

Proposal to improve services to students in the computer laboratory of the Faculty of Electrical Mechanical Engineering of the Universidad Veracruzana Poza Rica - Tuxpan region, based on section 10 of the ISO 9001: 2015 Standard

Propuesta de mejora en los servicios a alumnos dentro del laboratorio de cómputo de la Facultad de Ingeniería Mecánica Eléctrica de la Universidad Veracruzana región Poza Rica – Tuxpan, basada en el apartado 10 de la Norma ISO 9001:2015

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Abstract

This research aims to make a proposal in the computer laboratory of the Faculty of Electrical Mechanical Engineering Poza Rica-Tuxpan Region of the Veracruzana University based on the standard ISO 9001: 2015 section 10 by the analysis of the perception of the quality of services provided to students in the academic unit to complement their training in a comprehensive manner, thus identifying the main areas of opportunity. The present research is carried out by collecting information by the students through a survey applied in a non-probabilistic way to 100 students who have had the experience of occupying the services in the laboratory, subsequently the degree of satisfaction of the students is analyzed. services that were shown in the surveys to be able to carry out an improvement plan in each of the identified opportunity areas, and in this way to be able to propose a corrective action plan for each of the non-conformities that may arise and of this way to ensure increasing levels of satisfaction with the services offered.

Resumen

Este trabajo de investigación tiene como objetivo realizar una propuesta en el laboratorio de cómputo de la Facultad de Ingeniería Mecánica Eléctrica Región Poza Rica-Tuxpan de la Universidad Veracruzana con base la norma ISO 9001:2015 apartado 10 a través de análisis de la percepción de la calidad en los servicios que se brindan a los estudiantes dentro de la unidad académica con la finalidad complementar su formación de una manera integral, identificando así las principales áreas de oportunidad. El presente trabajo se lleva a cabo mediante recopilación de información por parte de los estudiantes mediante una encuesta aplicada de manera no probabilística a 100 estudiantes que han tenido la experiencia de ocupar los servicios en el laboratorio, posteriormente se analiza el grado de satisfacción de los servicios que se mostraron en las encuestas para así poder realizar un plan de mejora en cada una de las áreas de oportunidad identificadas, y de esta manera poder proponer un plan de acciones correctivas para cada una de las no conformidades que se pudieran presentar y de esta manera poder asegurar incrementar los niveles de satisfacción de los servicios ofrecidos.

Proposal, Quality, Service

Propuesta, Calidad, Servicio

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Introduction

The quality of higher education services represents a great challenge for educational institutions, due to the social commitment and the productive sector to form human capital that meets the needs of the labor field. That is why there must be a quality standard in the services offered in each of the university areas. The Faculty of Electrical Mechanical Engineering of the Poza Rica-Tuxpan Region of the Universidad Veracruzana provides services to its students using different laboratories for their comprehensive training, this study is carried out in the computer laboratory where the following are mainly offered services:

- Desktop computers.
- Lockers.
- Wireless Internet.
- Loans of equipment and accessories (Projectors, video cables, power cables, connectors, etc.).
- Prints, photocopies, and scans.

General objective

To make a proposal through an improvement plan in the computer laboratory of the Faculty of Electrical Mechanical Engineering of the Universidad Veracruzana Poza Rica - Tuxpan region, based on section 10 of the ISO 9001: 2015 Standard.

Specific objectives

- To identify areas of opportunity in the computer lab service.
- To know the non-conformities of the services offered in the computer lab.
- To carry out a corrective action plan.

Methodology to be developed

The research being carried out is of the exploratory type as it seeks to find the Non-Conformities of the services provided by the computer laboratory to students and is also qualitative and quantitative.

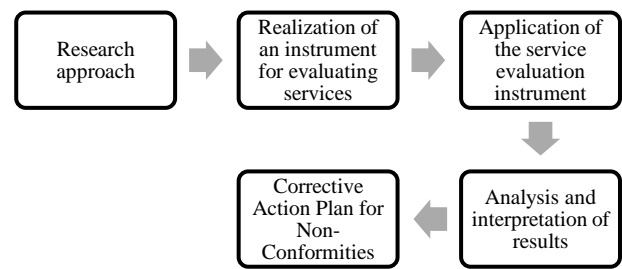


Figure 1 Methodological process of the investigation

Source: Own elaboration

Research approach

The service provided by the computer laboratory of the Faculty of Electrical Mechanical Engineering of the Poza Rica- Tuxpan Region does not have a reference parameter for its improvement, that is why it seeks to identify the areas of opportunity and make a plan of corrective actions based on the identification of the needs in the improvement of services, taking as a reference section 10 of the ISO 9001: 2015 Standard which is called Improvement whose objective is that the organization must determine and select the opportunities for improvement and implement any actions necessary to meet customer requirements and increase customer satisfaction.

