**APPRENTICESHIP COURSE WORK**

**GAP ANALYSIS**

**INTRODUCTION:**

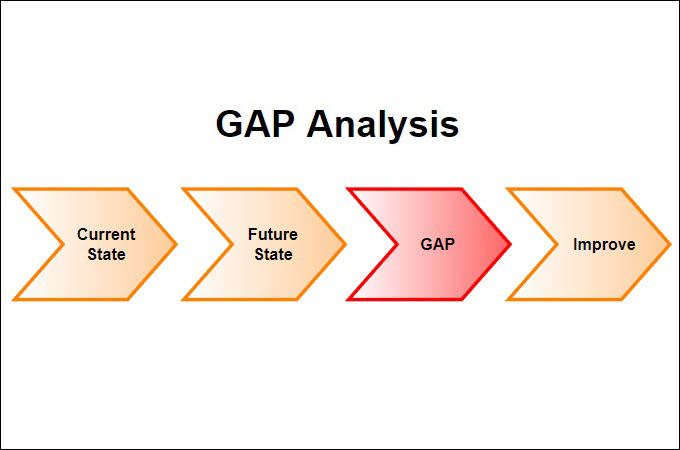
Within this project am discussing the current system for pregnant mothers' scan requests and how it is done using **iClinical Manager (ICM)** software. The current system process that we have in place is inefficient and includes too many steps without any visibility and it is causing a lot of dissatisfaction to the clinicians, consultants, nurses, **Sonographers** and most importantly the patients which in this case are the pregnant mothers. We need to streamline the process so that it is more efficient and creates more visibility. We are looking at improvements which will make life easier for the clinicians, and consultants who request scans and look at how we can carry the patient along in the journey.

As part of this project, I have been tasked with doing the **gap analysis** to capture how requests are made on **iClinical Manager** (**ICM**) for pregnant mothers' scan requests. This will help Clinicians and consultants search for patients using Hospital/NHS numbers whenever they want to review or request scans or examinations on Pregnant mothers using the in-house scan request platform called **CDN Radiology Information System** (**CRIS)**.

My input is to design the current way tasks are carried out (Current State Process Model) and then get it signed off or amended by the stakeholders/stockholders if there is anything that is missing during the information-gathering meetings. Once it's signed off, I then design (**Gap Analysis**) how they want things to look in the new system (Future State Process modelling) would look at all the new changes that would take effect once it's done.

**WHAT IS GAP ANALYSIS:**

This is a method of assessing the performance of a business unit to determine whether business requirements or objectives are being met and, if not, what steps should be taken to meet them. This may also be referred to as a needs analysis, needs assessment, or need-gap analysis. The “**Gap**” in the gap analysis process refers to the space between “**where we are**” as part of the business (Current State) and “**where we want to be**” (The future State or Desired State). The above graphic is what I have included explaining my point. As part of my gap analysis, I will be documenting the current state and the future state using process models. Below is the graphics I have included.



(Opinaldo, 2022)

As part of my Gap Analysis, I will be documenting the current state and the future/desired state using process models.

**WHAT IS BUSINESS PROCESS MODELLING?**

A business process model is a graphical representation of a business process or workflow and its related sub-processes. Process modelling generates comprehensive, quantitative activity diagrams and flowcharts containing critical insights into the functioning of a given process, which includes the following:

* Events and activities that occur within a workflow.
* Who owns or initiates those events and activities.
* Decision points and the different paths workflows can take based on their outcomes.
* Devices involved in the process.
* Timelines of the overall process and each step in the process
* Success and failure rates of the process.

**THE BENEFITS OF BUSINESS PROCESS MODELLING:**

Business process modelling arms and enterprises with objective business intelligence that supports more informed decisions for resource allocation, process improvement and the overall business strategy. With a clear view of processes, enterprise teams can ensure that workflows always drive the desired results. As a result, operating costs are lower, revenue is higher and business outcomes are stronger.

Specifically, business process modelling allows companies to do the following.

