ESTIMATING PAITIENT SATISFACTION IN GETTING SERVICES FROM A MEDICAL UNIVERSITY COLLEGE

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of MS in Management Information Systems (MIS)

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APPROVAL

This Project titled "**ESTIMATING PAITIENT SATISFACTION IN GETTING SERVICES FROM A MEDICAL UNIVERSITY COLLEGE**", submitted by **Sunjida Khondoker** to the Department of Computer Information System, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of MS in Management Information Systems (MIS) and approved as to its style and contents. The presentation has been held on January 2023.

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I hereby declare that, this project has been done by me under the supervision of **Md Zahid Hasan, Assistant professor, Department of CSE,** Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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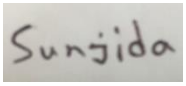

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Finally, I must acknowledge with due respect the constant support and patients of my parents.

ABSTRACT

One of the prominent Postgraduate Medical Institution of Bangladesh is Bangabandhu Sheikh Mujib Medical University (BSMMU). The institute has an undeniable notoriety for providing top notch postgraduate education in specific genres. The medical university offers outdoor patient services and also admitted patients. Everyday copious patients visit this hospital to get their treatment and leave satisfied with the doctors' services. The thesis report endeavors to provide a clear idea on the current state of the service of dental OPD, by analyzing the present outdoor patient's operation and suggest ways to develop the patient service. The majority of the patients at the dental unit at the medical university are happy with the doctors' care, but there are still a lot of problems. For example, patients frequently have to wait hours in line to register and even longer in the waiting room for the doctor to show up. By taking actions like increasing the number of registration workers, these ongoing problems can be resolved and patients' wait times reduced. The waiting time will be greatly reduced by the doctor's prompt arrival.

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CHAPTER 1

Introduction

1.1 Introduction

In recent years, there has been a reawakening of the notion that health is a fundamental human right and a global social objective; that it is crucial to meeting basic human needs and enhancing national production. They are aware that medical institutions are set up to offer them adequate and high-quality medical care. The health care institutions are deemed to have failed in carrying out their given tasks if they fail to do this.

The research has been carried out in the dental unit of the Medical University and specifically on the registration point, as dental has more patients and is overcrowded. Some recurring complaints from OPD were noticeable OPD as the information was gathered by me for 10 days, which included visits to the department and insight provided by one staff member appointed there.

1.2 Objective

- Analyzing the present patient’s activities of dental OPD.
- Suggesting positive enhancement of the service of OPD.

1.3 Rationale of Study

This study was conducted to evaluate the dental unit at BSMMU's level of service. After visiting and observing the department's operations, it became clear that the patients are not dissatisfied despite the fact that they must spend hours in the waiting area and registration line before their appointments. The registration staff may be expanded, and doctors' punctuality can be ensured, to simply avoid these difficulties. [1].

1.4 Methodology

Here I used a survey questionnaire method (survey taken from 50 patients) to identify the current conditions of the dental OPD. Observation method was also used for 10 days, to collect data. The information was analyzed using queuing models and a software called AnyLogic.

1.5 Limitations of Study

Problems Occurred on the research period is—

- The hospital's staff upholds confidentiality. They don't offer any patient information. Only if a member of that unit's personnel is well known to the researcher is it possible to obtain.
- Because hospital officials wouldn't let me speak with patients on hospital grounds during data collection, it was difficult to learn whether patients were satisfied with the hospital's services.

CHAPTER 2

SIMULATION & QUEUING THEORY

2.1 Literature Review

Subject of the literature review is:

- Simulation
- Queuing Theory
- AnyLogic

2.2 Simulation

To solve many real-world problems, simulation is a crucial way of problem solving. Simulation is used to analyze and characterize a system's behavior.

2.2.1 Simulation Models Classifications

- Model for Static Simulation
- Model for Dynamic Simulation
- Model for Deterministic Simulation
- Model for Stochastic Simulation
- Model for Continuous Simulation
- Model for Discrete Simulation [1]

2.2.2 Time of Simulation

Given below are some of the cases where simulation can be used-

- tests of a complex system's or a complex system's subsystem's internal interactions.
- Prior to final implementation, simulation can be used to test new designs and regulations.

- Simulation can be used to strengthen analytical procedures and confirm results from analytical methods.
- When determining the effects of changes in input variables on the system's ultimate output, simulation might be helpful.
- aids in making suggestions for enhancements to the system under study's dynamic performance.

2.2.3 Segments of Simulation Study

Simulation process has numerous steps. Generally, simulation study is divided into following distinguished steps:

- Firstly, Problem formulation
- Built model
- Collection of data
- Model programming
- Authentication
- Design of experiment
- Simulation run and analysis
- Documentation
- Implementation

2.2.4 Advantages and Disadvantages of Simulation

Advantages

- It's possible that the changes I want to research happen too slowly or too quickly to be detected easily. The operations of the system over several years can be condensed into a few minutes of computer run-time with the use of computer simulation.

- It is unnecessary to use costly trial and error methods to test out new ideas because management can foresee the difficulties and bottlenecks that may arise when introducing new machines, facilities, and procedures.
- Because simulation is largely devoid of mathematics, operating staff may easily comprehend the procedure.
- It aids in getting the suggested plans approved and put into action.
- The models can be adjusted to account for environmental changes in actual circumstances since they are relatively flexible, simple to grasp, and adaptable.
- Since simulation techniques are simpler than mathematical models, they can be used in a variety of contexts.
- Modern simulation models can be used because there are sizable computer software packages available.
- Better for training, used to teach the management and operations personnel how to use complex systems. For instance, before they are authorized to fly in the real world, pilots must complete extensive training in flight simulators.

