UNIVERSIDAD PARA LA COOPERACION INTERNACIONAL
(UCI)

PROJECT MANAGEMENT PLAN FOR THE IMPLEMENTATION OF AN ELECTRONIC PATIENT SCHEDULING APPLICATION

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This Final Graduation Project was approved by the University as partial fulfillment of the requirements to opt for the Master in Project Management (MPM) Degree

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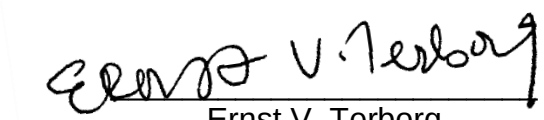

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DEDICATION

This thesis is dedicated to the Lord, family members, and close friends who supported encouraged and motivated me throughout the course.

“But seek ye first the kingdom of God, and his righteousness; and all these things shall be added unto you.”
Matthew 6:33

ACKNOWLEDGMENTS

I want to express gratitude to everyone who assisted and motivated me during the time at the University for the Master in Project Management program.
This includes friends, family, classmates who became friends during the program, the lecturers at the university and the management of the hospital that allowed me to perform the research for the thesis.

None would be possible if it were not for the Lord.

Project management is not a study or a course. Project management is a lifestyle.

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ABBREVIATIONS AND ACRONYMS

Abbreviation / acronym	Explanation
CPI	Cost performance index
EMV	Earned Monetary Value
FAT	Functional acceptance tests
FGP	Final Graduation Project
IT	Information Technology
LH	‘s Lands Hospital (Acronym in Dutch for ‘The Government’s Hospital’)
MS	Microsoft
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PMO	Project Management Office
RACI	Responsible, Accountable, Consult, Inform
RAM	Responsible Assignment Matrix
RBS	Risk Breakdown Structure
RTM	Requirements Traceability Matrix
SLA	Service Level Agreement
SPI	Schedule Performance Index
UAT	User acceptance tests
UCI	Universidad Para La Cooperacion Internacional
UPS	Uninterruptible Power Supply
WBS	Work Breakdown Structure

EXECUTIVE SUMMARY (ABSTRACT)

's Lands Hospitaal, LH for its acronym in Dutch, is a well-known hospital in the country of Suriname. This hospital is owned by the government and provides care to all layers of society. The hospital was established in 1760 and is based in the capital of Suriname, Paramaribo. The hospital daily serves more than 300 walk-in patients. These patients are referred by their primary physician or are there for a (surgical) procedure or repeating checkup.

Even though the hospital was established in an era where there was minimal innovation in medicine, the hospital staff managed to improve their skills and services during all those years and remained standing.

The hospital used paper charts to register appointments for patients. All appointments were written by the administrative staff on a calendar or in an agenda. It even occurred that appointments were never registered at all, even though the doctor in charge or patient requested one. This caused confusion and mismanagement at the different clinics in the hospital. It was also true that the contact details of patients were not always available. These patients could not be contacted in case a reschedule of an appointment needed to be made.

The generic objective of this final graduation project was to develop a project management plan based on the Project Management Institute's guidelines to manage implementation of an electronic patient scheduling application.

The specific objectives of this project were to create: a project integration management plan able to coordinate the different project management processes; a scope management plan to clearly identify the work needing completion; a project schedule management plan in order to finish the project within the planned timeframe; a project cost management plan in order to track the budget of the project and avoid cost overruns; a project quality management plan to apply the organization's quality guidelines; a project resource management plan to properly apply project resources and adjust where needed; a project communications management plan to properly communicate with project team members and project stakeholders; a project risk management plan to identify possible risks and ways to mitigate these risks; a project procurement management plan detailing ways to conduct procurements for this project; and, finally, a project stakeholder management plan for proper management of expectations and activities among the different project stakeholders.

This project utilized an analytical methodology. The most important resources were hospital documents, the PMBOK® guide sixth edition, and interviews with the managing board.

The project management plan that was created using the Project Management Institute's guidelines and the Project Management Body of Knowledge was a revelation for the hospital, since this way of managing projects had never been applied in full. There are intentions to perform future projects using this methodology.

With the implementation of the electronic patient scheduling application, the hospital will have improved patient scheduling activities and patient experiences due to the flexibility and reduction of double or missed appointments.

Indirectly, the hospital staff will acquire competencies in the use of computers and computer applications.

It is recommended that the hospital completely implements a project management methodology in order to implement future projects according to a certain set of (international) standards.

1 INTRODUCTION

1.1 Background

The government's hospital, LH for its acronym in Dutch, was established in 1760 and is based in the capital of Suriname, Paramaribo. The hospital serves more than 300 walk-in patients daily. These patients are referred by their primary physician or are there for a repeating checkup or procedure. Due to the financial difficulties in the country that also impact the healthcare industry, pressure is increasing on hospital management to survive the declining subsidies of the government. Management had to become creative in order to serve patients more efficiently and increase customer service. Even though the main goal of hospitals is to provide proper care, the hospital had to become more competitive because there were hospitals nearby which patients could choose as an alternative.

1.2 Statement of the problem

Patients of the hospital are mostly served based on appointments. Appointments can be made over the phone but also by visiting the hospital; the hospital employees then register the appointments in a notebook. Unfortunately, not all employees have legible handwriting and not all appointments are registered. Another bottleneck occurs because appointments are not written in chronological order, based on appointment date. All these challenges combined often create an unforeseen situation at the hospital's intake and registration desks, which makes optimal patient care difficult.

1.3 Purpose

Different project managers have different ways of thinking, different ideas, and different project management methodologies. This can result in failed or less successful completion of projects. Therefore, a well-developed project management plan can support the successful execution of the project. A project management plan can help keep the project execution costs within the planned budget as well as keep the project on time and according to schedule.

1.4 General objective

To develop a project management plan based on the Project Management Institute's guidelines to manage the project of implementing an electronic patient scheduling application.

1.5 Specific objectives

1. To create a project integration management plan to coordinate the different project management processes.
2. To create a scope management plan to clearly identify the work needing completion.
3. To create a project schedule management plan in order to be able to finish the project within the planned timeframe.
4. To create a project cost management plan in order to track the budget of the project and avoid cost overruns.
5. To create a project quality management plan in applying the organization's quality guidelines.
6. To create a project resource management plan to properly apply project resources and adjust where needed.
7. To create a project communications management plan to properly communicate with project team members and project stakeholders.

8. To create a project risk management plan to identify possible risks and ways to mitigate these risks.
9. To create a project procurement management plan detailing ways to conduct procurements for this project.
10. To create a project stakeholder management plan for proper management of expectations and activities with the different project stakeholders.

2 THEORETICAL FRAMEWORK

2.1 Company/Enterprise framework

2.1.1 Company/Enterprise background

‘s Lands Hospitaal (LH) is one of the oldest hospitals in Suriname and provides all classes of society with needed care at the highest possible level. The hospital also has agreements with major insurance companies. For this reason, the hospital can provide care and attend to patients who are insured by these insurance companies. The hospital provides primary care but also attends to illnesses that need the care of a specialized physician. Throughout the years, the hospital has developed specialization in maternal medicine and wellness.

In this hospital, mothers and mothers to be are guided in the maternity process. The staff is equipped with the proper skills. Due to the increasing demand for maternity care, patients had to make appointments for visits, so that the employees were better prepared. Unfortunately, the system of using paper charts for appointments was not effective enough. The manager decided to implement an electronic appointment system.

2.1.2 Mission and vision statements

Mission

LH is ready for anyone in Suriname who calls on medical care from among the specialties represented in the hospital and above all for people with needs in reproductive health care and care for children between the age of zero and fourteen years. (‘s Lands Hospitaal, translated from policy document, 2019)

Vision

LH shall be developed so that it becomes the center of excellence in the area of mother and childcare in Suriname. (‘s Lands Hospitaal, translated from policy document, 2019)

Mission

From experience to renewal. (‘s Lands Hospitaal, translated from policy document, 2019)

2.1.3 Organizational structure

The hospital is managed by three staff members, who report to the board. The board is made up of people selected by the government. The three managers have specific areas of responsibility. The generic departments report to the general manager, the nursing departments report to the nursing manager, while the doctors report to the medical manager.

In figure 1, a visualization is made of the different departments of the hospital.

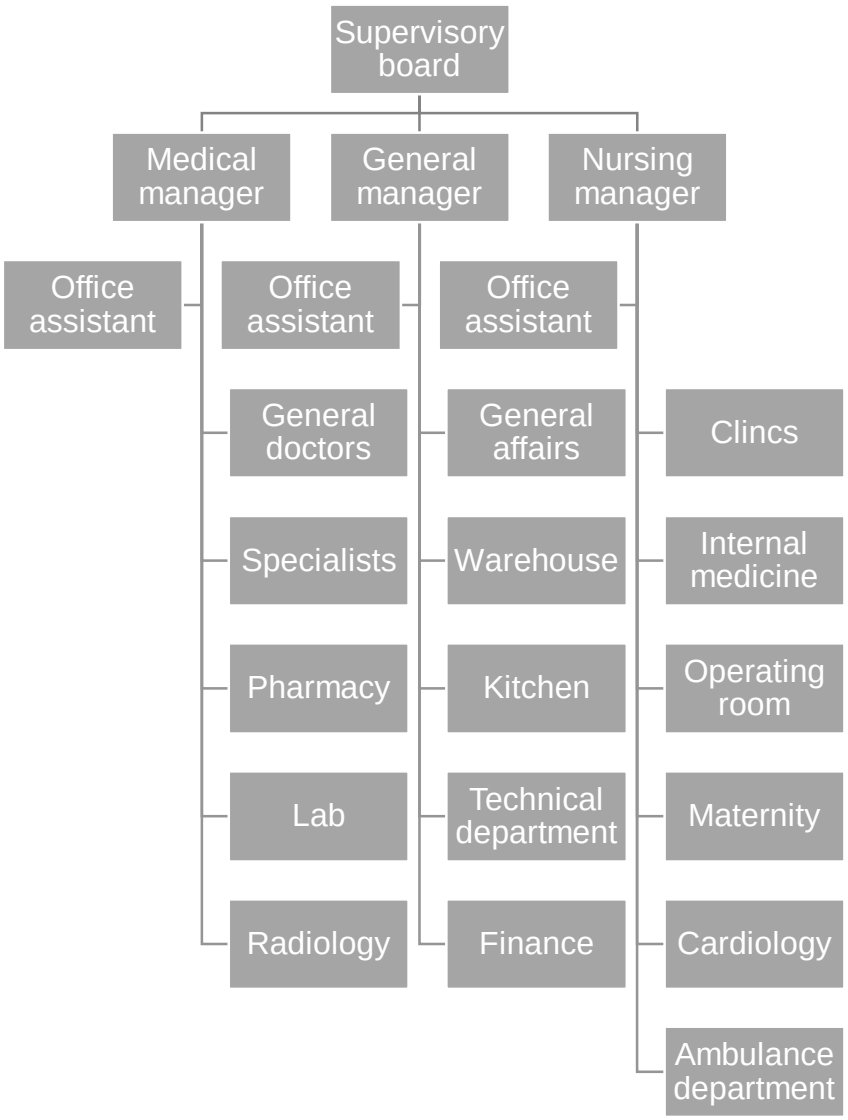

Figure 1 **Organizational structure. Adapted from "Hospital's policy document", copyright 2019 by 's Lands Hospitaal**

2.1.4 Products offered

LH offers primary and secondary medical care to different segments of the community. With primary and secondary physicians and supporting departments such as the pharmacy, operating room, and laboratory available, the hospital seeks to be a one-stop shop for patients.

2.2 Project Management concepts

2.2.1 Project

The *Oxford Advanced Learner's Dictionary* (2014) describes a project as a planned piece of work that is designed to locate information about something, to produce something new, or to improve something.

In the Project Management Body of Knowledge (PMBOK) 6th edition, a project is a temporary endeavor undertaken to create a unique product, service, or result. Projects are undertaken to fulfill objectives by producing deliverables (Project Management Institute, 2017).

2.2.2 Project management

According to the PMBOK guide, project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (Project Management Institute, 2017). Project management is needed to develop the specifications of what is needed to be done (Boyde, 2014).

In the environment of the hospital, project management can point in different directions. The hospital can decide to manage projects in order to upgrade departments, train employees, buy ambulances, or implement new systems, but also to perform renovations to the terrain. In the LH hospital, projects have never been performed according to the Project Management Institute's (PMI) standards. No project has the same outcome. This is due to the different experiences and management skills of project managers. Projects are divided into phases.

In relation to this final graduation project (FGP), the project phases could include, but are not limited to:

- Project initiation;
- Application design phase;
- Development phase;
- Testing phase;
- Implementation phase;
- Post implementation phase;
- Closing phase.

These phases comprise the project life cycle.

2.2.3 Project life cycle

A project life cycle is the series of phases that a project passes through from its start to its completion. The project life cycle can be influenced by the unique aspects of the organization, industry, development method, or technology employed.

Generic phases in the project life cycle are:

- Starting the project;
- Organizing and preparing;
- Execution;
- Ending the project.

In figure 2, the generic phases in the project life cycle have been visualized.

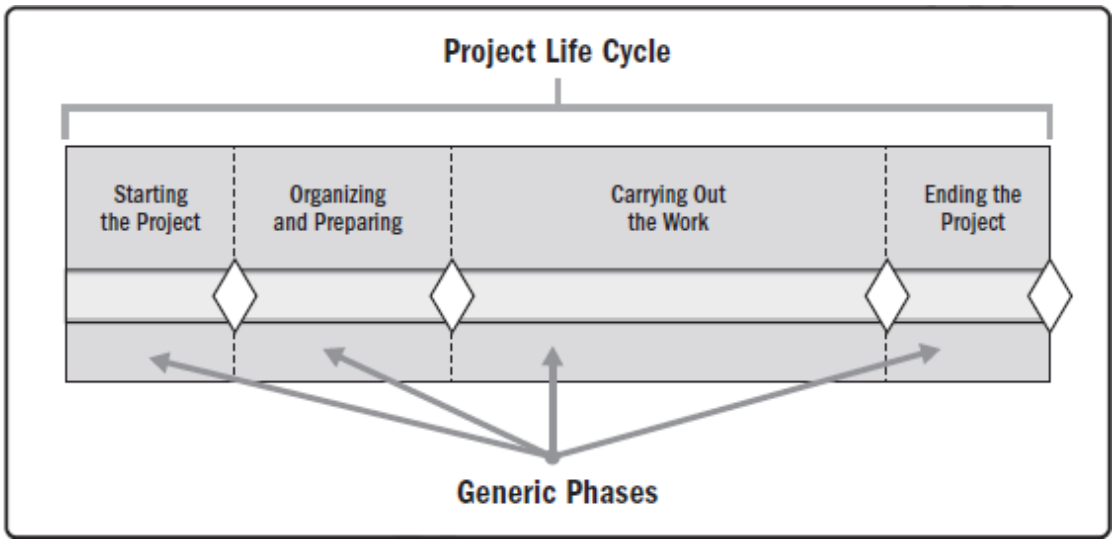

Figure 2 **Generic project life cycle phases, Project Management Institute, 2017**

2.2.4 Project management processes

A project management process group is a logical grouping of project management processes to achieve specific project objectives (Project Management Institute, 2017).

There are five project management process groups. These are:

- Initiating the process group;
- Planning the process group;
- Executing the process group;
- Monitoring and controlling the process group;
- Closing the process group.

For the FGP, the focus will only be on the initiating and planning process groups. This due to the fact that the FGP does not include the execution of the project itself.

2.2.5 Project management knowledge areas

Project management processes are also categorized by knowledge areas. A project management knowledge area is an identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools and techniques (Project Management Institute, 2017). Each knowledge area has specific process groups. These groups all have inputs and outputs. There are ten project management knowledge areas. The ten project management knowledge areas are:

- Project integration management

  In this knowledge area, the fundaments are laid for the project such as the project charter and project management plan. In this knowledge area, a project manager will be assigned. If the project management plan is approved, it will be tracked and monitored.

- Project scope management

  In this knowledge area, the work needed or planned for the project is defined. A work breakdown structure is used as a tool for better visualization of the tasks.

- Project schedule management
  The different start and end times of tasks are managed during this knowledge area. If the details change during the project, these are updated during this knowledge area.

- Project cost management
  Proper cost estimating tools are crucial to this knowledge area. The project budget must be estimated and monitored. No project manager wants a project that exceeds the planned budget.

- Project quality management
  The quality of a project is important to the project sponsors. Even if the project finishes on time, the quality level also has an important role. The quality assurance methods are described in this knowledge area.

- Project resource management
  For a successful completion of the project, resources are the most important part above the budget and scope. In this area, the required resources and their needed profiles are described and selected or hired.

- Project communications management
  As communication contributes to successful completion of a project, this project management area will be one of the most important. Proper communication between team members, project sponsors, stakeholders and other parties is needed and crucial. In this knowledge area, the communications plan will be laid out.

- Project risk management
  The risk management plan sets guidelines that help identify risk and how to attend to these risks. The risks are managed and maintained in a risk register.

- Project procurement management
  For the project, services and products are needed. These need to be acquired from external parties. This knowledge area will guide in this process.

- Project stakeholder management
  All stakeholders contribute to the success of a project. They must be managed properly: it is important to know their expectations and manage the results. As stakeholders can impact the flow of the project, proper stakeholder management is needed.

2.3 Other applicable theory/concepts related to the project topic and context

2.3.1 Regenerative development

Humankind has taken a dangerous path with its current global development trends. Humanity is in a time of rapid population growth coupled with overconsumption and massive destruction of Nature (Müller, 2017). With the implementation of the electronic patient scheduling application, the standard will be set for regenerative development in the hospital. It is expected that this will flow to other areas in the hospital. The implementation of this project will reduce paper use and paper waste.

2.3.2 Green project management

With this project, certain sustainable development goals will also be covered. The sustainable development goals are mentioned in the GPM P5 standard. These sustainable development goals will not only contribute to society, but also to the employees of the hospital (Green Project Management). Vendors providing services to the hospital in regards to this project will need to demonstrate their contribution to sustainable development goals. As an example, the hospital could only buy environmentally friendly hardware and not acquire services from a software vendor that employs child labor.

The sustainable development goals that will be covered during the project are:

- Good health;
- Quality education;
- Innovation and infrastructure.

The implementation of this project will also reduce paper use and paper waste.

3 METHODOLOGICAL FRAMEWORK

3.1 Information sources

For the composition of this project, one can acquire data and information in multiple ways. Libraries are often used as a main book source. Journal articles can also serve as an important source during the composition. A very interesting source which is often forgotten is human sources. There can be interviews with different people regarding the subject. This project will also include the definition of information sources, using APA style citation as needed. If the subject of the FGP is related to an organization, the organization's sources can also provide information.

In this digital era, books and other sources are easily available on the internet. As the internet can be filled with endless information, the information must be verified by the requestor or composer. This is due to the fact that the information might not be correct or could be interpretable in different ways.

Information is defined as facts or details about somebody/something and a source is defined as a person, book, or document that provides information, especially for study, or a piece of written work or news, according to the *Oxford Advanced Learners Dictionary* (2014). Sources can be divided into multiple levels. The primary and secondary sources used in this project are listed in the next section of this document.

3.1.1 Primary sources

A primary source is a document or person that contains information obtained by research or observation, not taken from other books and sources (*Oxford Advanced,* 2014*)*. The primary sources that will be used in this project are the managing board, nurses, and doctors.

The information is plotted in chart 1 for a clear overview.

3.1.2 Secondary sources

The *Oxford Advanced Learner's Dictionary* (2014) defines a secondary source as a book or other source of information where the writer has taken the information from some other source and not collected it themselves. The secondary sources used in this project are the PMBOK and other PMI sources.

The information is plotted in chart 1 for a clear overview.

Chart 1 Information sources (Source: Ernst V. Terborg, June 2020)

Objectives	**Information source(s)**	
	Primary	**Secondary**
To create a project integration management plan that will function as a guide to coordinate the several project management processes during the project.	Meeting with the nursing manager and project manager	PMBOK, PMI sources
To create a scope management plan to clearly identify the work that needs completion.	Meeting with the complete board and project manager	PMBOK, PMI sources
To create a project schedule management plan in order to finish the project within the planned timeframe.	Meeting with the nursing manager and project manager	PMBOK, PMI sources
To create a project cost management plan in order to track the budget of the project and avoid cost overruns.	Meeting with head of finance and project manager	PMBOK, PMI sources
Creating a project quality management plan to apply the organization's quality guidelines.	Meeting with the nursing manager and project manager	PMBOK, PMI sources

Objectives	Information source(s)	
	Primary	Secondary
To create a project resource management plan to properly apply project resources and adjust where needed.	Meeting with the human resource manager and project manager	PMBOK, PMI sources
To create a project communications management plan to properly communicate with project team members and project stakeholders.	Meeting with head of public relations	PMBOK, PMI sources
To create a project risk management plan to identify possible risks and how to mitigate these risks.	Meeting with the board and project manager	PMBOK, PMI sources
To create a project procurement management plan to be prepared for how to conduct procurements for this project.	Meeting with the procurement manager and project manager	PMBOK, PMI sources
To create a project stakeholder management plan for proper management of expectations and activities with the different project stakeholders.	Meeting with the complete board and project manager	PMBOK, PMI sources

3.2 Research methods

There are different research methods available. For the electronic patient scheduling application, three research methods have been compared in order to utilize the one that fits the most to the purpose.

The three research methods that have been compared are:

- Descriptive research method;

  The focus while performing a descriptive research is based on the current situation. In relationship to the project and the hospital, the descriptive research could focus on the current numbers of registered patient appointments or on the amount of paper used.

- Analytical research method

  The analytical research method supports in answering a reason why a certain situation exists and how it can be improved. In relationship to the project and the hospital, the research can be performed on the root cause of the problem, for example the inefficient registering of patient appointments, and how this can be improved.

