Transport and Telecommunication Institute

Faculty of Engineering Science

Project and Requirements management

Article Management System Report

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2024

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Introduction

This report provides a comprehensive overview of the project using an agile approach. Each phase builds upon the previous one, ensuring a clear and well-defined development process for the article management system.

Phase 1 explores the problem of inefficient email-based review processes for academic journals. We propose a custom article management system to streamline workflows, addressing delays, lack of transparency, security concerns, and scalability limitations associated with email.

Phase 2 is a business case presented to secure project approval and resources from "Strategic Solutions Group" for "Scholar Stream," a new scholarly journal publishing "Management Systems for IT Journal." The chosen development framework, Scrum, is introduced along with key project details and stakeholders.

Phase 3 details the creation of a stakeholder list and defines product requirements, encompassing both functional and non-functional aspects.

Phase 4 involves scope planning, schedule, product quality, project cost, communication, and stakeholder management. With corresponding artifacts related to the project's management.

Phase 5 explores strategies for managing requirements, project control, and monitoring. RACI charts are introduced to define roles and responsibilities for user stories, while burndown charts and SPI/CPI metrics are explained to monitor progress and identify potential risks.

Report

Phase 1. Product Inception and Business Requirements

a) Study the product you are going to develop.

After researching methods for academic conferences, academic publishers, or scholarly journals in reviewing papers. Reliance on email for journal submissions, reviews, and communication creates a cumbersome and disorganized workflow. This leads to:

- **Delays and inefficiencies:** Lost emails, disorganized attachments, and difficulty tracking progress can significantly slow down review times.
- **Lack of transparency:** The status of submissions and reviews is often unclear, hindering communication and frustrating users.
- **Security concerns:** Sensitive information like manuscripts and reviews are vulnerable when shared via email.
- **Scalability limitations:** As submission volumes increase, email becomes difficult to manage, hindering growth.

Researching similar software solutions also gives the time frame of comparable solutions to 2 - 5 months depending on specific requirements from the client.

b) Create Business Requirements.

We propose developing a custom article management system with the following features:

- **User Management:** Secure user registration, login, and profile management for editors, reviewers, and authors.
- **Submissions:** A dedicated online platform for submitting manuscripts, including file upload functionality.
- **Review Process:** An efficient system for assigning reviewers, managing reviews, and facilitating communication between all parties.
- **Searchable Database:** Organize and store submissions, reviews, and user information for easy retrieval.
- **Notifications:** Automated email and/or in-system notifications to keep users informed about submission status and review progress.

Phase 2. Project Initiation

a) Create a Business Case to initiate the project.

This phase begins with developing a compelling business case to initiate the project. The business case will justify the project for "Scholar Stream," a new scholarly journal publishing "Management Systems for IT Journal." It will be presented to "Strategic Solutions Group," our solutions company (a small-sized business with 20 employees), to secure their approval and resources for the project. The following specifications were added to the project. Article Management System

The solutions company adopts the SCRUM framework to deliver solutions in an agile process. The dev team will have a senior dev and 2 junior developers. Sprints will be two weeks and the product backlog will be populated by user stories.

b) Create a Project Charter

Background

This project aims to develop a custom article management system to streamline the editorial workflow for academic publishers and scholarly journals. The system will eliminate the inefficiencies of email-based review processes, facilitating collaboration among editors, reviewers, and authors.

Goals

- Develop a platform for user registration, login, and profile management.
- Create functionalities for article submission with file upload capabilities.
- Implement a system for assigning reviewers, managing reviews, and facilitating communication.
- Establish a searchable database to organize and store submissions, reviews, and user information.
- Integrate automated email and/or in-system notifications for status updates.

Scope

The end result of the project will be a functional article management system. Phases will include system setup, user management, submissions, and email/notification functionalities.

Onboarding users and refined UI/UX are excluded from future releases based on user feedback.

Key Stakeholders

Client	Bill Evans (Scholar Stream)
Sponsor	Bill Evans (An executive from Scholar Stream)
Project Manager	Alan Richard (Strategic Solutions Group Project Manager)
Project team members	Emily Grims(Product Owner), Ben Jones (Scrum Master), Clara Garcia(Senior Dev), Gonzalo Gamez (Junior Dev), Cindy Gentry (Junior Dev)

Project Milestones

Month 1: Complete user management functionalities.

Month 2: Implement submission forms, review functionalities, and basic notifications.

Month 3: Finalize system testing, deployment, and basic user training (if applicable).

Project Budget

€50,000 (includes development, deployment, and initial maintenance)

Constraints, Assumptions, Risks and Dependencies

Constraints	Unforeseen client requirements.
Assumptions	IT infrastructure will be provided by the company (on-site server or cloud-based).
Risks and Dependencies	Technical complexities during development, database integration challenges, and potential for scope creep due to unidentified client needs.