* **Access and utilise quantitative process data:** Without a process model, teams are limited to discussing and analysing workflows in quantitative and subjective terms. As a result, teams may not accurately understand their workflows; they may make business decisions based on misunderstandings, assumptions and/or incomplete knowledge. With process modelling, teams can access quantitative workflow data, including success and error rates, allowing for more rigorous analysis of business processes.
* **Streamline and accelerate process automation:** Before a process can be automated, an organization needs a clear understanding of how that process plays out, including the business logic underpinning each decision point. A process model illuminates both the way a workflow unfolds and the relationship between events, actors, tools, and systems within and between processes. This viewpoint helps a team document the process itself and the business rules that guide its execution. This information makes it easier to effectively automate workflows the first time.
* **Keep operation costs down:** Process models provide organisations with an easy way to identify opportunities to optimise existing processes. This makes it easier for the company to ensure that processes consistently produce the desired outcomes. As a result, business processes require less investment to maintain and generate positive outcomes at a lower cost.
* **Align Operations with Business Strategy:** Implementing a business strategy or new business model will require changes in the operations and in how people perform their work. Business process modelling facilitates by helping managers and executives ensure that business processes are consistent and enable business execution toward achieving the overall strategy and goals of the organisation.
* **Improve Process Communication:** Having a clear idea of what should be done, how it is supposed to be done, and what the exact role of every team member entails, represents key factors that lead businesses and teams to success.

Business process modelling enables the documentation and communication of an organisation’s business processes. It also provides a common, unified language and methodology for communicating processes, information and guidelines about the processes; it minimizes the loss of business process knowledge (for example, the loss of staff); jumpstarts the organisational process documentation initiative; and allows for rapid knowledge transfer with thoroughly documented processes.

**THE DIFFERENCE WAYS TO DOCUMENT PROCESS MODELS:**

* **Activity Flow-Oriented Diagram Approaches: -** This is the most used in business redesign. Activity flow-oriented representations of business processes. Business process redesign approaches that build on activity flow representations are often referred to as work-flow-oriented approaches to business process redesign. Because of their popularity, many different activity flow-oriented business process representation conventions exist, each with its own set of standard symbols.
* **Data Flow Diagramming Approach: -** The traditional systems analysis and design approach, also known as the structured systems analysis and design approach, has served as the basis for hundreds of thousands of software development projects. This approach’s main business process modelling diagram is the data flow diagram (or DFD). Different sets of symbols and notations have been proposed in the past for data flow diagramming.
* **Swimlane Diagrams: -** A Swimlane diagram is a type of flowchart that delineates who the stakeholders are and the roles they play in the process. Using the metaphor of lanes in a pool, a swimlane diagram provides clarity and accountability by placing the process steps within the horizontal or vertical “swimlanes” of a particular employee, workgroup or department. It shows connections, communication and handoffs between these lanes, and it can serve to highlight waste, redundancy and inefficiency in a process.
* **Activity Diagrams: -** This diagram describes how activities are coordinated to provide a service which can be at different levels of abstraction. Typically, an event needs to be achieved by some operations, particularly where the operation is intended to achieve many different things that require activities coordination, or how the event in a single use case relates to one another use cases where activities may overlap and require coordination. It is also suitable for modelling how the collection of use cases coordinates to represent business workflows.
* **Unified Modelling Language (UML) Diagrams: -** This is used for specification, visualisation, development and documentation of software systems. However, business professionals have adapted it as a powerful business process modelling technique. With 14 different UML diagram types, these offer a flexible and powerful way to visualize almost any business process. They are typically used for modelling the detailed logic of a business process. UML diagrams are the object-oriented equivalent of flowcharts.
* **Flowchart Technique: -** Flowcharts are the most popular diagram type in the world. Because it has few standard symbols it can be easily understood by many. Simplicity makes it a powerful and effective tool. BPMN can be considered as an advanced version of the basic flowchart technique. Also, most drawing software supports the creation of flowcharts, it is used by a much wider audience as well.

**GAP ANALYSIS APPROACH/PROCESS:**

By analysing the gap between the current state and the target required for the future state, I had to set up meetings with all the stakeholders/stockholders to discuss how things are done presently (Current State) and what works well and what doesn’t. I ask questions about the changes that need to be carried out in the new system to address the gaps (Future State) by collecting all the information, and data that would help me build and design the target state (Future State) and then compare both information and note the changes that this would address while also identifying the gaps that would be addressed.