- Disciplinary research method

  The disciplinary research method would result in suggestions on how a certain discipline could be improved. In relationship to the project and the hospital, the research will be performed on how the doctors can improve a certain treatment or operating procedure.

The analytical research method has been utilized to perform the research of the electronic patient scheduling application project.

Proper information was needed in order to complete this project. Information has been sought out and researched. Research is a careful study of a subject, especially in order to discover new facts or information about it (*Oxford Advanced*, 2014). The analytical method has been selected for this project, based on the characteristics of the different research methods and the goal of the project.

3.2.1 Analytical method

When researching a subject using the analytical method, information that is already available is used as input to generate an overview of a subject. In chart 2, a summary of the analytical methodology utilized to achieve the specific objectives of the project, has been plotted.

Chart 2 Utilized analytical research methods (Source: Ernst V. Terborg, June 2020)

Objectives	Analytical research method
To create a project integration management plan in order to coordinate the different project management processes.	Information gathered in sources will be put to use while creating the project integration plan.
To create a scope management plan to clearly identify the work that needs completion	The information gathered will contribute to the scope management plan.
To create a project schedule management plan in order to finish the project within the planned timeframe.	A baseline for creating a schedule will be analyzed and applied.
To create a project cost management plan in order to track the budget of the project and avoid cost overruns.	The quotes will serve as input for the cost management plan.
To create a project quality management plan in order to apply the organization's quality guidelines.	The desired level of quality will assist in analyzing the desired quality.
To create a project resource management plan to properly apply project resources and adjust where needed.	The research will contribute to create an overview of the availability of resources.

Objectives	Analytical research method
To create a project communications management plan to properly communicate with project team members and project stakeholders.	The proper ways of communication will be reviewed.
To create a project risk management plan to identify possible risks and how to mitigate these risks.	The identified risk will be used to create the project risk management plan.
To create a project procurement management plan to be prepared on how to conduct procurements for this project.	The procurement guidelines and best practices serve as input.
To create a project stakeholder management plan for proper management of expectations and activities with the different project stakeholders.	The stakeholder list and stakeholder guidelines will be analyzed for creating the stakeholder management plan.

3.3 Tools

A tool is a thing that helps you to do your job or to achieve something (*Oxford Advanced*, 2014). In the project management, there are several tools available to perform project management related processes. These processes support in composing the project plan and other related documents.

Several of these tools are:

- Expert judgement

  This is based on past experiences of the project manager

- Several project management related templates, which act as a framework to structure data for the project. These templates include but are not limited to a project charter template, a cost management plan template and a communications management plan template.

- Existing documents of the organization
  These could consist of employee lists, approved providers list and current procedures.

- Computer applications
  The mostly used are MS Project and MS Word.

For the composition of this project, multiple of these tools have been used. The tools used are listed in chart number 3.

Chart 3 Tools (Source: Ernst V. Terborg, June 2020)

Objectives	Tools
To create a project integration management plan in order to be able to coordinate the different project management.	Project management plan template, project charter template
To create a scope management plan to clearly identify the work that needs completion.	Business requirements meeting notes, Work Breakdown Structure (WBS), project scope plan template, Microsoft Project, data gathering interviews
To create a project schedule management plan in order to finish the project within the planned timeframe.	Microsoft Project, activity list

Objectives	Tools
To create a project cost management plan in order to be able to track the budget of the project and avoid cost overruns.	Cost management plan template, expert judgement
To create a project quality management plan to apply the organization's quality guidelines.	Quality management plan template, hospital quality measurement guidelines
To create a project resource management plan to properly apply project resources and adjust where needed.	Responsibility overview, project resource management plan template, employee list
To create a project communications management plan to properly communicate with project team members and project stakeholders.	Communications management plan template, communications budget, communications matrix
To create a project risk management plan to identify possible risks and ways to mitigate these risks.	Risk management plan template, Organization's risk management guidelines
To create a project procurement management plan to be prepared for conducting procurements for this project.	Project procurement management plan template, Organization's procurement guidelines, organization's approved providers list
To create a project stakeholder management plan for proper management of expectations and activities with the different project stakeholders.	Project stakeholder management plan template, project stakeholder overview

3.4 Assumptions and constraints

An assumption is a belief or feeling that something is true or that something will happen, although there is no proof; a constraint is a thing that limits or restricts something, or your freedom to do something (*Oxford Advanced*, 2014). During the preparation for this project, several assumptions and constraints have been made and set. These assumptions and constraints are listed in chart number 4.

Chart 4 Assumptions and constraints for the FGP (Source: Ernst V. Terborg, June 2020)

Objectives	Assumptions	Constraints
To create a project schedule management plan to be able to finish the project within the planned timeframe.	Proper and sufficient time periods have been allocated for the project.	The total time for composing should not exceed the period of six months.
To create a project cost management plan in order to be able to track the budget of the project and avoid cost overruns.	The financial resources for the creation and completion of this project available.	Changes in currency exchange rates, increase in prices of required budgeted items.
Creating a project quality management plan in order to apply the organization's quality guidelines.	The project quality management plan will list and contain the required quality guidelines.	Organization's quality guidelines document not available.
To create a project resource management plan to properly apply project resources and adjust where needed.	Proper identification and providence of resources.	List with resources not available, no guarantee of resource availability, and no approval of resource's manager for the resource to be assigned to the project.

Objectives	Assumptions	Constraints
To create a project communications management plan in order to properly communicate with project team members and project stakeholders.	List of stakeholders available, access to communication channels.	Incorrect contact details of team members and project stakeholders.
To create a project risk management plan to identify possible risks and ways to mitigate these risks.	Organization's staff assists in honestly identifying and assessing the different project risks, in the best possible way.	No approval provided to the organization's staff by the managing board to assist in identifying the project risks.
To create a project procurement management plan to be prepared for how to conduct procurements for this project.	Resources needed for this project are mostly available locally.	Time delays in providing items to the project
To create a project stakeholder management plan for proper management of expectations and activities with the different project stakeholders.	All relevant stakeholders to this project will be listed.	Incorrect information of stakeholders, low to non-performance of stakeholders.

3.5 Deliverables

A deliverable is any unique and verifiable product, result, or capability to perform a service that is required in order to produce a complete process, phase, or project. Deliverables are typically the outcomes of the project and can include components of the project management plan. (Project Management Institute, 2017)

The deliverables for this project have been listed in chart 5.

Chart 5 deliverables (Source: Ernst V. Terborg, June 2020)

Objectives	Deliverables
To create a project integration management plan in order to coordinate the different project management processes.	Project integration management plan.
To create a scope management plan to clearly identify the work that needs completion.	Scope management plan, project requirements.
To create a project schedule management plan in order to finish the project within the planned timeframe.	Project schedule management plan, timeline.
To create a project cost management plan in order to be able to track the budget of the project and avoid cost overruns.	Project cost management plan, budget
Creating a project quality management plan to apply the organization's quality guidelines.	Project quality management plan

Objectives	Deliverables
To create a project resource management plan in order to properly apply project resources and adjust where needed.	Project resource management plan, hiring guidelines
To create a project communications management plan to properly communicate with project team members and project stakeholders.	Project communications management plan, communications guidelines
To create a project risk management plan to identify possible risks and ways to mitigate these risks.	Project risk management plan
To create a project procurement management plan to be prepared for how to conduct procurements for this project.	Procurement management plan, procurement guidelines, procurement regulations.
To create a project stakeholder management plan for proper management of expectations and activities with the different project stakeholders.	Project stakeholder management plan, stakeholder overview.

The project can be closed when the acceptance criteria have been met. The acceptance criteria are based on the end product of the mentioned objectives. The acceptance criteria for this project is a fully implemented electronic patient application used by the hospital's staff, especially in the maternity department.

4 RESULTS

4.1 Project integration management

The first objective of the project is the creation of a project integration management plan. The Project Integration Management plan includes the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the project management process groups. (Project Management Institute, 2017)

The project integration management plan consists of several processes.
These are:

- Develop project charter;
- Develop project management plan;
- Direct and manage project work;
- Manage project knowledge;
- Monitor and control project work;
- Perform integrated change control;
- Close project or phase.

To develop the project charter, meetings were held with the management team of the hospital. While developing the project charter, the notes of these meetings were input into documents, together with the business case. Other input documents included the hospital's processes and current working procedures regarding patient scheduling. Expert judgement as a business analysis was put to use while developing the project charter. An extract from the PMBOK visualizing the develop project charter processes is displayed in figure 3.

In the project charter, the start and end dates have been documented.

The processes, such as: direct and manage project knowledge, manage project knowledge, and monitor and control project work will be conducted by the project manager during the execution of the project.

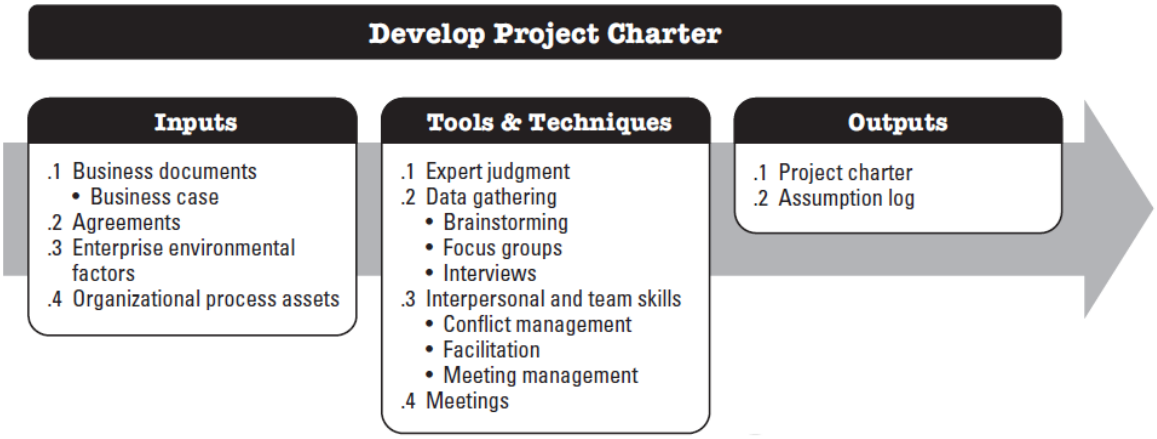

Figure 3 **Develop Project Charter, inputs, tools and techniques and outputs, reprinted from A Guide to the Project Management Body of Knowledge** (Project Management Institute, 2017)

The project charter is displayed as composed during this phase in chart 6.

Chart 6 Project Charter (Source: Ernst V. Terborg, June 2020)

<table>
<tr><th colspan="2">PROJECT CHARTER</th></tr>
<tr><td>Date:</td><td>Project Name:</td></tr>
<tr><td>7-Jun-2020</td><td>Implementation of an electronic patient scheduling application</td></tr>
<tr><td>Knowledge Areas / PM Processes:</td><td>Application Area (Sector / Activity):</td></tr>
<tr><td>Knowledge Areas:
Project cost management, project schedule management, project resource management, project procurement management, project stakeholder management.</td><td rowspan="2">Healthcare, Information technology, business information</td></tr>
<tr><td>PM Processes:
Initiating process group, planning process group</td></tr>
<tr><td>Project Start Date:</td><td>Project Finish date:</td></tr>
<tr><td>01-Jan-2021</td><td>17-Mar-2021</td></tr>
<tr><td colspan="2">Project Objectives (General and Specific):</td></tr>
<tr><td colspan="2">General Objective:
To upgrade the hospital's scheduling methodology and activities by introducing an electronic application, no later than June 2021.</td></tr>
<tr><td colspan="2">Specific Objectives:
1. To reduce the use of paper by 45% and promote a green mindset and working environment by monitoring the quantity of notebooks requested per month.
2. To provide a clear and central overview of patient appointments to administrative staff, doctors, and hospital management to reduce duplicate appointments.</td></tr>
</table>

3. To decrease the time needed to schedule a patient appointment by 50% by eliminating need for employees to locate paper notes but instead use the electronic interface.
4. Introduce electronic scheduling technology in the hospital to improve the computer technology skills of the staff
5. Introduce appointment reminders for patients and hospital staff to reduce the amount of missed appointments.

Project purpose or justification (merit and expected results):

Currently, the hospital uses paper agendas to keep track of patient appointments. Administrative employees and doctors often lose track of appointments and by mistake book double appointments in one timeslot. It has also happened that appointments were never written down which leads to clients were not receiving care on a specific date. The Hospital does not have access to management information regarding the hospital patients and the department's performance. With the implementation of the scheduling application, the scheduling of appointments will take less time, there will be less paper usage, and management will be able to track the amount of patients helped on a certain day.

Description of Product or Service to be generated by the Project – Project final deliverables:

1. Improvement of customer service and experience;
2. Give hospital staff access to reminder text messages for clients;
3. Decrease in the hospital's paper expenditure;
4. Contribute to the ICT education of the hospital staff;

Assumptions:

1. The employees, administration, doctors, and management are able to use computer workstations;
2. The IT department is available to assist with implementation;
3. Internet access available in the hospital;

4. There will be no migration of any current system, paper appointments, or database to the new electronic patient scheduling application;

Constraints:

1. Training on the usage of computer workstations is needed;
2. Training on usage of the application is needed;
3. Delayed delivery of needed hardware;

Preliminary Risks:

If the needed hardware is not delivered on time, or with the right specifications, there will be an impact on the project timeline. If the employees of the IT department are not available to assist during the implementation, the needed IT hardware and network will not be installed according to hospital standards and there will be an impact on the project timeline.

Budget:

$15,000.00 (United States Dollars)

Milestones and dates:

Milestone	**Start date**	**End date**
Project kickoff	4-Jan-2021	4-Jan-2021
Hardware delivery & installation	19-Jan-2021	15-Feb-2021
User training	2-Feb-2021	18-Feb-2021
User acceptance testing (UAT)	19-Jan-2021	15-Feb-2021
Soft launch	16-Feb-2021	22-Feb-2021
Mass roll-out	23-Feb-2021	1-Mar-2021
Post production support	2-Mar-2021	15-Mar-2021
Project closure	16-Mar-2021	17-Mar-2021

Relevant historical information:

The hospital daily attends to approximately 400 patients. Previous attempts were made to improve the method of patient scheduling (paper to paper) but an attempt to upgrade to an electronic system has not been made.

Stakeholders:	
Direct stakeholders: Administrative employees, doctors, hospital management team **Indirect stakeholders:** Patients, purchasing department	
Approval:	
Project Manager: E. V. Terborg	Signature:
Authorized by: M. Adely	Signature:

4.2 Project scope management

After the list of stakeholders was clearly delineated, composition of the project scope management plan began. The scope management plan is crucial in clearly defining the scope of the project and will help keep track of what is required and what is not required during the project.

The project scope management plan consists of several processes. These are:

- Plan scope management;
- Collect requirements;
- Define scope;
- Create work breakdown structure;
- Validate scope;
- Control scope.

The project charter developed in the previous phase serves as input to planning the scope. Enterprise environmental factors should also be taken into consideration. Enterprise environmental factors include but are not limited to:

- Working hours

  Even though the hospital is open for business all day, the most progress for the project will take place from 7 am to 3 pm. These are the regular working hours of the administrative and IT employees of the hospital.

- Employee IT experience

  As employees are not used to performing patient scheduling through an electronic application, and computer use in the hospital is minimal, the automated experience has been taken into consideration. The staff must be trained on using computers.

- IT infrastructure

  The current IT infrastructure might not be capable of processing the load of the scheduling application. Tests should be performed in order to assess the situation and decide if upgrading or replacing the existing IT infrastructure is best.

- Administrative procedures

  The current administrative procedures regarding patient schedules will be analyzed and modified to fit the use of the electronic patient scheduling application while still providing the intended improvement, proper patient experience and efficiency.

To collect requirements of the scheduling application, meetings were held with the hospital management team and the employees currently performing the patient appointment scheduling. Based on the mentioned requirements, a list of the primarily needed items (must haves) and not directly needed items (nice to haves) was made.

The final list with the requirements as follows:

Must haves:

- Calendar with scheduling and planning functionalities;
- E-mail and SMS possibilities;
- Training of hospital staff;
- Management information functionalities.

Nice to haves:

- Automatic reminders to patients through e-mail or SMS;
- Storage and management of basic patient information.

The requirements for the application will be recorded and monitored in a requirements traceability matrix (RTM). The RTM template for this project is documented in chart 7.

Chart 7 Requirement Traceability Matrix for the electronic patient scheduling application project (Source: Ernst V. Terborg, July 2020)

ID	Requirement description	Source / requestor	Business justification	WBS deliverable	Acceptance criteria	Status
1	Calendar with scheduling and planning functionalities	Nursing manager	This is the main reason for this project.	1.1.1.1.1	Make 5 appointments in the new application without receiving errors	Open
2	Send e-mails and SMS messages	ICT manager	To send appointment confirmation and reminders to patients in a timely matter.	1.2.3.3	Of the 5 created appointments, 3 should be send out via e-mail and the other 2 via SMS	Open
3	Store and manage patient basic information	Maternity department head	To have contact information of patients at hand for future reference.	1.2.1.1	Basic information such as name, address, phone number and date of birth should be saved in the application without receiving errors	Open

ID	Requirement description	Source / requestor	Business justification	WBS deliverable	Acceptance criteria	Status
4	Management information functionalities	Nursing manager	To be able to generate reports regarding patient visits and care provided by the hospital staff.	1.2.1.1	Generate charts and tables based on the existing schedule	Open
5	Automatic reminders to patients through e-mail or SMS	Nice to have	An automatic reminder functionality will generate efficiency of human resources and increase the patient attendance rate.	1.2.3.3	Of the created 5 applications, 2 patients should receive a reminder 1 day in advance for their appointment	Open
6	Training of hospital staff	Nursing manager	As primary users of the application, the hospital staff with little to no experience in the application should be trained.	1.2.2	The hospital staff who will make use of the application are able to add, edit, and delete patients and appointments.	Open

The scope management plan, including the work breakdown structure (WBS) are further developed in the next section of this document. Elements from a scope management plan template from the University of Texas, Dallas was used to compose the scope management plan for this project (Scope Management Plan Template, 2020).

During this project, there will be multiple people responsible for different tasks. These roles and responsibilities are recorded in the role and responsibility matrix in chart 8. Due to confidentiality, the names of the actual resources will not be printed. The actual names are known by the author of the document and the management team of the hospital.

Chart 8 Project role and responsibility Matrix the electronic patient scheduling application project (Source: Ernst V. Terborg, June 2020)

Name	Role	Responsibilities
Ernst V. Terborg	Project Manager	- Manage project - Update project documents - Manage Project timeline - Report to project sponsor
M. Johnson	Finance Manager	- Authorize project payments - Authorize project related wages
V. Pinas	ICT Manager	- Facilitate ICT related project activities - Assist during procurement of ICT related devices
H. Soemo	Human resources officer	- Assure resource availability during the project
M. Adely	Nursing manager, Project sponsor	- Sponsor of the project
C. Chloe	Maternity Department head	- Identifies locations to install computers - Coordinates Maternity Department employee availability for project activities

The project scope statement is the description of the project scope, major deliverables, assumptions, and constraints (Project Management Institute, 2017).

The project scope statement consists of:

- Project scope description;
- Deliverables;
- Acceptance criteria;
- Project exclusions.

The scope of the project is limited to the implementation of the electronic scheduling application solely in the maternity department. Members of the management team will also be able to monitor progress and use of the application. Users of the application will be trained in proper utilization of the application. If deemed necessary, the application can be installed for other departments. Implementation should be performed during a separate project. Furthermore, only the items mentioned in the requirements will be implemented. Other functionalities will be attended to in subsequent projects.

The main deliverables for this project include:

- Implementation of an electronic patient scheduling application, tailored to the requirements of the hospital;
- Training of the users of the application.

A work breakdown structure (WBS) divides or breaks the project down into smaller, better manageable deliverables. The WBS for this project is displayed in figure 4.

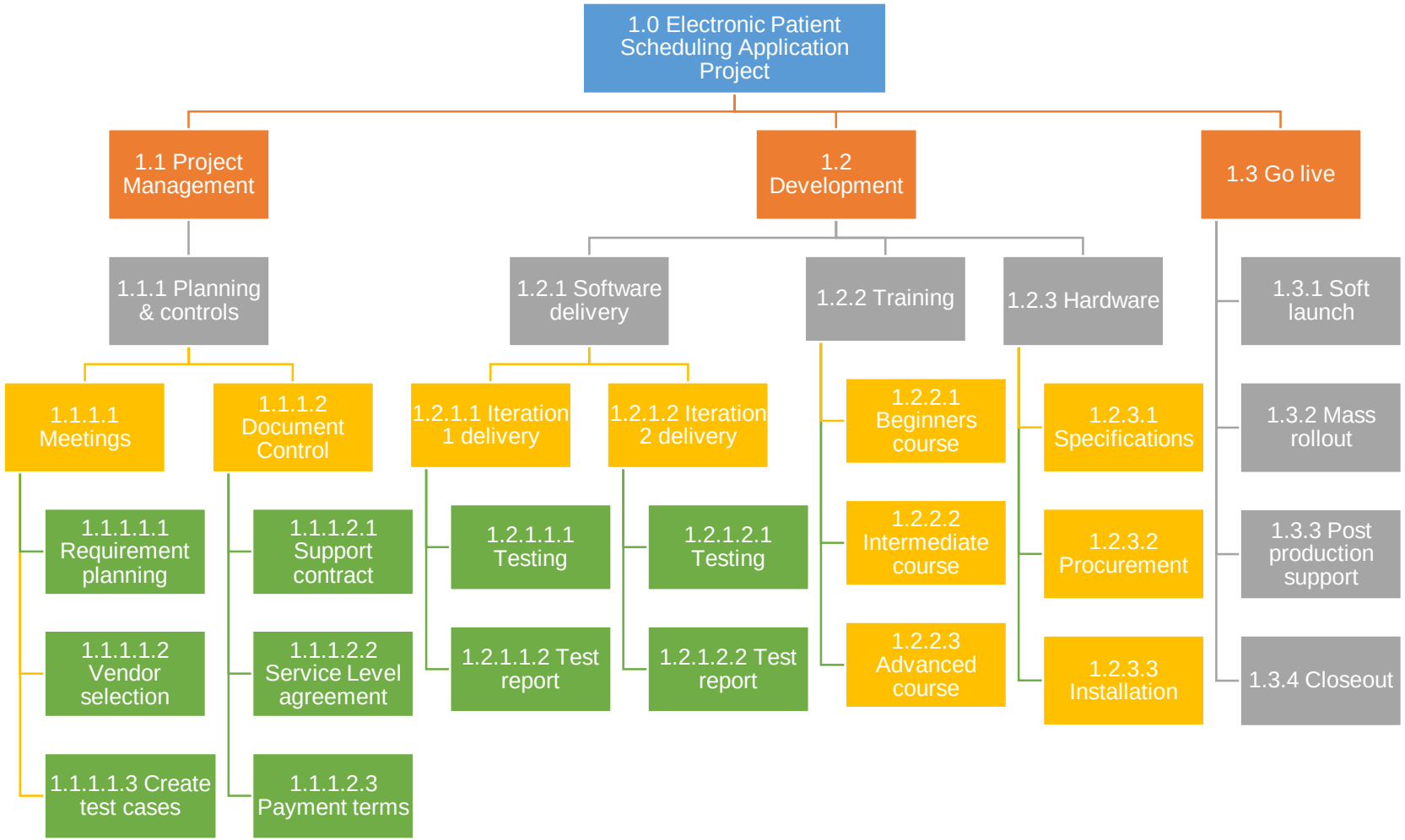

Figure 4 **Work Breakdown Structure of the electronic patient scheduling application project** (Source: Ernst V. Terborg, July 2020)

The activities as plotted in figure 4 are divided in different levels. The legend of the different levels is plotted in figure 5.