Approval Signatures

Bill Evans, Project Client	Bill Evans, Project Sponsor	Alan Richard, Project Manager

Phase 3. Defining product scope

a) Creating a Stakeholders List

Table 1 contains a portion of the list of stakeholders for the article management system:

Table 1. A portion of the Stakeholder list

ID	Name	Position	Interna/ External	Project Role/Tasks	Contact Information
1	Alan Richard	Project Manager	Internal	Project planning, execution, monitoring, communication	alan@email.com
2	Bill Evans	Sponsor from Scholar Stream	External	Project funding approval, championing within Scholar Stream	bill@email.com
3	Emily Grims	Product Owner	Internal	Representing user needs, defining product backlog items	emily@email.com
4	Clara Garcia	Senior Developer	Internal	Development, code reviews, technical expertise	clara@email.com
5	Ben Jones	Scrum Master	Internal	Facilitating scrum process, removing roadblocks	ben@email.com
6	Omar Romero	Head of Legal of Scholar Stream	External	Legal review of contracts, ensuring compliance	omar@email.com
7	Dr. Amelia Rose	Journal Editor	External	User, providing feedback during testing	amelia@email.edu

b) Developing Product Requirements

Table 2 contains functional and non-functional requirements for the product.

Table 2. Functional and Non-Functional Requirments

Functional	Non-Functional
The system interface should be developed in English.	● System Design: The system will be developed using a Material Design Template.
User Roles and Access: Access to the system modules will depend on the roles assigned to each user.	● Interface Languages: The system user interface will be displayed in English.
User Management with: ■ Registration page ■ Login page ■ Reset password page	● System Security: The system should be GDPR compliant and a standard security pack should be developed.
Submissions with: ■ Submission form	● System Availability: The system should be accessible on the following web browsers: ○ Chrome 67 ○ Safari 11.1 ○ Edge 17 ○ Firefox 61 ○ Internet Explorer 11 ○ Opera 53
Users: ■ User profile	● Interface Layout: The user interface should be correctly displayed on standard screen resolutions including: ○ 1280 x 1024 pixels

	○ 1600 x 1200 pixels ○ 1366 x 768 pixels
Journals: ■ Journal form (for adding/editing journal information)	
My Profile: A page where users can view and update their account information.	
Service Pages: ■ About Us ■ Privacy Policy ■ Contact Details Reviewers list: A list of reviewers in the system	

Phase 4. Project planning

a) Project Scope Planning

WBS

To plan the scope of the article management system, a WBS is developed. Fig 1 is the WSB created to define the scope along with a WBS dictionary (Fig. 3) to clarify WBS packets that may be confusing.

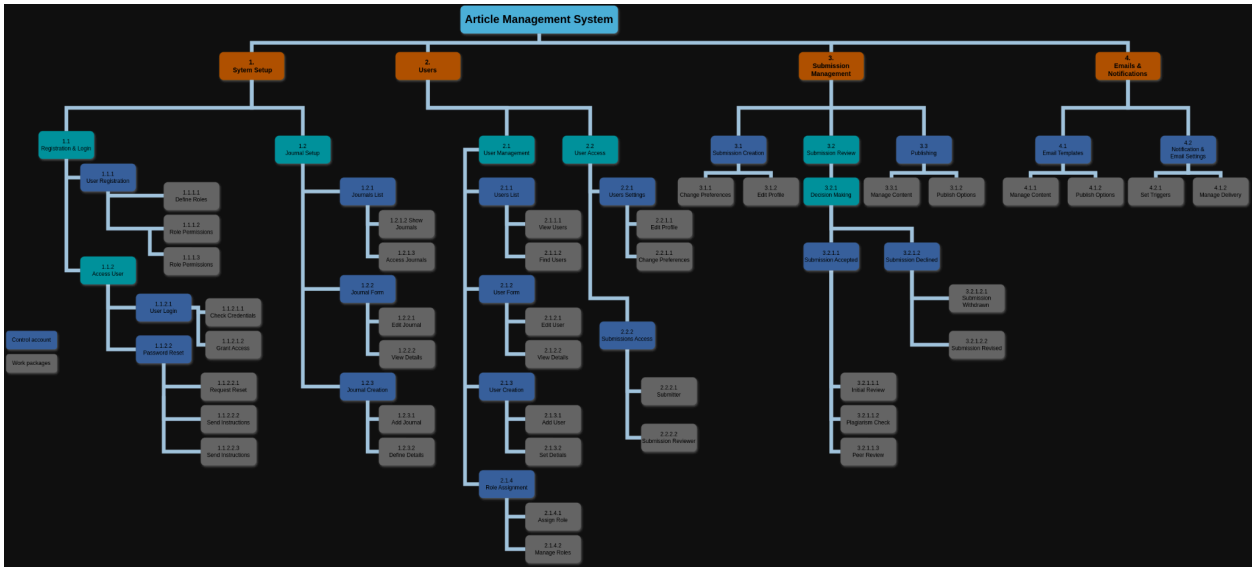

Fig. 1 WBS for Article Management System

WBS Dictionary

Table 3. WBS key dictionary

WBS-1.1.2	Access User: The user is able to access the appropriate account
WBS-2.2	User Access: What is the user able to access in their account

Product Backlog

The product backlog could be created from the work packages. The product owner will be meeting with stakeholders to create user stories to clearly define the scope of the client's needs. Using the following epic user story template:

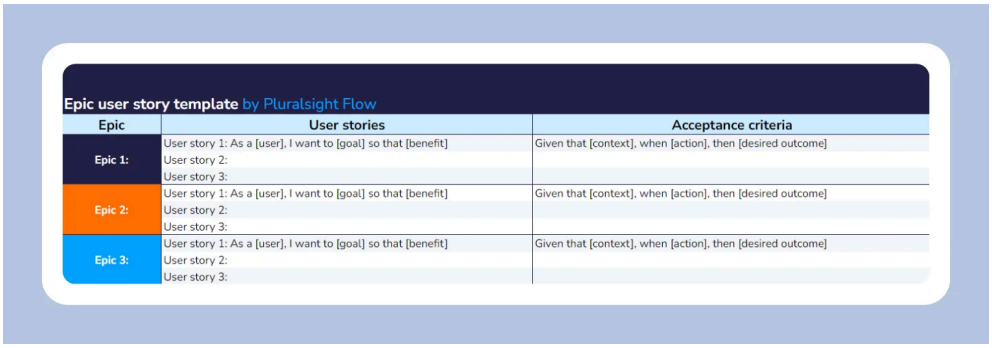

Fig 2. Epic user story template by Pluralsight

Table 4 contains users epic 14 which aligns with control packet WSB 3.2.1.1 where user stories correspond to the work packages.

Table 4. A portion of the product backlog

Epic	User Story	Acceptance Criteria
E-14: WSB 3.2.1.1	**US-14-1(WBS 3.2.1.1.1): As a System Administrator or Editor,** I want to review submitted content initially **so that** I can ensure it meets basic formatting and quality guidelines before moving forward in the approval process.	**Given** a submission is uploaded to the system, the system should display the submission details (title, author, abstract) when the reviewer accesses the submission. The system should also display pre-defined criteria (e.g., formatting, adherence to topic) to allow the reviewer to assess the content. After assessment, the system should allow marking the submission as "Approved" for further processing or "Rejected" with feedback for the author. Additionally, the system should allow the reviewer to leave comments and suggestions for improvement.

	US-14-2(WBS 3.2.1.1.2): As a System Administrator or Editor, I want to initiate a plagiarism check on submitted content **so that** I can identify potential copyright infringement.	**Given** the system is integrated with a plagiarism detection service, the system should initiate the check and generate a report when the user selects a submitted document for a plagiarism check. The report should highlight any instances of potential plagiarism and detail the source and percentage of matching content. Additionally, the system should allow flagging submissions with high plagiarism for further investigation.
	US-14-3(WBS 3.2.1.1.3): As a Subject Matter Expert, I want to review and provide feedback on assigned submissions **so that** I can contribute to ensuring the quality and accuracy of published content.	**Given** the system has a pool of reviewers with expertise, the system should assign reviewers based on their expertise and the topic relevance of the submission when a submission is uploaded. When a reviewer is assigned a submission and they access the review interface, the system should provide full access to the submission content. The system should also provide a review form to capture feedback on various aspects (e.g., originality, methodology, clarity) and the ability to upload additional documents or resources for reference. Additionally, the system should facilitate communication between reviewers and authors for clarification or discussion. Finally, after all reviews are completed, the author should receive a consolidated report with feedback from all assigned reviewers.

b) Project schedule management

Once the scope is defined After gathering the product backlog, a project schedule will be made by the product owner from Epics. The table is filled with priority and an estimate of story points. Then the Gantt chart is filled based on priority, dependencies, and estimated story points from Table 3.

Table 5. Table of first 6 out of 17 epics

Epic	Priority	Story Point(Fib.)
E-1. User Registration (WBS 1.1.1)	High	8
E-2. User Login (WBS 1.1.2.1)	Medium	5
E-3. Password Reset (WBS 1.1.2.2)	Low	5
E-4. Journals List (WBS 1.2.1)	Low	3
E-5. Journal Form (WBS 1.2.2)	Medium	5
E-6. Journal Creation (WBS 1.2.3)	High	5

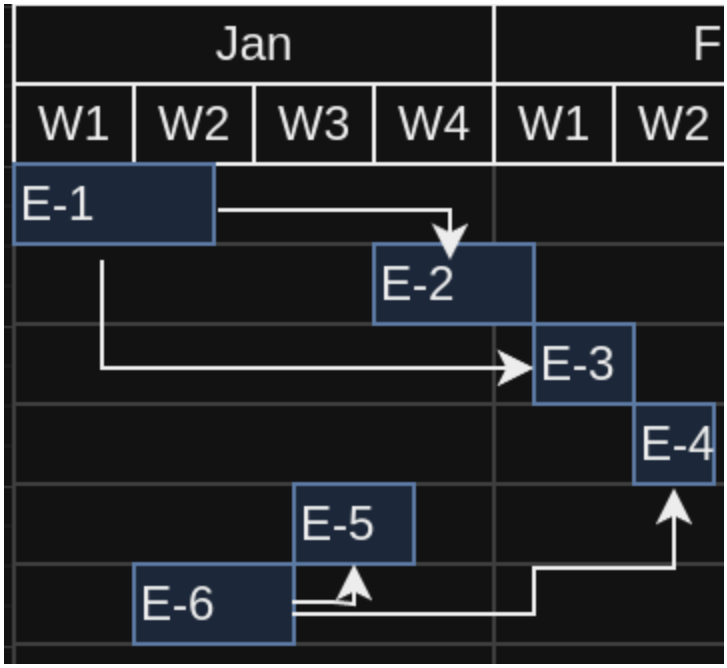

Fig 3. Gantt Chart for first 6 epics

The total story points for the whole project are estimated to be 60. The team expects to complete 10 story points during one sprint every two weeks.