Disadvantages

- Accurate findings cannot be produced via simulation. The observations are susceptible to possible statistical errors when dealing with uncertainty.
- Another challenge is estimating the variables. In some circumstances, it is impossible to quantify every potential factor that might have an impact on how the system behaves.
- The large variables and relationships between them in complex situations make solving the difficulties quite difficult.

- Simulation is never a cost-effective analysis technique. It can take a lot of computer time to run even the smallest simulations. Numerous simulations require more effort and money than others.
- The tendency to rely on simulation models is another serious flaw.
- As a result, the technique is used in circumstances that other mathematical programming techniques can handle more effectively, such as those that are straightforward.[2].

2.2.5 Applications Areas of Simulation

Simulation modelling has cumulated huge success stories in a diverse span of application sectors. As contemporary modelling methods and technologies appear and the power of computers expand, one can anticipate simulation modelling to enter even wider areas.

The figure below exhibits multiple simulation applications, categorized by abstraction level of the corresponding models.

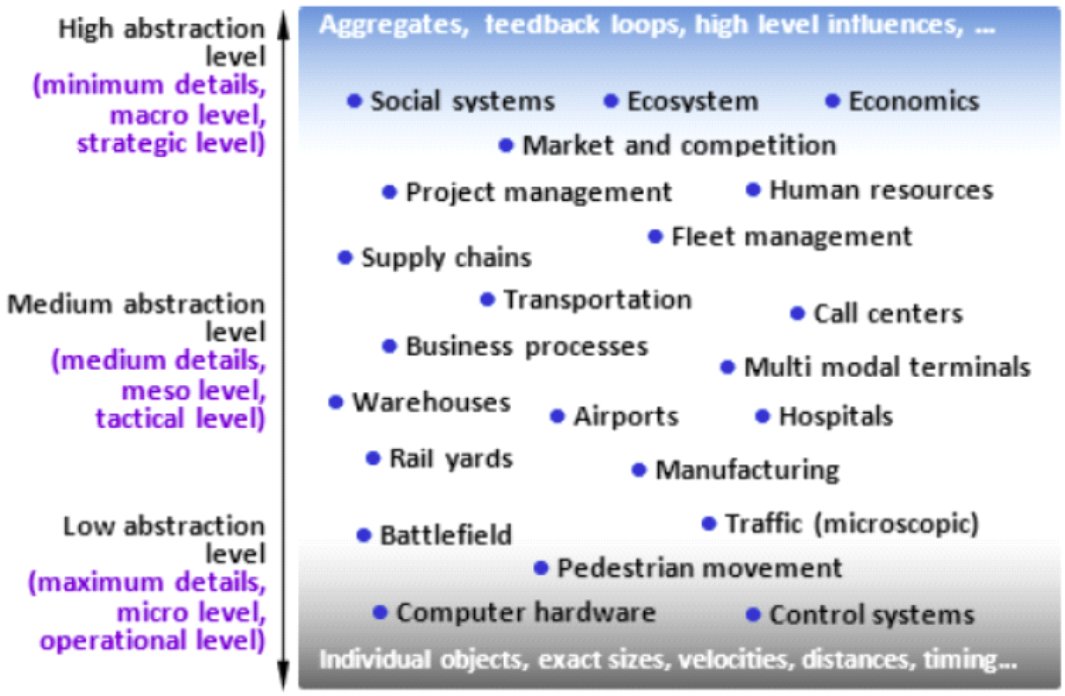

Figure 1: Applications Areas of Simulation

At the very bottom are the physical-level models using very detailed depiction of real-world elements. Here, we care about physical interaction, dimensions, velocities, distances, and timings. Suitable examples of low abstraction modelling include - automobile's anti-lock brakes, the evacuation of football fans from a stadium, the traffic at an intersection controlled by a traffic light, and soldiers' actions on the battlefield.

The models at the top are very conceptual and typically use collections rather than single elements, such as consumer demographics and job statistics. Without the need to represent intermediate processes, the items' high-level relationships can aid in our understanding of connections such as how a company's advertising budget affects sales.

Other models have a medium abstraction level. When modelling a hospital's emergency department, we mostly care about physical space when we wish to know how long it may take for a person to move from the emergency room to the x-ray department, not counting physical interaction between people in the building as we automatically assume the building to be uncongested.

In contrast hand, we can represent the order and length of operations regardless of location for a model of a business process or call center. Again, we carefully evaluate truck or rail car speed in a transportation model. In a high-level supply chain model, however, we merely assume that it takes an order, on average, seven to 10 days to be delivered.

Some of the sectors where simulation can be successfully administered are listed in the following section-

- **Processing**: Design analysis and production system optimization, materials management, layout and capacity planning, performance evaluation, and process quality assessment.
- **Enterprise**: Market analysis, forecasting customer behavior, streamlining logistics and marketing plans, and comparing and contrasting marketing strategies.
- **Weapons**: Evaluation of potential combat tactics, air and sea operations, simulated war games, honing the effectiveness of ordinance, and inventory management.
- **Applications in the field of health care:** include scheduling health services, predicting patient density, determining the need for facilities, staffing hospitals, and determining the efficacy of a given program.
- **Applications related to communication:** include message buffer sizing, network design and optimization, network reliability assessment, and workforce planning.
- **Computer applications:** include creating operating system protocols, sharing, and networking, as well as hardware configurations.
- **Economic applications:** Managing a portfolio and predicting how government policies and changes in the global market will affect the economy. planning a budget and predicting market changes.

- Designing and evaluating alternative transportation strategies and networks, such as roads, railroads, and airports. evaluating schedules and planning traffic.
- Solid waste management, performance evaluation of environmental initiatives, and evaluation of pollution control systems are examples of environmental applications.
- applications in biology include epidemic spread and population genetics [1].

