Software Project Management

Learning Journal

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Course: Software Project Management

Journal link: https://github.com/AdarshPawar/LearningJournal.git

Date: 06/03/2024

Week 5: February 18 - March 09

Concepts Learned

Chapter 7 - Project Monitoring and Control

In this chapter, we are introduced to project monitoring and control, processes that ensure undertaken projects are completed successfully, remain within budget, and delivered on schedule.

Project monitoring and control processes allow project managers to identify, address issues that can impact the project, make calculated and informed decisions, and keep stakeholders informed throughout the project lifecycle etc.

Main components of Project monitoring

I. Measure Task Progress-

- Project monitoring involves continuously tracking the progress of various project activities. This includes comparing actual progress with the planned schedule, milestones, and budget.
- By monitoring progress, project managers knows how the direction in which the project is heading and can ensure that the project stays on track and identify any areas where adjustments may be needed.

II. Resource Utilization and Resource Loading-

- Project monitoring also involves tracking resource utilization and resource loading. This means evaluating how efficiently resources are being utilized and ensuring that workloads are balanced appropriately.
- By monitoring resource usage, project managers can optimize resource allocation and prevent overloading or underutilization.

III. Generate Status Reports-

- Project monitoring includes providing stakeholders with regular updates on project progress. This involves sharing information on costs, schedules, quality, achievements, challenges, and resolutions.
- Providing status reports on a regular basis helps keep stakeholders constantly informed and engaged, fostering transparency and trust throughout the project.

IV. Assessing Risks and Issues-

- Monitoring helps in assessing potential risks and issues that may impact project success. This includes identifying, analyzing, and mitigating risks, as well as addressing any issues that arise during project execution.
- By actively managing risks and issues, project managers can minimize disruptions and keep the project on track.

V. Monitor Skills and Knowledge of Project Team-

- Monitoring the skills and knowledge of the project team involves matching resources to project tasks during planning. Any gaps between required and available skills are addressed through training plans.
- During execution, training completion is tracked to ensure competency. Adjustments to the project plan may be necessary if there are delays or changes in resource availability. If a resource leaves the project, the project manager must find a suitable replacement by matching skills and knowledge required for the tasks.

Techniques for project control

I. Resource Levelling

- Resource levelling is a strategic method employed during project execution to resolve conflicts in resource allocation. When a resource is assigned to multiple tasks and a delay in one task affects another, adjustments become necessary.
- This may entail shifting tasks within the schedule to utilize available slack or supplementing resources. Software like Microsoft Project identifies conflicts such as impractical task dates or resource overallocation, which can disrupt project timelines.
- Manual or automatic adjustments are made to rectify these conflicts, ensuring project efficiency and adherence to deadlines. By employing resource levelling techniques, project managers can optimize resource utilization and minimize the impact of delays on project progress.

II. Schedule Optimization

- Efficient scheduling is done by determining the critical path of a project using PERT/CPM methods. Unnecessary slack in the project plan should be removed to optimize the critical path. Identifying and eliminating slack on all potential critical paths helps to identify the longest path, which becomes the critical path for the project.

- During execution, tasks on the critical path completed earlier than planned can shorten the critical path or allow for earlier starts on dependent tasks. Schedule optimization includes putting sequential tasks in parallel and splitting tasks to collapse the schedule significantly.
- Concurrent engineering methods plan downstream activities in advance, enabling parallel work by multiple teams, which further compresses the project schedule. This approach is particularly effective in software projects, where tasks can be easily divided and worked on concurrently, leading to substantial time savings.

III. Corrective Actions against Issues

- Issues should be classified into categories, and high-priority ones should be tackled first as they are time-sensitive and can impact the project significantly if not addressed promptly.
- When multiple issues arise simultaneously, determining their priority can be challenging. Assigning weights based on urgency and severity helps in prioritization. Sorting the issues by weight and time sensitivity allows for better decision-making.
- If time permits, addressing high-weight issues with longer time frames alongside lower-weight ones with shorter time frames is ideal. However, if time constraints exist, focusing on higher-weight issues minimizes project impact, ensuring critical issues are resolved promptly to mitigate risks.

IV. Resource Optimization

- In outsourced projects, the project manager must consider the benefits to their organization. Service providers aim for profit, which is predetermined during project bidding. However, various factors during execution can threaten the profit margin.
- Monitoring expenses is crucial to maintain profitability. Increasing employee wages is a known threat; thus, productivity must increase accordingly to mitigate this issue. Optimizing resources in projects can be achieved through project portfolio management.
- By aligning resources with project needs, idle resources can be minimized. Additionally, prioritizing the utilization of higher-paid staff ensures maximum efficiency and cost-effectiveness. This approach helps in maintaining profitability and achieving project objectives effectively.

Chapter 8 - Project Closure

In this chapter, we are introduced to project closure which marks the end of a project's lifecycle and its various activities to wrap up the project and ensure a transition to the next phase. During project closure, several activities are undertaken to wrap up the project effectively -

I. **Finalizing Deliverables**: This phase involves a comprehensive review and validation of all project deliverables including software modules, documentation, and reports related to the project. Attention to detail is crucial to ensure that all agreed upon deliverables are not only completed but also align precisely with the expectations of the stakeholders. Any discrepancies must be addressed promptly before the delivery of the project.

II. **Client Acceptance**: Formal acknowledgment and approval from the client has to be obtained to confirm that predefined project objectives have been satisfactorily achieved. This acknowledgment indicates that the project effort has come to an end and is an important milestone in the fulfillment of contractual obligations. It lays the foundation for a successful transition to the next stage or project completion.