Carrying out an instrument for evaluating services

The instrument for the evaluation of the services was carried out through a survey that seeks to identify the areas of opportunity for the improvement of the services, structuring the questions according to the main services offered to the students attached to the faculty.


 <p>Universidad Veracruzana Facultad de Ingeniería Mecánica Eléctrica Región Poza Rica – Tuxpan</p> <p><i>"Working with quality to achieve Excellence"</i></p> <p>SATISFACTION SURVEY OF THE COMPUTER LABORATORY OF THE POZA RICA FACULTY OF ELECTRICAL MECHANICAL ENGINEERING</p> <p>1. What educational program do you belong to? a) Mechanical Engineering b) Electrical Engineering c) Industrial Engineering</p>

Figure 2 Survey (part one)

Source: Own elaboration

2. What semester are you currently in?
- 3rd Semester
 - 5th Semester
 - 7th Semester
 - 9th Semester
3. How often do you use the computer lab?
- Once a week
 - 2 to 3 times a week
 - All week
4. Is there enough lockers capacity?
- Enough
 - Fairly Sufficient
 - Insufficient
5. What kinds of activities have you done in the computer lab? (You can select more than one)
- Homework
 - Classes
 - Practices
 - Workshops / Certifications
 - Internet use
 - Loans (Projectors, Video Cable, Power Cable, etc.)
 - Copies and Impressions
6. Are you satisfied with the hours of operation offered by the computer lab?
- Yes
 - No
7. In your experience, how do you rate the service of the computer lab?
- Excellent
 - Good
 - Regular
 - Bad
8. Do the computer equipment have the necessary hardware and software to carry out your activities?
- Yes
 - No
9. How do you consider the loan service (projectors, video cables, power cables, etc.)?
- Excellent
 - Good
 - Regular
 - Bad
10. In general, how would you sound the service offered by the computer lab?
- Excellent
 - Good
 - Regular
 - Bad
11. If you could improve some aspect of the lab. What would be?

Thanks for your participation!

Figure 3 Survey (part two)

Source: Own elaboration

Application of service evaluation instrument

For the application of the instrument, a non-probabilistic sampling was used due to the absenteeism of the object of study of the research that are the students, this because of the SARS-CoV-2 / COVID-19 pandemic, carrying out the application of the instrument through google forms for students attached to the Faculty of Electrical Mechanical Engineering.

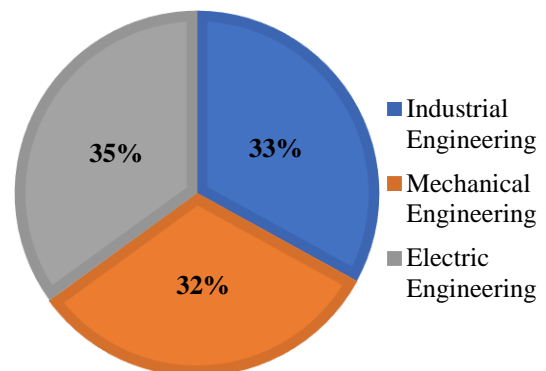
Sample

The total population that currently has the Faculty of Electrical Mechanical Engineering Poza Rica Region - Tuxpan, is 593 undergraduate students, but 147 new students have been discarded because they still do not know or have participated in activities within from the computer lab, since due to the COVID-19 pandemic it has not been possible for students to take their face-to-face classes at the faculty. Therefore, in this project, 446 students are considered as the total population who have already been users of said laboratory during their university journey.

To carry out this survey, a sample of 22.5% was taken, equivalent to 100 students who were located in strata of the three educational programs of the Faculty of Electrical Mechanical Engineering, where students from 3rd, 5th, 7th and 9th semester to answer the survey and also obtain the necessary data for the investigation of this project.

