that the program will run. To develop the implementation, we used the Gantt chart which gives rise to check the progress of the process. The following shows the software tools to develop.

Technical Specifications

- Framework: 2.0
- Server Pages ASPX and sessions IIS Microsoft
- Platform: ASP.NET
- Programming language: C#
- Tag Generator HTML: Visual Studio 2008
- Technology for JavaScript: AJAX
- Libraries used: MySql (For connector databases MySql), PDFSharp (To file creation PDF), Excel Library (To file creation XLS), AJAX (for running JavaScript)
- Extensions of images used: .jpg, .gif, .png
- Database: MySql
- Database Manager: MySqlWorkBench 5

Structure (Layers)

- Templates ASPX with the content of labels HTML (design)
- DLL's compiled and encrypted with the code of each of the templates ASPX
- Files of type class that contains code (C#) with methods for various system functions
- Global File with settings logins
- Using Master Pages
- Inserts, updates, deletes using stored procedures and through Querys stored in Classes C#
- Type templates XLS with the basis for creating format files (standardized forms) XLS

4.3 PHASE: CHECK

The next step is to check that the results are validated and a comparison with the planned. Following is the main screen of software.



Figure 1. Main Screen Software

4.4 PHASE: ACT

Finally, it was concluded in the quality cycle stages. Here is observed if the verification was successful and achieved the desired benefits, it is vital to make a systematic and documentation of such changes to ensure the benefits.

The software works effectively and efficiently in the procurement process of the Department of Material Resources and General Services, so you will have a successful management in the process as required by ISO 9000 and he cared for the environment as required by the ISO 14000.

Table 2. Project Progress

Activities	Progress	Progress	Progress	Progress	Progress	Progress
	1	2	3	4	5	6
Project Formulation						
Data Collection						
Presentation of Progress						
Data Processing						
Data Analysis						
Presentation of Progress						
Design and creation of database						
Presentation of Progress						
Software Development and creation of interfaces						
Presentation of Progress						
Debugging and Testing						
Presentation of Progress						
Submission of Final Report						

5. RESULTS

Despite having an idea of premeditated on continuous improvement ideology before starting the execution of this project, its implementation and completion of that have helped to reinforce this initial idea that revolves around that currently, the only way to survive in this competitive world is to adapt to the requirements demanded by the market and ultimately close tightly and securely to the manufacturing excellence.

This improvement project is the result of knowledge gained in academic, professional and teamwork. As discussed in the Act phase, the fourth phase of the Deming Cycle, performed an analysis to the verification stage, and it was noted that this step was successful, in other words the desired benefits achieved.

The software worked effectively and efficiently in the procurement process of the Department of Material Resources and General Services. This work will be effective annual saving money, the money saved in 2012 is \$ 4,671 pesos and time are 46 191 minutes.

The figures were announced, is what would be saved annually in the Higher Education Institution with the infrastructure and staff resources at present, because when the campus grows, there will be more Departments working, there will be more number of requirements to perform purchase orders and thus savings in charge of the Department of Material Resources and Services when making purchase orders.

6. ACKNOWLEDGMENT

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7. CONCLUSION

The Deming Cycle use leads to improved quality and increased productivity. It also helps the administration to pay more attention to customer needs, building a system that takes into account the requirements of it.

The education provided by the Higher Education Institution, is a type of formal education within the top level that prepares students to efficiently incorporated into society and into production if necessary. This provides a comprehensive education that transcends the transmission of knowledge and makes active participant in the educational process to the main protagonists: the learner and the teacher.

It is confirmed that the implementation of software or any other system is successful if given good use, in addition to helping the sustainability of the planet.

It is a fact that with the commissioning of the software will simplify the role of the Department of Material Resources as it will avoid redundancy in information management and exclusion errors also reduce the cost of information sent to the offices within the Higher Education Institution, and last but not least, help to care for the environment.

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