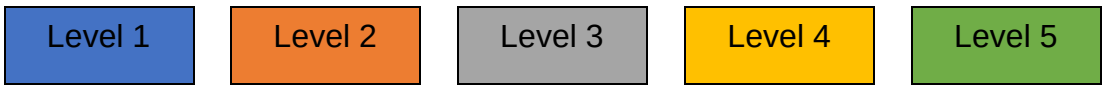

Figure 5 **Legend of different levels in the WBS for the electronic patient scheduling application project** (Source: Ernst V. Terborg, July 2020)

A WBS dictionary is a table type representation of the WBS and consists of details regarding the different elements or activities mentioned. The WBS dictionary for this project is plotted in chart number 9.

Chart 9 WBS dictionary (Source: Ernst V. Terborg, June 2020)

Level	WBS code	WBS element	WBS element description
1	1.0	Electronic Patient Scheduling Application Project	Project to implement the electronic patient scheduling application.
2	1.1	Project Management	Project management main tasks with the PMI standards as main focus point. The PMBOK guide will serve as the primary guide and way of working during the project.
3	1.1.1	Planning & controls	Proper planning will be made to achieve the successes is the project.
4	1.1.1.1	Meetings	Different meetings will be held to decide on scope, decisions, delivery, planning and so on.
5	1.1.1.1.1	Requirement planning	Resources will be invited to provide suggestions regarding functionalities of the application. This suggestions will be used to compose a list of requirements.
5	1.1.1.1.2	Vendor selection	A process will be initiated to identify a software and hardware vendor.
5	1.1.1.1.3	Create test cases	All possible scenarios in the application that need to be tested will be documented.
4	1.1.1.2	Document Control	In this phase the specifications, contracts, instruction documents will be properly documented and indexed.

Level	WBS code	WBS element	WBS element description
5	1.1.1.2.1	Support contract	The support contract consists of the needed software and hardware maintenance. The frequency and rates will be discussed and documented.
5	1.1.1.2.2	Service Level agreement	A SLA will be signed with the software and hardware vendors to describe the priority levels and response times if urgent support is needed.
5	1.1.1.2.3	Payment terms	The payment terms for the agreed contracts will be discussed and documented.
2	1.2	Development	The application will be developed and all related activities will be executed.
3	1.2.1	Software delivery	The software packages will be delivered and made available for installation on the servers.
4	1.2.1.1	Iteration 1 delivery	The first release of the application will be delivered and made available for installation on the servers and testing.
5	1.2.1.1.1	Testing	The first delivery of the software package will be tested by the hospital staff.
5	1.2.1.1.2	Test report	A test report will be composed to document the working of the application and the errors. The test report will be a reference to compare the test results of the next iteration.

Level	WBS code	WBS element	WBS element description
4	1.2.1.2	Iteration 2 delivery	An update to the first release of the application will be delivered and made available for installation on the servers and testing.
5	1.2.1.2.1	Testing	The second delivery of the software package will be tested by the hospital staff. The application should function as expected and the errors reported in the first iteration should not occur anymore.
5	1.2.1.2.2	Test report	A test report will be composed to document the working of the application. There should not be any major errors prior to promoting the application to the production environment. .
3	1.2.2	Training	Hospital staff will be trained on using computers and the new hospital's electronic scheduling application.
4	1.2.2.1	Beginners course	During this course, the employees will receive basic training in the use of personal computers.
4	1.2.2.2	Intermediate course	During this course, the employees will receive training in the use and working of the electronic patient scheduling application.

Level	WBS code	WBS element	WBS element description
4	1.2.2.3	Advanced course	During this course, the management team will receive training in the use of the management information module of the electronic patient scheduling application. The technical staff will receive troubleshooting skills.
3	1.2.3	Hardware	This area consists of the activities related to the ICT hardware needed for the project.
4	1.2.3.1	Specifications	The specifications for the hardware needed will be discussed and documented.
4	1.2.3.2	Procurement	The procurement process will be initiated for ordering the hardware as specified during the specifications phase.
4	1.2.3.3	Installation	The selected hardware will be installed on the hospital's premises.
2	1.3	Go live	Install the application on the production servers.
3	1.3.1	Soft launch	Activate the application for 3 users to monitor the progress on the production.
3	1.3.2	Mass rollout	Activate the application for all users of the maternity ward.
3	1.3.3	Post production support	Provide support to users after the application has been put to use in the production environment.
3	1.3.4	Closeout	Project will be evaluated, end meeting will be held and project will be officially ended.

Scope verification will mainly be performed during the development phase, the FAT and the UAT. During the development phase, the scope and requirement are the foundation for the developers. The project manager can then control and verify. During the FAT and UAT phases, users are testing all functionalities of the application. Testers are writing a test report after each test cycle. Based on the findings in the test reports, the project manager can verify whether the scope has been achieved or not.

The WBS should be accepted by the sponsor before continuing. At the end of the scope management document, there will be a location for the project sponsor to indicate that they agree with the contents.

Sponsor acceptance

Approved by the Project Sponsor:

_____ Date:_____

M. Adely
Nursing Manager

4.3 Project schedule management

With project scheduling, a detailed plan regarding the delivery of the projects, results, and services as described in the project scope management plan is presented. Project schedule management consists of several processes that contribute and support to completing the project in time. The processes of project schedule management are:

- Plan schedule management;
- Define activities;
- Sequence activities;
- Estimate activity durations;
- Develop schedule;
- Control schedule.

A template from the website Project Management Docs has been used as a guideline to compose the project schedule management plan for this project (Schedule Management Plan Template, 2020). The schedule management plan is inserted in the following section of this document.

Schedule management plan

This document, the project schedule management plan, serves as the backbone regarding instructions to starting and finishing the project and its tasks.

This document will be the guide and dashboard for the entire project team and project sponsor regarding the project's progress. Different aspects of the schedule management plan will be analyzed and elaborated.

These aspects include but are not limited to:

- The technique that the project team will utilize to compose the project management schedule;
- Schedule changes;
- Manage changes;
- Administrative tasks that are related to the schedule such as analyzing, approving, and rejecting.

Schedule management approach

Microsoft's online version of MS Project, included in Office 365, will be utilized to compose and manage the project schedule. Specific work packages that must be performed will be identified in the activity definition section, while the order of the work packages will be performed by activity sequencing. The number of work periods required to complete the work packages will be calculated with the use of activity duration. To assign resources to those work packages, resource estimating will be utilized.

The several assigned project tasks will be reviewed by the project manager after the development of the first schedule. The complete project team should be in agreement with the proposed assignments, schedule, and duration. When this is performed, the schedule can be baselined after the approval of the schedule by the project sponsor. The items mentioned in the WBS will also be included in the project schedule.

The milestones for the project Schedule are listed as follows:

- Project kick off;
- Application requirements set;
- Functional requirements documented;
- Hardware requirements documented;
- Procurement documents produced;
- Vendor selection completed;
- Vendor contracts signed;
- Sla signed;
- Efficient testing training performed;
- Application training performed;
- Software development completed;
- Hardware installed;
- Iteration 1 software delivery completed;
- Iteration 2 software delivery completed;
- Approval received for go live;
- Awareness and promotion;
- Go live completed;
- Aftercare completed.

The responsibilities and the roles for developing the schedule are as follows:

- For interpreting and facilitating the work breakdown structure, the project manager will be responsible;
- For creating and managing the schedule, the project manager will be responsible;
- For performing project tasks, the project team will be responsible;
- The project team is also responsible for resource estimating;

- If deemed necessary, the proposed schedule will also be reviewed and approve the proposed schedule.

Schedule control

If deemed necessary, the project schedule will be reviewed and updated when new information is added and existing information is deleted. The actual start and finish dates and progress of completion are recorded in percentages. These assessments will be made once a week. Performing updates on the schedule is the task of the project manager. The project manager will also make sure that review meetings are held. Determination of schedule modifications will be the tasks of the project manager as is the reporting of the project schedule's status. Meeting sessions should be reviewed by the project team members, as should they participate in schedule updates, reviews and changes to the schedule related meetings. There are also expectations for the project team to report changes to the actual start and finish dates to the project manager. If there are schedule change requests submitted by the project manager, the responsibility for the project stakeholder or project sponsors is to review and approve these accordingly as submitted by the project manager.

Schedule changes and thresholds

Each member of the project team can identify whether a change is needed to the existing project schedule. If such an event occurs, the project team, including the project manager, will have a meeting to assess the mentioned changes.

The project team, including the project manager should assess the impact of the mentioned change to the task and the difference in time due to the mentioned change, if applied. Substitutions to influence the change to the schedule, resources, and scope will also be evaluated.

After the evaluation or impact of the possible change to the schedule, the project manager will analyze if the possible change will exceed set limits. If all criteria are passed, a schedule change request must be submitted to the project stakeholder(s). Posting a schedule change request to the project stakeholder(s) is mandatory if any of the following conditions are met:

- There is an estimation that the proposed change will reduce the duration of a work package, mentioned in the schedule change request by 2% or more.
- There is an estimation that the proposed change will increase the duration of a work package, mentioned in the schedule change request by 10% or more.
- There is an estimation that the proposed change will reduce the duration of the overall baseline schedule by 10% or more.
- There is an estimation that the proposed change will increase the duration of the overall baseline schedule by 2% or more.

Any changes that do not meet the criteria mentioned in the conditions above should first be submitted to the project manager for approval. The reason should be properly substantiated. The project manager is responsible for adjusting the schedule, communicating the changes and related impacts on the project to the project team and stakeholders, and properly documenting and storing the change request after it has been reviewed and approved.

Scope change

Any change approved by the project sponsor that is being performed to the project will require that the project team will evaluate the effect of the scope change on the project schedule currently active. These scope changes can include new or modified deliverables or requirements which were not mentioned or deemed necessary at first during the requirements planning or scope phase.

If the project manager determines that the current project schedule will significantly be affected, the project manager may state that the schedule should be re-baselined in regard to the additions or changes that need to be appended to the new project scope. The request for performing a re-baseline should first be reviewed and approved by the project stakeholder before the re-baseline of the schedule can be performed.

Sponsor acceptance

Approved by the project sponsor:

_____ Date:_____

M. Adely
Nursing Manager

As mentioned in earlier sections, project schedule management consists of several processes that contribute and support completing the project in time. The process that follow the plan scope management is the definition of the activities.

The inputs for the definition of activities processes were:

- The project management plan;
- Enterprise environmental factors such as the culture and existing habits of the organization;
- Standardized processes;
- A lessons-learned repository.

The techniques for the definition of activities processes were:

- Expert judgement;
- Decomposition;
- Meetings.

To document and manage all this information, Microsoft Office Project was used as tool. As described in the PMBOK guide, there are several outputs for this process.

The outputs are:

- Activity list;
- Activity attributes;
- Milestone list;
- Change requests;
- Project management plan updates.

The outputs such as activity list, activity attributes, and milestone list have not been generated separately, even though these are mentioned in the PMBOK guide.
This has been decided due to the fact that these are already included in the WBS of this document (chart 9). In chart 10, a merged overview of the outputs is included as activity list.

Chart 10 Activity list (Source: Ernst V. Terborg, June 2020)

Activity ID	Activity Name	Description	Responsible for activity
1.1	Project Management	Initiate the project	Project manager, assistant project manager
1.1.1	Planning & controls	Planning of project activities	Project manager, assistant project manager, human resources officer
1.1.1.1	Meetings	Elaborate on project activities	Project manager, assistant project manager, human resources officer, ICT manager
1.1.1.1.1	Requirement planning	Define and compose a list of requirements.	Project manager, assistant project manager, human resources officer, ICT manager, procurement manager, finance manager, maternity department head
1.1.1.1.2	Vendor selection	Identify and select a software and hardware vendor.	Project manager, assistant project manager, ICT manager, procurement manager, finance manager, maternity department head
1.1.1.1.3	Create test cases	Compose test cases of possible application scenarios	ICT manager, procurement manager, assistant project manager, maternity department head
1.1.1.2	Document Control	Indexing and documenting of project documents	Project manager, assistant project manager

Activity ID	Activity Name	Description	Responsible for activity
1.1.1.2.1	Support contract	The composing an agreement on support contract consists of the software and hardware maintenance.	Project manager, assistant project manager, ICT manager, procurement manager, finance manager
1.1.1.2.2	Service Level agreement	The composing and signing of a SLA between the hospital and the suppliers.	Project manager, assistant project manager, ICT manager, procurement manager
1.1.1.2.3	Payment terms	The payment terms for the agreed contracts will be discussed and documented.	Project manager, assistant project manager, ICT manager, procurement manager, finance manager
1.2	Development	Development of the electronic patient scheduling application.	Project manager, assistant project manager, ICT manager, procurement manager, finance manager, maternity department head, human resources officer, software vendor, hardware vendor

Activity ID	Activity Name	Description	Responsible for activity
1.2.1	Software delivery	Delivery of the developed application packages	Project manager, assistant project manager, ICT manager, software vendor, human resources officer
1.2.1.1	Iteration 1 delivery	Delivery of the first software package for testing.	Project manager, assistant project manager, ICT manager, procurement manager, software vendor
1.2.1.1.1	Testing	Testing of the first delivery of the software package.	Project manager, assistant project manager, ICT manager, maternity department head, human resources officer
1.2.1.1.2	Test report	Report to document the working of the application and the errors.	Project manager, assistant project manager, ICT manager, human resources officer
1.2.1.2	Iteration 2 delivery	Delivery of the second software package for testing.	Project manager, assistant project manager, ICT manager, procurement manager, software vendor
1.2.1.2.1	Testing	Testing of the second delivery of the software package.	Project manager, assistant project manager, ICT manager, maternity department head, human resources officer

Activity ID	Activity Name	Description	Responsible for activity
1.2.1.2.2	Test report	Report to document the working of the application and the errors.	Project manager, assistant project manager, ICT manager, human resources officer
1.2.2	Training	Training of hospital staff in using of the application	Project manager, assistant project manager, ICT manager, software vendor, human resources officer
1.2.2.1	Beginners course	Train employees in basic computer skills	Project manager, assistant project manager, ICT manager, software vendor, human resources officer
1.2.2.2	Intermediate course	Train employees in usage of the electronic scheduling application.	Project manager, assistant project manager, ICT manager, software vendor, human resources officer
1.2.2.3	Advanced course	Train employees in trouble shooting skills and generating of MIS report	Project manager, assistant project manager, ICT manager, software vendor, human resources officer

Activity ID	Activity Name	Description	Responsible for activity
1.2.3	Hardware	Hardware purchasing.	Project manager, assistant project manager, ICT manager, procurement manager, finance manager
1.2.3.1	Specifications	Specify needed hardware	Project manager, assistant project manager, ICT manager
1.2.3.2	Procurement	Purchase hardware	Project manager, assistant project manager, ICT manager, procurement manager, finance manager
1.2.3.3	Installation	Assembly and installation of hardware	Project manager, assistant project manager, ICT manager, hardware vendor
1.3	Go live	Activate the application for real live use	Project manager, assistant project manager, ICT manager, software vendor
1.3.1	Soft launch	Activate the application for 3 users	Project manager, assistant project manager, ICT manager, software vendor
1.3.2	Mass rollout	Activate the application for all intended users	Project manager, assistant project manager, ICT manager, procurement manager, finance manager, maternity department head
1.3.3	Post support	Provide post live support	Project manager, assistant project manager, ICT manager

Activity ID	Activity Name	Description	Responsible for activity
1.3.4	Closeout	Evaluate project	Project manager, assistant project manager, ICT manager, procurement manager, finance manager, maternity department head

Another process in this sequence, after all activities were identified and defined, is identifying and documenting the relationships between project activities. Inputs to this process were the project management plan, project documents, enterprise environmental factors, and organizational process assets. To visualize the relationships between the project main activities, a diagram was composed.
This diagram is visible in figure 6. Using the precedence diagramming method, the finish to start relationship type was utilized.

Figure 6 **Project schedule network diagram** (Source: Ernst V. Terborg, June 2020)

After the sequencing and identification of the activities, the next process, estimate activity durations, was initiated. The project documents, project management plan, enterprise environmental factors, and organizational process assets were the inputs. Meetings, data analysis, and expert judgement were the tools and techniques used to perform the estimation of the activity durations. This process resulted in proper duration estimates. The duration of the different activities is plotted in chart 11.

Chart 11 Activity duration (Source: Ernst V. Terborg, June 2020)

WBS code	Task name	Duration
1.0	Electronic Patient Scheduling Application Project	90 days
1.1	Project Management	11 days
1.1.1	Planning & controls	11 days
1.1.1.1	Meetings	6 days
1.1.1.1.1	Requirement planning	3 days
1.1.1.1.2	Vendor selection	3 days
1.1.1.1.3	Create test cases	3 days
1.1.1.2	Document Control	5 days
1.1.1.2.1	Support contract	2 days
1.1.1.2.2	Service Level agreement	2 days
1.1.1.2.3	Payment terms	1 day
1.2	Development	53 days
1.2.1	Software delivery	20 days
1.2.1.1	Iteration 1 delivery	10 days
1.2.1.1.1	Testing	5 days
1.2.1.1.2	Test report	5 days
1.2.1.2	Iteration 2 delivery	10 days
1.2.1.2.1	Testing	5 days
1.2.1.2.2	Test report	5 days
1.2.2	Training	13 days
1.2.2.1	Beginners course	5 days
1.2.2.2	Intermediate course	5 days
1.2.2.3	Advanced course	3 days
1.2.3	Hardware	20 days
1.2.3.1	Specifications	5 days
1.2.3.2	Procurement	5 days

WBS code	Task name	Duration
1.2.3.3	Installation	10 days
1.3	Go live	22 days
1.3.1	Soft launch	5 days
1.3.2	Mass rollout	5 days
1.3.3	Post support	10 days
1.3.4	Closeout	2 days

The next process that followed the estimation of the project activities was the development of the schedule. Inputs to this process were the project management plan, project documents, enterprise environmental factors, agreements, and organizational process assets. The technique used was data analysis.

Microsoft Office Project was utilized as tool. This resulted in the project schedule as output. The project schedule is visible in figure 7.