Analysis and interpretation of results

1. What educational program do you belong to?

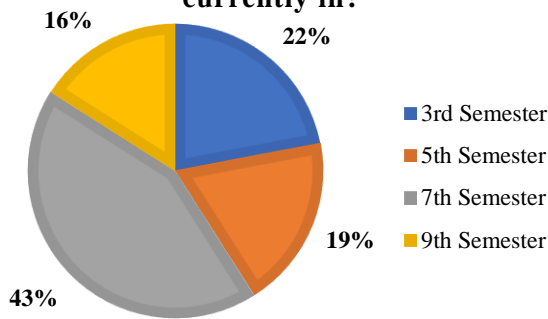


Graphic 1 Results of question 1

Source: Own elaboration

In this graph, the three educational programs of the Faculty of Mechanical Electrical Engineering of Poza Rica were similar, where 32 students are from Mechanical Engineering, 35 from Electrical Engineering and 33 from Industrial Engineering, giving a total of 100 students, where the data in quantity of students in terms of rank are very close, this allows us to know that the level of perception in each educational program is similar.

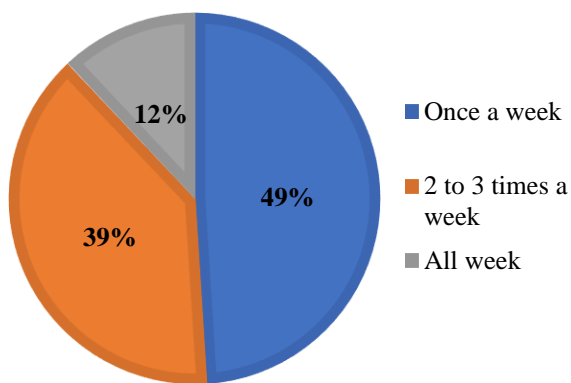
2. What semester are you currently in?



Graphic 2 Results of question 2
Source: Own elaboration

The graphic shows that there is a greater use of the computer laboratory for students who are in the 7th semester, this is due to the type of educational experiences they are studying that belong to the area of terminal training; While the other semesters if there is a considerable and almost proportional use, it can be seen that in all periods the use of the laboratory by the students is necessary.

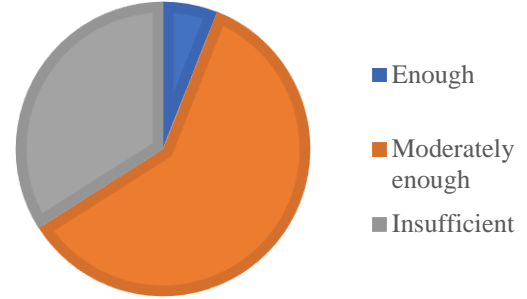
3. How often do you use the computer lab?



Graphic 3 Results of question 3
Source: Own elaboration

This graphic reflects the frequency of use of the services of the computer laboratory where more than 50% of the sample have frequent use of these services, showing the importance that this space represents for the students assigned to the Faculty of Electrical Mechanical Engineering.

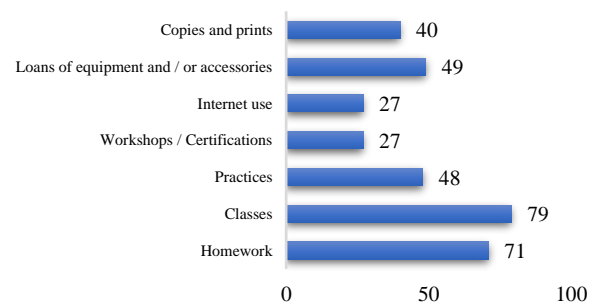
4. Is the capacity of lockers that currently exist sufficient?



Graphic 4 Results of question 4
Source: Own elaboration

Graphic 4 indicates the perception by the students in relation to the number of lockers available when they use the computer lab and it can be seen that there is much disagreement regarding the sufficiency of lockers, which is one of the services offered by the computer laboratory for the protection of belongings.

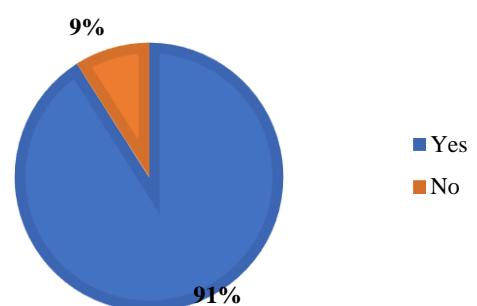
5. What type of activities have you carried out within the FIME laboratory?



Graphic 5 Results of question 5
Source: Own elaboration

Graphic 5 shows which are the objectives of attending the computer laboratory, it is observed that the main activity they carry out is taking classes with almost 80% and thus also performing tasks, followed by requesting copies and printing with an average 45%, and approximately 30% are assistances for practices and use of the internet.