2.3 AnyLogic

The AnyLogic Company created the multi-method simulation program known as AnyLogic. We used AnyLogic simulation software, which is used to model a variety of industries including markets, healthcare, project manufacturing, supply chains, traffic, and IT.

2.3.1 Simulation Language

The following components make up the AnyLogic simulation language:

Diagrams of stock and flow are employed in system dynamics modeling.

To define agent behavior in agent-based modeling, statecharts are primarily employed.

Algorithm definition is done using action charts. The use of this program is possible for discrete event modeling,

Process flowcharts are used in discrete event modeling to define processes [4].

2.3.2 Libraries of AnyLogic

AnyLogic includes the following standard libraries:

- Process Modeling Library
- Pedestrian Library
- Rail Library
- Road Traffic Library
- Fluid Library

The following are the parts that go into making these models.

- Source
- Service
- Resource pool
- Sink
- Rectangular node
- Attractors in rectangular node [5]

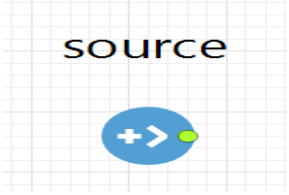

Figure 2:Source

Figure 3: Service

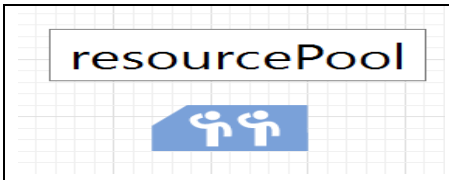

Figure 4: Resource Pool

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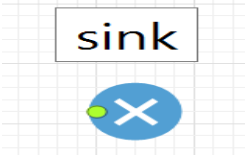

Figure 5: Sink

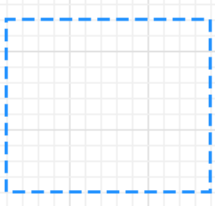

Figure 6: Rectangular Node

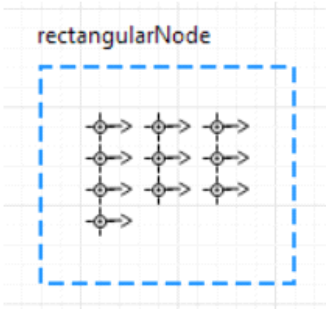

Figure 7: Attractors on rectangular node

2.4 Queueing Theory

Life includes waiting in lines on a regular basis. The mathematical analysis of queues is known as queuing theory. This model was created to allow for the prediction of waiting times and queue lengths. It costs too much to provide too many services. Waiting for service in supermarkets and banks.

Examples-

- Computers - wait for reply
- Public transport - wait for bus or train

2.4.1 The primary Structure of Queueing Models

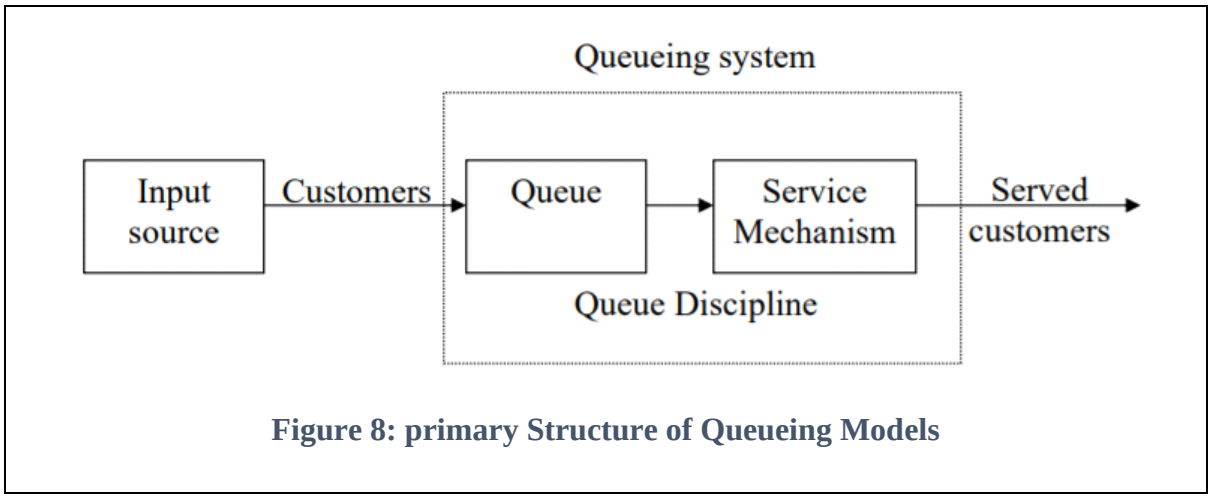

Figure 8: primary Structure of Queueing Models

2.4.2 The Queueing System

This system can be described by the servers and customers. Important elements of queueing systems are described below:

Customer- The term "customer" refers to anything that enters a facility and needs service, including people, equipment, vehicles, and emails.

Server- Any resource that offers the desired service is referred to as a server, including service technicians, equipment for retrieving items, and airport runways [6].

2.4.3 Service System and Queue Discipline

'Queuing discipline' shows the way the queue is maintained (rules to insert and remove customers to/from the queue). There are these ways to do this. They are-

1) First and get service first (FIFO)
2) Last Come First Serve (LIFO)
3) Serve In Random Order (SIRO).
4) Given to order with importance (Priority Queue).

