INDUSTRIAL, MANUFACTURING, & SYSTEMS ENGINEERING

CAPSTONE PROJECT /INTERNSHIP
SUMMARY

Your Name: Kim Dominguez, Francisco Ivan Armendariz, Oscar Cedillo

Type of Capstone (research, teaching, practical application): Practical Application

Capstone Project Title: Diagnostic Center Outpatient Workflow
Year and semester: Fall, 2016

INTRODUCTION

El Paso, Texas is a huge city and its population is increasing every day, it is a town always in need of healthcare services, therefore when someone has an injury or needs to see a doctor, there is a long waiting time in hospitals. Las Palmas Del Sol Healthcare Center is a hospital that provides healthcare services to El Paso and the surrounding region by offering comprehensive medical help in almost every specialty, their staff are always in charge of keeping their patients healthy and taking care of them, therefore here people can always have the care they need the 24 hours of the day. When speaking to the directors of the Diagnostic Clinic and of the department, several problems were identified. The main general problem is slow patient flow due to long waiting times between departments. Therefore, we took a close look into their processes needed to be made to understand what where the contributors to the long waiting times. Time Studies

and Inter-Arrival Times where obtained to help distinguish these factors. Then to analyze the data we are used Work Sampling to determine what are the processes that are causing the long waiting times. It was figured out that the Lab & Surgical processes where the process that had the most amount of waiting time and had inefficient workflow. After more analysis of the workflow for each process was conducted, solutions to mitigate these problems were proposed. In order to know how much the proposed solutions would benefit the clinic waiting time for lab and surgical patients a simulation in ARENA had to be created that would simulate each individual solution. The cost of implementing each solution was also taken into account as well as the feasibility. The solutions were feasible depending on greater reduction of time and less cost of implementation. A prioritization matrix had to be created to be able to evenly compare each solution based on how much time was reduced, cost and feasibility. At the end, only one solution from each emphasis was chosen as the best to implement giving us a total of three solutions that where the most optimal to implement based on reduction of waiting time, cost, and feasibility. The next step was implement the solutions. Again, we recurred to ARENA to simulate these solutions.

PROJECT OUTCOMES

We divided our project into three emphasis areas, the Lab patients, the Surgical patients, and the Entire clinic and we used Industrial Simulation and Methods and Ergonomics to work and solve the problem.

With (DMAIC) Define, Measure, Analyze, Improve, and Control, we defined our problem based on the Outpatient Workflow project at the Diagnostic center, we analyzed our values and probabilistic distributions by doing work sampling in Minitab and we improved our tools, methods, and the whole project by using Arena to make this possible by doing many simulations of all our data collected.

For emphasis one our first alternative solution was to open a third lab room, and by doing the

simulation of it we found out that we reduced the waiting by 3 minutes, our second alternative solution was to create a urine sample drop off station with this solution we reduced the lab work duration from 10.32 to 8.78 according to Arena, the third alternative for the lab workflow was to improve the current routing sheets that the clinic has, and by doing this we reduced the time by five minutes. This final solution was the most effective one because we did our prioritization matrix and it reduced the longest time also it was the one with the highest feasibility value.

For emphasis 2 our first alternative solution was to put an alert monitor to let the staff clinic know when a room is available to help the patients and with this alternative we reduced the waiting time by 1 minute. The second alternative solution was to give color bracelets to the patients, and it reduced the lab waiting time by 1 minute and the X-ray duration time by 1 minute also. The third alternative solution was to distribute scheduled appointments and it reduced the surgical workflow by one minute. For this emphasis two we also did the prioritization matrix and the most effective solution was the color bracelet with a the highest value in the matrix of .5138.

For the third emphasis the first alternative solution was a registration kiosk and it reduced the time by 2 minutes, the second possible solution for this emphasis was to create a Check-in poster with the requirements to be in the clinic, and the third alternative solution was to create a waiting time information sheet and it reduced the time in the simulation by 1 minute. This final solution was the most effective after doing the prioritization matrix.

There were benefits to the company from our project the department director said that all the forms that we have improved helped in the Out Patient workflow process, also we could notice that with our simulations the time duration of each department was significantly reduced.

At the end we meet the objectives of the project because we reduced the waiting time in Lab and Surgical patients workflows, we improved the flow between departments and we reduced the duration of the check-in and registration.

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INDUSTRIAL ENGINEERING PROGRAM ASSESSMENT

Overall it was an excellent learning experience, using the tools and the methodologies learned in all of our classes. During this project we noticed that doing problems from the book is not the same as in real work life. This project taught us how things will be after graduation and when we start to work. Also it opened our are minds about how there are more areas of work for example as in Health Care. This experience made us grow and helped us to be prepared to work as professionals.