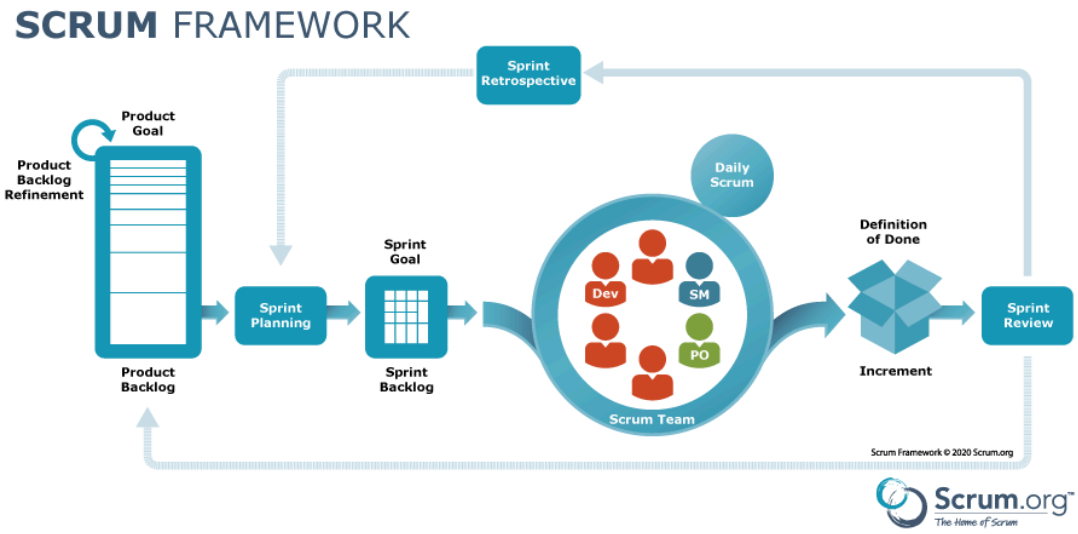

Fig 4. Sprint in the Scrum Framework from Scrum.org

The following will be an example of a Sprint that contains Epic 14 and 15:

Daily Stand-Up (15 minutes):

Each team member will share progress on assigned tasks related to Epic 14 and 15 (**WBS 3.2.1.1 & WBS 3.2.1.2**). They will discuss any roadblocks or dependencies. The Scrum Master will facilitate the meeting and ensure everyone stays focused.

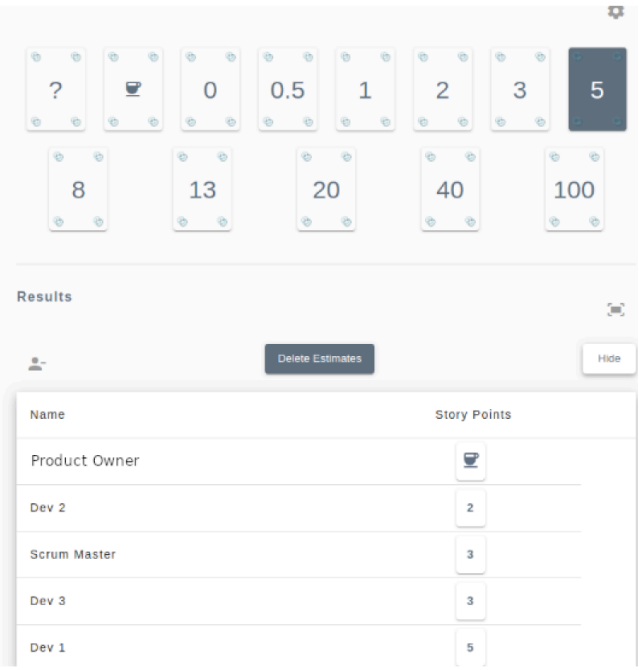

Fig 5. Planning poker for a user story

Sprint Backlog:

The following User stories were put on the sprint backlog during Sprint Planning with planning poker used to assign points to the story points:

US-14-1(WBS 3.2.1.1.1): 2 story points

US-14-2(WBS 3.2.1.1.2): 1 story point

US-14-3(WBS 3.2.1.1.3): 2 story points

US-15-1(WBS 3.2.1.2.1): 2 story points

US-15-2(WBS 3.2.1.2.2): 3 story points

Development Process:

Developers will work on tasks collaboratively, potentially using pair programming or code reviews for quality assurance. The Product Owner will be available to answer questions and clarify requirements throughout the sprint. The Scrum Master will facilitate communication, remove roadblocks, and ensure the team stays on track.

Testing:

Unit tests will be written by developers for each task to ensure functionality. The Product Owner and Scrum Master will perform user acceptance testing (UAT) to verify the implemented features meet the user story's acceptance criteria.

Sprint Review and Retrospective:

At the end of the sprint, the team will showcase the completed functionalities in a Sprint Review. Stakeholders (including the Product Owner) will provide feedback. The team will then hold a Sprint Retrospective to discuss what went well, what could be improved, and how to approach upcoming sprints.

c) Product quality management

Product Quality Management (PQM) is a comprehensive approach to ensure a product meets all its requirements and delivers a positive user experience. In this context of the article management system project, PQM would involve activities throughout the development lifecycle to identify and address potential issues.

