Learning Journal 2

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Key Concepts Learned:

This week, I focused on **Effort & Cost Estimation** and **Risk Management** in software projects.

1. **Effort Estimation Techniques:**
   - Software development is effort-driven, making estimation tricky.
   - Different estimation techniques were covered:
     - **Estimation by Analogy** – Comparing new projects with past ones for effort approximation.
     - **Function Point Analysis (FPA)** – Measuring software size based on functional components.
     - **Wideband Delphi Method** – Group-based estimation for reducing bias.
     - **COCOMO (Constructive Cost Model)** – Mathematical models for effort estimation based on software size.
2. **Cost Estimation Techniques:**
   - Cost estimates depend on effort and factors like salaries and infrastructure.
   - Models like **Activity-Based Costing** and **Cost Factor Analysis** are used to determine overall project costs.
3. **Risk Management:**
   - Risks can impact product quality (bad engineering, lack of testing) and project timelines (resource shortages).
   - Managing risks involves:
     - **Risk Identification** – Finding potential risks at the project, product, and business level.
     - **Risk Analysis** – Evaluating likelihood and impact (qualitative and quantitative).
     - **Risk Prioritization** – Focusing on high-impact risks first.
     - **Risk Control Strategies:**
       - **Acceptance** – Preparing contingency plans.
       - **Avoidance** – Changing plans to eliminate risks.
       - **Transference** – Shifting risk (e.g., using insurance or third-party contracts).
       - **Mitigation** – Reducing risk probability through early actions.

Application in Real Projects:

Effort and cost estimation are crucial in real-world projects because inaccurate estimates lead to budget overruns, missed deadlines, and resource mismanagement.

- **Effort estimation in industry:**
  - Many companies use FPA and COCOMO models to predict effort and cost before development starts. In Agile environments, techniques like Story Points and Planning Poker are preferred because they allow flexibility in effort estimation. In

startups, effort estimation is often based on experience rather than formal models due to limited historical data.

- **Cost estimation in real-world scenarios:**
  o Cost estimation is not just about salaries; it includes infrastructure, software licenses, cloud services, and third-party integrations. Projects with iterative models (like Agile) tend to have better cost control than traditional Waterfall models, where cost overruns happen due to upfront fixed budgets.
- **Risk management in projects:**
  o **Tech risks**: Rapidly changing tech stacks mean companies must mitigate risks by choosing stable technologies or investing in training.
  o **Scope creep**: Many projects fail due to ever-changing requirements. Teams mitigate this risk using Agile methodologies and strict scope management.
  o **Resource risks**: Projects often suffer delays due to unavailable skilled developers. Companies mitigate this by cross-training employees or hiring external consultants.

Peer Interactions:

- This week, I had some insightful discussions with my friends, Abhijit Banerjee and Saheb Singh, about Effort Estimation challenges and why FPA vs. Estimation by Analogy works better in different cases.
- Worked in a group on a Delphi estimation exercise, and it was interesting to see how different perspectives improved the accuracy.
- Talked about real-world risk factors—one peer shared an example of a project that failed because they underestimated resource needs.

Challenges Faced:

- **COCOMO models** are detailed but complex, and it took time to understand their variations.
- Traditional estimation techniques don't always apply well to modern AI/ML projects.
- **Risk prioritization** can be subjective—quantifying certain risks (e.g., evolving third-party APIs) is tricky.

Personal Development Activities:

- Looked into AI-driven effort estimation models to see how modern tools predict project costs.
- Read some case studies on software project failures due to poor estimation and risk management—some were wild.
- Practiced FPA calculations on sample software specs to get a better understanding.

Goals for the Next Week:

- Dive deeper into Agile Estimation techniques like Story Points and Planning Poker.
- Learn about schedule estimation—want to understand Critical Path Method (CPM) and PERT Analysis.
- Find real-world examples of risk mitigation strategies and how they worked out.