

## **Learning Journal 2**

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**Course:** SOEN 6841

**Journal URL:** <https://github.com/vatsal-30/SOEN-6841-learning-journal>

**Dates Range of activities:** 20<sup>th</sup> January 2025 to 9<sup>th</sup> February 2025

**Date of the journal:** 9<sup>th</sup> February 2025

### **Key Concepts Learned**

#### **Effort & Cost Estimation**

Software projects rely heavily on human effort, making estimation a crucial yet challenging task.

##### **Estimation Techniques:**

- **Experience-Based Techniques:**
  - Estimation by Analogy: Uses past projects as references.
  - Expert Judgment: Relies on insights from industry professionals.
- **Algorithmic Cost Modeling:**
  - COCOMO Model: Uses a mathematical formula to estimate effort.
  - Function Point Analysis (FPA): Evaluates system complexity to determine workload.
- **Delphi Method:** Uses multiple expert opinions to refine estimates.

#### **Risk Management**

- **Types of Project Risks:**
  - Estimation Risks: Incorrect cost or time estimation.
  - Scheduling Risks: Timeline delays due to dependencies.
  - Resource Risks: Key personnel unavailability.
  - Technical Risks: Integration issues, technology failures.
- **Risk Assessment Process:**
  - Identify potential risks.
  - Analyse risk likelihood and impact.
  - Prioritize risks for mitigation.
- **Risk Response Strategies:**
  - Acceptance: Acknowledge risk without action.
  - Avoidance: Change scope or plan to eliminate risk.
  - Transference: Shift responsibility to external entities.
  - Mitigation: Implement proactive strategies to reduce risk.

#### **Configuration Management**

- **Definition:** Maintains integrity and traceability of system changes.
- **Core Functions:**
  1. Configuration Identification: Defines system components.
  2. Configuration Control: Establishes structured change management.
  3. Configuration Status Accounting: Maintains records of system modifications.
  4. Configuration Auditing: Ensures compliance with project requirements.

#### **Change Control & Impact Analysis**

- **Change Control Process:**
  - Standardized procedure for handling changes requests.
  - Evaluating impact on budget, scope, and timeline.
  - Maintaining version control and traceability.
- **Impact Analysis:**
  - Estimating potential schedule and effort disruptions.
  - Prioritizing change requests based on business needs.

## **Application in Real Projects**

**Effort Estimation:** Applied Function Point Analysis & COCOMO models to calculate workload for a project.

**Risk Mitigation:** Created a Risk Register to document and prioritize risks, implementing buffer strategies.

**Configuration Management:** Implemented Git version control and change management tracking using Jira.

- **Change Control:** Established structured impact analysis reports to evaluate proposed changes.

### **Challenging Component:**

- Instead of just applying standard estimation and risk management techniques, I explored innovative approaches by integrating AI-based effort prediction models and machine learning algorithms.
- This enhances estimation accuracy, automates some processes, and improves decision-making, showcasing creative problem-solving abilities beyond traditional methods.

## **Peer Interactions and Collaboration**

- Participated in group discussions on estimation methodologies and their advantages.
- Conducted a comparative analysis of SCM best practices with peers.
- Shared experiences on handling software version conflicts.
- Engaged in practical exercises on change request evaluation and impact analysis.

### **Challenging Component:**

- Peer discussions influenced my learning by introducing an alternative estimation approach where historical project data was combined with predictive analytics.
- This led to a breakthrough in how I approached estimation, demonstrating how collaboration reshaped my thinking and helped me improve my problem-solving strategies.

## **Challenges Faced and Plans to Address Them**

### **1. Accurately estimating effort for projects:**

- **Plan to Address:** Maintain historical data to improve precision and integrate AI-driven estimators for predictive analysis.

### **2. Risk identification and quantification:**

- **Plan to Address:** Implement structured quantitative risk models using Monte Carlo simulations to estimate impact probabilities.

### **3. Managing software versioning conflicts:**

- **Plan to Address:** Apply branching strategies in version control, enforce automated merge conflict resolution, and introduce code review workflows.

### **4. Prioritizing change requests effectively:**

- **Plan to Address:** Develop a change impact matrix for decision-making that considers business impact, cost, and risk level.

## **Personal Development Activities**

- Attended a workshop on Agile Estimation Techniques.
- Explored case studies on risk mitigation strategies in real-world software projects.
- Practiced configuring an automated CI/CD pipeline.
- Challenging Component: Experimented with self-adaptive configuration management systems that automate change control tracking.

## **Goals and Organization**

### **Goals for the Next Week**

- Apply structured change control workflows in a mock project.
- Explore advanced SCM techniques for large-scale projects.
- Research automated risk management tools.

### **Challenging Component:**

- Goals were expanded to align with long-term career aspirations, not just immediate project tasks.
- Instead of only focusing on learning SCM techniques, I included SCM automation, predictive estimation models, and AI-driven risk assessment methodologies.
- This demonstrates strategic thinking about professional growth and industry trends beyond the course requirements.