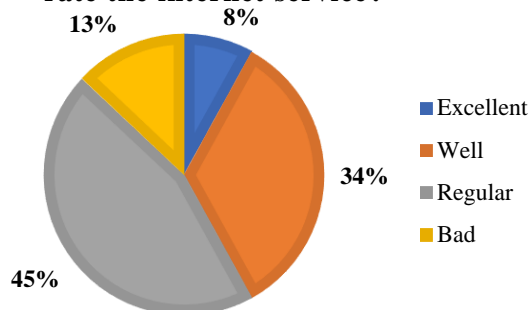
6. Are you satisfied with the opening hours offered by the laboratory?



Graphic 6 Results of question 6
Source: Own elaboration

It can be seen in graphic 6 that of the total of the respondents there is a percentage of more than 90% who show satisfaction with the service hours currently in the computer laboratory, being able to consider as a strength that this space has within the faculty.

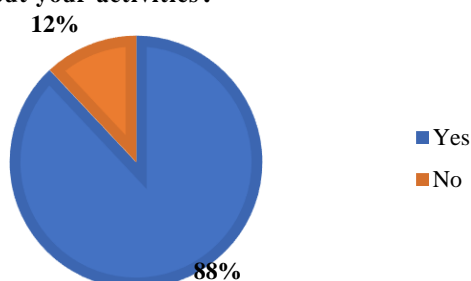
7. In your experience, how do you rate the internet service?



Graphic 7 Results of question 7
Source: Own elaboration

Graphic 7 presents the experience that students have had regarding the internet service that is offered, it can be seen that 58% is considered a regular to bad service, having a great area of opportunity for the improvement of internet service at the laboratory.

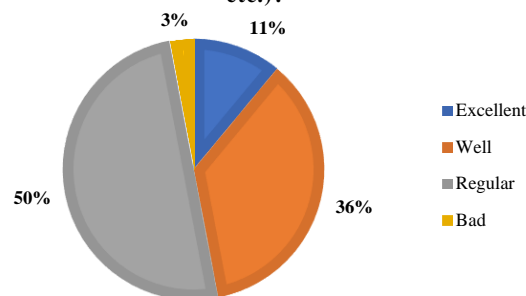
8. Do the computer equipment have the necessary hardware and software to carry out your activities?



Graphic 8 Results of question 8
Source: Own elaboration

Graphic 8 shows that the computer equipment fulfills 88% of the hardware and software needs for the students, having a 12% dissatisfaction regarding this equipment service.

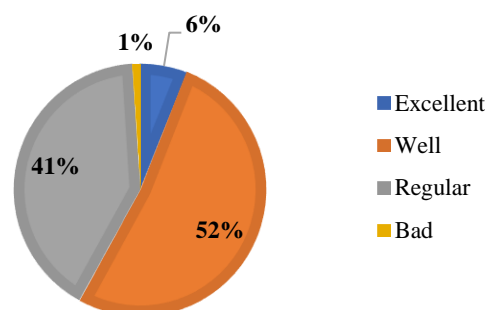
9. How do you consider the loan service (projectors, video cables, power cables, etc.)?



Graphic 9 Results of question 9
Source: Own elaboration

Another of the essential services offered by the computer laboratory is the loan of accessories and equipment and according to the results in graph 8, 53% of the perception of a service can be seen from fair to bad, considering this service as something that can be improved.

10. In general, how do you consider the service offered by the computer lab?



Graphic 10 Results of question 10
Source: Own elaboration

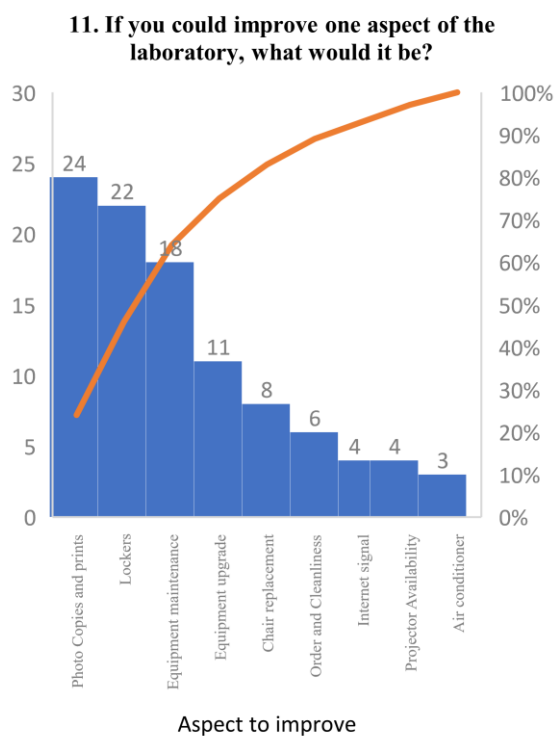
In graphic 10 we have as a result a general evaluation of the computer laboratory, with a prevailing perception of good with 52% and 42% from fair to bad and only 8% considered excellent, without a doubt there are many areas of opportunity for improvement in the services offered.