ID	Task Name	Duration	Start	Finish
1	**1 Electronic Patient Scheduling Application Proje**	**53 days**	**Mon 1/4/21**	**Wed 3/17/21**
2	**1.1 Project Management**	**11 days**	**Mon 1/4/21**	**Mon 1/18/21**
3	**1.1.1 Planning & controls**	**11 days**	**Mon 1/4/21**	**Mon 1/18/21**
4	**1.1.1.1 Meetings**	**6 days**	**Mon 1/4/21**	**Mon 1/11/21**
5	1.1.1.1.1 Requirements	3 days	Mon 1/4/21	Wed 1/6/21
6	1.1.1.1.2 Vendor selection	3 days	Thu 1/7/21	Mon 1/11/21
7	1.1.1.1.3 Create test cases	3 days	Thu 1/7/21	Mon 1/11/21
8	**1.1.1.2 Document Control**	**5 days**	**Tue 1/12/21**	**Mon 1/18/21**
9	1.1.1.2.1 Support contract	2 days	Tue 1/12/21	Wed 1/13/21
10	1.1.1.2.2 Service Level agreement	2 days	Thu 1/14/21	Fri 1/15/21
11	1.1.1.2.3 Payment terms	1 day	Mon 1/18/21	Mon 1/18/21
12	**1.2 Development**	**23 days**	**Tue 1/19/21**	**Thu 2/18/21**
13	**1.2.1 Software delivery**	**20 days**	**Tue 1/19/21**	**Mon 2/15/21**
14	**1.2.1.1 Iteration 1 delivery**	**10 days**	**Tue 1/19/21**	**Mon 2/1/21**
15	1.2.1.1.1 Testing	5 days	Tue 1/19/21	Mon 1/25/21
16	1.2.1.1.2 Test report	5 days	Tue 1/26/21	Mon 2/1/21
17	**1.2.1.2 Iteration 2 delivery**	**10 days**	**Tue 2/2/21**	**Mon 2/15/21**
18	1.2.1.2.1 Testing	5 days	Tue 2/2/21	Mon 2/8/21
19	1.2.1.2.2 Test report	5 days	Tue 2/9/21	Mon 2/15/21
20	**1.2.2 Training**	**13 days**	**Tue 2/2/21**	**Thu 2/18/21**
21	1.2.2.1 Beginners course	5 days	Tue 2/2/21	Mon 2/8/21
22	1.2.2.2 Intermediate course	5 days	Tue 2/9/21	Mon 2/15/21
23	1.2.2.3 Advanced course	3 days	Tue 2/16/21	Thu 2/18/21
24	**1.2.3 Hardware**	**20 days**	**Tue 1/19/21**	**Mon 2/15/21**
25	1.2.3.1 Specifications	5 days	Tue 1/19/21	Mon 1/25/21
26	1.2.3.2 Procurement	5 days	Tue 1/26/21	Mon 2/1/21
27	1.2.3.3 Installation	10 days	Tue 2/2/21	Mon 2/15/21
28	**1.3 Go live**	**22 days**	**Tue 2/16/21**	**Wed 3/17/21**
29	1.3.1 Soft launch	5 days	Tue 2/16/21	Mon 2/22/21
30	1.3.2 Mass rollout	5 days	Tue 2/23/21	Mon 3/1/21
31	1.3.3 Post production support	10 days	Tue 3/2/21	Mon 3/15/21
32	1.3.4 Closeout	2 days	Tue 3/16/21	Wed 3/17/21

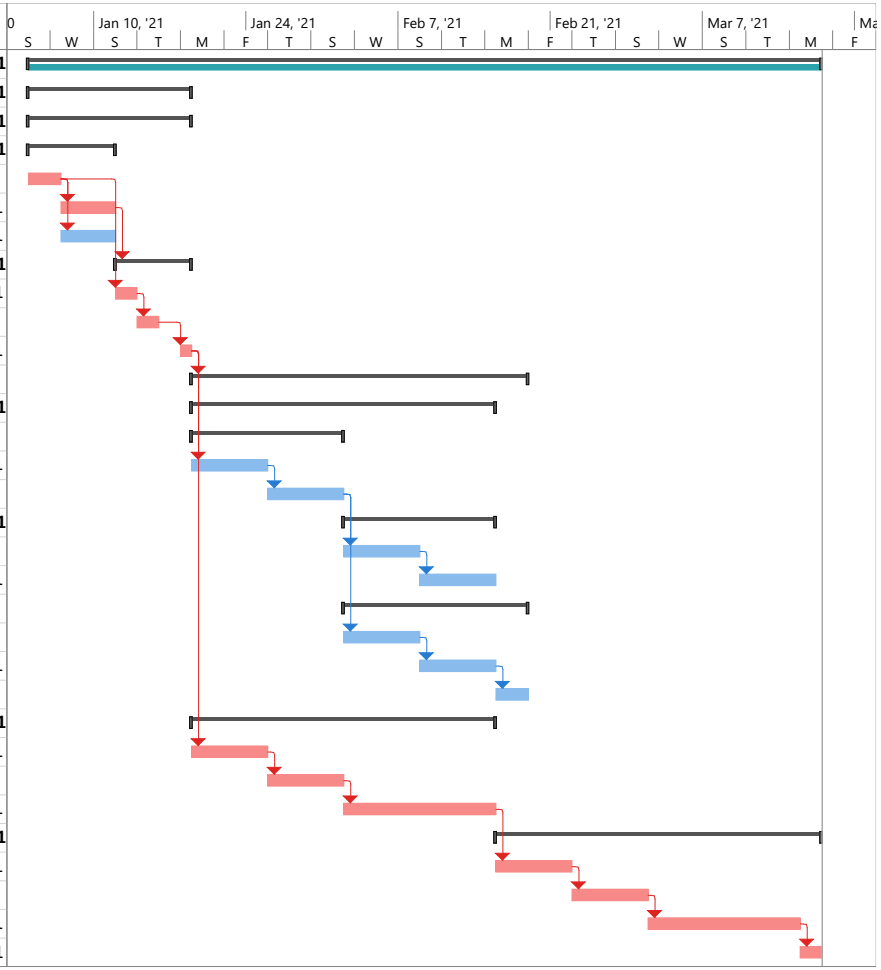

Figure 7 **Project schedule of the electronic patient scheduling application project** (Source: Ernst V. Terborg, July 2020)

4.4 Project cost management

Project cost management includes the processes involved in planning, estimating budget, financing, funding, and managing and controlling costs so that the project can be completed within the approved budget (Project Management Institute, 2017).

Project cost management consists of four processes. The four project cost management processes are:

- Plan cost management;
- Estimate costs;
- Determine budget;
- Control costs.

To develop the project cost management plan, the project plan and the schedule management plan were used as input. Elements from a project cost management plan template retrieved from the website *Project Management Docs* served as a guide to composing the project cost management plan for this project (Cost Management Plan Template, 2020).

The purpose of the project cost management plan is to clarify how the budget and finances of the electronic scheduling application project will be managed during the project lifecycle. During the weekly project status meeting, the project manager should present a cost overview to the project sponsor. In minutes from that meeting, the project manager will document the presented info and provide that information digitally to the project sponsor and the management team of the hospital. It is the responsibility of the project manager and the assistant project manager to keep track the project finances and changes, if such exists.

A presentation should be held for the project sponsor with suggestions for getting the project costs and budget back on track if budget overruns occur. If there are urgent decisions that need to be made regarding the project costs, the project manager should e-mail the project sponsor. The project sponsor can request clarification of that e-mail if deemed necessary. The cost performance of the project will be measured during the earned value method.

Cost management approach

The second level of the WBS will be the baseline for the cost management for this project. To track the costs, control accounts will be created. The financial performance for the control accounts of this project will be measured by earned value calculations while the credit for performed work will be assigned at the work package level. Based on the amount of work completed within a certain timeframe, the percentage of funds granted to a work package will be calculated. This will be in comparison to the total costs of successfully completing the work package.

As measured in the schedule and cost indexes, variances in the costs with the value of +/- 0.1 will trigger a status change. The status of that specific cost will be indicated with an orange color in the project status reports which stands for warning.

Variances in the costs with the value of +/- 0.2 will trigger a status change. The status of that specific cost will be indicated with a red color in the project status reports, which stands for danger. A corrective action will be needed from the project manager and the assistant project manager. This action must result in bringing the cost performance index and schedule performance index to an acceptable level, preferably below the danger level. For these corrective actions, a project change order will be required. Approval from the project sponsor is required before the changes can be amended to the scope of the project. In the cost management approach, the project manager will keep the currency exchange rates in mind.

Measurement of project costs

The performance of the project will be measured by utilizing the earned value management method. To measure the cost performance of the project, the following earned value metrics will be utilized:

- Schedule variance (SV)
  A measurement of the schedule performance for a project.
- Cost variance (CV)
  Related to the budget of the project.
- Schedule Performance Index (SPI)
  Utilized to measure the achieved progress versus the planned.
- Cost Performance Index (CPI)
  Utilized to measure the value of the completed work versus the actual costs of the completed work.

In chart 12, the performance measurement metrics, schedule performance index and cost performance index are plotted with their respective warning and danger thresholds.

Chart 12 Activity duration derived from the cost management plan template (Cost Management Plan Template, 2020)

Performance metric	Warning	Danger
Schedule Performance Index (SPI)	Between 0.9 and 0.8 or between 1.1 and 1.2	Less than 0.8 or greater than 1.2
Cost Performance Index (CPI)	Between 0.9 and 0.8 or between 1.1 and 1.2	Less than 0.8 or greater than 1.2

Reporting format

The progress regarding cost management will be reported in the project progress report in the designated section. The earned value metrics for this project will be included. Cost variances with anomalies to the set thresholds will also be reported in the project progress report, as will the planned corrective actions. Regarding change orders trigged by project cost overruns, it can be noted that these will be mentioned and tracked in the same project progress report.

Cost variance response process

It is noted in chart 12 that the acceptable control threshold for this electronic scheduling application project includes a CPI or SPI of less than 0.95 or greater than 1.15. A cost variance corrective action plan is required and mandatory if the project reaches one of these set control thresholds. Within the project, the hospital's management team, the project sponsor, and the project manager agreed on deadlines and time frames regarding the corrective actions for proper cost variance management. The options for corrective actions will be presented to the project sponsor by the project manager within fourteen days, beginning from the moment the cost variance is first reported. After a suggestion for a corrective action has been selected by the project sponsor, the project manager will plan a meeting with the project sponsor to present a formal cost variance corrective action plan. In this cost variance corrective action plan, the options and actions necessary to align the project costs back to the planned budget will be presented and discussed. The cost variance corrective action plan will be merged with the project plan after the approval and acceptance of the cost variance corrective action plan. The corrective actions will be added as items to the existing project.

Estimation of costs & project budget

After the development of the cost management plan, the costs for this project were estimated. The input for this process was the cost management plan. Expert judgement MS Project and bottom-up estimating were the tools used. To decide on the most efficient ways to compose the budget of the projects, meetings were organized and held. The project manager and the assistant project manager estimated the costs of the individual work packages and tasks. Quotes and bids received from different vendors during procurement were used as baselines and guides. The details of the costs for the individual work packages and tasks are plotted in chart 13. The project management costs will be donated to the hospital. To budget the funds required bi-weekly, a chart has been made to display the planned allocation of the funds during the electronic scheduling application project. With a clear schedule of the planned allocation of funds, the project sponsor can schedule ahead regarding the disbursement of finances to the project. This will also contribute to the financial planning of the hospital. This planned allocation of funds is visible in chart 14.

The contingency reserve for the project has been calculated using the expected monetary value method, which will be discussed and clarified during the project risk management section. The specific EMV amount of the contingency amount can be applied if a certain risk occurs. In the hospital, a percentage of 10% is calculated in all budgeting purposes as a management reserve. This value is also applied for the budgeting of the electronic patient scheduling application project.

Chart 13 Cost of individual work packages and tasks for the electronic patient scheduling application project (Source: Ernst V. Terborg, June 2020)

Quantity	Unit	Task	Unit costs	Total costs
		Project Management		**$ 0.00**
25	hour	Meetings	$ 0.00	$ 0.00
1	several	Office supplies	$ 0.00	$ 0.00
		Development		**$ 0.00**
2	cycle	Development during iteration	$ 0.00	$ 0.00
2	cycle	Testing of iteration	$ 0.00	$ 0.00
		Training		**$ 500.00**
7	hour	Beginners course	$ 25.00	$ 175.00
7	hour	Intermediate course	$ 25.00	$ 175.00
6	hour	Advanced course	$ 25.00	$ 150.00
		Hardware		**$ 6,760.00**
4	piece	Desktop computers	$ 1,250.00	$ 5,000.00
8	several	Network items	$ 100.00	$ 800.00
4	piece	UPS 1500 VA	$ 240.00	$ 960.00
		Go live		**$ 1,080.00**
11	Unit	Remote support	$ 25.00	$ 275.00
12	Unit	Software licenses	$ 65.00	$ 780.00
1	unit	Activation on the production environment & support	$ 25.00	$ 25.00
		Cost estimate total		**$ 8,340.00**
		Contingency reserve		$ 5,282.50
		Sub total		**$ 13,622.50**
		Management reserve		$ 1,362.25
		Grand total		**$ 14,984.75**

Chart 14 Planned allocation of funds of the electronic patient scheduling application project (Source: Ernst V. Terborg, July 2020)

Project activity phase	4-Jan-2021	18-Jan-2021	1-Feb-2021	15-Feb-2021	1-Mar-2021	15-Mar-2021	29-Mar-2021	5-Apr-2021	12-Apr-2021	Total
Project management										
Development										
Training				$ 500.00						**$ 500.00**
Hardware			$ 6760.00							**$ 6760.00**
Go live						$ 250.00	$ 250.00	$ 250.00	$ 330.00	**$ 1080.00**
Total			**$ 6760.00**	**$ 500.00**		**$ 250.00**	**$ 250.00**	**$ 250.00**	**$ 330.00**	**$ 8340.00**

Note: The contingency reserve and management reserve are excluded from this chart. The management reserve is available to all three project phases of this project. The management reserve will be assigned as needed, if approved.

Project Budget Components

As seen in chart 13, the project budget is based on several components. A graphical representation of the project budget components is displayed in figure 8.

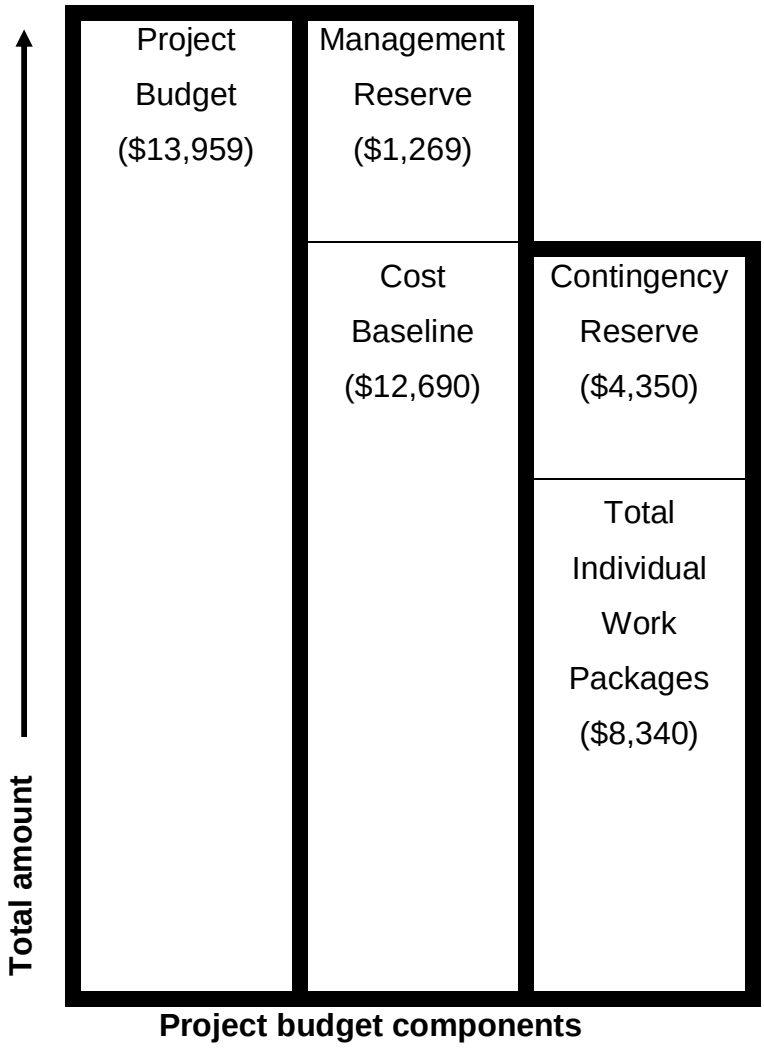

Figure 8 **Graphical representation of project budget components for the electronic patient scheduling application project.** (Source: Ernst V. Terborg, August 2020)

Sponsor acceptance

Approved by the project sponsor:

_____ Date:_____

M. Adely

Nursing Manager

4.5 Project quality management

The quality management plan is the successive plan that would need to be created after the procurement management plan has been completed. According to the PMBOK, project quality management includes the processes that are needed for incorporating the organization's quality policies concerning planning, managing, and controlling project and product quality requirements in order to meet the objectives of the stakeholder (Project Management Institute, 2017).

Project quality management consists of several processes. These processes are:

- Plan quality management;
- Manage quality;
- Control quality.

Plan quality management

To perform the planning of quality management, several items were used as input. These items consist of but are not limited to:

- Stakeholder register;
- Risk register;
- Requirements management plan.

The PMBOK suggests tools to perform the quality management planning. Out of these suggestions, several tools were selected. The list of tools used are:

- Benchmarking;
- Brainstorming;
- Interviews;
- Data analysis;
- Meetings.

As result or output of this process, a quality management plan has been created. The quality management plan is included in this document in the next sections. A quality management plan template from the website *Project Management Docs* has been used as guideline to compose the project quality management plan for this project (Quality Management Plan Template, 2020).

The objectives of the quality management plan for the electronic patient scheduling application project are:

- Guarantee that quality for the project is planned;
- Document how the quality is quality for the project will be managed;
- Document the activities related to quality assurance;
- Document the activities related to quality control;
- Document the acceptable quality standards.

Quality management approach

The quality management approach is there to ensure that quality is delivered during the electronic patient scheduling application project. This applies to the output, the results, but also to several other processes. The quality objectives of this project must be achieved to guarantee the success of the electronic patient scheduling application project. The project quality will be ensured through application of an integrated quality approach to define quality standards, measure quality, and continue to improve quality. It is advisable that quality always is planned into a project in order to prevent unnecessarily wasted work, cost, time, and resources.

Product quality for the electronic patient scheduling application project will be defined by and based on the hospital's current quality criteria and industry standards. The project deliverables, standards, and criteria used will be the main focus point. This is to guarantee that the electronic patient scheduling application exceeds or at least meets the established quality standards and satisfaction.

Process quality for the electronic patient scheduling application project will focus on the processes by which the project deliverable will be designed and programmed. Establishing process quality standards will guarantee that all activities are performed to hospital and regulatory standards, which will result in the successful delivery of the application.

The project manager and assistant project manager will define and document all organizational and project specific quality standards for both the application and the (project) processes. All documents in regards to quality management will be amended to the project plan of the electronic patient scheduling application. After the successful completion of the project, the quality related documentation will be transferred to the operational departments and employees who will be using the electronic patient scheduling application.

Metrics will be established as baseline and used to measure quality of the application and processes throughout the project lifecycle. The project manager and the assistant project manager will be responsible for working with the project team to define the metrics. The project manager and the assistant project manager will also conduct measurements and analyze the results. These application (product) and process measurements will be used as criteria to determine the success of the project. The application and process measurements must be reviewed by the project sponsor.

The metrics that have been established will include but are not limited to:

- Schedule;
- Resources;
- Process performance:
    - Application programming;
    - Application testing;
- Costs;
- Product performance:
    - Application performance;
    - Application stability;
- Application design;
- Employer and user satisfaction.

Any member of the project team can and will identify quality improvements. All recommendations will be reviewed to determine the costs versus the benefits of implementing and processing these improvements. The improvements' impact on the application and the existing processes will be assessed. All project documentation will be updated by the project manager if the mentioned improvement is implemented. Simultaneously, the quality manager will update the hospital's documentation to reflect the improvement and the related effects.

Quality requirements and standards

Quality requirements and standards are there to demonstrate how compliance is being met with the identified quality standards and at which level. Quality requirements and standards should be identified and documented. The two quality requirement levels and standards that are being focused on are product quality and process quality.

- Product quality

  The project team will determine the quality standards, levels, and requirements regarding product quality, which will be based on the hospital's existing documents and processes, mainly regarding patient appointments and scheduling. If standards have been looked over or missed, an assessment will take place and the standards will be appended to the existing documents and processes. These standards will also be documented in the project plan. It is the responsibility of the project team to ensure that standards are communicated to all project stakeholders. During the test cycles, an assessment can be made to assure that the electronic patient scheduling application is in line with the set quality levels.

- Process quality

  The project team will also determine the quality standards, levels, and requirements regarding process quality. These will be based on the hospital's existing documents, processes, and standards, mainly regarding patient appointments and scheduling. If standards have been looked over or missed, an assessment will take place and the standards will be appended to the existing documents and processes. These standards will also be documented in the project plan. It is the responsibility of the project team to assure that the standards are communicated to all project stakeholders. During the test cycles, an assessment can be made to assure that the electronic patient scheduling application is in line with the set quality levels.

Quality assurance

Several requirements and thresholds will be audited, based on defined quality requirements. The defined quality requirements and levels will be compared against the current quality values of the project.

The quality assurance of the electronic patient scheduling application project focusses on the processes used in developing the electronic patient scheduling application and the functionality and performance of the application. An iterative process including measuring the process metrics, analyzing process data, and continuous improvement is included in the iterative processes of quality measurement and quality assurance. Quality assessments will be performed by the project manager and assistant project manager in collaboration with the project team. Assessment intervals will be planned.

The metrics that mainly will be focused on are:

- System processing;
- Application installation time;
- Message delivery time;
- Development rework required.

In chart 15, the key quality assurance metrics for the electronic patient scheduling application project have been plotted.

Chart 15 Quality assurance metrics for the electronic patient scheduling application project (Source: Ernst V. Terborg, July 2020)

Process Action	Acceptable Process Standards	Process Phase	Assessment Interval
System processing	No lag in screen movement, almost instantly advancement	Development	Per iteration delivered
Application installation time	Maximum of 15 minutes for installing the application on the hospital servers	Development	Per iteration delivered
Message delivery time	Less than 7 seconds to deliver a message to a client	Testing	During each test set in the test cycles
Development rework required.	Less than 24 working hours assigned to rework	Development	Every 2 days

The assistant project manager will be responsible for quality management. Audits will be performed according to the intervals listed in chart 15. These audits will contribute to the monitoring of quality metrics. If discrepancies are noticed, the project manager will be notified to assess and take corrective actions, if possible.

Findings regarding the performed audits will be reported in project meetings which are scheduled by the project manager. Improvements can be suggested and made to the auditing processes. These will be reviewed, documented, implemented, and also communicated to the project stakeholders.

Quality control

The quality control of the electronic patient scheduling application project focuses primarily on the workings of the application, the processes during development, and the acceptable standards and performance. The quality performance standards for the electronic patient scheduling application project are in accordance with the organizational standards of scheduling patient appointments. As there are no physical products, an assessment cannot be processed to measure the product. The quality, however, can be measured based on performance of the application. As mentioned previously, regular project meetings will be held by the project manager. Improvements for the application can be suggested.

These suggested improvements will be reviewed, documented, implemented and also communicated to the project stakeholders. It is crucial to the success of the project that all the established standards for this project are met. If standards are being met, then the electronic patient scheduling application project is being performed by the best standards and the application will adhere to expectations. This will also ensure that implementation will be in line with set budget and resource allocations.

