A Reflection on the Fundamentals of Project Management (PMGT 501)

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Abstract

This paper reflects on the Embry Riddle graduate level course, Fundamentals of Project Management (PMGT 501). The course Professor taught the fundamental concepts, practical application and best practices of project management. Project management concepts such as defining a project, estimating project times and costs, developing a project plan, managing project risk, scheduling resources and costs, reducing project duration and outsourcing, measuring and evaluating performance, and closing the project were all summarized in the context of what the student learned over the course of the term. Each of these fundamental concepts was compared and contrasted with the student's personal work and organizational experiences. Finally, the student's impression of the final group project, building a long-haul touring bicycle, were described. This summary included the purpose of the group project, the student's impression of team performance in preparing for and communicating about the project submittal, the final project product submittal and the student's individual contribution to the group project.

A Reflection on the Fundamentals of Project Management (PMGT 501)

Fundamentals of Project Management (PMGT 501) introduced graduate students to fundamental concepts and practical application of project management. This paper reflects upon the theoretical concepts of the course and compares them to project experiences in my work organization. In addition, the purpose and performance of PMGT 501's primary deliverable, the group project, is discussed.

Project Management Theory and Practice

PMGT 501 instruction focused on eight areas of project management, including defining a project, estimating project times and costs, developing a project plan, managing risk, scheduling resources and costs, reducing project duration and outsourcing, measuring and evaluating performance, and closing the project. There were many parallels between our theoretical coursework and my organization's practice of project management; my contract was structured using many of these concepts. My specific role is to ensure that research experiments are being implemented within the larger requirements levied upon them by the operational environment, i.e. spaceflight and contract project requirements.

Defining the Project and Defining Time and Costs

"Defining the project" focused on the importance of developing a project scope of work (SOW). Larson and Gray defined the content of a SOW as "project objectives, deliverables, milestones, specifications, and limits and exclusions" (p. 648). I learned that the SOW is a key step in ensuring that scope creep does not occur. Once completed, the SOW is used to generate smaller "work elements" that feed into the Work Breakdown Structure (WBS); top-level documents such as the communications plan and responsibilities matrix are then generated (Project Management Institute, 2008). WBS Dictionaries are created to provide detail for the desired WBS levels, including task descriptions, durations and labor hours/rates. I had never encountered a WBS Dictionary and felt it was a useful tool for providing project detail before generating a schedule.

The abovementioned steps are conducted at many levels within my organization. A contract-level SOW is revised every fiscal year to detail current research experiments. It incorporates a Work Breakdown Structure (WBS) and assigns work package numbers, but does not include WBS dictionaries. The work I perform is considered a smaller, more discrete items within the WBS. When I receive a new experiment protocol I perform a Feasibility Assessment (FA) which outlines projected start time, costs, risks, and experiment assumptions. This FA is a fundamental part of ensuring that an experiment is well understood before it is approved for implementation, and this is the source of estimated labor hours that are not provided by WBS dictionaries at the contract level.

Developing a Project Plan

I learned that developing a project plan focused on developing a network diagram with merge and burst activities, conducting a forward pass to identify overall project duration, a backward pass to identify slack, and identification of the critical path. Although the first few steps of this critical path method are performed in my office, we do not use the method in its entirety. Specifically, when experiments are in our “design phase” the experiment manager identifies activities and durations, and determines burst and merge activities using successors and predecessors in the schedule. This is where the use of the critical path method ends; conducting a forward pass, backward pass, calculating slack and tracing the critical path is not used. Because of this, our schedules are considered more of a reporting tool than a real project plan.

Managing Risk

The theoretical concepts of managing risk are widely used in my organization. Risks are identified during the FA process, and are assessed using the same Risk Register Template provided in the course for likelihood and impact; each risk response is addressed, i.e. mitigating, avoiding or transferring, and contingency plans are identified. My organization has a website to track experiment risks, actions and costs. In class, we learned the added value of conducting a PERT or Monte Carlo analysis to identify schedule risks, and I think Monte Carlo would be a useful tool for my work group to implement.