11. If you could improve one aspect of the laboratory, what would it be?			
Aspects	Frequency	Relative Frequency	Relative Cumulative Frequency
Photo Copies and prints	24	24%	24%
Lockers	22	22%	46%
Equipment maintenance	18	18%	64%
Equipment upgrade	11	11%	75%
Chair replacement	8	8%	83%
Order and Cleanliness	6	6%	89%
Internet signal	4	4%	93%
Projector Availability	4	4%	97%
Air conditioning	3	3%	100%

Table 1. Results of question 11

Source: Own elaboration

We can identify in table 1 the main aspects that the surveyed students continue to improve in the computer laboratory, a frequency distribution table was made to identify those aspects that have the highest frequency and to be able to identify the most crucial ones.



Graphic 11 Results of question 11

Source: Own elaboration

Graphic 11 shows the aspects that are most relevant for the students to be improved, for the explanation of the importance weighting of each of the aspects mentioned by the surveyed students, the Pareto principle was applied, focusing on improvement of the most crucial aspects to be able to have an improvement percentage of more than 80%, which in this case would be the services of:

- Copies and prints.
- Lockers.
- Equipment maintenance.
- Equipment update.
- Replacement of chairs.

Based on the aforementioned aspects and mainly those with the greatest impact, as shown in graph 11, they will be based on the implementation of the improvement plan.

Improvement plan

In accordance with the results obtained in the surveys applied to students and what is established by the ISO 9001: 2015 standard in section 10 Improvement

Non-Conformity	Corrective action	Responsible
Photocopies and prints	To supply the printing and photocopying equipment with toner to meet the needs through requests to the administration.	Academic Computer Laboratory Technician / Director of the academic entity
Lockers	To request a request to the administration for the purchase of more lockers and relocate them in the available spaces within the laboratory	Academic Computer Laboratory Technician
Equipment maintenance	To carry out a maintenance program for computer equipment	Academic Computer Laboratory Technician

Equipment upgrade	To make an inventory of the equipment that does not present a good operation and make a report to the management for repair or replacement if necessary.	Academic Computer Laboratory Technician / Director of the academic entity
Chair replacement	To identify chairs that are in poor condition to request the replacement of furniture through a requisition.	Academic Computer Laboratory Technician / Director of the academic entity
Order and Cleanliness	To establish a program with cleaning staff to carry out cleaning activities on a daily basis.	Academic Computer Laboratory Technician
Internet signal	Weekly review the intensity and quality of the internet signal and evaluate the network system, making the pertinent reports to the General Directorate of Information Technology of the Universidad Veracruzana	Academic Computer Laboratory Technician
Projector Availability	To keep control of the available projectors, as well as their functionality and request the acquisition of new equipment	Academic Computer Laboratory Technician
Air conditioning	To review the maintenance program for air conditioning equipment and ensure compliance with it, if it does not exist, design one.	Academic Computer Laboratory Technician

Table 2 Improvement Plan for Non-Conformities

Source: Own elaboration

Results

As a result of the research, it was found that there are areas of opportunity to improve the services offered by the computer laboratory of the Faculty of Electrical Mechanical Engineering Poza Rica-Tuxpan Region of the Universidad Veracruzana in terms of the services offered to students, It is necessary to consider carrying out the activities proposed for the monitoring of Non-Conformities as established by the ISO 9001: 2015 standard, Section 10. Improvement in order to guarantee a service that meets the requirements of the quality systems based on this standard.

This is in order to guarantee quality in the services offered in this very important space for the student community of the faculty.

Gratefulness

To the direction of the Faculty of Electrical Mechanical Engineering for the support for the management of the students' information, as well as the management for financial support in research.

Conclusions

The search for areas of opportunity in the education sector is of the utmost importance for higher education institutions since from them it is possible to make proposals that help us improve them. This research was able to identify the most important aspects that are evaluated by the students who receive the service in the computer laboratory, and with being able to propose corrective actions that help minimize non-conformities by users, likewise it was possible to propose a plan of improvement based on the ISO 9001: 2015 standard of its section 10. Improvement.

It should be noted that educational institutions always seek continuous improvement of their processes and their services towards their students, who are undoubtedly the main user of these organizations.

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