Quality control measurements

All the deliverables and development processes of the electronic patient scheduling application must and will be measured and fall within the established standards and margins. In charts 16 and 17, examples of logs that will be used to conduct the measurements are plotted. The logs will contribute to the project's acceptance as supporting documents.

Chart 16 Quality assurance log template for the electronic patient scheduling application project (Source: Ernst V. Terborg, June 2020)

Process inspection #	Date measured	Process measured	Required value	Actual measured value	Acceptable? Yes / No	Recommendation	Date resolved
1							
2							
3							

Chart 17 Quality control log template for the electronic patient scheduling application project (Source: Ernst V. Terborg, June 2020)

Deliverable #	Date measured	Item measured	Required value	Actual measured value	Acceptable? Yes / No	Recommendation	Date resolved
1							
2							
3							

Sponsor acceptance

Approved by the Project Sponsor:

_____ Date:_____

M. Adely

Nursing Manager

4.6 Project resource management

Project resource management includes the processes that identify, acquire, and manage the resources needed for the successful completion of a project. These processes help to ensure that the correct resources will be available for the project manager and the project team, right when and where they are needed (Project Management Institute, 2017). Resource management is a critical part of the electronic patient scheduling application project. Resources are needed to perform several activities ranging from performing payments to suppliers to testing the application.

Project resource management consists of several processes. These processes are:

- Plan resource management;
- Estimate activity resources;
- Acquire resources;
- Develop team;
- Manage team;
- Control resources.

The activity resources requirements are derived from the work packages listed in the work breakdown structure earlier in this document.
These requirements, together with the project schedule, have been used as input for this process. The scope management plan was also used as an input document for this process. The tools and techniques used were the meetings held and expert judgement. As result or output of this process, a resource management plan will be composed. The resource management plan is included in this document in the next sections. A resource management plan template from the website *Project Management Docs* has been used as guideline to compose the resource management plan for the electronic patient scheduling application (Resource Management Plan Template, 2020).

The resources management plan is additionally a tool which will serve as an aid in the management of this electronic patient scheduling application project's resource activities until project closure. The resource management plan consists of several parts:

- The roles and responsibilities of team members throughout the project;
- Project organization charts;
- Staffing management plan, containing:
    - Documentation on how resources will be acquired;
    - The timeline for resources and skill sets;
    - Training required to develop skills;
    - Description on how performance reviews will be conducted;
    - A recognition and rewards system.

The purpose of the resource management plan is to achieve project success by ensuring the appropriate resources are acquired and applied using the necessary skills, resources are offered if any gaps in skills are identified, team building strategies are clearly defined, and team activities are both effectively and efficiently managed.

Roles and responsibilities

A clear description of the roles and responsibilities of the project team members for the electronic patient scheduling application project are essential to project success. It is crucial that all project team members clearly understand their roles and responsibilities in order to successfully perform their contribution and responsibilities to the project.

The following roles and responsibilities have been defined for the electronic patient scheduling application project:

- Software developer (SD), 2 positions

  The software developers are responsible for developing and coding the electronic patient scheduling application according to the set requirements and specifications listed by the software architect.

  Due to the fact that scrum methodology will be utilized, the developer should report to the scrum master. The software developer should also be proficient in programming languages such as HTML and PHP.

  Experience with MySQL, SQL, Apache, and Windows Server environments is mandatory.

- Software architect (SA), 1 position

  The software architect is responsible for documenting the requirements of the organization for the electronic patient scheduling application as technical specifications that will be used as input and a base starting point for the software developers and will determine the hardware requirements based on the software requirements. The software architect will also serve as a backbone for the application testers in order to verify the functionality of the electronic patient scheduling application.

  The software architect will act as the first point of contact in regard to the functionalities of the electronic patient scheduling application. The software architect should have a background in data analysis and a minimum of two years of experience in a comparable position.

  They should also be proficient in programming languages such as HTML and PHP. Experience with MySQL and SQL is preferred.

  The training regarding the (proper) use of the electronic patient scheduling application will be provided by the Software architect.

- ICT manager (IM), 1 position

  The ICT manager will not only facilitate the activities regarding hardware purchases and installation, but will also guarantee the availability of the ICT hardware to the project team. The technical responsibilities will fall back to the ICT manager.

- Human resource officer (HRO), 1 position

  The human resource officer will not have a primary position in the project team. The human resource officer will be responsible for aiding the project manager in hiring for the project and facilitating and providing office locations and other human resources related tasks such as salaries and employee recognition.

- Project manager (PM), 1 position

  The project manager is responsible of the overall success of the electronic patient scheduling application project. All project activities will be authorized and approved by the project manager. The project manager assures project work activities meet the set criteria for quality and will monitor possible variance where and if it exists. The project status and deviations will be reported by the project manager. Human resources may be assigned to the project as a co-effort. The performance of the project team members will be evaluated and scored by the project manager. Skills that the project manager should possess are time management, thinking green, budgeting, and leadership.

- Lead test officer (LTO), 1 position

  The lead test officer will be responsible of planning all test cycles. Test scripts will need to be designed by the lead test officers. All test officers will report to the lead test officers.

The lead test officer will work in close contact with the software architect. The lead test officer should have experience in and skills regarding time management, iterative testing, and the TMAP test suite.

Project organizational charts

A project organizational chart is a graphical display of the project tasks in relation to team members. The responsible assignment matrix (RAM) and the responsible, accountable, consult, and inform (RACI) method are tools used to create and display project organizational charts. In chart 18, the RACI matrix for the electronic patient scheduling application has been composed.

Chart 18 RACI matrix for the electronic patient scheduling application project (Source: Ernst V. Terborg, July 2020)

Task	SD	SA	HRO	IM	PM	LTO
Project management	C	A	I	I	R	C
Development	A	C	I	C	R	A
Training	I	A	C	I	R	C
Hardware	I	I	I	A	R	I
Go live	I	C	I	A	R	C

The legend for chart 18 is as follows:

- R – Responsible for performing the activities;
- A – Accountable for the work performed;
- C – Consulted if decisions are made;
- I – Informed regarding work performed and decisions;

The resources of the project, both human and material resources, plotted in a clear overview in figure 9.

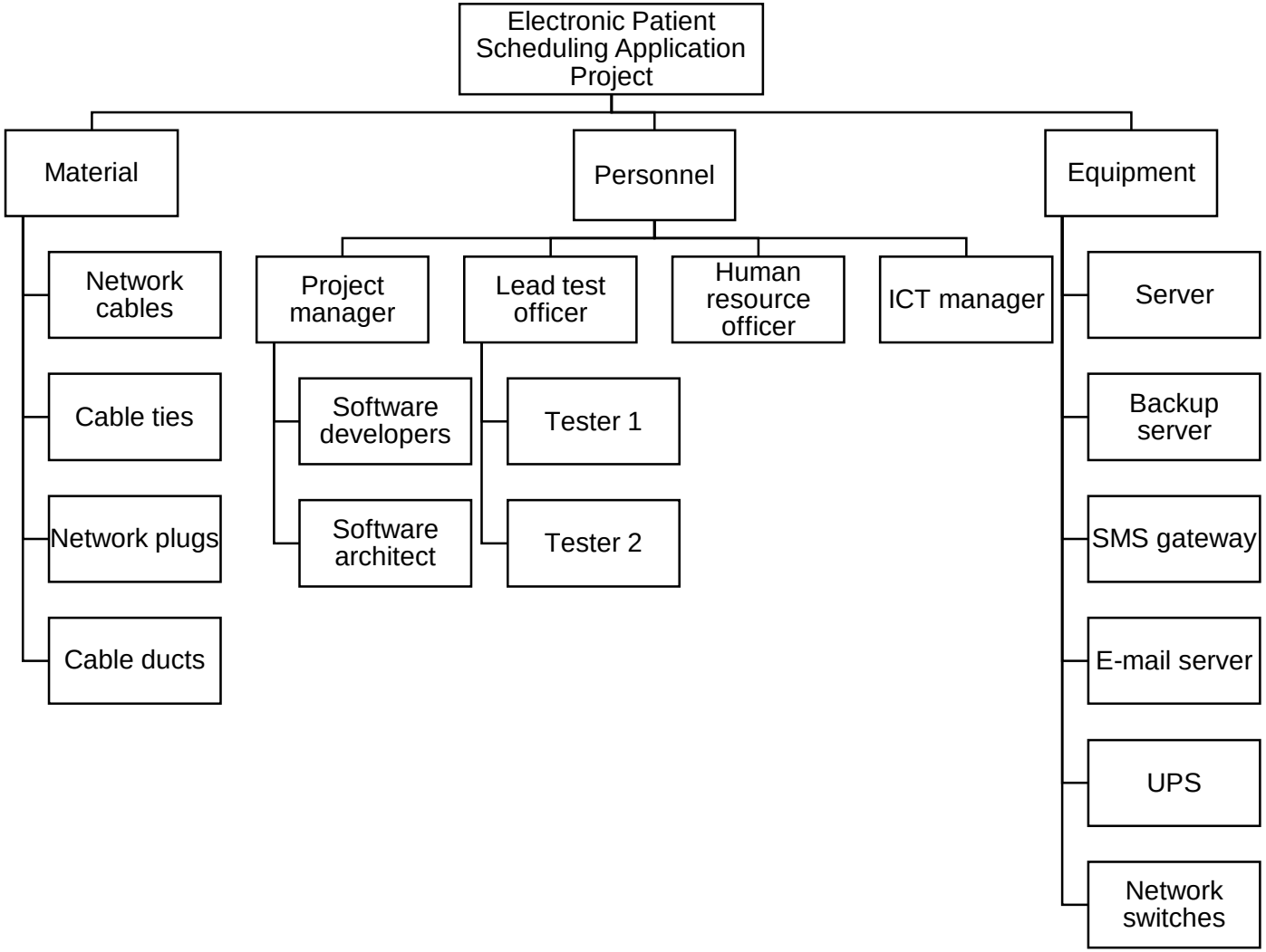

Figure 9 **Project resource breakdown structure for the electronic patient scheduling application project**

(Source: Ernst V. Terborg, July 2020)

Staffing management

Human resources must be assigned to the project. The resources will be acquired from different departments of the hospital to form the project team. Therefore, certain activity groups are in place to assist in staffing management.

These activity groups are:

- Staff acquisition;
- Resource calendars.

The activity groups will be described in the following sections of this document.

Staff acquisition

Employees of the hospital will be assigned to the electronic patient scheduling application project. The only external resource is the hardware supplier, which will not be added to the project team because their only function will be to install the hardware needed for the project. The project manager will assign resources to the project, together with the human resource officer. The individual department heads should be in agreement before a resource is assigned to the project. A conference room of the hospital will serve as project office. The resources will temporarily be relocated to this location in the hospital.

Resource allocation calendar

The electronic patient scheduling application project will have a duration of 18 weeks. All resources must be secured before the project can begin. The resource histogram, seen in figure 10, displays than an unequal effort is needed per resource, per three weeks. The most effort is needed from the project manager throughout the project. The developers and lead test officer are required, only when needed. The least amount of effort is required from the ICT manager.

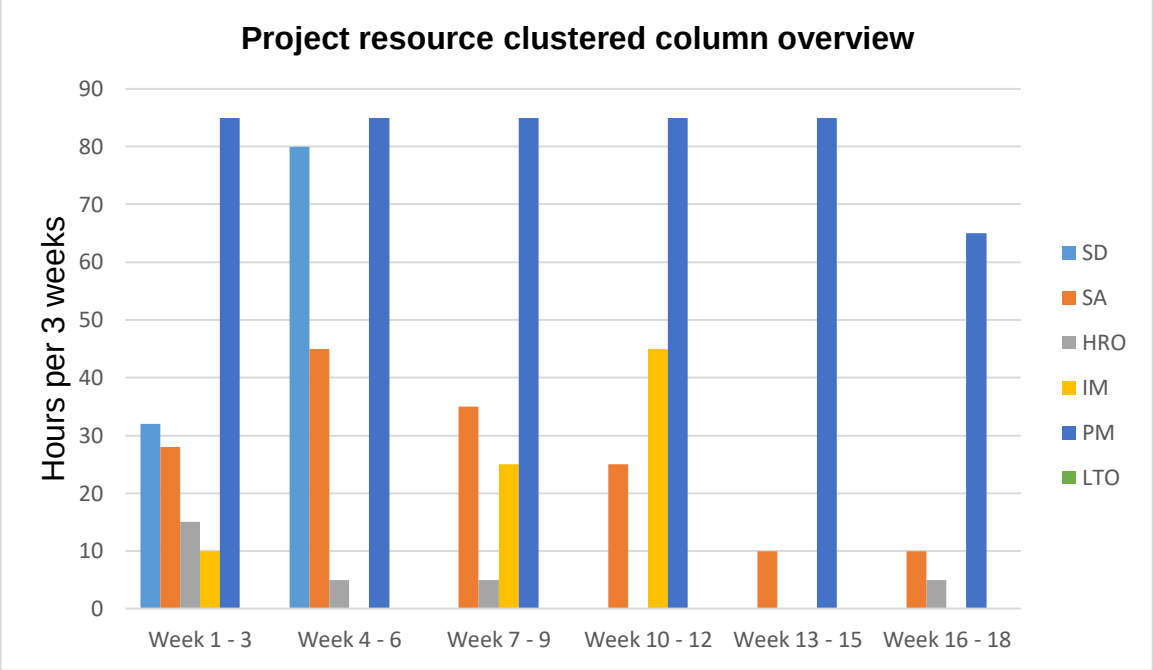

Figure 10 **Project resource clustered column overview for the electronic patient scheduling application project** (Source: Ernst V. Terborg, June 2020)

Training

Training will not be held for the project team members, but for the users of the electronic patient scheduling application. If additional training is deemed necessary during the project, this will be funded from the project reserve.

The trainings are divided in three levels:

- Beginners course
  Users with no basic knowledge of computer usage.
- Intermediate course
  Users with basic knowledge of computer usage and users who will utilize the MIS module of the application.

- Advance course.
  Meant for the hospital's ICT staff who will provide the first line of support to hospital users.

Performance review

The project manager is responsible for reviewing and assessing each team member's assigned work activities at the initiation of the project and communicating expectations of work to be performed. The project manager will then evaluate each team member during the project to gauge how effectively they are completing their assigned work. Prior to completing the project work periods with the assigned project team resources, the project manager will meet with the manager and provide feedback for each employee on their project performance and contribution.

Employee recognition and rewards

During the project, there will be no employee recognition and rewards. Due to the fact that the project is being performed during normal business hours, there will not be any additional financial compensation for the employee that participates in the project. After the successful completion of the project, a project closing meeting will be held where the achievements of the staff will be presented. After the formal presentation, there will be an informal gathering where employees will receive participation awards. This will be performed by the human resources officer and the hospital's management team.

Sponsor acceptance

Approved by the project sponsor:

_____ Date:_____

M. Adely

Nursing Manager

4.7 Project communications management

The communication outline for the electronic patient scheduling application project will be based on the communications management plan. The communications management plan will serve as a guide during the project regarding communications. This plan will be changed if deemed necessary. In a communications management plan, the requirements for communications will be defined and documented. The plan will also describe how information regarding the project will be distributed. Project communications management includes the processes that are necessary to ensure that the information needs of the project and its stakeholders are met through development of artifacts and implementation activities designed to achieve effective information exchange (Project Management Institute, 2017).

The project communications processes are:

- Plan communications management;
- Manage communications;
- Monitor communications.

The project charter, project management plan, enterprise environmental factors, and other project related documents such as the stakeholder register have been used as inputs for the project communications management plan. The tools and techniques used were the meetings that were held and expert judgement. The roles of the persons involved in the electronic patient scheduling application project are identified and defined in the communications management plan. The communications management matrix defines the communication requirements of the project. There will be a guide available for conducting meetings. The rules and the method of meetings will be presented in order to guarantee successful meetings.

The contact information of all project stakeholders is listed in a project team directory. This project team directory is included to describe the correct contact information for all stakeholders who have direct involvement in the electronic patient scheduling application project.

As result or output of this process, a communication management plan will be composed. A communication management plan template from the website Project Management Docs has been used as a guideline to compose the communication management plan for the electronic patient scheduling application project (Communication Management Plan Template, 2020).

Communications management approach

During the project, the project manager will have a primary role and responsibility for ensuring effective and proper communications. Approximately 70 to 80% of the time invested by the project manager is applied to communicating. Planning, monitoring and reporting are just a few methods of communicating. The Project Manager will take a proactive role in ensuring effective communications on this project. The communications requirements are documented in the Communications Matrix presented in this document. The Communications Matrix will be used as a guide for what information to communicate, who is to do the communicating, when to communicate it, and to whom to communicate.

With most projects, there are typically changes and updates. These changes may occur as the project progresses. Changes are approved and may be required due to changes in personnel, scope, budget, or other possible reasons. In addition, an update may also be required as the project progresses and there are additional requirements. It is the responsibility of the project manager to manage all the proposed changes, if approved, to the communications management plan.

The project manager will update the communications management plan and other supporting and related documentation after the changes are approved. The updates will be distributed to the project team and the project stakeholders.

Communications management constraints

There are limitations and constraints during the project. The project must be within the scope, aligned with the budget and also with the resource requirement planning. The project's communication activities will occur within the approved budget, schedule, and allocation of resources. It is the responsibility of the project manager to ensure that communication activities are performed by the project team, because there is no budget allocation for communication activities by external resources. The communication activities, such as meetings, will be held according to set constraints, such as frequency. Changes to the project schedule are possible, but must be approved by the project sponsor. The same is valid for schedule delays and exceeding the budget.

At the moment, the hospital does not utilize a formal project management office. Therefore, there are no official or approved standardized project documents available in the hospital. This project will introduce and begin to standardize project related forms, templates and policies. Other than communication specific related policies, the hospital does have a guideline regarding confidential information. Confidential information may not be shared. If deemed necessary, approval is needed from the senior management team of the hospital. The data used while developing the electronic patient scheduling application until the go live will be dummy data.

Stakeholder communication requirements

The project manager will identify and interact with the project stakeholders to determine a preferred frequency and the method of communication.

An average will be determined from their responses and the project communications will occur according to the communication matrix. The project managers should be aware of the progress activities, thus should they be properly informed, primarily because the project stakeholders (can) have an influence on the project. As part of identifying all project stakeholders, the project manager will communicate with each stakeholder in order to determine their preferred frequency and method of communication. This feedback will be maintained by the project manager in the project's Stakeholder Register. Standard project communications will occur in accordance with the Communication Matrix. However, depending on the identified stakeholder communication requirements, individual communication is acceptable and within the constraints outlined for this project.

In addition to identifying communication preferences, stakeholder communication requirements must identify the project's communication channels and ensure that stakeholders have access to these channels. If project information is communicated via secure means or through internal company resources, all stakeholders, internal and external, must have the necessary access to receive project communications. Once all stakeholders have been identified and communication requirements are established, the project team will maintain this information in the project's Stakeholder Register and make use of it, along with the project communication matrix, as the basis for all communications.

Roles

The resources of the project have several roles. Setting boundaries and managing expectations and responsibilities must be clearly described. The method of communication with resources that fulfill different roles are described in the following section.

- Project Sponsor

  The project sponsor is the most powerful person in terms of role and responsibilities of the project. The project sponsor authorizes the project by signing the project charter. The project sponsor is responsible for funding of the project and is ultimately responsible for the successful completion of the project. Communication, in terms of presentations or reports, will be in summary format, unless requested otherwise due to the executive role of the project sponsor.

- Key Stakeholders

  Normally, stakeholders include all individuals and organizations who are impacted by the project. For this project, a subset of the stakeholders as key stakeholders will be defined. The list of stakeholders is lengthy but can be subset to the main stakeholders that will have the direct contact with the project team. Those main stakeholders are the managers of the departments that will make use of the electronic patient scheduling application. These stakeholders will be contacted weekly with reports and bi-weekly with presentations.

- Project Manager

  The project manager has total responsibility for the electronic patient scheduling application project. The daily activities, resources, and project (progress) reports are the responsibility of the project manager. The project manager is the primary person overseeing communications. The project manager will distribute project related information to the project team and other stakeholders.

- ICT Manager

  The ICT manager is responsible for the ICT infrastructure. Changes to the ICT related hardware or software should be reported to the ICT manager. Updates regarding the project will be communicated to them via e-mail in a detailed overview. They should also attend the weekly project meetings to receive the updates regarding the project.

- Project Team

  Each individual with a role in the project comprises the project team. Communication is crucial for the success of the project. Thus, should there be daily interaction and communication between the team members and the project manager. There will be detailed communications between the project team members. Updates will also be provided during the weekly project meetings.

- Steering Committee

  The Steering Committee includes the management team of the hospital and the managers of the different departments related to the project. Communications to this group will be in summary format. The steering committee will be provided project updates once every two weeks.

- Human Resources Officer
  The human resources officer will receive communications in summary format. The human resources officer supports project team members and will often only require info regarding resource planning and allocation.

- Lead Test Officer
  The lead test officer will be updated regarding the project in detailed format. The lead test officer should be aware of all updates, as this will support in composing the test cases.

Project team directory

A project team directory contributes to proper, clear, and successful communication. In chart 19, the contact information for the entities mentioned in the communications management plan has been included. The e-mail addresses and phone numbers in this chart will be used to communicate with the entities.

Chart 19 Project team directory for the electronic patient scheduling application project (Source: Ernst V. Terborg, June 2020)

Role / title	Name	Organization / Department	E-mail address	Phone number
Project sponsor	M. Adely	‘s Lands Hospitaal	m.adely@LH.sr	473655
ICT manager	V. Pinas	‘s Lands Hospitaal	v.pinas@LH.sr	473655
Software developer	A. Karto	External	akarto@gmail.com	8682299
Software architect	R. Pansa	External	r.w.pansa@gmail.com	7156985

Role / title	Name	Organization / Department	E-mail address	Phone number
Human resource officer	H. Soemo	‘s Lands Hospitaal	h.soemo@LH.sr	473655
Project manager	E. Terborg	External	evterborg@gmail.com	8682299
Lead test officer	S. Mahinder	External	mahinder.s@live.com	7256985

Communication methods and technologies

Information that is communicated and the variety of communication methods are equally important. Communication is also dependent on the communication expertise and skills of those who are communicating. Proper definition of communication methods and terms during the project can contribute to success.