III. **Resource Release**: As a project comes to a close, it is important to reallocate resources such as team members, equipment, and materials effectively. This includes planning for the release of these assets so that they can be used in newer projects rather than have them stand by idly. Efficient use of resources streamlines costs and ensures the company’s flexibility to the changing requirements of the project

IV. **Financial Closure**: Completion of the financing phase is an important step in closing the project. This includes reconciling budgets, settling invoices, and formally closing contracts. Attention to detail in budgeting ensures accountability and transparency, reduces financial risk and paves the way for easier completion of the project.

There is a lesson to be learnt from every project completed. This continuous improvement of software projects requires an analysis of project progress, constraints and barriers. Important steps related to this process include:

I. **Post-Project Analysis**: Involves participation in comprehensive project post-assessments to differentiate factors contributing to project success, identification of areas of weakness as well as options for improvement. These important findings serve as a basis for informed decision-making and strategic planning in future efforts.

II. **Documentation of lessons learned**: Documenting insights gained from project experiences in a systematic manner facilitates the retention and sharing of valuable knowledge. Including the learnt best practices, pitfalls to avoid, and recommendations for process improvement in documents reinforce organizational learning and reinforce project management practices.

III. **Knowledge sharing**: Sharing of lessons learned to appropriate stakeholders including project teams, management, and other project stakeholders is paramount. Effective knowledge transfer ensures proper use of accumulated intelligence toward optimal ongoing project outcomes and fosters continuous improvement in the project ecosystem in the system.

Reflections on case study

- I came across a case study where a software solutions company embarked on a project to develop a cutting-edge real-time web application for a global e-commerce giant. The application aimed to redefine the online shopping experience by integrating advanced features like live product updates, flash sales, personalized recommendations, and a seamless checkout processes.
- The initial planning phase spanned approximately four weeks during which the project manager and team meticulously outlined project scope, objectives, and timelines. Using Agile techniques, the team divided the project into manageable sprints, each focusing on specific deliverables. Through user story mapping and sprint planning, tasks were prioritized, timelines were accounted for, and resources were efficiently allocated. A detailed project roadmap was developed, identifying milestones, deliverables and dependencies.
- To ensure the project's progress remained on track, the company put in place a robust management system. Agile project management tools such as JIRA and Trello were used to track projects, user profiles and sprint progress. Daily stand-up meetings provided a space for team members to discuss their progress, roadblocks and action plans.
- Efficient resource utilization was prioritized throughout the project. Skilled developers were assigned tasks based on their expertise and availability, ensuring optimal utilization of human resources. Cloud-based infrastructure services such as Amazon Web Services (AWS) were leveraged to scale resources dynamically, minimizing downtime and maximizing performance. Additionally, automated Jenkins CI/CD pipelines were implemented to streamline the deployment process and reduce manual effort.

- Proactive risk management played a key role in mitigating potential threats to project success. They conducted regular risk assessments to identify and prioritize risks such as server outages, security vulnerabilities and third-party API dependencies. They also developed mitigation measures including redundancy measures, security patches and new API integrations. They prioritized continued risk trigger monitoring and their early intervention strategy helped prevent potential problems with the project timeline. Doing so helped them successfully deliver the real-time web application to the client ahead of schedule and within budget.

Collaborative Learning

- During the reading week, my friend and I met and had the chance to go over chapters 7 and chapters 8. Since he and I both worked at software development companies before, we shared our thoughts and learnings about project monitoring and control in our company settings.
- We particularly went into great discussion on how project monitoring can be achieved in an agile setting. We recognized the important of iterative level planning where planning occurs at the iteration level due to the short duration of iterations and various controlling techniques such as prioritizing requirements/features.
- I learnt about performance measurements such as feature points delivered per iteration, defects found per iteration, and team productivity etc. It was hard to understand at first, but after using a huge discussion and great number of examples I'm able to accurately identify the appropriate performance measurement for the particular type of project and calculate it accurately.

Further Research/ Readings

- During the reading week, I had a chance to go through the book, "Project Monitoring, Analytics, and Control: Monitoring for Active Control" authored by Jeffrey Russell and Wayne Pferdehirt where I learnt the concept of health for a project which refers to the status of a project's overall functionality and progress towards its successful completion.
- The book emphasized the importance of gathering data on the health of projects through collecting information about various aspects of a project, such as its progress, costs, and risks. On successful analysis of the data, a project

manager could gain insights into the project's status and performance which is crucial for making informed decisions and taking appropriate actions to ensure the successful execution of a project.

- The book also provided a detailed overview of tasks related to monitoring and control. It also explained how the project monitoring process involves tracking the project's progress and performance against its planned objectives.

- It advocated for for an active control approach, which involved **controlling what you can** and **adapting to what you can't control**.

- **Controlling What You Can**: This involved understanding what's important, taking meaningful measurements, and building an effective team focused on project success. **Adapting to What You Can't Control**: This involved early detection and proactive intervention.

- It also states that If the project deviates from its plan, the project manager must take corrective actions to bring it back on track. The process of monitoring and control must be a continuous cycle that occurs throughout the project's lifecycle to ensure that the project stays aligned with its objectives and delivers the expected outcomes.

Adjustment to goals

We had planned to meet only once for the project discussion for the week but given the extension for our project deliverable, we plan to meet at least 3 times in the next week to go over the feasibility study, solution proposal, project plan parts of the deliverable.

I aim to research thoroughly regarding the Economic Feasibility section of the feasibility study. I want to have a good idea on the estimation of the economic viability of the project.

I also want to review my answers for the mid term questions with the professor. There were 4 questions to which I was not clear on the answer, so I plan to meet the professor during her office hours and go over them in detail with her