The number of service facilities and the length of the customs line are represented by the service system. Examples of these systems are given below:

- Specific service system
- parallel server, Multiple, single queue model system
- Multiple, parallel facilities with multiple queues system

2.4.4 Applications of Queueing Theory

Following are a few applications of queueing theory that have been successful:

- Telecommunications
- Control of traffic
- Determining the sequence of computer
- Operations
- Predicting computer performance
- Health care services.
- Airport traffic, airline ticket sales
- Timeline of manufacturing system

2.4.5 Limitations of Queueing Theory

- The assumptions of the traditional queueing theory could be too restrictive to effectively simulate a scenario in real life.
- The intricacy of any production line with specific product aspects cannot be handled with these models.
- Although there are many restrictions, it is safe to violate them because there are not many statistically significant discrepancies between the real world and theory. In comparison to the anticipated usual state, the likelihood that such constrained situations would arise is unlikely.

CHAPTER 3

PROFILE OF ORGANISATION

3.1 Bangabandhu Sheikh Mujib Medical University

The Institution Grant Commission and the Ministry of Health and Family Welfare of the Government of the People's Republic of Bangladesh have established rules, regulations, and assistance for the administration and financial management of the university.

Goal: The university has its goal to achieve a very high standard in the education of medical science, practices and research.

Aim: The development of health is the primary objective of BSMMU in order to provide South Asian residents, including those in Bangladesh, with high-quality medical care (10)

The departments of BSMMU are given below:

- Department Of Medicine
- Surgery unit
- Primary science and Paraclinical science
- The Odontology
- Nursing Sector
- Department of Bio-Technology
- Medical Technology

CHAPTER 4

DESCRIPTIVE FINDINGS

4.1 Findings

This study was carried out in the Medical University's dental outdoor unit. The researcher demonstrated how the improvement may be made using the simulation program AnyLogic. The researcher gathered information from the registration staff and solicited patient feedback regarding their level of satisfaction with the hospital's services, employees, and medical professionals. The researcher also noted the length of time that patients had to wait for patient registration, doctor wait times, and doctor service times.

4.1.1 Descriptive Findings

The following describes the researcher's descriptive findings after visiting the hospital for 10 days and interviewing five patients every day.

The following are the questions the researcher asked the patients, along with their responses:

Question1: Are they content to wait in line for 10-15 minutes to complete their registration?

No, roughly 85% of them are not happy, and the remaining 15% arrived late to the hospital but still demand prompt care.

Question2: Do they approve of the way the registration clerk and other employees behave in the dentistry OPD?

The majority of patients nearly 95% are content with the level of service and the conduct of the registration employees. Some patients don't like the fact that some new patients skip the line and go right to the clerk to ask questions.

Question 3: Are they content with the 30-35minute wait in the waiting area before seeing the doctor?

No, is the response. The doctors' tardy arrival in their room has upset everyone. If the doctors were able to visit the patients in time for a consultation, the patients wouldn't have to wait as long.

Question 4: Do they appreciate the doctor's care?

Yes, it is the answer. The majority of patients are content with the doctor's care. Some of the patients are not pleased since they believed the doctor gave them numerous prescriptions for medications.

4.1.2 Findings of Observation

The registration booth opens at morning 8a.m.

The patients start arriving at hospital premises for dental OPD appointments at approximately 7:45 am.

There are two doctors providing services at once.

The time doctors should start giving services to the patients is 8 a.m. but they are normally 15-20 minutes late on average.

Hospitals data of 10 consecutive days were gathered and the researcher asked questions to 5 patients per day.

The appendix section contains some crucial information, such as the daily average wait time in the registration line and the average wait time for doctor services in the waiting area.

4.2 Analysis of Data

It was time to analyze these data when the data collection process was finished. in order to make the patients more satisfied with the hospital's services and to offer improvements to BSMMU's outdoor patient service. Using the data gathered from BSMMU, various models are created using the AnyLogic software. These simulation models discussed the current situation and offered suggestions for how to enhance the hospital's patient care.

These models were created using a process modeling library. Using the objects from the process modelling library, we can represent real-world systems as sequences of operations that frequently involve queues, delays, resource utilization, and resources, as well as entities like transactions, customers, goods, and parts.

4.2.1 Model 01 [As Is]

The researcher then selected a source block from the process modeling library, went to its property, and changed the block's name to entry. This model then depicts the current state of the hospital. Change the arrival rate to 100 per hour to reflect the actual event. More than 200 individuals, if not more, are waiting in line to register at the hospital. Three departments can register using a single registration server. Since only 200 patients visit the doctors in the three departments, a limited number of arrivals should be chosen, and the maximum number of arrivals should be 200.

Place the service block next to the source block by removing it from the palette so that it connects automatically. Change its name to Registration Service in its characteristics. Set the triangle (8, 9, 10) minute delay time and the queue's maximum capacity to 100. Triangular (8,9,10) indicates that the registration process will take a maximum of 10 minutes and a minimum of 8 minutes of delay.

Next to the registration Service block, we need to link another service block. Identify it as doctor service. Set delay time to triangular (25, 30, 35) minutes as it takes this long to wait for the doctor and receive service. Set queue capacity to 80 people as 80 people can sit outside the doctor's room.

Connect the sink block to the Doctor service block at this time, and give it the name Exit to reflect the fact that patients exit following the Doctor service.

Now add a Resource Pool block beneath Registration Service, which stands in for the registration server. Given that the server has a capacity of 1, choose "capacity: 1." Go to Registration Service settings, click on resource set (alternatives), and select Server to link this resource to the service.

We will now sketch the registration booth and the waiting area. For this, two rectangle-shaped nodes are selected and given the names Registration Queue and Registration Booth, respectively. Since there is just one registration booth, add an attractor to Registration Booth. Go to the Registration Service's attributes to choose this node as the selected one. Select the Agent location (queue) option for the node Registration Queue that we have drawn, as well as the Agent location (delay) option for the node Registration Booth.