For this project, the project team will generate an overview of communication methods, technologies, and tools to be used. The communication methods, policies, and tools will as much possible be those already used by the Hospital. Where possible, more modern technologies for communication will be introduced if these introductions do not interfere with the project timeline.

Most of the communication regarding the project will be performed by e-mail because the project manager is an external resource. Electronic documents related to the project will be stored on the hospital’s data server which is located on the hospital’s premises. The documents that will be stored on the hospital’s server should be accessible to all project team members and the hospital’s management team.

Maintenance of the hardware responsible for storing and accessing the project documents and also the availability of licenses of applications unrelated to the project are not included in the scope of the project and are the sole responsibility of the hospital. The communication requirements of the project are displayed in chart 20.

Chart 20 Communication requirements for the electronic patient scheduling application project (Source: Ernst V. Terborg, June 2020)

Com-munica-tion type	Objective of communication	Medium/ method	Frequency	Audience	Owner	Deliverables	Format
Kickoff meeting	Introduction of project team members. Review project objectives, targets and management approach	Face to face	Once	Project sponsor and project team	Project manager	Agenda and meeting minutes	PDF on hospital server
Project team meetings	Discuss the progress of the project	Face to face and online meetings	Once a week	Project team	Project manager	Agenda, meeting minutes and project schedule	PDF on hospital server
Project status meetings	Discuss the project progress	Face to face and online meetings	Every two weeks	Project sponsor	Project manager	Project status report & meeting minutes	PDF on hospital server

Com-munica-tion type	Objective of communication	Medium/ method	Frequency	Audience	Owner	Deliverables	Format
Project progress reports	Report the project progress	E-mails	Once a week	Project team	Project manager	Project progress report	PDF on hospital server
Technical setup meetings	Define and monitor the technical specifications and progress of the project		Once a week	Project team and hospital IT staff	Project manager	Progress reports & meeting minutes	PDF on hospital server

Communication methods and technologies

The communication processes of a project can be difficult to understand. Communication flowcharts are one of the tools used to visually represent communication processes. To clarify these processes, a flowchart has been composed to serves as a guide for the project team members. If there are situations where the communications flowchart does not provide instructions, the project manager will be responsible for providing instructions on how to proceed. In figure 11, the project communications flowchart is plotted.

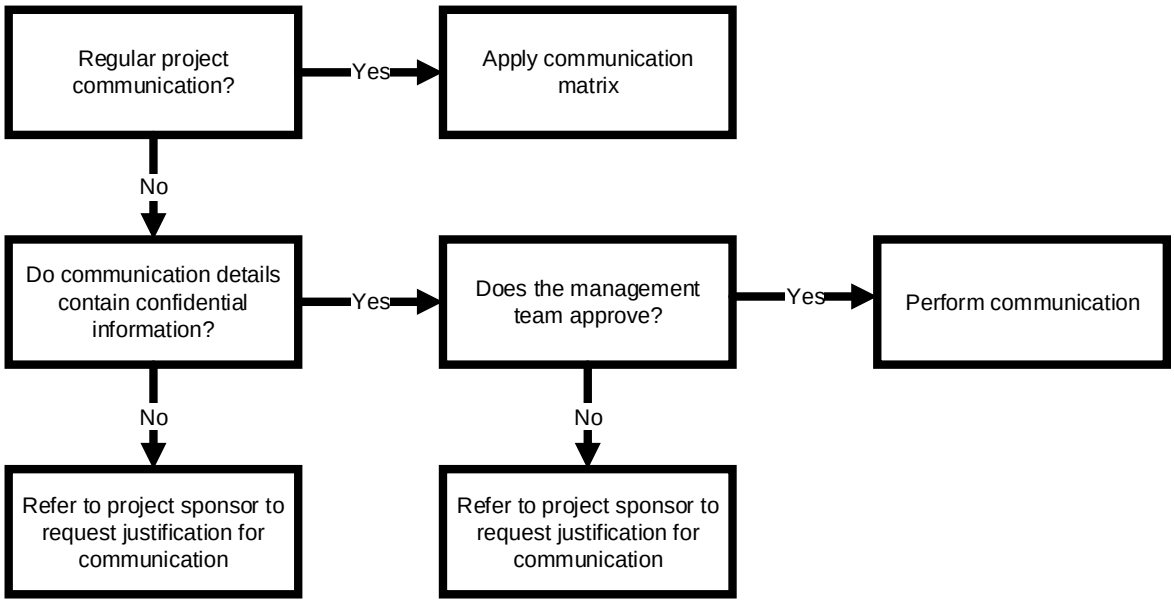

Figure 11 **Project communications flowchart for the electronic patient scheduling application project** (Source: Ernst V. Terborg, June 2020)

Guidelines for meetings

Different individuals have different methods for leading meetings. For uniformity during the meetings, certain guidelines have been decided upon in order to properly lead or organize project. These guidelines will promote uniformity and proper meeting progress.

These guidelines consist of several subjects, including:

- Meeting chair

  The meeting chair is responsible for organizing the meetings and inviting the attendees. Time keeping is also one of the roles of the meeting chair.

- Meeting agenda

  The agenda of the upcoming meeting should be distributed to the meeting participants not later than 4 days in advance, including a recap of the previous meeting as a subject for the upcoming meeting.

- Action item list

  Action items with deadlines should be noted in the meeting minutes along with the responsible resources and/or departments.

- Meeting minutes

  After each meeting, the meeting minutes should be distributed to the meeting participants. The minutes are crucial for the following meeting and will support the action item list.

- Minutes secretary

  The minutes secretary supports the meeting chair and takes notes at the meeting. This individual is also responsible to for distributing the meeting minutes to the attendees.

Organization communication standards

The project manager will promote utilization of the hospital's standard communication templates. During the project, a standard naming convention and document storing location on the server will be defined.

The hospital's letterhead will be provided to the project manager and minutes secretary in order to prepare meeting invitations and meeting minutes according to the existing hospital templates. The project progress reports will also be noted and distributed based on the hospital's communication standards, such as letterhead.

Communication escalation process

Even though there are processes in place for proper communication, there can be complications. The project team should work on a solution. If the project team does not achieve a solution, the issue should be escalated. The communication escalation and resolution matrix as displayed in chart 21 provides a guide on how to resolve communication complications.

Chart 21 Communication escalation resolution matrix for the electronic patient scheduling application project (Source: Ernst V. Terborg, June 2020)

Priority	Definition	Decision maker	Window for resolution
1	Critical impact to the project or project timeline. The project cannot continue without resolution	Hospital management	4 to 6 business hours
2	High impact to the project or project timeline. The project can significantly be impacted	Project sponsor	One working day
3	Medium impact to the project or project timeline	Project manager	Two working days
4	Low impact to the project or project timeline	Project manager	During the project

Sponsor acceptance

Approved by the project sponsor:

_____ Date:_____

M. Adely

Nursing Manager

4.8 Project risk management

Performing projects comes with certain risks, especially when introducing a new product or service to an existing one. By initiating the project, an organization or project manager commits to accepting, managing, or mitigating the risks. These risks can play a major role in the progress of a project. A project risk is an activity that occurs during a project that can affect the project positively or negatively. A risk management plan serves as a guide on how to identify, mitigate or avoid the identified risks. The major activities for the project risk management phase are the risk identification, qualitative risk analysis, and \quantitative risk analysis. As described in the previous sections, the two major risks for this project are

- Late delivery of project related IT hardware;
- Non-availability of the hospital's IT resources.

The identified project risks will be monitored by the project manager. The risks have been identified during the development phase of the project charter and will be tracked in the risk register. Action items will be created and tracked in the risk register. For the identification of project risks, the risk management plan, the cost management plan, the schedule management plan, quality management plan, and the human resources management plan should be completed. These will serve as input.

Risk Identification

The risk identification for the electronic patient scheduling application project was conducted during risk assessment meetings, in expert interviews, and reviewing reports of similar projects. All project team members were granted the opportunity during the risk assessment meetings to identify risks as much as possible. These were then discussed and analyzed. The identified risks will be listed in a risk management sheet as described and plotted in chart 22. During the project, the progress of resolving risks should be monitored. When a risk has been resolved, the close date in the sheet must be updated.

Chart 22 Risk management sheet for the electronic patient scheduling application project (Source: Ernst V. Terborg, July 2020)

ID	Description	Category	Date	Status	Responsible	Suggested actions	Close date
1	Change of project manager	Human resources	July 10, 2020	Open	Nursing manager	Sign contracts to prevent sudden change of project manager	
2	Unwillingness of the hospital employees	Human resources	July 10, 2020	Open	Human resource manager	Organize awareness sessions that clarify the need for implementation	
3	Change of the national currency exchange rate (devaluation)	Financial	July 10, 2020	Open	Project manager	Decide to stop or continue the project, request donations to compensate the extra needed funds.	
4	Insufficient Internet speeds at the hospital	Data connection	July 10, 2020	Open	ICT manager	Contact the internet service provider to perform speed tests and improve if needed	
5	Unforeseen national health threats which will require dedication	Human resources	July 10, 2020	Open	Human resource manager	Decide how to proceed. Will the project be put on hold?	

ID	Description	Category	Date	Status	Responsible	Suggested actions	Close date
6	Employees not trained on time	Planning	July 10, 2020	Open	Project manager	Agree with the human resource manager and training facility to assure training deadline will be met.	
7	Price increase of hardware	Financial	July 10, 2020	Open	Project manager	Sign contracts with vendors to have dedicated prices available.	
8	Cancellation of the project by hospital management	Planning	July 10, 2020	Open	Project manager, Nursing manager	Organize awareness sessions that emphasize the benefits of this project.	
9	Unavailability of hospital employees for training & testing	Human resources	July 10, 2020	Open	Human resource manager	Resource planning sessions with human resources manager.	
10	Delay in hardware delivery	Planning	July 10, 2020	Open	Project manager	Ship critical items by air not by ocean.	

ID	Description	Category	Date	Status	Responsible	Suggested actions	Close date
11	No (public) transportation available for hospital employee training	Human resources	July 10, 2020	Open	Human resource manager	Arrange transport to the hospital for employees.	
12	Internet connection failure during the training of hospital employees	Data connection	July 10, 2020	Open	ICT manager	Postpone training, activate secondary internet connection, ask software vendor to facilitate an offline training.	
13	Wrong equipment received (other than ordered)	Hardware	July 10, 2020	Open	ICT manager	Communicate with vendor and shipping company to deliver correct equipment and expedite delivery.	
14	Power outage during training and implementation	Utilities	July 10, 2020	Open	Project manager	Ensure related computers and hardware are connected on a UPS, connect power outlets on the hospital's electrical generator.	

ID	Description	Category	Date	Status	Responsible	Suggested actions	Close date
15	Power outage during project meetings	Utilities	July 10, 2020	Open	Project manager	Make sure related computers and hardware are connected on a UPS, connect power outlets on the hospital's electrical generator.	
16	Contracts with vendors not signed in time	Planning	July 10, 2020	Open	Project manager	Add a time reserve of 2 extra days to mitigate issues.	
17	Repetitive non-availability of the project sponsor for meetings	Human resources	July 10, 2020	Open	Project manager, Nursing manager	Schedule meetings 2 weeks in advance, agree on a bi-weekly meeting schedule, let a representative attend meetings.	
18	Loss of project documents from hospital servers	ICT	July 10, 2020	Open	ICT manager	Schedule daily backups.	

ID	Description	Category	Date	Status	Responsible	Suggested actions	Close date
19	Stopping of project funding	Financial	July 10, 2020	Open	Project manager, Nursing manager	Create funding schedules & sign dedication or commitment agreements.	
20	Discontinuation of services by software vendor	Application	July 10, 2020	Open	ICT manager, Project manager	Sign SLA to guarantee availability and support	
21	Closure of hardware vendor company	Hardware	July 10, 2020	Open	ICT manager, Project manager	Sign SLA to guarantee availability and support	
22	Incorrect parameterization of scheduling application during the project	Application	July 10, 2020	Open	ICT manager	Create sheet with the parameter values as reference during the configuration of the application.	
23	Hospital staff not regularly informed about project	Human resources	July 10, 2020	Open	Project manager, Nursing manager	Send weekly updates regarding the progress of the project to all hospital employees.	

ID	Description	Category	Date	Status	Responsible	Suggested actions	Close date
24	Project manager not granted access to hospital premises	Human resources	July 10, 2020	Open	Nursing manager	Introduce the project manager to the hospital employees, especially the security.	
25	Discontinuation of the project by the government due to implementation of a central application	Planning	July 10, 2020	Open	Project manager	Inform the ministry of health to integrate the central application with the one the hospital is implementing with this project.	
26	Hospital management mandates a project scope change to implement the application at multiple departments	Planning	July 10, 2020	Open	Project manager, Nursing manager	Agree on the project scope and suggest initiating an additional project.	

ID	Description	Category	Date	Status	Responsible	Suggested actions	Close date
27	Cybersecurity attacks on the hospital	ICT	July 10, 2020	Open	ICT manager	Have anti-virus and anti-malware software installed on the hospital's workstations and servers. Ensure that these are regularly updated.	
28	Data leak of the (sensitive) patient information	ICT	July 10, 2020	Open	ICT manager	Make the hospital staff aware of the cyber security risks, how to identify them and how to mitigate them.	

ID	Description	Category	Date	Status	Responsible	Suggested actions	Close date
29	Lawsuit by patient due to data leak	ICT	July 10, 2020	Open	ICT manager	Ask patients to sign agreements that notify them of the electronic storage of their personal data and that the hospital cannot be held responsible for any data leaks, even though the hospital is taking every possible preventive measures.	

Risk probability and impact

A probability and impact matrix guide with scales has been plotted in chart 23 in order to visualize the values of the probabilities and impacts. These values will be the input for the risk register. The corresponding probability and impact values used has been plotted in chart 24. This is part of the qualitative risk analysis.

The scale values from 1-5 will be used to identify the probability. The meaning of these values are:

- 1 – Very low (unlikely)
- 2 – Low (seldom)
- 3 – Medium (occasional)
- 4 – High (likely)
- 5 – It is a fact (definitely)

The scale values from 1-5 will be used to identify the impact. The meaning of these values are:

- 1 – Insignificant
- 2 – Marginal
- 3 – Moderate
- 4 – Critical
- 5 - Catastrophe

Chart 23 Graphical visualization of the probability and impact scales that will be used during the Electronic patient scheduling application project (Source: Ernst V. Terborg, August 2020)

		Impact				
		1 – Insignificant	2 – Marginal	3 – Moderate	4 – Critical	5 - Catastrophe
Probability	1 – very low (unlikely)	Low	Low	Low	Medium	Medium
	2 – Low (seldom)	Low	Low	Medium	Medium	Medium
	3 – Medium (occasional)	Low	Medium	Medium	Medium	High
	4 – High (likely)	Medium	Medium	Medium	High	High
	5 – It is a fact (definitely)	Medium	Medium	High	High	High

Chart 24 Graphical visualization of the probability and impact values that will be used during the Electronic patient scheduling application project (Source: Ernst V. Terborg, August 2020)

		Impact				
		1 – Insignificant	2 – Marginal	3 – Moderate	4 – Critical	5 - Catastrophe
Probability	1 – very low (unlikely)	1	2	3	4	5
	2 – Low (seldom)	2	4	6	8	10
	3 – Medium (occasional)	3	6	9	12	15
	4 – High (likely)	4	8	12	16	20
	5 – It is a fact (definitely)	5	10	15	20	25

Risk qualification and prioritization

All identified risks were analyzed to determine the probability and impact. Based on the probability and impact results, the project manager was able to determine the priority of the risks. During the project, the prioritization of the risks should begin with the risks with high and medium scores, because these risks have a higher level of probability and impact. The probability and impact of the identified risks has been calculated. The tool used for this risk qualification and prioritization assessment was a probability and impact matrix. With the focus at first on the high and medium risks, the time invested to mitigate these is well spent within the project timelines. Time should not be dedicated to a low risk at the beginning of the project and then experience a rush at the end with the medium and high risks. Keep in mind that the low scored risks are also important because these can shift in level of impact. The risk register with the probability and impact levels and scores is displayed in chart 25.

Chart 25 Risk register for the electronic patient scheduling application project (Source: Ernst V. Terborg, August 2020)

Risk event	Probability	Impact	Score	Priority
Change of project manager	1	4	Medium	3
Unwillingness of the hospital employees	2	4	Medium	4
Change of the national currency exchange rate (devaluation)	4	4	Critical	1
Insufficient Internet speeds provided to the hospital by the internet service provider	3	3	Medium	29
Unforeseen nation health threats which will require dedication	1	4	Medium	5

Risk event	Probability	Impact	Score	Priority
Employees not trained on time	2	3	Medium	27
Price increase of hardware	3	3	Medium	6
Cancellation of the project by the hospital's management	1	5	Medium	7
Unavailability of hospital's employees	3	3	Medium	8
Delay in hardware delivery	2	3	Medium	9
No (public) transportation available to the hospital for the hospital employees on training days	2	4	Medium	12
Internet connection failure during the training of the hospital employees	1	3	Low	28
Wrong equipment received (other than ordered)	2	4	Medium	10
Power outage during training and implementation	1	3	Low	25
Power outage during project meetings	1	3	Low	26
Contracts with vendors not signed in time	1	4	Medium	11
Repetitive non-availability of the project sponsor for meetings	2	4	Medium	16
Loss of project documents from the hospital's servers	1	4	Medium	17
Stopping of project funding	1	5	Medium	20
Discontinuation of services by software vendor	1	4	Medium	18

Risk event	Probability	Impact	Score	Priority
Closure of hardware vendor company	1	4	Medium	19
Incorrect parameterization of scheduling application during the project	2	3	Medium	21
Hospital staff not regularly informed about project	3	3	Medium	22
Project manager not granted access to hospital premises	1	3	Low	24
Discontinuation of the project by the government due to implementation of a central application	1	5	Medium	23
Hospital management mandates a project scope change to implement the application at multiple departments	3	4	Medium	2
Cybersecurity attacks on the hospital	2	4	Medium	13
Data leak of the (sensitive) patient information	2	4	Medium	14
Lawsuit by patient due to data leak	1	4	Medium	15

Risk Breakdown Structure

A risk breakdown structure (RBS) is utilized to group risks by category to make the risks more manageable. The RBS is a hierarchical representation of potential sources of risks (Project Management Institute, 2017). The RBS for the electronic patient scheduling application project is plotted in chart 26.

Chart 26 Procurement list for the electronic patient scheduling application project (Source: Ernst V. Terborg, July 2020)

RBS level 0	RBS level 1	RBS level 2
All sources of the project risks	1. Technical risk	1.1 Insufficient Internet speeds provided to the hospital by the internet service provider
		1.2 Internet connection failure during the training of the hospital employees
		1.3 Wrong equipment received (other than ordered)
		1.4 Power outage during training and implementation
		1.5 Power outage during project meetings
		1.6 Loss of project documents from the hospital's servers
		1.7 Incorrect parameterization of scheduling application during the project
	2. Management risk	2.1 Change of project manager
		2.2 Unwillingness of the hospital employees
		2.3 Employees not trained on time
		2.4 Cancellation of the project by the hospital's management
		2.5 Unavailability of hospital's employees
		2.6 Contracts with vendors not signed in time
		2.7 Repetitive non-availability of the project sponsor for meetings
		2.8 Stopping of project funding
		2.9 Hospital staff not regularly informed about project

RBS level 0	RBS level 1	RBS level 2
	2. Management risk	2.10 Project manager not granted access to hospital premises
		2.11 Hospital management mandates a project scope change to implement the application at multiple departments
	3. Commercial risk	3.1 Delay in hardware delivery
		3.2 Wrong equipment received (other than ordered)
		3.3 Discontinuation of services by software vendor
		3.4 Closure of hardware vendor company
	4. External risk	4.1 No (public) transportation available to the hospital for the hospital employees on training days
		4.2 Unforeseen nation health threats which will require dedication
		4.3 Change of the national currency exchange rate (devaluation)
		4.4 Discontinuation of the project by the government due to implementation of a central application
		4.5 Cybersecurity attacks on the hospital
		4.6 Data leak of the (sensitive) patient information
		4.7 Law suit buy patient due to data leak

Expected monetary value

The expected monetary value (EMV) calculation method is a tool used to calculate the contingency reserves for a project budget. The EMV calculation for the electronic patient scheduling application project is plotted in chart 27. In this EMV calculation chart, only the risks with a medium and high impact score have been included. The EMV calculation is part of the quantitative risk analysis.

