CSE 566 Software Project Process and Quality Management

Assignment 1

Company Background: XYZ Tech, a mid-sized software development company, is known for its innovative solutions in the healthcare industry.

New Product: XYZ Tech has recently developed a revolutionary healthcare application designed to streamline patient data management for hospitals. This application integrates various functionalities like AI-driven patient prioritization, appointment scheduling, patient record management, and real-time data analysis.

Problem: The company has a strong in-house development team but lacks specialized resources in software testing[10].

Hypothetical Situation: Due to the application's complexity and the need for rigorous testing to ensure compliance with healthcare regulations, XYZ Tech decides to outsource the testing process[9]. This decision is driven by the need for specialized testing expertise, the desire to reduce time-to-market, and the aim to maintain internal focus on core development activities[8].

Initial High Level Value Stream Mapping

The following are the processes involved in the initial high level value stream mapping with respect to outsourcing of the developed a revolutionary healthcare application by XYZ Tech:

1. **Requirement Gathering and Analysis**
    a. This process involves identifying, analysing, documenting, and verifying the needs and constraints of a healthcare application.

b. **Value Added Time** (5 days) : This is the estimated time as it is needed for thorough requirement gathering and alignment with the software's complex functionalities and compliance needs.

c. **Non-Value-Added Time** (2 days): This is an estimation of the time spent on over-analysing certain low-risk features or creating excessively detailed documentation.

d. **Lean Waste**: (**Overprocessing**): This occurs if the requirements are excessively detailed or redundant.

2. **Vendor Selection and Contracting**

a. This process involves conducting market research, creating, and sending out RFPs, selecting a vendor depending on the pricing and capabilities matching with the product requirements, and finalizing contracts.

b. **Value Added Time** (14 days): This is the estimated time as significant time is necessary due to the critical nature of finding a vendor with specific expertise in healthcare software testing and compliance.

c. **Non-Value-Added Time** (7 days): This is the estimation of the time that is spent due to the delays that often occur in awaiting vendor responses or internal approvals and extended negotiations over contract terms.

d. **Lean Waste**: (**Waiting**) waste might primarily occur due to slow decision-making and approval processes.

3. **Test Planning with Vendor**

a. This involves defining the testing approach, preparing a detailed testing schedule, resource allocation and setting up communication protocols with the vendor.

b. **Value Added Time** (7 days): This is the estimated time since adequate time is needed to ensure a comprehensive plan covering all aspects of the software.

c. **Non-Value-Added Time** (2 days): Some time is lost in preparing overly detailed plans for scenarios that are unlikely to occur.

d. **Lean Waste**: (**Over-processing)** may occur if the test plan is more detailed than necessary for effective testing.

4. **Test Design**

a. This process involves creating detailed test cases/scenarios and scripts based on the test plan, setting up the test environment and preparing test data.

b. **Value Added Time** (14 days): This is the estimated time as this phase requires careful preparation to cover all aspects of the software, especially given its complexity and regulatory requirements.

c. **Non-Value-Added Time** (5 days): This is the estimated amount of excess time spent due to issues arising during the setup of the test environment.

d. **Lean Waste**: (**Overproduction**) is possible if more test cases are created than what is needed.

5. **Test Execution**

a. This process involves running the developed test cases, documenting results and logging defects.

b. **Value Added Time** (21 days): The core testing phase, where the outsourced team rigorously tests the software and identifies defects.

c. **Non-Value-Added Time** (4 days): Inefficiencies in defect logging or unnecessary status meetings.

d. **Lean Waste**: None.

6. **Defect Management**

    a. This involves analysing reported defects, prioritising them, fixing the defects and re-testing to verify those fixes.

    b. **Value Added Time** (14 days): Time is critical for ensuring all defects are adequately addressed.

    c. **Non-Value-Added Time** (3 days): Inefficiencies in communication between the in-house team and the outsourced vendor.

    d. **Lean Waste**: (**Defects**) : they require additional time and resources to fix, and they can delay the delivery of the software product. They can also lead to customer dissatisfaction if they are not addressed promptly and effectively.

7. **Performance and Compliance Monitoring**

    a. This process involves tracking KPIs, ensuring quality assurance and compliance as it is essential for meeting healthcare industry standards.

    b. **Value Added Time** (7 days): Critical for making last-minute improvements and finalizing the product.

    c. **Non-Value-Added Time** (2 days): Delays in final signoffs or Time spent correcting issues that could have been identified earlier in testing.

    d. **Lean Waste**: (**Overprocessing**) Overly detailed adjustments or changes that do not significantly impact the final product.

8. **Project Closure**

    a. This process involves Finalizing documentation, releasing resources, evaluating the testing process, and vendor performance.

    b. **Value Added Time** (3 days): Proper documentation and evaluation are essential for future reference and process improvement.

c. **Non-Value-Added Time** (1 day): Delays in Administrative formalities.