Quality Assurance (QA): QA focuses on establishing processes and procedures to prevent defects from entering the product. It involves activities such as:

Defining quality standards: This includes defining user requirements, functional and non-functional requirements, and performance benchmarks.

Reviews and inspections: Regular code reviews, design reviews, and user interface (UI) reviews to identify potential problems early in the development process.

Static code analysis: Using automated tools to identify coding errors, potential security vulnerabilities, and adherence to coding standards.

Quality Control (QC): QC focuses on identifying and eliminating defects that do occur in the product. It involves activities such as

Unit testing: Developers write unit tests to verify individual components function as intended.

Integration testing: Testing how different modules or components work together.

System testing: Testing the entire system against all requirements and functionalities.

User Acceptance Testing (UAT): Involving actual users to test the system and provide feedback to ensure it meets their needs and expectations.

The SCRUM framework provides QA such as defining with gathering user stories with the acceptance criteria and quality control by testing against the acceptance criteria for the sprint. The Definition of Done (DoD) is specific to each user story defined by the dev team such as testing meets acceptance criteria from User stories, requirements met, and no bugs in the branch before going into deployment.

d) Project risk management

Project risk management is taken for the User stories to reduce uncertainty and be within acceptable risk tolerance which will be below the medium level. Proper planning is taken to avoid, mitigate, or transfer threats. The following will be a risk analysis for User Story 14-2(WSB 3.2.1.1.2).

Table 6. User story for work package WBS 3.2.1.1.2

US-14-2(WBS 3.2.1.1.2): As a System Administrator or Editor, I want to initiate a plagiarism check on submitted content **so that** I can identify potential copyright infringement.	**Given** the system is integrated with a plagiarism detection service, the system should initiate the check and generate a report when the user selects a submitted document for a plagiarism check. The report should highlight any instances of potential plagiarism and detail the source and percentage of matching content. Additionally, the system should allow flagging submissions with high plagiarism for further investigation.

The following risks were found for User Story 14-2:

Table 7. Risk identified for WBS 3.2.1.1.2

Risk ID	**Description**
R-14-2-1	Integration complexity with plagiarism detection service
R-14-2-2	Inaccurate plagiarism detection results
R-14-2-3	High cost of plagiarism detection service

The risks were placed on a Probability and Impact Matrix to identify if further planning would be involved.

Table 8. Probability and Impact Matrix for Risk of WBS 3.2.1.1.2

		IMPACT				
		INSIGNIFICANT	MINOR	MEDIUM	MAJOR	SEVERE
PROBABB	ALMOST CERTAIN	**MEDIUM**	**MEDIUM**	**HIGH**	**CRITICAL**	**CRITICAL**
	LIKELY	**LOW**	**MEDIUM**	**MEDIUM**	**HIGH**	**CRITICAL**

I L I T Y						
	MODERATE	LOW	MEDIUM	R-14-2-3	MEDIUM	HIGH
	UNLIKELY	R-14-2-1	LOW	MEDIUM	R-14-2-2	MEDIUM
	RARE	VERY LOW	VERY LOW	LOW	LOW	MEDIUM

Since risks 14-2-3 and 14-2-2 are above our risk tolerance we will plan risk responses. We choose to mitigate both risks.

Table 9. Risk Response for WBS 3.2.1.1.2

Risk ID	**Risk Response**
R-14-2-2	**Mitigation:** Evaluate the chosen plagiarism detection service's accuracy and choose one that meets thresholds for flagging potential plagiarism based on the percentage and source of matching content.
R-14-2-3	**Mitigation:** Research pricing models of plagiarism detection services and choose one that fits the project budget. Consider alternative open-source options if available and appropriate.

e) Project Cost Management

The following will be a bottom-up estimate to determine the budget of the project. Story points will help determine project estimates. There is a total of 60 story points and 10 story points completed in each sprint. The cost for a sprint for a 5-person team is $4000, so a story point will be estimated to be $400. Will do one for Control Account WBS 1.1.1 and then for the total project.

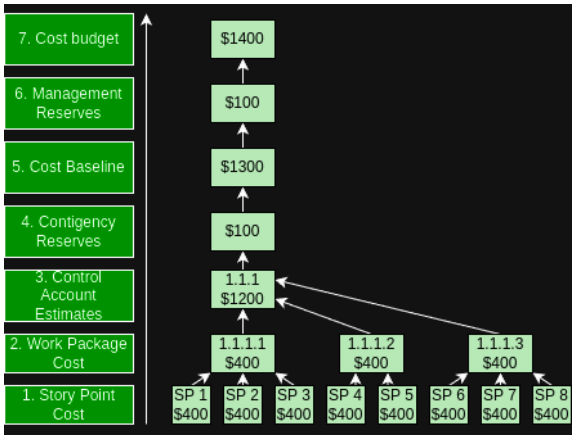

Fig 6. Budget for the control account WBS 1.1.1

Assuming that the product team will be working remotely and they need to buy specific equipment for the devs for the project. Assumption of total contingency reserves to be $1000