Chart 27 EMV calculation for the electronic patient scheduling application project (Source: Ernst V. Terborg, August 2020)

Risk	Probability	Cost impact	EMV
Change of project manager	5%	$2,000.00	$ 100.00
Unwillingness of hospital employees	25%	$1,000.00	$ 250.00
Change of the national currency exchange rate (devaluation)	75%	$1,000.00	$ 750.00
Insufficient Internet speeds at the hospital	45%	$ 350.00	$ 157.50
Unforeseen national health threats which will require dedication	10%	$ 750.00	$ 75.00
Employees not trained on time	25%	$ 350.00	$ 87.50
Price increase of hardware	50%	$ 750.00	$ 375.00
Cancellation of the project by hospital management	10%	$4,000.00	$ 400.00
Unavailability of hospital's employees	45%	$ 750.00	$ 337.50
Delay in hardware delivery	25%	$ 600.00	$ 150.00
No (public) transportation to the hospital available for employees on training days	25%	$ 750.00	$ 187.50

Risk	Probability	Cost impact	EMV
Wrong equipment received (other than ordered)	30%	$ 750.00	$ 225.00
Contracts with vendors not signed in time	5%	$ 500.00	$ 25.00
Repetitive non-availability of the project sponsor for meetings	25%	$ 500.00	$ 125.00
Loss of project documents from the hospital servers	15%	$ 500.00	$ 75.00
Stopping of project funding	10%	$1,500.00	$ 150.00
Discontinuation of services by software vendor	5%	$ 750.00	$ 37.50
Closure of hardware vendor company	5%	$ 750.00	$ 37.50
Incorrect parameterization of scheduling application during the project	25%	$ 500.00	$ 125.00
Hospital staff not regularly informed about project	50%	$ 350.00	$ 175.00
Discontinuation of the project by the government due to implementation of a central application	5%	$4,000.00	$ 200.00
Hospital management mandates a project scope change to implement the application at multiple departments	45%	$ 750.00	$ 337.50
Cybersecurity attacks on the hospital	25%	$1,500.00	$ 375.00
Data leak of the (sensitive) patient information	25%	$1,500.00	$ 375.00

Risk	Probability	Cost impact	EMV
Lawsuit by patient due to data leak	10%	$1,500.00	$ 150.00
Total EMV			**$ 5,282.50**

Risk monitoring

The progress of resolving the risks were monitored by organizing bi-weekly meetings. The project manager assigned a risk manager to the identified risk in order to facilitate and assure proper resolution of the risks. The project manager will assure that the assigned risk managers will report accordingly regarding the progress of resolving risks.

Risk mitigation and avoidance

During the risk assessment meetings, several methodologies to mitigate the identified risks have been noted. The project manager has led the project team in developing responses to each identified risk. If during the project, additional risks are identified, the project manager will organize risk management meetings to assess the priority and impact of these newly identified risks. The risks are based on the probable impact on the project scope, timeline and costs.

Sponsor acceptance

Approved by the project sponsor:

_____ Date:_____

M. Adely

Nursing Manager

4.9 Project procurement management

The outline of the procurement regarding the electronic patient scheduling application will be recorded in the procurement management plan. The procurement management plan is based on a procurement management plan template. In the procurement management plan, a procurement approach, contracts, and procurement risks have been noted. Procurement is crucial to the successful completion of the project. Therefore, all items with financial impact to the project are managed under proper procurement. The procurement will take place based on the existing procurement procedures of the hospital. In the procurement management plan, the items that must be procured will be listed. The types of contracts that will be signed will also be listed. The procedures for awarding contracts to vendors will also be listed.

Procurement management approach

The procurement manager of the hospital will manage the procurement activities, in close collaboration with the project manager. All items needed for successful completion of the project and those that must be procured will be listed by the project manager while discussing this with all project team members. The procurement manager of the hospital will review the items listed before starting the procurement procedures and future actions such as selecting vendors, contracting, and purchasing.

Procurement Definition

During the procurement assessment, several items have been marked as needed and beneficial to the project. The items, justification, and ultimate needed date are visible in chart 28.

It is mandatory to note that individual project resources are not allowed to perform procurement activities in relation to the electronic patient scheduling application project.

Chart 28 Procurement list for the electronic patient scheduling application project (Source: Ernst V. Terborg, July 2020)

Item / Service	Justification	Needed by date
Desktop computers	Workstations for the hospital staff to manage the patient scheduling	19-Jan-2020
Networking equipment	Communication between workstations and the internet	19-Jan-2020
Application licenses	Access and support to use the application legally	19-Jan-2020
Uninterruptable power supplies	Power backup in case of power outage	19-Jan-2020

Type of contracts

All services and items for this project will be procured based on a fixed pricing contract. The signed contracts will serve as foundation for the project team during the project. The procurement department of the hospital will manage the several proposals and assign or award contracts to vendors. The base term of all contracts is one year with an option for extension with periods of 6 months.

Procurement risks and risk management

Procurement activities carry several risks that should be managed to contribute to the successful completion of the project. All project risks will be dealt with by the project risk management, yet there are procurement specific risks that will be analyzed below.

These risks are:

- Unrealistic delivery timelines by vendors;
- Application programming capabilities of vendors;
- Conflict of interest between vendors and procurement department entities;
- Configuration management for upgrades and improvements of purchased technology;
- Delivery and transport delays of hardware;
- Negative rating of vendors.

Proposals

A quote request with specifications will be sent out to multiple vendors in order to initiate the procurement process. The outline for the project and scope of work should be listed and clear for the prospective vendors. The vendors should deliver proper timelines and provide at least a one year guarantee for the delivered services and hardware. The provided information will serve as baseline during the selection process.

Procurement constraints

For the procurement management plan, there are a few constraints that must be kept in focus. The constraints are as follows:

- Project schedule must be completed within the project schedule;
- The procurement will be performed based on the established budget. The reserves will not be applied initially;
- The procurement activities must be in alignment with the set project scope;
- The project procurement activities must be performed with existing resources. No new human resources will be acquired;

Contract decision criteria

There are several criteria that contribute to the selection of vendors. For this project the vendor selection criteria are as follows:

- Delivery deadlines;
- Quality and cost;
- Expected delivery dates;
- Vendor history;
- Comparison of outsourcing or in-house delivery.

The final decision for vendor selection will be based on these criteria.

Vendor management

The last person responsible for managing the vendors is the project manager. To assure the vendors are delivering and performing as agreed, the project manager will meet with the vendor and procurement department to discuss these subjects. The methodology for conducting this meeting can be agreed on by these parties. The purpose of these meetings will be to review all documented specifications for each product as well as the performance. In this meeting, questions can be answered. The entity that is responsible for scheduling this meeting is the project manager.

Performance metrics for procurement activities

For the electronic patient scheduling application, certain guidelines have been set to rate and monitor the performance of the selected vendors. The template for rating the performance of the vendors is visible in chart 29. The metrics are rated based on a scale from one to five. The results of the vendor ratings will serve as input documentation for future related procurements.

Chart 29 Vendor performance matrix for the electronic patient scheduling application project (Source: Ernst V. Terborg, July 2020)

Vendor	Product quality	On time delivery	Documentation quality	Development costs	Development time	Cost per unit	Transactional efficiency
Vendor 1							
Vendor 2							
Vendor 3							

The legend for chart 29 is as follows:

- 1 = Unsatisfactory;
- 2 = Fair;
- 3 =Acceptable;
- 4 = Great;
- 5 = Exceptional;

Sponsor acceptance

Approved by the project sponsor:

_____ Date:_____

M. Adely

Nursing Manager

4.10 Project stakeholder management

The final process of the initiation process group is Project Stakeholder Management. All project stakeholders were included and consulted to perform stakeholder management for the project. All changes to the scope should be conducted in close communication and agreement between the stakeholders and the project team.

The project manager is responsible for listing the stakeholders, their roles, and expectations. The stakeholder register as listed in chart 30 provides a clear overview of the project stakeholders, their roles, and other related details. The methodology of communicating with the project stakeholders is mentioned in the project communication area.

Chart 30 Project stakeholder register for the electronic patient scheduling application project (Source: Ernst V. Terborg, July 2020)

ID	Name	Organization	Role	Contact information	Communication types	Part in project	Influence
1	Nursing manager	LH					
2	Procurement manager	LH					
3	ICT manager	LH					

5 CONCLUSIONS

1. LH does not have a project management office (PMO) in place. Neither do they have dedicated project managers. Implementing the project according to PMI standards will require extra effort.
2. This project management plan for implementing the electronic patient scheduling application was composed based on the PMI uses and theory mentioned in the PMBOK Guide.
3. There is a clear reason for implementing this project. The hospital is in a transformation phase. The implementation of this project will improve the efficiency and the customer experience.
4. To achieve the first deliverable, the project management plan was composed. The project management plan consists of the high level information regarding the project. The nursing manager's signature is needed in order for the project to start.
5. The scope management plan was composed to clearly define the scope of the project. The scope management plan is based on a template of the University of Texas, Dallas. The scope management plan includes a WBS and a WBS dictionary. This fulfills the second objective of this document.
6. Simultaneously with the schedule management plan, the activity list, schedule network diagram, and project schedule were composed in order to clearly identify the project activities and to guarantee a successful completion in alignment with the set time schedule.
7. To develop the project budget mentioned in the cost management plan, a cost management plan was utilized. This will support the project team in properly managing the project's budget and visualizing the budget requirements.
8. A quality management plan template was used as a baseline to identify the project's quality requirements, quality management approach, quality control and measures, and to compose this project's quality management plan.

9. To address the human resources project objective, the roles and responsibilities of the identified human resources were mentioned. The methodology of managing the project's human resources are mentioned in the human resource management plan.
10. The project stakeholders were identified along with their roles and responsibilities. This was part of composing the stakeholder management plan. The stakeholder communication plan serves as guide on how the project team should communicate with the project stakeholders.
11. A template was utilized to write the project risk management plan. A risk register template was composed to keep track of the identified risks, responses, and response deadlines
12. The Procurement Management Plan was written based on a procurement management plan template. This served as guide to identify the procurement, contracts, and contract approval process.
13. Due to the fact that the hospital didn't have a certified experienced project manager, the project management plan and all underlying project plans were written by the composer of this document.

6 RECOMMENDATIONS

A list of recommendations to the hospital management team has been composed which, if implemented, can contribute to the success of this project, future projects and other activities of the hospital.

1. Since LH is in a transformation phase, they should consider formalizing a PMO. This PMO can assist with proper project management of future projects but also projects related to the transformation phase.
2. It is advised that the personnel of the PMO attends a project management related training in order to manage the hospital's projects at a more efficient and professional level.
3. LH should motivate nursing staff to participate more actively in the hospital's projects as they currently only focus on their specific area of work and specializations.
4. All future projects should be managed by the new PMO.
5. Every two months, the hospital should monitor the use of the electronic patient scheduling application to determine if improvements are needed and monitor the improvement of efficiency.
6. Standard project management documents will be used regarding project management initiation and project management planning.
7. Project related documents should be stored on a central server for future reference.

7 REFERENCES

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8 APPENDICES

Appendix 1: FGP Charter

PROJECT CHARTER	
Date:	**Project Name:**
26 August 2019	Project management plan for the implementation of an electronic patient scheduling application
Knowledge Areas / PM Processes:	**Application Area (Sector / Activity):**
Knowledge Areas Project integration management, project scope management, project schedule management, project cost management, project quality management, project resource management, project communications management, project risk management, project procurement management, project stakeholder management. **PM Processes** Initiating process group, planning process group, monitoring and controlling	Healthcare, planning, customer service

Project Start Date:	**Project Finish date:**
26 August 2019	21 February 2020

Project Objectives (General and Specific):

General Objective:

To create a project management plan for the implementation of an electronic patient scheduling application.

Specific Objectives:

1. To create a project integration management plan in order to coordinate the different project management processes during the project.
2. To create a scope management plan to clearly identify the work that needs completion.
3. To create a project schedule management plan in order to finish the project within the planned timeframe.
4. To create a project cost management plan in order to track the budget of the project and avoid cost overruns.
5. Creating a project quality management plan for applying the organization's quality guidelines.
6. To create a project resource management plan to properly apply project resources and adjust where needed.
7. To create a project communications management plan to properly communicate with project team members and project stakeholders.
8. To create a project risk management plan to identify possible risks and ways to mitigate these risks.
9. To create a project procurement management plan to be prepared for conducting procurements for this project.
10. To create a project stakeholder management plan for proper management of expectations and activities with the different project stakeholders.

Project purpose or justification (merit and expected results):
For the Final Graduation project, it is advisable to make use of a project management plan due to the fact that the project management plan guides and instructs project team members regarding the progress and project activities. It is good practice to make use of the Project Management Institute (PMI) standards because of the well sustained documentation and instructions on how to apply this standard. This standard has been applied multiple times for the successful completion of projects.
Description of Product or Service to be generated by the Project – Project final deliverables:
The final deliverable will be the project management plan as worked out in the final graduation project.
Assumptions:
1. The FGP project will be funded by the student 2. The university supplies a FGP tutor 3. The university supplies reviewers 4. The virtual campus is available to sign in, read, and upload 5. Information is available to write the final graduation project plan
Constraints:
1. Financial constraint: Working on the he FGP is budgeted for USD 2500 2. Operational: The FGP will be written remotely (not in Costa Rica) 3. Time: Maximum allowed time for completion is 5 months
Preliminary risks:
1. Information regarding FGP not available 2. No tutors and reviewers available 3. Not passing the graduation seminar with a minimum score of 70% 4. No response from graduation assistants.

Budget:

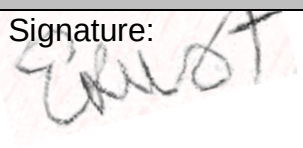
The budget is built up of man-hours, utility costs, office supplies, office rental for FGP presentation, consumption, printing, storage, and postage. Costs have been converted from the local currency (Surinamese dollars) to United States Dollars. (USD 1 = SRD 7.55)

Quantity	Unit	Description	Amount	Sub-total
110	Hours	Hour rate	$ 5,00	$ 550,00
5	Months	Water & electricity	$ 4,00	$ 20,00
1	Package	Office supplies	$ 25,00	$ 25,00
2	Hours	Office rental	$ 20,00	$ 40,00
1	Package	Consumption	$ 75,00	$ 75,00
1	Set	Printing costs	$ 90,00	$ 90,00
1	Set	Postage	$ 75,00	$ 75,00
Sub-total				**$ 875,00**
1	Set	Unforeseen costs (10%)		$ 87,50
Grand total				**$ 962,50**

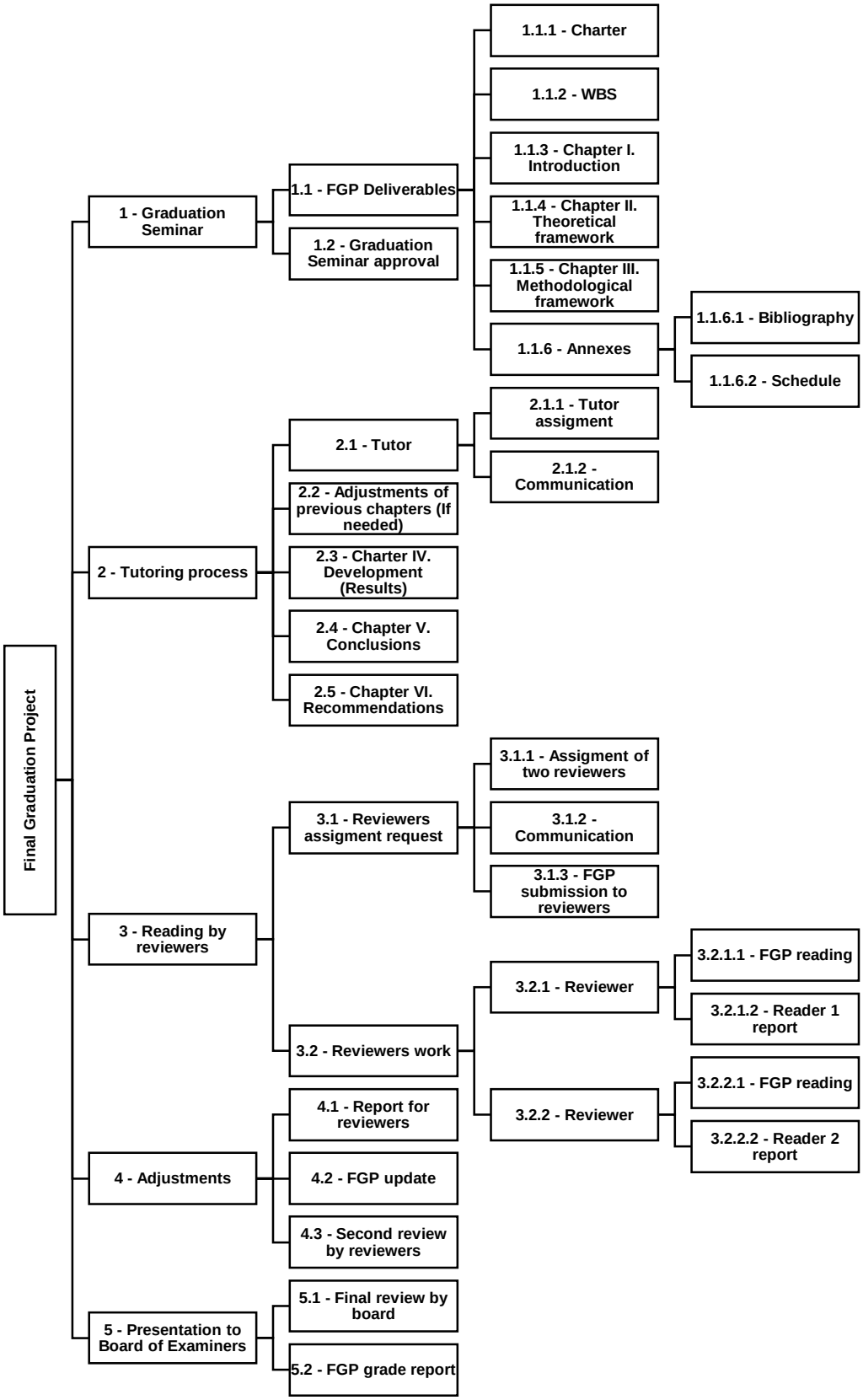
Milestones and dates:

Milestone	Start date	End date
Project start	Aug. 26, 2019	Aug. 30, 2019
Annexes: Project charter & WBS	Aug. 26, 2019	Aug. 30, 2019
Chapter I: Introduction chapter	Sept. 2, 2019	Sept. 6, 2019
FGP schedule completion	Sept. 2, 2019	Sept. 6, 2019
Chapter II: Theoretical framework	Sept. 9, 2019	Sept. 13, 2019
Chapter III: Methodological framework	Sept. 16, 2019	Sept. 20, 2019
Annexes: Bibliography & FGP Schedule	Sept. 16, 2019	Sept. 20, 2019
Graduation Seminar approval	Sept. 23, 2019	Sept. 27, 2019
Assign tutor	Sept. 30, 2019	Sept. 30, 2019
Adjustments of previous chapters	Oct. 3, 2019	Oct. 9, 2019

Milestone	**Start date**	**End date**
Integration management plan development	Oct. 10, 2019	Dec. 13, 2019
Scope management plan development	Oct. 10, 2019	Dec. 13, 2019
Schedule management plan development	Oct. 10, 2019	Dec. 13, 2019
Cost management plan development	Oct. 10, 2019	Dec. 13, 2019
Quality management plan development	Oct. 10, 2019	Dec. 13, 2019
Resource management plan development	Oct. 10, 2019	Dec. 13, 2019
Communications management plan development	Oct. 10, 2019	Dec. 13, 2019
Risk management plan development	Oct. 10, 2019	Dec. 13, 2019
Procurement management plan development	Oct. 10, 2019	Dec. 13, 2019
Stakeholder management plan development	Oct. 10, 2019	Dec. 13, 2019
Chapter V: Conclusions	Dec. 16, 2019	Dec. 20, 2019
Chapter VI: Recommendations	Dec. 23, 2019	Dec. 27, 2019
Approval by tutor	Dec. 27, 2019	Dec. 27, 2019
Assignment of two reviewers	Dec. 30, 2019	Dec. 31, 2019
Submission of FGP to reviewers	Jan. 3, 2020	Jan. 3, 2020
FGP readers reading reports	Jan. 6, 2020	Jan. 16, 2020
Adjustment report for reviewers	Jan. 20, 2020	Jan. 30, 2020
FGP update	Jan. 31, 2020	Jan. 31, 2020
Second review of FGP by reviewers	Feb. 3, 2020	Feb. 14, 2020
Final review of FGP by board	Feb. 17, 2020	Feb. 18, 2020
FGP grade report	Feb. 19, 2020	Feb. 21, 2020
FGP Completion	Feb. 21, 2020	Feb. 21, 2020
Relevant historical information:		
The hospital daily attends to approximately 400 patients. Previous attempts were made to improve the way of making appointments but an attempt to upgrade to an electronic system has never been made.		

