Simulation Project in Arena

Dentist Office

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The last time I visited my dental office, I noticed that majority of people who visited the dental office are either in for tooth cleaning or tooth filing or both services, even though the facility offers more than two services. The dental office provides various services like, regular checkup, filings, oral surgery, implants root canal, tooth extraction etc. I will be reporting on two major services people do when they visit dental office, which are tooth cleaning and filing.

The system to be simulated is the dentist office, and purpose of the project is to show the statistics of number of people who visit the dental office either for tooth cleaning or tooth filing, and the number of times spent in the facility for the service.

Objective: My object on this project is to build a module that would improve client service by minimizing waiting time and maximizing the speed of service offered to client who visit the dental office for tooth filing, tooth cleaning or both services. This can be done by understanding how the client wait time varies in various stages from the time they join the queue till the time they receive their order.

Current Process: Client enters the dental office and wait in the queue or go to the first stage where they select the type of service, they are interested in doing, i.e., tooth cleaning, tooth filing or both services. Depending what service they choose, the client then goes through the second stage which is whatever they choose to do, either tooth cleaning, tooth filing or both services. The client then moves to the next stage, which is the billing counter after service render to them, make payments and leave the facility.

Problem and Counter Proposal: The client wait too long for one person to attend to them especially during lunch time, because they are short of staff. The probability of people walking out of the facility without not getting the service they came for is high, so I proposed increasing number of staff to accommodate the volume of client, that was even during lunch time, there would be staff on ground to attend to clients. The dental office can have additional resource at the billing counter, like scheduling for next appointment and including wait time to reduce many people at a time, which can make a positive difference both in customer satisfaction and waiting time.

Data collection: I was not able to collect as much data as possible due to Covid 19 restriction. My project is based on my experience in the dental office, and my conversation with my dentist.

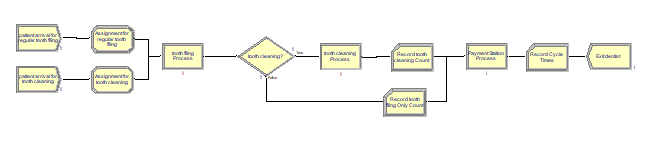
Model: My arena model has 7 modules as given below:

1. Arrival Module: All clients arrive through the port of entry to the dental office and join queue at the counters to check in.

2. Assign: The available staff calls the client in to know what type of service they would need for the day, and properly assign to the right channel depending on what service they request.

3. Billing Counter: A client from both for tooth filing, cleaning or both services will then proceed to same billing counter to check out and make adequate payment. Once the clients finalize, he/she can choose to schedule another appointment. (This part is not included in the model)

Following is the outlay of the Arena model.



The model would also show the various time individuals spent during the process of either service. The problem and modeling in this project will consist of number of people who visit the dentist office for both tooth cleaning and filing, and the timing which includes i.e., waiting, transfer, filing or cleaning time. The model was finally run for 1 replication and the results obtained are as shown below.

Table

Description automatically generated

Approach: The statistics shows that 16.2840 is the average time for tooth filing, and 41.1908 is the average time for tooth cleaning. Due to low number of staff and extreme rush in peak hours, even the average total time in system is quite high. Therefore, it is proposed to increase the resources. This is implemented in the second model.

The below diagram shows that the value of tooth filing raise to maximum of 32.0000

A picture containing shape

Description automatically generated

Overview and analysis: Even though the overview and analysis show that both patients came in from the same entrance, both checked in with the receptionist and was assigned to different section based on the service they are asking for, the tooth filing queue on average still raise to 8.2167, while tooth cleaning queue is as low as 0.1883. See below for more details.

Timeline

Description automatically generated

Even at the point of checking out, the casher is busy with the patients who came in for tooth filing compared to patients for tooth cleaning.

Chart

Description automatically generated with low confidence

I was kept waiting for almost an hour, so I fashioned that in my model to show the long waiting time in the dental office for tooth filing. The other staffs for tooth cleaning are technically utilizing same time for operation.

Chart

Description automatically generated

You will notice that in my analysis, both at some point split and reconnect back at the payment point and use the same door to check out.

Chart, timeline

Description automatically generated

The analysis shows the counter value to be equal

Conclusion

My information and analysis are based on my experience in a dentist office I visited, and after going through all the results, we can clearly see that hiring more staff and reducing resources would decrease the wait time of clients. I find out that lots of people spend more time for tooth filing since tooth filing is not as easy as tooth cleaning. My analysis was able to show the activities from the entrance of the doctor office to the exit, and the time spent during the process. The biggest time in all process in the dentist office is the waiting time because on average it only takes 16.2840 VA time for tooth cleaning, and 41.1908 VA time for tooth filing. In value, I noticed that one pays more for tooth filing than cleaning since it required more time and large usage of resources. I will conclude by saying hiring an additional employee, can improve the customer experience by decreasing the wait time and hence further improve the reputation of dentist office, and client satisfaction.