Scheduling Resources and Costs

Scheduling resources was presented as a way to identify resource conflicts, resulting in a more accurate critical path duration. Simple examples such as construction equipment were presented and calculated by hand, and additional examples in MS Project lesson plans were also conveyed. We also learned the concept of creating a time-phased budget for WBS and resource schedule to identify costs over time. I learned that creating a time-phased budget is important for measuring performance over the project lifecycle.

During fiscal year planning, my group identifies experiment resources and durations for every project team across each fiscal month. However, the organization does not have the tools required to level the resources, so for simplicity a yearly total is spread evenly across the entire fiscal year for each experiment. This can result in months where employees are over-allocated and others where they are under-allocated. This also causes issues with reporting performance; what may appear to be a cost overrun for one month is actually what was originally "planned" at my level.

Reducing Project Duration and Outsourcing

Reducing project duration was discussed in the context of projects which are resource constrained and those which are not. If a project is not resource constrained, one option to reduce project duration is a concept I had not encountered before called "crashing" the schedule. This was done by evaluating the network diagram for critical path; the activity which carries the lowest cost impact is removed and its cost added to the budget. The process was repeated until the optimum project duration was identified in the context of overall cost (Larson & Gray, 2011). Another way to reduce project duration, if resources were not constrained, was outsourcing.

In my organization, overall experiment durations are often driven by circumstances beyond the team's control; the most common instance of schedule reduction occurs when experiment unique hardware is being developed. It is not unusual for additional individuals to be assigned to a hardware effort; in these instances individuals are pulled from lower priority experiments or overtime is approved. It is rare for outsourcing to occur due to unique hardware design and development requirements. Managers are hesitant to agree to reduce schedule durations unless they are assured that they can increase cost; if costs cannot be increased, schedules are typically delayed.

Measuring and Evaluating Performance and Providing Project Closure

The example regarding measuring and evaluating performance was earned value management (EVM) in which comparisons were made between "baselined" costs, actual costs, and earned value of the work performed. The data obtained indicated whether or not the project was over or under budget, and provides an indication of schedule status. I learned that this method will provide an early indication in the project lifecycle as to whether or not it is likely to be early or delayed as well as over or under projected costs. Project closure was discussed in class, highlighting the importance of archiving data, providing lessons learned, and reading the lessons learned before starting a new project.

My organization requires EVMS milestones be tracked as far down as my experiments. I report the completion or delay of tasks on a monthly basis, but am not involved with the interpretation of the data. It was very helpful to learn about schedule variance (SV) and cost variance (CV) and indexes in terms of performance. To close out experiments, we have an extensive system in place for archival, but lessons learned are rarely shared. The professor's recommendation to have teams read previous lessons learned will be conveyed.

Group Project

The purpose of our group project, in the context of the course, was to apply the concepts of project management to better understand the fundamentals and best practices of project management. The purpose of our group project in the context of the assignment was to build a long-haul touring bicycle. Our team performed extremely well with the tasks which did not involve the MS Project schedule, e.g. scope, communications plan, change control process. The concepts associated with the project schedule (e.g., what defined time-phased budget) in the context of MS Project, were often confusing and required much more team coordination. I believe that one contributing factor to this was the contrast between concepts laid out in the textbook versus the actual implementation via MS Project's reporting tools. Communication on the team went very well among three of the team members, but for the other two team members who did not have time to read updates via discussion board or email, communication was a bit more difficult. As a result, there were instances when redundant work was performed and delays encountered. Our final product at the midterm was very good, but I felt less confident regarding the specific details of what was required for the final submittal due to the issues encountered and different perspectives on the MS Project component of the project. However, overall our final product demonstrated that we learned project management concepts and generally worked well as a team. Although we didn't assign specific roles, my team role evolved into a co-lead, and I felt that I performed well with helping those who were less likely to "follow directions" to recall the requirements laid out in class and the weekly WBSs.

References

Larson, E. W., & Gray, C. F. (2011). *Project management: The managerial process* (5th ed.). New York, NY: McGraw-Hill. ISBN: 978-0077426927

Project Management Institute. (2008). *Project management body of knowledge (4th ed.*). Newton Square, PA. PMI Publications. ISBN: 978-1933890517