We must follow the same procedures for Doctor Service as we did for Registration Service. Take a resource Pool from the palette, give it the name "Doctor," and adjust the capacity to "2" because there are always two doctors providing care at once. Rename the rectangle node to "Waiting Room" or "Doctor Room," if appropriate. Since there are two doctors, Doctor Room should have two attractors. Go to the Doctor Service's attributes to choose this node as a target. Select the nodes Doctor and Waiting Room that we have drawn for the Agent location (queue) and Agent location (delay), respectively.

This is how the model is constructed.

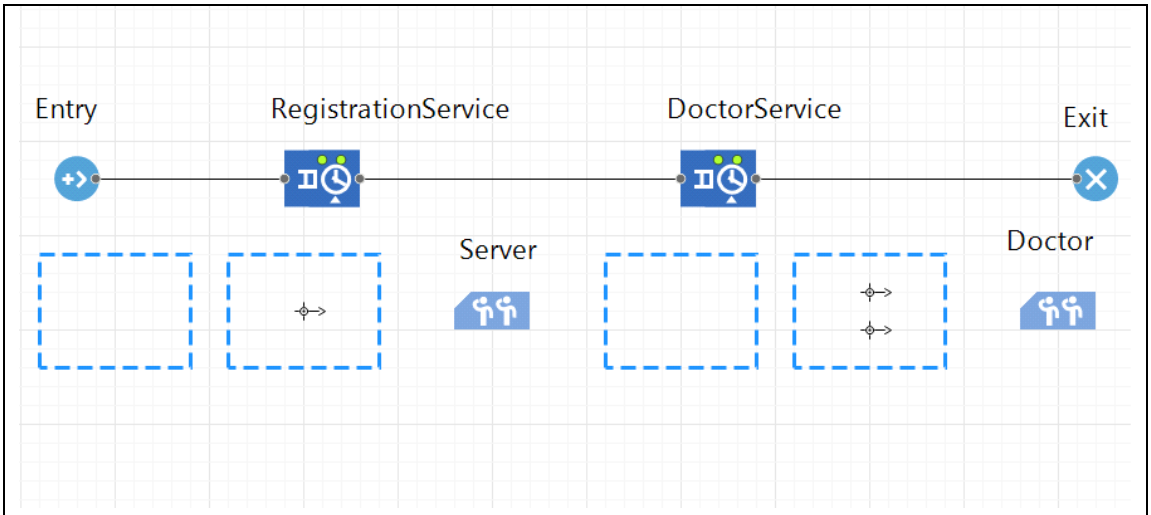

Figure 9: Model 01

To see the outcome, run the model after clicking the build button. As a result of model 1, there will be a small line for the first 30 minutes, and patients will only need to wait 2 to 3 minutes. However, as time passes after 2 hours, the line for registration will grow as more patients arrive at a steady rate, and the service time will rise from 2 to 9 minutes. Due to the doctor's delayed arrival, there will be a delay in the waiting area.

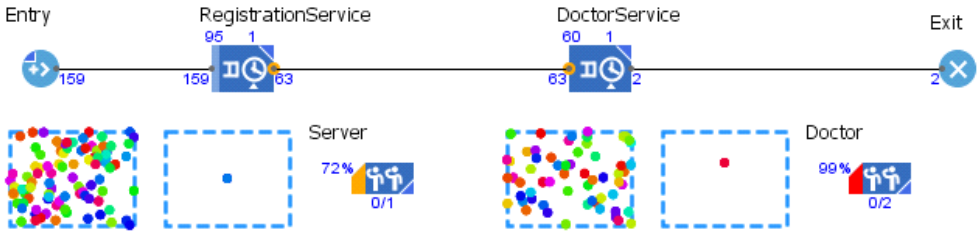

Figure 10:Result of Model 01

The result of this model shows that there are a large number of patients waiting in the waiting room and registration queue. They are patiently waiting for both this procedure and their doctor's appointment. With this hospital outdoor service, the patients are not happy.

4.2.2 Model 02 [Modified]

Models 01 and 02 underwent some modifications, and the results are now visible. Due to the fact that only dental OPD patients can register at one registration booth while everyone else must do so at the corresponding department's OPD, the patient arrival rate drops to 30 per hour and the maximum number of patients drops to 60. Due to the shrinking patient line, the delay time will also drop from the triangular (8, 9, 10) to the triangular (2, 2.5, 3) minutes.

There will be significantly less waiting time in this approach because the doctor will arrive at his chamber promptly to see patients. The delay time from Doctor Service settings will change to a triangular (7,9,8) amount of time for the doctor to examine patients.

The second model will seem the same as model 01 but the parameter will have changed.

