**Learning Journal – Week 2**

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**Course:** Software Project Management

**Journal URL:** <https://github.com/Amanpreet1304/SOEN6841-Software_Project_Management>

**Dates Rage of activities:** 23rd January 2025 – 29th January 2025

**Date of the journal:** 26th January 2025

**Key Concepts Learned:**

This week, I explored effort estimation, cost estimation, and risk management, which are essential in planning and executing software projects. Highlights included the following:

* **Effort Estimation & Its Importance:** I learned how estimating effort correctly helps in resource planning, budgeting, and setting realistic deadlines. Underestimation can lead to project failure, while overestimation wastes resources.
* **Effort Estimation Techniques:** Different scenarios require different approach of effort estimation, which helps us in choosing the right technique.
  + **Estimation by Analogy:** Compares effort with similar past projects by analyzing the number of elements and their complexity. This technique involves 4 steps:

Step 1: Gathering the results of a similar previous project.

Step 2: Finding the multiplication factor:

MF = No. of Elements in new project / No. of Elements in old project

Step 3: Calculate the size of the project:

Size of new sub system = sub system \* MF

Size of the new project = sum of the above sizes of sub systems

Step 4: Size ratio: size of the new project / Size of the old project.

**Estimated Effort =** Effort of old project \* size ratio.

* **Estimation by Expert judgement:** 
  + - **Function Point Analysis (FPA):** Measures software functionality rather than code size, making it technology independent.
      * **Establishing boundary:** This is done by identifying the scope of the project and required external integrations.
      * **Calculation of UFP:** The unadjusted Function Points are calculated based on evaluating the 6 Function Count types.
      * **Calculating VAF:** The value adjustment factor is calculated by choosing the 14 most important characteristics of the project.
      * **FP:** The final FP is the product of UFP and VAF.
    - **Wide Band Delphi Method:** This is another method of Effort Estimation where each team member’s opinion is mattered to refine effort estimates. I found this method interesting because it reduces individual bias.
    - **Cost Estimation:** Cost estimation is done using a mathematical function which relies on the product, project and process attributes:
      * **Algorithmic Cost Modelling:** Effort = A \* SizeB\* M.
      * **COCOMO Cost Modelling:** A mathematical model to estimate effort based on project size. **COCOMO 2** is now being used as it is an advanced and improved version of COCOMO that considers different stages of software development and adjusts estimates accordingly.
* **Risk Management & Its Importance:** Risks can be related to technology failures, budget overruns, schedule delays, resource shortages, or legal compliance. Understanding risks early helps in preventing major project failures.
* **Risk Identification & Assessment:** Assign risks a Low, Medium, or High impact rating.It uses probability calculations to assess financial and operational impact.
* **Risk Response Strategies:**
  + **Avoidance:** Eliminating risks by modifying the project plan.
  + **Mitigation:** Reducing the risk’s probability or impact (e.g., adding extra testing)
  + **Transference:** Passing the risk to another party.
  + **Acceptance:** Acknowledging a risk without taking preventive action.
* **Risk Control Strategies:** Using schedule buffers, quality gates, and knowledge management systems to reduce project uncertainties.

**Application in Real Projects:**

* The learned concepts can be applied to our project Intelligent Tutoring System (ITS), the **Wide Band Delphi** technique for initial effort estimation and **COCOMO II model for** Cost Estimation to determine budget feasibility.
* In my group project, I identified major risks such as unclear requirements, dependency on external APIs, and team availability conflicts.

**Peer Interactions:**

* I collaborated with my peers on discussing whether FPA or COCOMO II would be a better estimation approach. Some suggested FPA for measuring modular functionalities, while others believed COCOMO II would be more suitable for effort and cost estimation.
* We discussed whether technology risks (e.g., AI model failures) or resource risks (e.g., team availability) pose a bigger threat.

**Challenges Faced:**

* While discussing about project, I realized that estimating effort is difficult when project requirements are not fully defined. To overcome this, I planned to first finalize core functionalities before applying estimation techniques.

**Personal development activities:**

* I reviewed open source ITS platforms to understand how their development effort was estimated.
* I experimented with JIRA’s effort estimation and risk-tracking features to see how professional teams handle estimation in Agile workflows.

**Goals for the Next Week:**

* Analyze real-world project failures to see how poor risk management led to costly mistakes.
* Finalize our approach for effort estimation in the ITS project.
* Focus on time managementto ensure better tracking of progress within our team.