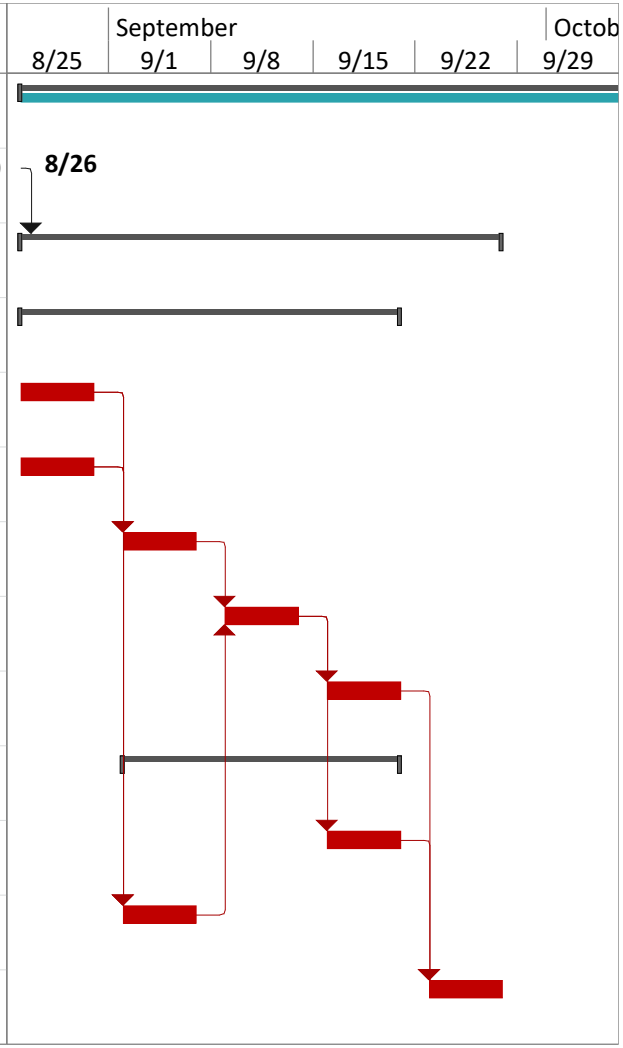
Stakeholders:	
Direct stakeholders FGP Tutor Project Manager: Ernst Terborg Board of examiners Graduation Seminar facilitator: Carlos Brenes **Indirect stakeholders** Academic assistants: Gabriela Zúñiga, Sofía Gómez FGP reviewers	
Approval:	
Project Manager: Ernst Terborg	Signature: 
Authorized by:	Signature:

Appendix 2: FGP WBS

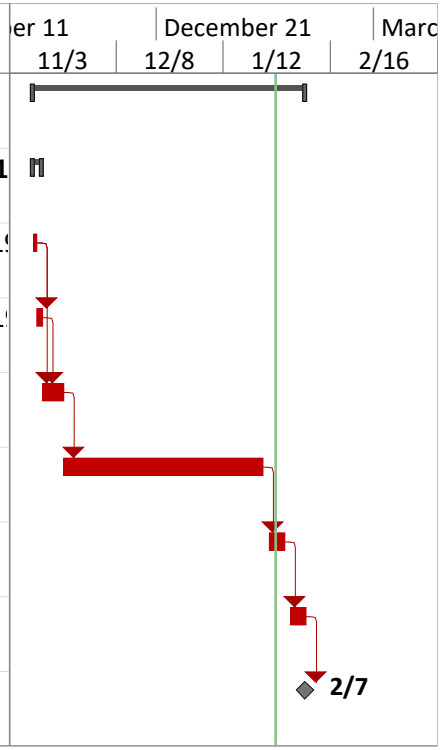


Appendix 3: FGP Schedule

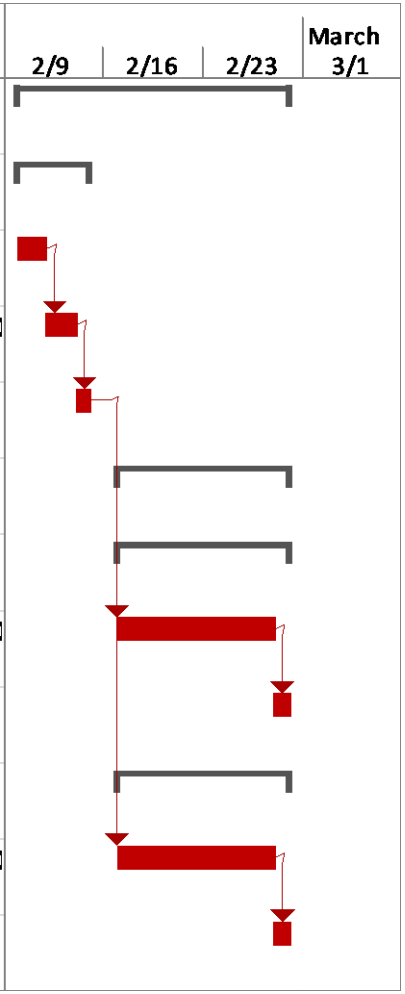
ID	Task Name	Duration	Start	Finish
1	**Final Graduation Project**	**130 days**	**Mon 8/26/19**	**Fri 2/21/20**
2	FGP Start	0 days	Mon 8/26/19	Mon 8/26/19
3	**1,Graduation Seminar**	**25 days**	**Mon 8/26/19**	**Fri 9/27/19**
4	**1.1,FGP Deliverables**	**20 days**	**Mon 8/26/19**	**Fri 9/20/19**
5	1.1.1,Charter	5 days	Mon 8/26/19	Fri 8/30/19
6	1.1.2,WBS	5 days	Mon 8/26/19	Fri 8/30/19
7	1.1.3,Chapter I. Introduction	5 days	Mon 9/2/19	Fri 9/6/19
8	1.1.4,Chapter II. Theoretical framework	5 days	Mon 9/9/19	Fri 9/13/19
9	1.1.5,Chapter III. Methodological framework	5 days	Mon 9/16/19	Fri 9/20/19
10	**1.1.6,Annexes**	**15 days**	**Mon 9/2/19**	**Fri 9/20/19**
11	1.1.6.1,Bibliography	5 days	Mon 9/16/19	Fri 9/20/19
12	1.1.6.2,Schedule	5 days	Mon 9/2/19	Fri 9/6/19
13	1.2,Graduation Seminar approva	5 days	Mon 9/23/19	Fri 9/27/19



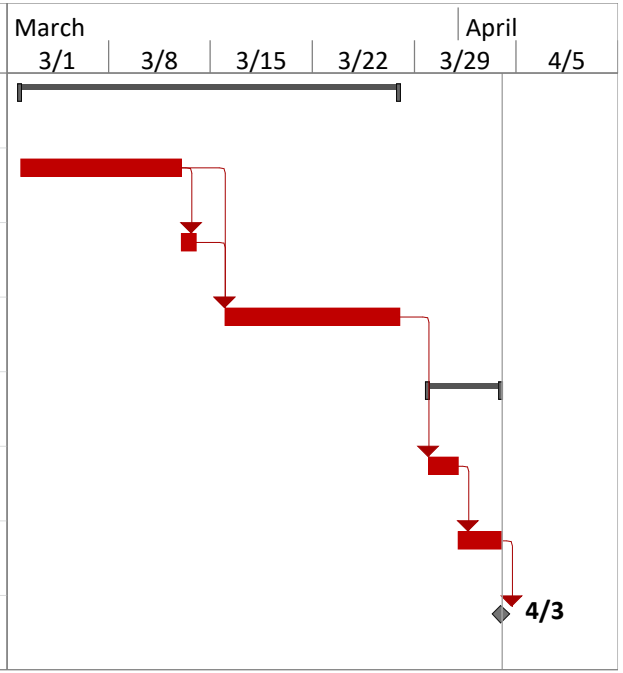
ID	Task Name	Duration	Start	Finish
14	**2,Tutoring process**	**65 days**	**Mon 11/11/1**	**Fri 2/7/20**
15	**2.1,Tutor**	**3 days**	**Mon 11/11/1**	**Wed 11/13/1**
16	2.1.1,Tutor assigment	1 day	Mon 11/11/1	Mon 11/11/1
17	2.1.2,Communication	2 days	Tue 11/12/19	Wed 11/13/1
18	2.2,Adjustments of previous chapters (If needed)	5 days	Thu 11/14/19	Wed 11/20/19
19	2.3,Charter IV. Development (Results)	47 days	Thu 11/21/19	Fri 1/24/20
20	2.4,Chapter V. Conclusions	5 days	Mon 1/27/20	Fri 1/31/20
21	2.5,Chapter VI. Recommendatior	5 days	Mon 2/3/20	Fri 2/7/20
22	Tutor approval	0 days	Fri 2/7/20	Fri 2/7/20



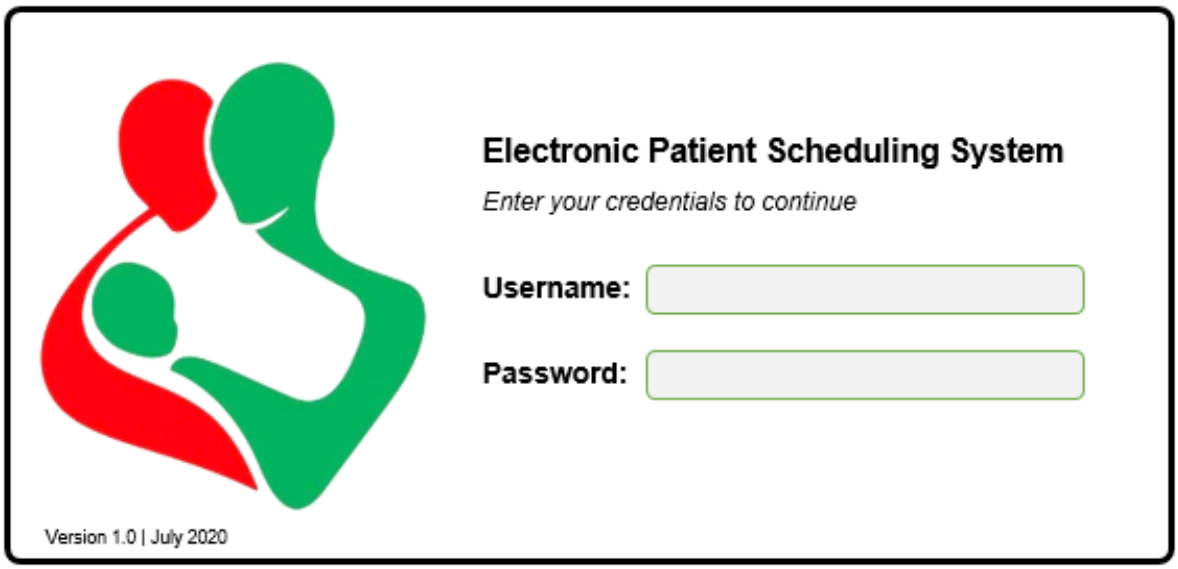
ID	Task Name	Duration	Start	Finish
23	**3,Reading by reviewers**	**15 days**	**Mon 2/10/2**	**Fri 2/28/20**
24	**3.1,Reviewers assigment re**	**5 days**	**Mon 2/10/2**	**Fri 2/14/20**
25	3.1.1,Assigment of two reviewers	2 days	Mon 2/10/20	Tue 2/11/20
26	3.1.2,Communication	2 days	Wed 2/12/2	Thu 2/13/20
27	3.1.3,FGP submission to reviewers	1 day	Fri 2/14/20	Fri 2/14/20
28	**3.2,Reviewers work**	**10 days**	**Mon 2/17/2**	**Fri 2/28/20**
29	**3.2.1,Reviewer**	**10 days**	**Mon 2/17/2**	**Fri 2/28/20**
30	3.2.1.1,FGP reading	9 days	Mon 2/17/2	Thu 2/27/20
31	3.2.1.2,Reader 1 report	1 day	Fri 2/28/20	Fri 2/28/20
32	**3.2.2,Reviewer**	**10 days**	**Mon 2/17/2**	**Fri 2/28/20**
33	3.2.2.1,FGP reading	9 days	Mon 2/17/2	Thu 2/27/20
34	3.2.2.2,Reader 2 report	1 day	Fri 2/28/20	Fri 2/28/20



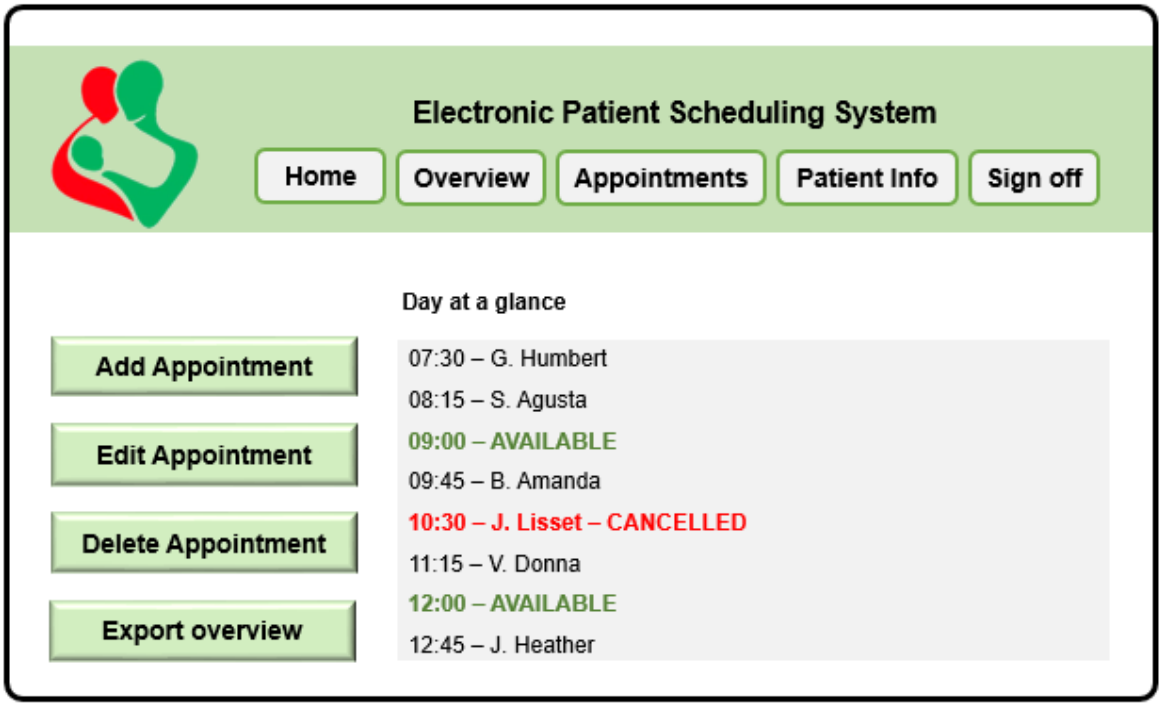
ID	Task Name	Duration	Start	Finish
35	**4,Adjustments**	**20 days**	**Mon 3/2/20**	**Fri 3/27/20**
36	4.1,Report for reviewers	9 days	Mon 3/2/20	Thu 3/12/20
37	4.2,FGP update	1 day	Fri 3/13/20	Fri 3/13/20
38	4.3,Second review by reviewers	10 days	Mon 3/16/20	Fri 3/27/20
39	**5,Presentation to Board of Examin**	**5 days**	**Mon 3/30/20**	**Fri 4/3/20**
40	5.1,Final review by board	2 days	Mon 3/30/20	Tue 3/31/20
41	5.2,FGP grade report	3 days	Wed 4/1/20	Fri 4/3/20
42	FGP End	0 days	Fri 4/3/20	Fri 4/3/20



Appendix 4: Example of the login page of the electronic patient scheduling application



Appendix 5: Main screen example of the electronic patient scheduling application



Appendix 6: Philologist review

As per criteria number 7, mentioned in the criteria and procedures for evaluation and accreditation page on the Virtual Campus facilitated by UCI (Universidad Para La Cooperacion Internacional), this document was provided to a philologist to perform the philological screening.

It is the obligation of the students to present their progress and final delivery of the FGP document with the proper philological quality (correct writing, spelling and grammar) corresponding to a master's level work. The final version of the FGP document must be sent by the student to be reviewed and corrected by a professional in the field of philology, with charge to the student, and the revision dictum of this professional must be annexed to the final written document resulting from the tutorship process, within its corresponding time frame, in order to receive the approval from the tutor to proceed to the reading process. (UCI, 2020)

The statement and the credentials of the philologist, relevant to this endeavor have been included on the following pages.

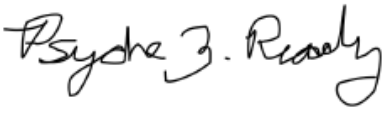
Philologist letter of review

September 5, 2020

To Whom it May Concern,

I have a Master's Degree in English (Literature), and I am a current student in a PhD program in English (Composition & Rhetoric). I have taught College English for 5 years, and I have worked as an editor and copyeditor of academic writing for 5 years. I have attached a copy of my MA degree from George Mason University.

I have reviewed Ernst Terborg's Final Graduation Project, making structural and grammatical changes where necessary.

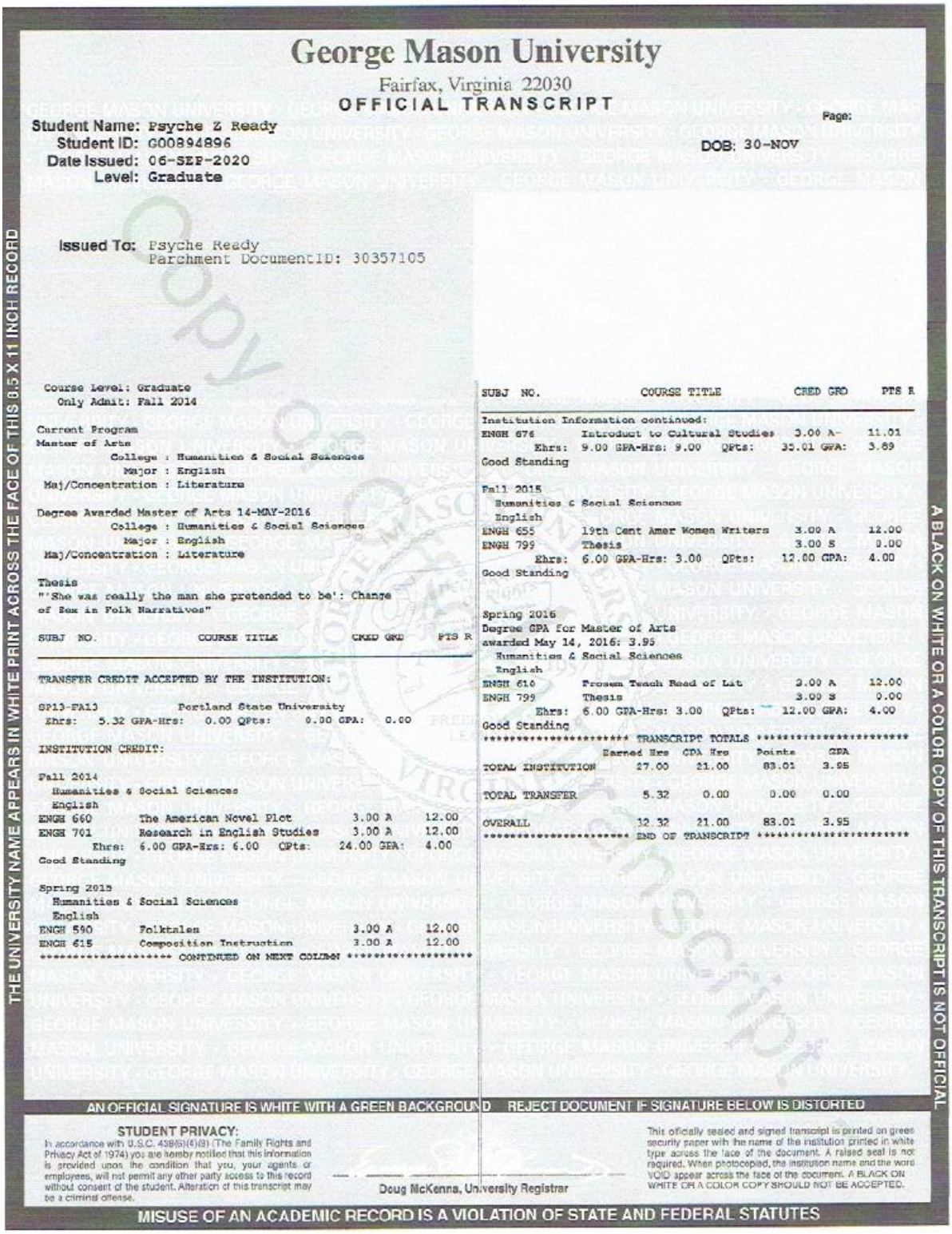


Psyche Z. Ready

September 5, 2020

psyche.ready@uconn.edu

Official university transcript of the philologist



George Mason University

Fairfax, Virginia 22030

OFFICIAL TRANSCRIPT

Page:

Student Name: Psyche Z Ready
Student ID: G00894896
Date Issued: 06-SEP-2020
Level: Graduate

DOB: 30-NOV

Issued To: Psyche Ready
Parchment DocumentID: 30357105

Course Level: Graduate
Only Admit: Fall 2014

Current Program
Master of Arts
College : Humanities & Social Sciences
Major : English
Maj/Concentration : Literature

Degree Awarded Master of Arts 14-MAY-2016
College : Humanities & Social Sciences
Major : English
Maj/Concentration : Literature

Thesis
"'She was really the man she pretended to be': Change of Sex in Folk Narratives"

SUBJ NO.	COURSE TITLE	CRED	GRD	PTS	R

TRANSFER CREDIT ACCEPTED BY THE INSTITUTION:

SP13-FA13 Portland State University
Ehrs: 5.32 GPA-Hrs: 0.00 QPts: 0.00 GPA: 0.00

INSTITUTION CREDIT:

Fall 2014
Humanities & Social Sciences
English

ENGH 660	The American Novel Plot	3.00 A	12.00
ENGH 701	Research in English Studies	3.00 A	12.00

Ehrs: 6.00 GPA-Hrs: 6.00 QPts: 24.00 GPA: 4.00
Good Standing

Spring 2015
Humanities & Social Sciences
English

ENGH 590	Folktales	3.00 A	12.00
ENGH 615	Composition Instruction	3.00 A	12.00

********** CONTINUED ON NEXT COLUMN **********

SUBJ NO.	COURSE TITLE	CRED	GRD	PTS	R

Institution Information continued:

ENGH 676	Introduct to Cultural Studies	3.00 A-	11.01

Ehrs: 9.00 GPA-Hrs: 9.00 QPts: 32.01 GPA: 3.89
Good Standing

Fall 2015
Humanities & Social Sciences
English

ENGH 655	19th Cent Amer Women Writers	3.00 A	12.00
ENGH 799	Thesis	3.00 S	0.00

Ehrs: 6.00 GPA-Hrs: 3.00 QPts: 12.00 GPA: 4.00
Good Standing

Spring 2016
Degree GPA for Master of Arts awarded May 14, 2016: 3.95
Humanities & Social Sciences
English

ENGH 616	Proseminar Teach Read of Lit	3.00 A	12.00
ENGH 799	Thesis	3.00 S	0.00

Ehrs: 6.00 GPA-Hrs: 3.00 QPts: 12.00 GPA: 4.00
Good Standing

********** TRANSCRIPT TOTALS **********

	Earned Hrs	GPA Hrs	Points	GPA
TOTAL INSTITUTION	27.00	21.00	83.01	3.95
TOTAL TRANSFER	5.32	0.00	0.00	0.00
OVERALL	32.32	21.00	83.01	3.95

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Doug McKenna, University Registrar

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