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**The meeting invites from the senior clinical systems manager**

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**The email after the initial meeting**

I will start the design phase of the current state and then send it via email to all the stakeholders for review and try to see if anything is missing. Once that is signed off, I then start the future state design and implement all the changes that would take place. Send it back to stakeholders for a final review and signoff in case I missed anything, or the stakeholders notice something missing while looking through it, a different pair of eyes might see what I didn’t notice because they would be the ones that would be using the system once it goes live.

The investigative steps I used, in this case, were to visit the unit/ ward to spend a day with the members of staff to watch how things are done and ask all the necessary questions that would help me in the design phase of the model design (Process Mapping) while also asking questions that would help me in the design phase I then map the shortfalls and deficiencies on Business activity model (BAM) using RAG analysis to illustrate and identify all the changes that would replace the old ways of doing things and what the new system would be addressing.

Using RAG, helps me present the analysis in a graphic method and the result of the gap analysis. I had to conduct individual interviews and group interviews to try and understand what is needed in the new system and also visited the Neonatal ward to spend a day with the ward Nurses just so I could observe how things are done and how the scan is requested on the **CDN Radiology Information System (CRIS)** which is an in-house image requesting system that consultants, clinician use to request scans.

The **investigation** technique I used was to ask questions on the ward when I was observing to know where the scanning machine is located, if it's stationary or if it can be moved from its stationary position to the bedside of the pregnant mother, just in case she can’t move due to some medical reason.

The **problems** of the current business process were the fact that scan requests were not working well enough to the satisfaction of the ward Consultants/Clinicians which was making life harder and difficult for scans to be carried out, especially when the pregnant mother is in the maternity ward rather than the neonatal ward.

The **Decision** was to help bridge the gap that is being experienced by designing a new system that would help address the issue. I was **tasked** to capture the current state and also design the future state while addressing the gap between the way things are done presently and where/what is expected of the new system (Future State) of the process modelling.

I then did a **SWOT** Analysis to determine the strengths, weaknesses, opportunities and Threats that the new business process modelling would pose. I know that most people fear change and enjoy staying with whatever they are used to, which is why the SWOT analysis would be looking at the fears and the opportunities that the new system would bring to the department. This is explained below: -

(Estio Training Provider, 2023)

* **SWOT Analysis:**

**Strength:** We had to look at the software integration how it would sit within the Maternity Electronic Patient Records (EPR) and how easy it would be for the stakeholders to use. Deeper research was carried out to make sure the chosen EPR can be integrated into the in-house software called **Badger** so that information can sync between systems.

**Weakness:** The staff is not motivated due to system failures which hinder staff from monitoring CTGs at the nurse station (Front desk). Which is bound to happen in the early stage of the rollout (Teething period). Sometimes this can be frustrating and make the nurses want to quit using the system.

**Opportunities:** The opportunities the new system brings are so vast and endless in terms of cloud-based storage so that the fear of losing data isn’t an issue for the ward staff (consultants, midwives, secretaries), **Sonographers** won't be scared of losing scan images in transit. If the network suddenly drops the image is stored automatically in the cloud.

**Threats:** The threats and setbacks in some cases make the nurses worry about not being able to complete treatments and observations on the mother and child due to the system or software freezing/logging them out in the middle of an event. So, we end up being stationed on the wards should such incidents occur. We are giving 24/7 support on all the delivery wards (Argyle, Central Delivery Suite, Transitional Care Ward, Neonatal Intensive Care Unit (NICU)) for 4 weeks which is a full month to help them stabilise the new system and make them settle into the new business/process model.

I then decided to document the current process model using a swimlane diagram, Business Process Model Notation (BPMN) and Microsoft Visio to design the current process model and the future/desired state.

**CURRENT STATE/SITUATION:**

**A Swimlane Diagram** is a type of flowchart that outlines who does what in each process. Based on the analogy of lanes in a pool, a swimlane diagram places process steps within the horizontal or vertical “Swimlanes” of a particular department, workgroup or employee, thus ensuring clarity and accountability and highlighting connections and communication between these lanes. It can serve as an indicator of waste, redundancy, and inefficiency in a process. And it also helps to structure the process properly with all the stakeholders, and stockholders according to the part everyone plays in the process modelling.

**Business Process Model and Notation (BPMN):** This is a graphical notation style or a visual language that enables the description and optimisation of business processes. A Key to Business Process Management (BPM), visually depicts a detailed sequence of business activities and information flows needed to complete a process.