Summary of the Initial High Level Value Stream Mapping

S.No	Name of the Process	Value Added Time (in days)	Non-Value-Added Time (in days)
1.	Requirement Gathering and Analysis	5	2
2.	Vendor Selection and Contracting	14	7
3.	Test Planning with Vendor	7	2
4.	Test Design	14	5
5.	Test Execution	21	4
6.	Defect Management	14	3
7.	Performance and Compliance Monitoring	7	2
8.	Project Closure	3	1
		85 days	26 days

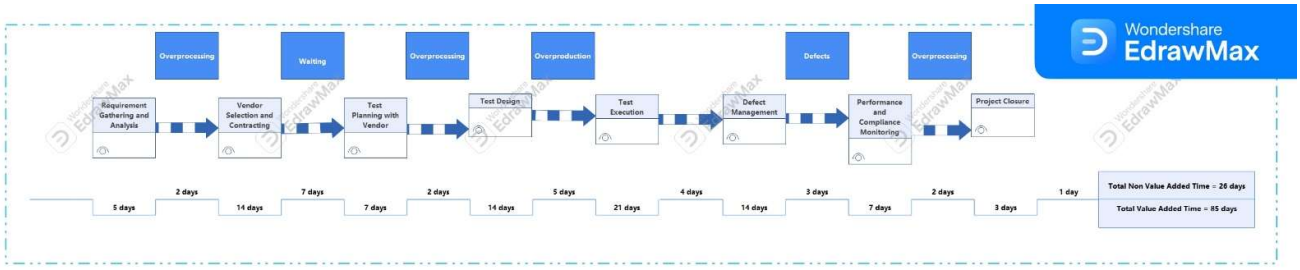

Figure 1: Initial High Level Value Stream Mapping

Lean Waste Elimination

To eliminate[2] the lean wastes identified in the previous analysis, XYZ Tech can implement specific strategies at each stage of the process.

1. **Initial Process: Requirement Gathering and Analysis**
    a. **Lean Waste Identified** in this process is **Overprocessing**.
    b. **Strategy to eliminate this lean waste**: is to implement a 'lean requirements' approach, determining testing requirements and focusing on only critical features for testing, using templates for documentation to ensure consistency without excessive detail.
    c. **Impact caused due to the elimination of this lean waste** is that it reduces the need for overly detailed focus on the low aspects of the healthcare application.
2. **Initial Process: Vendor Selection and Contracting**
    a. **Lean Waste identified** in this process is **Waiting**.
    b. **Strategy to eliminate this lean waste**: Develop a streamlined decision-making strategy by establishing a pre-approval framework for routine decisions and forming a cross-functional team with the authority for swift decisions on vendor selection and contract approvals. Set clear, objective criteria for vendor evaluation and implement a scoring system to ensure transparency and efficiency. Conduct vendor assessments and internal approvals in parallel to reduce turnaround time. Continuously review and adapt the process to meet changing business needs and identify improvement areas.
    c. **Impact caused due to the elimination of this lean waste**: Speeds up the vendor selection process by reducing delays in decision-making and approvals.
3. **Initial Process: Test Planning with Vendor**

a. **Lean Waste identified** in this process is **Overprocessing**.

b. **Strategy to eliminate this lean waste**: Adopt a Minimum Viable Product (MVP) strategy, focusing on creating testing plans that cover the most critical aspects first and expand as needed, based on the early testing results.

c. **Impact caused due to the elimination of this lean waste**: By implementing the above strategy we can prevent the creation of unnecessary detailed plans for unlikely scenarios, saving time and resources.

4. **Initial Process: Test Design**

a. **Lean Waste identified** in this process is **Overproduction**.

b. **Strategy to eliminate this lean waste**: Implement a lean test case design approach to test case creation developing test cases as they are needed based on the MVP strategy.

c. **Impact caused due to the elimination of this lean waste**: By implementing the above strategy we can reduce the number of excess test cases that would be developed otherwise. This strategy helps us on focusing on the most high-risk areas of the application.

5. **Initial Process: Test Design**

a. **Lean Waste identified** in this process is **Overproduction**.

b. **Strategy to eliminate this lean waste**: Implement a lean test case design approach to test case creation developing test cases as they are needed based on the MVP strategy and feedback.

c. **Impact caused due to the elimination of this lean waste**: By implementing the above strategy we can reduce the number of excess test cases that would be

developed otherwise. This strategy helps us on focusing on the most high-risk areas of the application.