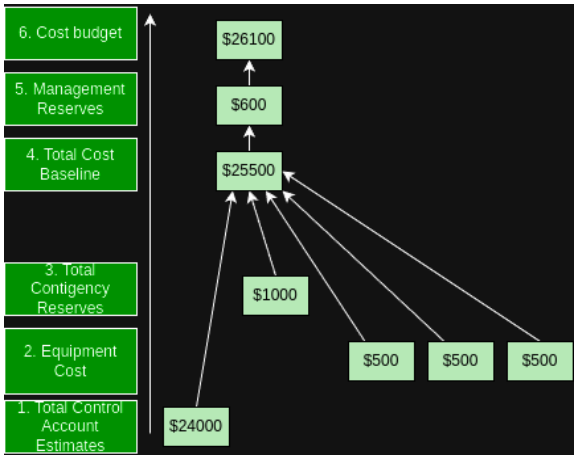

Fig 7. Budget for the total project

Taking the rough order of magnitude estimate of 30% the following estimates are provided for the total cost budget:

Lower Estimate Cost: $18,270

Base Estimate Cost: $26,100

Upper Estimate Cost: $33,930

f) Communication Management

Since there will be communication between many people, there will be management of communication to have understanding for senders and receivers of messages to minimize noise. The following is an example of different types of communication methods and types. Interactive communication with type formal verbal will take place between project team members on the platform Teams. Pull communication with formal written for company coding standards available on the company website. Push communication with informal written by those informing events within the company in an email.

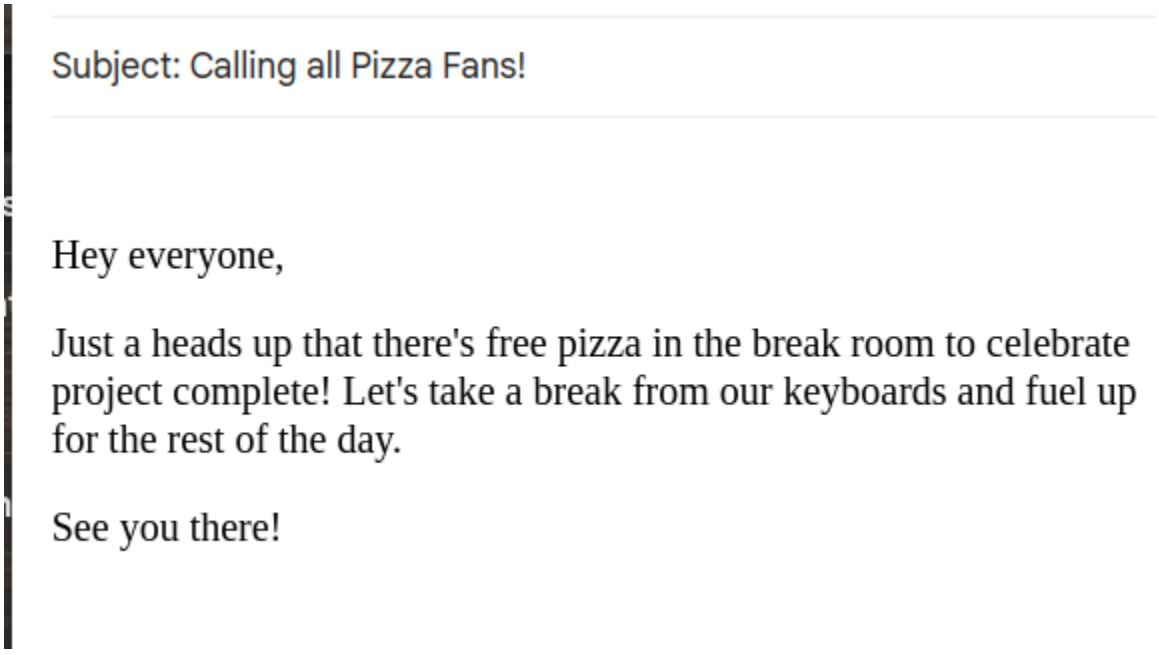

Fig 8. Push communication with informal written in an email

g) Project stakeholder management

A successful project hinges on the smooth collaboration of various individuals and groups with vested interests in its outcome. These individuals and groups are known as project stakeholders. They can be internal or external. Effective stakeholder management is the process of identifying, understanding, engaging with, and managing the expectations of these stakeholders throughout the project lifecycle. It ensures their needs are considered, concerns are addressed, and their influence is harnessed positively.

The stakeholder register helps to analyze stakeholders who should be kept satisfied, managed closely, lightly monitored, and kept informed.

Table 10. Sample of Stakeholder Register

ID	Name	Position	Interna/ External	Project Role/Tasks	Contact Information	Power (1-5)	Interest (1-5)
1	Alan Richard	Project Manager	Internal	Project planning, execution, monitoring, communication	alan@email.com	5	5
2	Bill Evans	Sponsor from Scholar Stream	External	Project funding approval, championing within Scholar Stream	bill@email.com	4	5
3	Emily Grims	Product Owner	Internal	Representing user needs, defining product backlog items	emily@email.com	4	4
4	Clara Garcia	Senior Developer	Internal	Development, code reviews, technical expertise	clara@email.com	4	4
5	Ben Jones	Scrum Master	Internal	Facilitating scrum process,	ben@email.com	3	4

				removing roadblocks			
6	Omar Romero	Head of Legal of Scholar Stream	External	Legal review of contracts, ensuring compliance	omar@email.com	4	2
7	Dr. Amelia Rose	Journal Editor	External	User, providing feedback during testing	amelia@email.edu	2	4