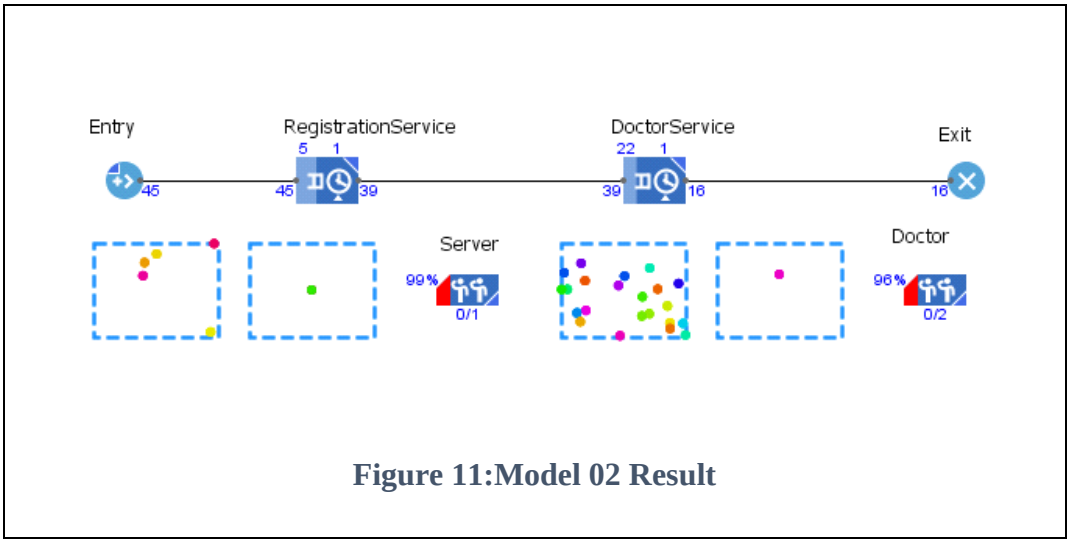

Figure 11:Model 02 Result

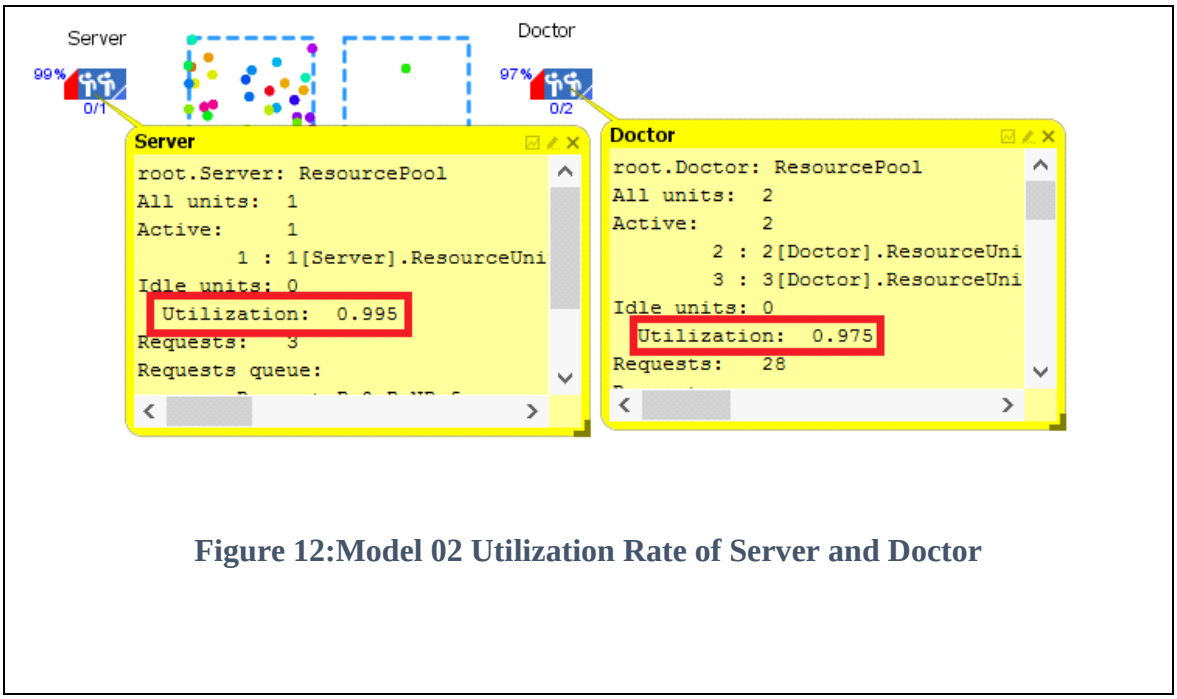

Figure 12:Model 02 Utilization Rate of Server and Doctor

Overview of model 02 is better, however there are still many patients sitting in the waiting area since registration is completed quickly but doctor consultations take an average of six minutes. Another issue with this approach is that the server and doctor's respective utilization rates are 99.5% and 97.5%. This utilization rate is impractical in the actual world. The doctors and the server must take a break from their work periodically to answer calls, sip tea or water, or just to rehydrate. This model cannot be implemented in reality.

The highest capacity utilization rate that may be anticipated is 80% because neither a machine nor a human can be expected to operate at 100% of their potential. This is because both can experience a variety of issues. there are a number of mechanical issues that prevent you from getting the best performance. Similar to how a worker cannot constantly give his best effort every day. Utilization rate offers a rate that might assist you in determining the maximum possible production.

4.2.3 [Final] Model 03

Every parameter in model 3 will be the same as in model 2; the only changes will be the addition of an additional server and doctor to observe any differences. Our primary goals are to reduce waiting times in the waiting area and the utilization rate. The addition of a second doctor will reduce the wait time. The Registration Booth and Doctor Room nodes, respectively, need to have one additional attractor added in order to accomplish this. A chair and a sitting person must be put over the attractors from 3D items for these models to have 3D effects. Both the server and the doctor are represented by the people seated in the chairs in the doctor's room and the registration booth, respectively. Patients travelling from one location to another should be added using the resource type block from the process modeling library. On the step to create a new agent, the new agent wizard will launch. Choose to construct the agent type "from scratch" and enter "patient" as the name of the agent type. Click next. 4.Choose a person from the list of 3D figures in the following step, then choose 3D as the animation type. To finish building the model, click Finish.