6. **Initial Process: Defect Management**
    a. **Lean Waste identified** in this process is **Defects**.
    b. **Strategy to eliminate this lean waste**: Integrate continuous testing and early feedback loops to encourage proactive defect identification. We can also improve communication channels between teams and utilize defect tracking tools for more efficient defect management.
    c. **Impact caused due to the elimination of this lean waste**: By implementing the above strategy we can reduce the time and resources spent on reworking and correcting issues identified late in the process.
7. **Initial Process: Performance and Compliance Monitoring**
    a. **Lean Waste identified** in this process is **Overprocessing**.
    b. **Strategy to eliminate this lean waste**: We can eliminate the lean waste identified in this process by focusing more on the key performance indicators and critical compliance metrics that directly impact product quality and regulatory adherence. We can also avoid over-monitoring the low-risk elements of the application.
    c. **Impact caused due to the elimination of this lean waste**: By implementing the above strategy we can reduce the time and resources spent reworking on the overly detailed adjustments or changes that do not significantly impact the final product.

Final Value Stream Mapping

After identifying different strategies to eliminate the lean wastes from each of the processes involved in the initial high level value stream mapping, I was able to reduce the total value-added time and the non-value-added time considerably. The final value stream mapping consists of the same processes as that of the initial value stream mapping but there are few changes in the activities performed as part of each process to implement the identified strategies to eliminate the identified lean wastes from each individual process.

1. **Requirement Gathering and Analysis**
    a. This process now involves focused requirement sessions prioritizing high-value features and iterative refinement.
    b. **Value Added Time** (3 days) : The value-added time has reduced to 3 days from the initial span of 5 days as the focus shifts to high-impact features i.e. essential requirements and continuous refinement.
    c. **Non-Value-Added Time** (1 days): The NVA time has reduced to 1 day from the initial span of 2 days due to minimizing the over analysis on the low-risk features.
2. **Vendor Selection and Contracting**
    a. This process involves conducting accelerated market research, creating, and sending out RFPs to pre-qualified vendors, rapid evaluation based on preset criteria, and swift contracting.
    b. **Value Added Time** (10 days): The value-added time has reduced to 10 days from the initial span of 14 days due to a streamlined process for vendor evaluation and selection and quicker negotiations.

c. **Non-Value-Added Time** (3 days): The NVA time has reduced to 3 days from the initial span of 7 days as the waiting time for internal approvals and vendor responses is minimized.

3. **Test Planning with Vendor**

   a. This involves MVP based test strategy development, critical path testing schedule creation and lean resource allocation.

   b. **Value Added Time** (4 days): The value-added time has reduced to 4 days from the initial span of 7 days due to focusing on key aspects ensuring a quicker and more efficient planning phase.

   c. **Non-Value-Added Time** (1 day): The NVA time has reduced to 1 day from the initial span of 2 days due to the elimination of over planning for low-risk scenarios.

4. **Test Design**

   a. This process involves just in time test case creation, dynamic test environment setup and on- demand test data preparation.

   b. **Value Added Time** (7 days): The value-added time has reduced to 7 days from the initial span of 14 days due to need of test cases targeting only the essential features.

   c. **Non-Value-Added Time** (3 days): The NVA time has reduced to 3 days from the initial span of 5 days due to the fact that the test environment is setup dynamically the inefficiencies are reduced.

5. **Test Execution**

   a. This process involves running the developed test cases, documenting results and logging defects.

b. **Value Added Time** (21 days): The value-added time remains the same to ensure proper through testing to make sure the healthcare application is in compliance with the market standards and medical code.

c. **Non-Value-Added Time** (2 days): The NVA time has reduced to 2 days from the initial span of 4 days by streamlining defect logging and reducing unnecessary meetings.

6. **Defect Management**

a. This involves efficient defect tracking and prioritization and streamlined communication via an integrated development.

b. **Value Added Time** (10 days): The value-added time has reduced to 10 days from the initial span of 14 days due to efficient defect management ensuring quick turnaround on critical defects.

c. **Non-Value-Added Time** (1 day): The NVA time has reduced to 1 day from the initial span of 3 days by efficient tracking and enhancing communication efficiency between teams.

7. **Performance and Compliance Monitoring**

a. This process involves focused compliance monitoring and key performance tracking.

b. **Value Added Time** (5 days): The value-added time has reduced to 5 days from the initial span of 7 days enabling quicker final adjustments.

c. **Non-Value-Added Time** (1 days): The NVA time has reduced to 1 day from the initial span of 2 days by eliminating delays in sign offs and overprocessing.

8. **Project Closure**

a. This process involves standardized final documentation, efficient resource allocation and structured vendor performance evaluation.

b. **Value Added Time** (3 days): The value-added time is maintained at 3 days ensuring thoroughness while being efficient.

c. **Non-Value-Added Time** (1 day): The NVA time also remains the same.