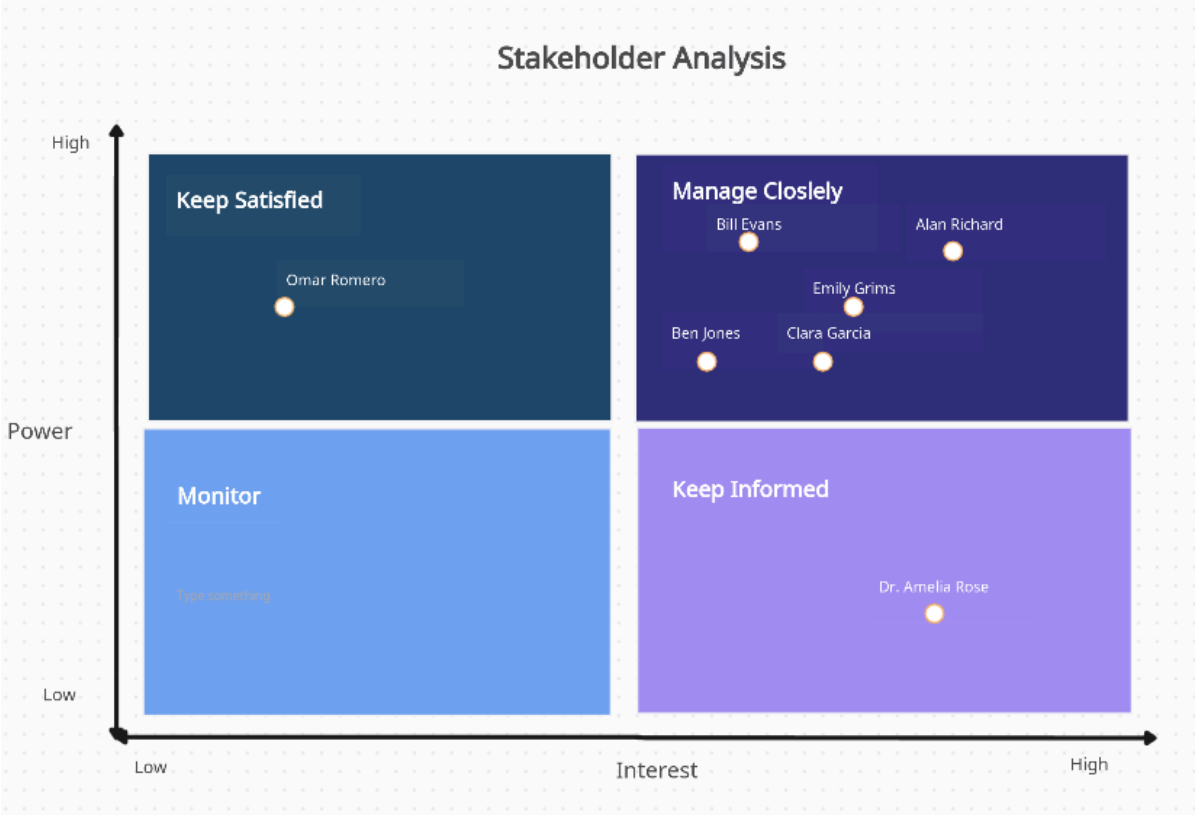

Fig 8. Stakeholder Analysis Matrix

Phase 5. Defining Requirements Management, Project Control and Monitoring Strategies.

Requirements management is the process of gathering, documenting, analyzing, tracking, prioritizing, and validating the needs of a project. It ensures that the final product or service meets the expectations of stakeholders and users. A RACI matrix is used to see who is responsible, accountable, informed, and who needs to be consulted for specific user stories.

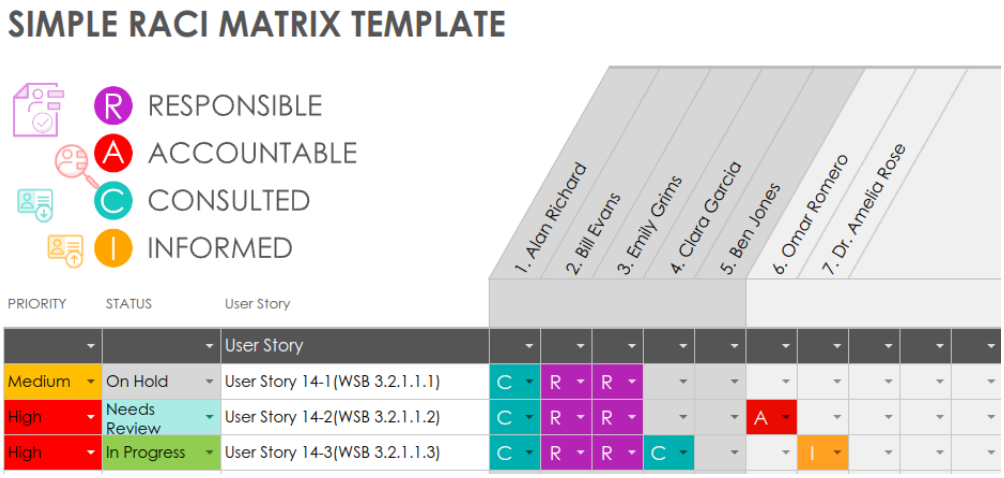

Fig 9. RACI matrix for 3 User Stories using Smart Sheet Template

SPI(fig. 20) will be used along with the release burndown chart (fig. 19) to monitor scheduling. Both are needed because the burndown chart will not show the total cost of the project only the cost of sprints. It will be adjusted to 60 story points and 6 sprints. SPI gives a good indication when scheduling falls below planning when under 1.