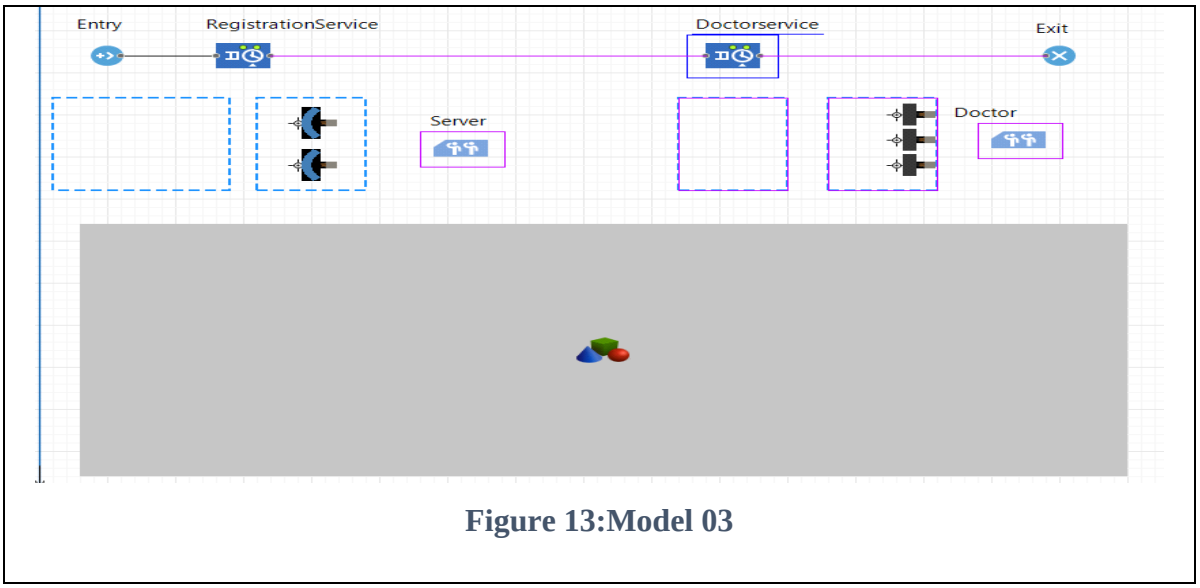

Figure 13:Model 03

The conclusion of model 3 is that it performs better than the previous two models. According to the results of this model, patients wait less in line, the registration line moves more slowly, and

there is less congestion in the waiting area, resulting in shorter wait times for medical attention. If this concept is implemented in real life, patient satisfaction should rise as the delay time decreases.

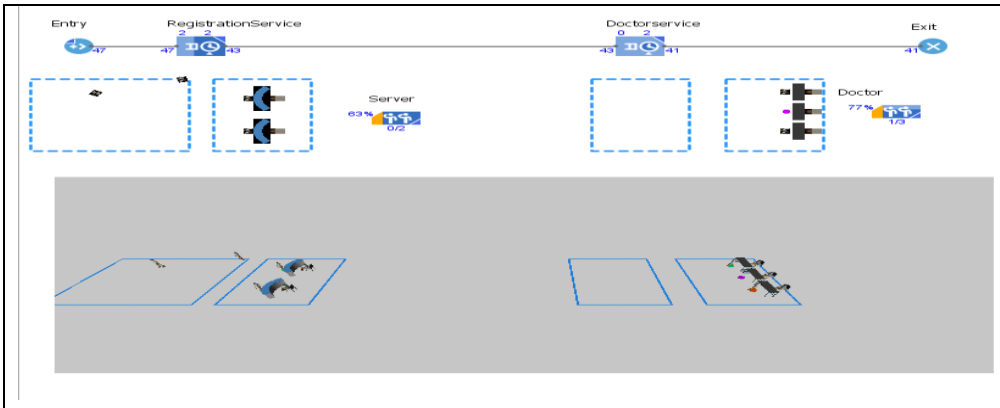

Figure 14:Model 03 Result

Both the server and doctor's usage rates fall to 68.2% and 80.8%, respectively. In this model, one server and one doctor occasionally become idle. They can make calls or get ready during the downtime, and they can also take a rest. This approach can be applied in the real world to enhance BSMMU's dentistry OPD's outdoor patient service.

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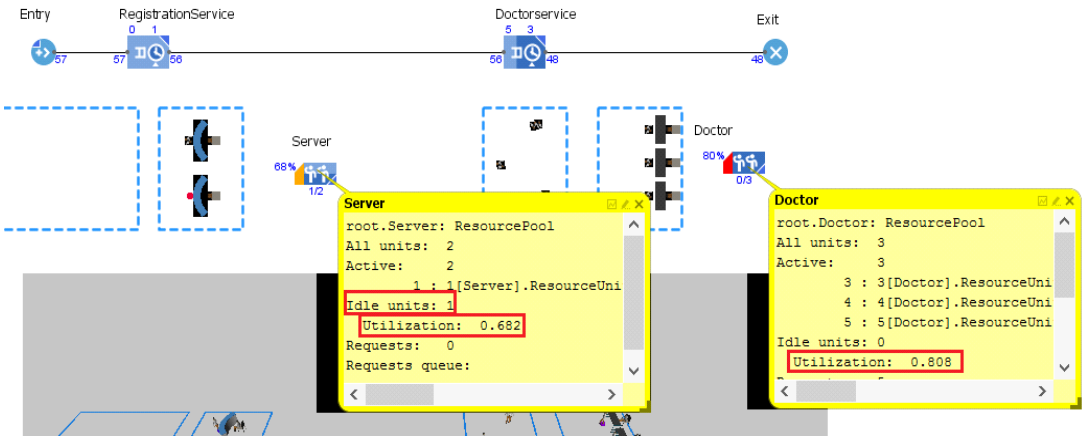

Figure 15:Utilization Rate of Server and Doctor in Model 03

4.3 Recommendation

With the growing number of health service companies in the current competitive environment, it is predicted that those that provide the greatest services at the most affordable prices will benefit. This study has highlighted a few issues with the Bangabandhu Sheikh Mujib Medical University's services. This study makes some suggestions for how to enhance BSMMU's outside patient service. Model 3 demonstrates the improvements that are made to address the issues that the patients are unhappy with.