Its purpose is to model ways to improve efficiency, account for new circumstances or gain competitive advantage. The method has been undergoing a standardisation push in the past few years and is now often called by a slightly different name: **Business Process Model and Notation,** still using the BPMN acronym.

Below is a step-by-step breakdown of what the current state does:

**CURRENT SITUATION/ STATE:**

* *Request exam/Scan for patient on ICM/iSOFT –* ***Clinicians***
* *ICM order automatically turned into a CRIS request by way of the MACRO –* ***Automatically done by MACRO.***
* *Load CRIS -* ***Clinicians/secretary (depending on out of hours)***
* *Search for patients using hospital /NHS number -* ***Clinicians/secretary (depending on out of hours)***
* *Find previously requested exam/event done in the first step -* ***Clinicians/secretary (depending on out of hours)***
* *Load selected event for the patient by double clicking or clicking the change button -* ***Clinicians/secretary (depending on out of hours)***
* *Add room code DNICU for scans taking place on L5 and then ‘Attend’ the patient -* ***Clinicians/secretary (depending on out of hours)***

**Issues with the Current Process:**

* The **Sonographer** can't see the request that is made by the clinicians and that slows down the time frame allocated for each pregnant mother this also contributes to the clinicians not being able to meet the daily target of scan requests to clear the backlog.
* The **Sonographer** always finds it mentally draining to have to scroll through a huge list of patients before getting to the required Patient. This needs to be addressed by making sure that the **Sonographer** goes straight to the required patient once the system is loaded to be able to deal with the patient in question and move on to the next.
* The Clinician and Consultants find it time-consuming to sit down and go through a long list of pregnant mothers to request a scan, and it delays the clinics and makes it longer than necessary.
* The Pregnant mothers are not being carried along in the current process which doesn’t help at all,
* The pregnant mothers don’t keep track of their clinic appointments and miss clinics in the process. So, this doesn’t help the Clinicians and consultants.
* Scans go missing in the current process or are not requested on time due to system inadequacies.

A diagram of a diagram

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**Current State**

**DESIRED SITUATION/ FUTURE STATE:**

In the desired situation, the goal is to address the concerns of the Clinician, **Sonographer** which is listed below.

* Patient details are now sent to L5 scanner worklists. – **Sonographer**
* Load worklists on the scanner – **Sonographer**
* Select the correct patient (as others may show) – **Sonographer.**
* Scan patient - **Sonographer**
* Finish scan - **Sonographer**
* Images sent to PACS (network connection required) - **Sonographer.**
* *Depending on how US Scanner is set up; once the scan is finished scan will automatically be sent to PACS or a manual send may be required.*
* Log into PACS - **Sonographer**
* Check Images have arrived in PACS **- Sonographer**
* Create a report using the current NICU process. – **Secretary (if attaching) if reporting directly to CRIS this will be done by the Consultant.**

I then documented the desired situation using the process model that addresses all the clinicians'/Consultants'/Sonographers' concerns using Microsoft Visio

Below is the breakdown of the desired/future state using Microsoft Visio:

A diagram of a computer flowchart

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**Future State**

**GAP ANALYSIS:**

**Definition**: This is classified as the gap between where the organisation or department is presently and where it is in the desired/future state.

|  |  |  |
| --- | --- | --- |
| **CURRENT STATE** | **FUTURE STATE** | **DIFFERENCE** |
| * The **Clinician** requests a Patient scan exam on ICM/iSOFT | * The patient scan needs to be picked up by the **Sonographer** on the level 5 scanner worklist. | * The gap between when the scan is requested for the pregnant mother to when it occurs and how the **Sonographers** can track the request in real-time, and make sure the scan is carried out on time for the pregnant mother and the baby’s safety while monitoring the scan request. |
| * ICM order automatically turned into a CRIS request by way of the MACRO – automatically done. | * The **sonographer** loads the worklist onto the scanner | * The task is to make sure the gap is closed, and the consultants/clinicians can request scans and be sure it is picked up by the **Sonographer** on the system and get the scan done on time. |
| * *Load CRIS -* ***Clinicians/secretary (depending on out of hours).*** | * *Select the correct patient (as others may show) –* ***Sonographer.*** | * The **Sonographer** is to make sure the work list is sent to the level 5 scanner and the worklist is loaded on the scanner to be able to select the Patient required using the unique hospital number of the Patient (As other Patients would show on the same list) and then scan the patient. |
| * *Search for patients using hospital /NHS number -* ***Clinicians/secretary (depending on out of hours)*** | * *Scan patient -* ***Sonographer*** * *Finish scan -* ***Sonographer*** | * After the scan is finished, the images are sent to **Picture Archiving Communication Service (PACS)**, this also depends on how the scanner is set up so that the images are sent automatically to **Picture Archiving Communication Service** (**PACS)**, or manually sent where required. |