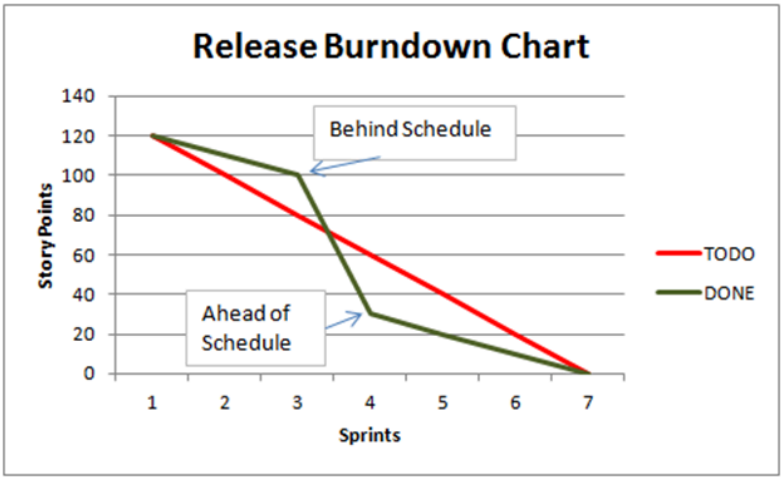

Fig 10. Example Release Burndown Chart from Word of Agile

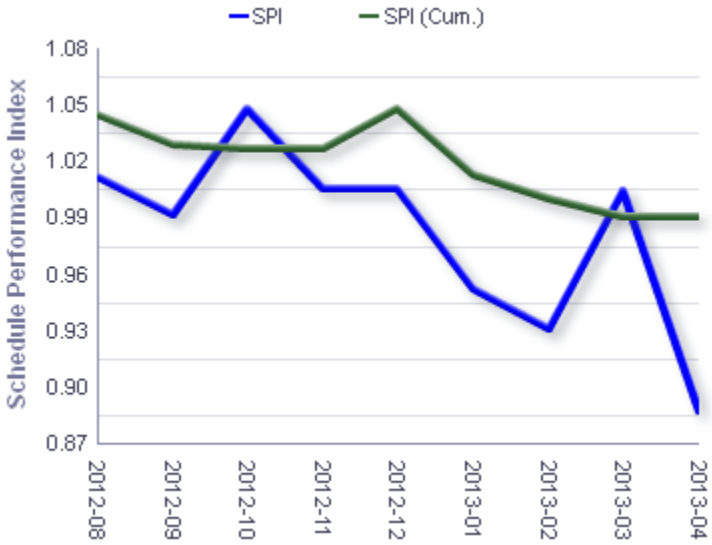

Fig 11. SPI chart from Oracle

Another metric to monitor is CPI where if it falls under 1 it is a signal for action, the threshold is more lenient at the start of the project but is strict as the week progresses.

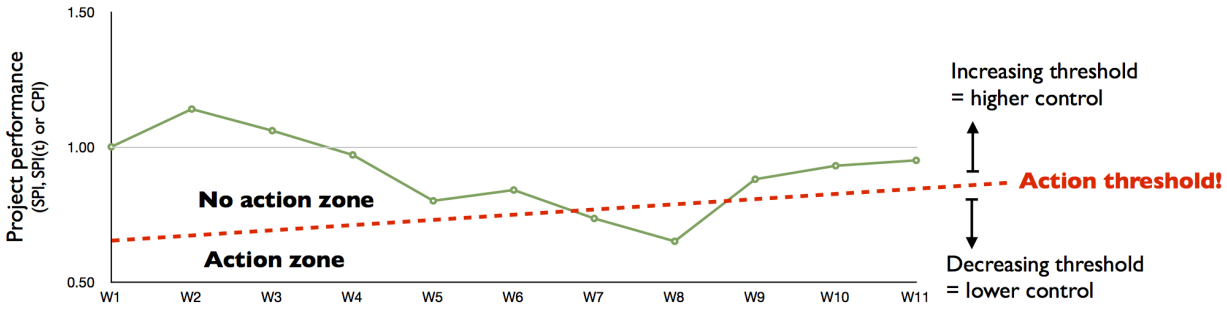

Fig 12. Action Threshold on a CPI/SPI a chart from pmknowledgecenter

Conclusion

Completing this project gives a better understanding of the skills necessary for planning a project. Doing with SCRUM also helped me understand the framework and see how it helps in the planning process since things are integrated within the framework. The biggest problem is just understanding the SCRUM framework with no experience working within the framework. However, after a lot of dialogue and research, it makes great sense why the approach is used within an IT setting to projects efficiently. Some of the artifacts are only samples of a complete table or diagram, understanding why certain items are labeled a certain way and how the size of technical documents grows so huge. Understanding where requirements come from when I join a team and having a better understanding of how to complete a project.

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