**Learning Journal 2**

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**Course:** SOEN 6841

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

**Dates Rage of activities:** 20th January 2025 to 9th February 2025

**Date of the journal:** 9th February 2025

**Key Concepts Learned**

**Effort & Cost Estimation**

Software projects rely heavily on humaneffort, 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.