* **The Gap and Recommended Action:**

The gap between when the scan is requested for the pregnant mother to when it occurs and how the **Sonographers** can track the request in real-time, and make sure the scan is carried out on time for the pregnant mother and the baby’s safety while monitoring the scan request. The task is to make sure the gap is closed, and the consultants/clinicians can request scans and be sure it is picked up by the **Sonographer** on the system and get the scan done on time. The **Sonographer** is to make sure the worklist is sent to the level 5 scanner and the worklist is loaded on the scanner to be able to select the Patient required using the unique hospital number of the Patient (As other Patients would show on the same list) and then scan the patient. After the scan is finished, the images are sent to **Picture Archiving Communication Service (PACS)**, this also depends on how the scanner is set up so that the images are sent automatically to **Picture Archiving Communication Service** (**PACS)**, or manually sent where required.

* **Actions to move from Current State to Future State:**

The actions that would be taken to gradually transition from the current state to the desired/future state would have to be considered very carefully to not affect the flow of daily activities that occur within the ward. The plan is to run a **pilot scheme** in some sections of the Neonatal Intensive Care Unit (NICU) that will be used to test the new system and monitor how the staff use and interact with it. And used that time to monitor/ assess the functionalities of the new system for setbacks malfunctions or bugs. And if there is any, then we can fix it during the testing period, before rolling it out to the entire ward. During the testing period, we will be monitoring it closely and have staff members on the shop floor to monitor the progress and answer all questions that may arise from midwives and patients alike.

* **Summary:**

In summary, the difference between the current state and the future state is the fact that **Sonographers** do play a vital role in the scanning process by keeping track of the scan request from the consultants and clinicians through PACS and see when it arrives so that they can take all the necessary actions required so that the secretary can attach the Image using neonatal intensive care unit (NICU) reporting process. But if reporting directly to CDN Radiology Information System (CRIS) that can be done by the consultant on duty. ***Recommended actions*** are to test the new system and see where corrections need to be carried out. And, to run a pilot scheme which is to pick a ward to use as the pilot scheme so that we know where the new system needs a remodelling or redesigning before the final rollout is carried out. We didn’t have time for a pilot, as we were running on a very tight schedule to get the job done before the Maternity electronic patient records (EPR) was in place.

* **Conclusion:**

In conclusion, during the investigation and information gathering, I ***learnt***that in most cases the stakeholders/ stockholders are not sure what they want the new system to address until the current state of the business model and processes is designed for them to see the visuals for them to be able to make corrections and amendments and also decide on what to include in the future state when designing the process model/future state. Even with this, I still learnt that “**NOT**” all information gathered was allowed on the future state/desired situation because the stakeholders kept moving the goal post and amending all the information that was agreed upon during the brainstorming stages of the process.

The process modelling/mapping of the future state is ***What went well*,** even though the stakeholders kept coming back with more expectations and changes in the final process mapping, which was mentally draining for me because of the back and forth. It made me realise my patience and strength of being able to weather the storm of rejection in terms of the stakeholders accepting my first process modelling of the desired state.

I had to schedule new meetings with the stakeholders (Consultants, Matron, Nurses, and Secretary) to understand what the new process is supposed to address so as to not make mistakes or have it rejected again. ***What I will do differently*,** is make sure that I send the sample design to the stakeholders/stockholders as many times as possible for them to look at and make corrections before I design the desired situation/future state process model.

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* (Opinaldo, 2022)

[GAP Analysis: Definition, Methods and Templates to Download (gitmind.com)](https://gitmind.com/gap-analysis.html)

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