According to the study's results, the following actions might be made by hospital managers and policy makers to improve patient care at the facility:

- The patients are dissatisfied with having to wait in line for registration for ten minutes. As with Model 3, this issue can be resolved if patients of a particular department can register at a particular registration booth, for example, patients of the dental OPD will register at the dental registration booth. The booth needs two servers so that one can take a break and the other can continue to provide service. In addition to reducing queue wait times, two servers working together will increase utilization to 68.2%. Two servers can be kept by the hospital administration for a predetermined amount of time before being transferred to another task, which will be advantageous for the hospital as well. If the outdoor registration crew operates in accordance with model 03, the average wait time in the line and the average registration time will both be 2.5 minutes.

- The patients don't like having to wait so long to see the doctor. The doctor's tardy arrival in their room is the primary cause of this. Doctors typically arrive in their chamber 20 to 30 minutes late. The patients must wait in the waiting area for this amount of time. Patients won't have to wait as long, and the waiting area won't get too busy, if the doctors arrive on schedule. If the outdoor operation of the doctor's service is carried out in accordance with model 03, then the average wait time in the waiting area and the average wait time for the doctor's service will both be 6 minutes.

- In the dental OPD of BSMMU, there are two doctors providing care at once, yet model 2 claims that the doctor utilization rate is 97.5%, which is not realistic because doctors take breaks during their shifts. Patients won't have to wait as long in the waiting room and the usage rate will drop as model 3 if 3 doctors provide service at once to prevent the waiting room from being overcrowded. This model 3 can be used in practical situations to enhance BSMMU's outdoor patient service.

- The cleanliness of the hospital and waiting area, the availability of enough chairs for patients, and the availability of enough drinking water are all essential amenities that help to satisfy patients. The hospital staff should be inspired to work there.

CHAPTER 5

CONCLUSION

5.1 Conclusion

At any level of health care, patient satisfaction is the key metric that represents the level of service quality. The patient satisfaction study is a useful tool for assessing how well a hospital is performing from the patients' point of view. The knowledge gained from these kinds of surveys is useful for improving the hospital and OPD's appeal to patients and removing issues that are impairing patient satisfaction.

The dentistry OPD at BSMMU is renowned for providing excellent patient care while being very effective and affordable for the patients. The results of this investigation also demonstrate that many patients are visiting for treatment each day. These patients are content with the staff's demeanor, the doctor's care, and the registration service. However, these patients are not pleased with the outside services, such as standing in line for an excessive amount of time and in the doctor's waiting area. The patients became frustrated by these issues.

Using AnyLogic simulation software, the researcher in this study builds certain models after analyzing the hospital-collected data. These simulations show both the current state of the facility and potential upgrades. Model 3 demonstrates how to make the improvement. The reduction of the patients' waiting times was the main goal of this process. The amount of time the patients waste in the registration line and the waiting area is not acceptable to them.

The level of patient satisfaction is crucial because happy patients are more likely to keep a steady relationship with a certain physician. To address these issues, the hospital administration of BSMMU needs make some adjustments. With these enhancements to the outdoor service, patients will be more satisfied and won't switch hospitals for their medical care.

The hospital administration should make ongoing efforts to improve a particular area of the service based on the patient satisfaction levels for the study's many dimensions. Patient satisfaction

increased as a result of general improvements in the hospital's environment and facilities, as well as in the caliber of its customer services and the results of a motivated workforce.

The author is optimistic that the findings of this study would spur other researchers to start a variety of research projects in order to enhance hospital services for both inpatients and outpatients in the best interests of the patients for whom these facilities were established.

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Appendix

Information about the average wait time for the registration service and the length of the registration queue was collected.

Date	Per hours number of patient	waiting time in registration booth queue (minute/Avg)	time of registration service (minute/Avg.)
2022-11-15	50	10.5	2
2022-11-17	29	5	2
2022-11-18	32	11	2
2022-11-19	30	12	2
2022-11-20	29	10	2
2022-11-22	40	8	2
2022-11-24	17	9	2
2022-11-25	30	8	2
2022-11-26	34	10	2
2022-11-27	37	8	2

Figure 16:Data obtained from registration queue

The average duration in the line and the overall enrollment time will both be 2.6 minutes if the outside operation of the registration personnel is carried out in accordance with model 3. Information on average doctor visit times and waiting room wait times was retrieved from the reception desk.

Date	Per hours number of patient	waiting time for doctor's service in waiting room (minute/Avg.)	. time of doctor's service (minute/Avg)
2022-11-15	38	30	5
2022-11-17	23	28.5	5.8
2022-11-18	33	30	6.5

2022-11-19	32	38	6
2022-11-20	39	30	6.5
2022-11-22	38	28	6.25
2022-11-24	27	38	6.50
2022-11-25	33	30	5
2022-11-26	32	33	6
2022-11-27	36	30	5.5

Figure 17:Data obtained from dental OPD

The average wait time in the waiting area and the average wait time for medical attention will both be six minutes if the outside operation of the doctor's service is carried out in accordance with model 3.

Therefore, in the current scenario, a patient spends a total of 50 minutes receiving care in the OPD. If the hospital runs on model 03, this might be cut down to 18 minutes.

PATIENTS SATISFACTION AND SERVICES LEVEL OF MEDICAL UNIVERSITY

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