Summary of the Final High Level Value Stream Mapping

S.No	Name of the Process	Value Added Time (in days)	Non-Value-Added Time (in days)
1.	Requirement Gathering and Analysis	3	1
2.	Vendor Selection and Contracting	10	3
3.	Test Planning with Vendor	4	1
4.	Test Design	7	3
5.	Test Execution	21	2
6.	Defect Management	10	1
7.	Performance and Compliance Monitoring	5	1
8.	Project Closure	3	1
		63 days	13 days

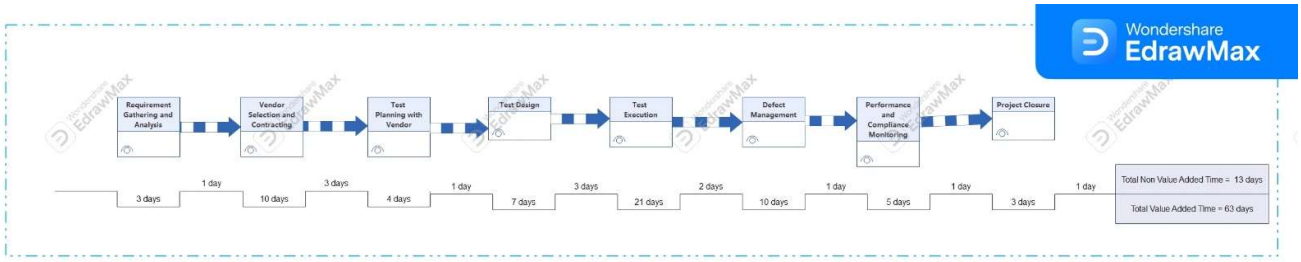

Figure 2: Final Value Stream Mapping

Therefore, you can see that the total value-added time has dropped from 85 days to 63 days and the total non-value-added time has decreased to 13 days from 26 days. This shows the importance[1] of eliminating lean wastes in the software development resulting in enhancing overall efficiency and effectiveness.

References

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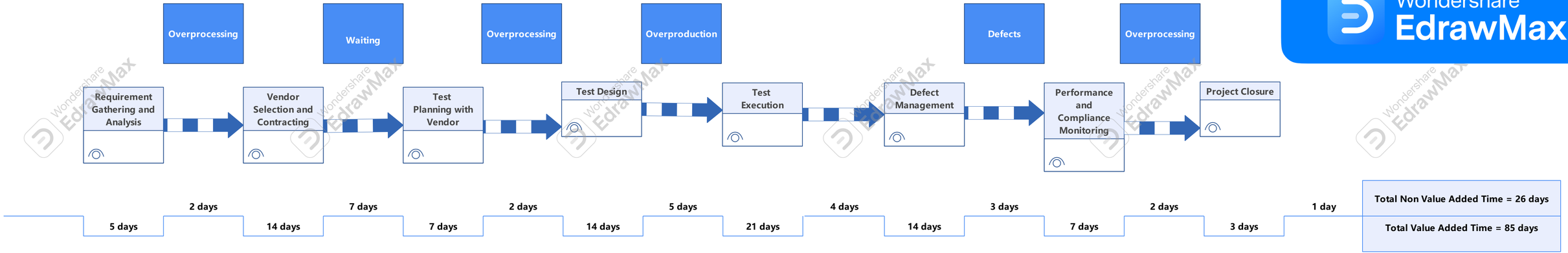
Overprocessing
Waiting
Overprocessing
Overproduction
Defects
Overprocessing
Requirement Gathering and Analysis
Vendor Selection and Contracting
Test Planning with Vendor
Test Design
Test Execution
Defect Management
Performance and Compliance Monitoring
Project Closure
5 days
2 days
14 days
7 days
7 days
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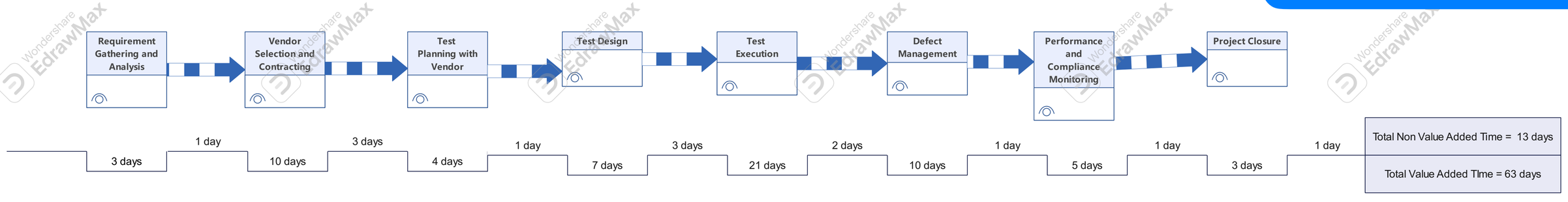
Total Non Value Added Time = 26 days
Total Value Added Time = 85 days


Requirement Gathering and Analysis
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1 day
Total Non Value Added Time = 13 days
Total Value Added TIme = 63 days