Handout
Project Management Methods - „Mars Expedition“

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What is a Team?

Definition: A group of people with a full set of complementary skills required to complete a task, job, or project. Team members operate with:

- A high degree of interdependence
- Share authority and responsibility for self-management
- Are accountable for the collective performance
- Work toward a common goal and shared rewards(s)[1]

Characteristic points of a team:

- The purpose, mission or main objective is known and understood by all team members
- Communication in the team is open, direct and honest
- Sufficient leadership is available in the team
- Agreed organizational structure to the team
- Being available to help teammates
- Volunteering information to teammates who need it
- Coming to meetings prepared
- Keeping teammates advised of changes, developments and additional information

Why use Teams?

- Information flow is more effective
- Meetings are more productive and goal-oriented
- Better decisions are made
- Team members learn from each other
- Management work is shared
- Team problems are identified sooner and more clearly[2]

Basic Phases of Project Management

1. **Project conception and initiation**
   An idea for a project will be carefully examined to determine whether it benefits the organization. During this phase, a decision-making team will identify if the project can realistically be completed.

2. **Project definition and planning**

[1] Quelle: http://www.businessdictionary.com/definition/team.html
[2] Quelle: http://courses.washington.edu/ie337/team.pdf; Seite: 1-5

A project plan, project charter and/or project scope may be put in writing, outlining the work to be performed. During this phase, a team should prioritize the project, calculate a budget and schedule, and determine what resources are needed.

3. **Project execution**
   Resources' tasks are distributed, and teams are informed of responsibilities. This is a good time to bring up important project related information.
4. **Project performance**
   Project managers will compare project status and progress to the actual plan, as resources perform the scheduled work. During this phase, project managers may need to adjust schedules or do what is necessary to keep the project on track.

5. **Project close**
   After project tasks are completed and the client has approved the outcome, an evaluation is necessary to highlight project success and/or learn from project history. Projects and project management processes vary from industry to industry; however, these are more traditional elements of a project. The overarching goal is typically to offer a product, change a process or to solve a problem to benefit the organization.[3]

Milestones

Definition: Scheduled event that indicates the completion of a major deliverable event of a project. Milestones are measurable and observable and serve as progress markers.[4]
A milestone is a specific point in time within a project lifecycle used to measure the progress of a project toward its goal. In project management, milestones are used as signal posts for:

- Project’s start or end date
- Need for external review or input
- Need for budget checks
- Submission of a major deliverable, and much more

Milestones have a fixed date but no duration.[5]

Usage

- Benefit your project plans in several ways
- Set up deadline for different work packages
- Spot important dates[6]

Project Supporting Tools

Different type of Project supporting tools:

GitHub

- Used as a collaboration tool for the project

[3] Quelle: https://www.projectinsight.net/project-management-basics/basic-project-management-phases
[4] Quelle: http://www.businessdictionary.com/definition/milestone.html
[5] Quelle: https://www.wrike.com/project-management-guide/faq/what-is-a-milestone-in-project-management/
[6] Quelle: https://www.teamgantt.com/blog/the-how-and-why-of-using-milestones-in-your-project-plan/

- Separate the tasks regarding the project phases
- In addition to the project plan —> more clearly & detailed

Templates (based on Excel)

- project owner requirements
- Team member structure
- Risk analysis
- Technical requirements

Additional Tools for the project

- Visio for the team structure
- PPT
- Eagle
- Inventor

Risk evaluation of the project „Mars Rover“

For the project it was necessary to find out the risks for the robot. After evaluate the risks we need ne define counteractive measures. After this step it is necessary to evaluate the risks to find a order find a equal solution.

The following picture shows the Risk analysis for the Mars Rover:

Risikoanalyse Mars Rover Robot "Mohne"

Risikotyp	Nr.	Probability	Effect		Manager	Describtion	Controlling
Standardrisiken							
Planning	1	2	3	6		Communication between the departments	weekly Meetings or even daily meetings (depends on the priority)
Planning	2	1	2	2		Project time plan	Check the time line after every Milestone
Planning	3	1	1	1		project plan	Check the time line after every Milestone
Planning	4	1	3	3		Project Stakeholder	to involve the Stakeholder in the project progress
Planning	5	1	2	2		Project Structure Plan	check the time line after every Milestone
Resources	6	2	3	6		Delivery & availability of the Resources	check the delivery dates conitniousliy with your provider
Projektbezogene Risiken							
Technic	7	2	3	6		Construction "Mohne"	prototyping
Technic	8	2	3	6		Software requirements	run the code on a visual test
Technic	9	2	2	4		Functionality between Hardware & Softwar	run the code on a prototype
Customer	10	0	0	0		Emergency Stop	check the concept / prototype test
Technic	11	1	2	2		Waterproof Construction	prototype test
Customer	12	2	2	4		drive around the obstacles	test flight with the prototype & testrun
Customer	13	2	2	4		Climb / fly across the obstacles	test flight with the prototype & testrun
Customer	14	2	3	6		autonomic aviation	test flight with the prototype & testrun

Traditional project management method in our example

Initiation:

- Create and discuss specification list
- Evaluate risk analysis
- Define goals (get over the 60cm obstacle)

Planning:

- Setup the milestone plan
- Determine resources
- Define work packages

Execution:

- Work off the planned work packages
- Document the progress (tickets in our github project)

Monitoring & Control:

- Control scope, progress, costs
- Readjust the project planning
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Goal of traditional project management methods in our example

We want to get the best ratio between the three heavily depending constraints: time, cost and scope. At the same time, we must hold quite the quality, with the aim to produce a reliable product. But we are aware that we will build a prototype in this project. Also, the time (1.5 days for producing) and budget (40€) are very low, but we want to achieve the scope, which also will decrease the quality.

With the traditional project management method, we want to get the overview over the project to minimize the risks because of the hard conditions for this project and optimize the organisational work, so that we can be most efficient during the agile development.

Agile development in our example

Most of our development will be software development and computer aided design.
Because of that, agile development methods like scrum fit perfect for that phase of the project.
We easily can adopt issues which came up during the development and which were hard to see at the beginning.

Conclusion

Traditional project management method → overall planning ✓

Agile project management method → development ✓