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Project Management: Setting the Standards in Schools

Self-organised learning and working according to plan

An activity-oriented guide for upper secondary level and vocational education

4th edition

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Introduction

Why project management in schools?

On one hand, every working process consists of routine tasks. On the other hand, all products, services, institutions and workflows must be continuously developed. Generally, all significant developments and especially innovations are reached in the form of projects. Stability and change, as well as routine and project work, are two sides of the same coin. But according to present requirements, project-based working is in increased demand and is gaining in significance. In some industries projects are already the norm. Many companies and institutions would not be able to survive without project management any more. In many big and middle-sized companies projects already account for more than half of the company's turnover.

What exactly is a project? According to DIN-standard 69901, a project is an undertaking that is essentially characterised by a unique set of conditions, the most important ones being (1) the goals, (2) the constraints of time, finance, human resources and so on, as well as (3) the necessary project-specific organisation. At its core, it is about solving complex problems within a team, within a given time-frame and the given resources (constraints).

The objective of project management (PM) and the task of the project manager[1] is to guarantee the quality of project work and any ensuing innovations. Project managers combine individual efforts to ensure effective team performance, monitor the project progress and present the project to the client. If something does not work they try out something new – it is their duty to manage problem-solving tasks within the team.

Project management is not a method. It rather represents a working system and a working attitude, widely used and well-established through professional practice. It requires a high grade of responsibility, cross-cultural knowledge, team work, reliability, creativity, as well as a forward-looking attitude and contextual thinking. PM-learning is only possible by applying the process of "learning by doing". PM-learning requires team planning and team work, where the quality of the project work is ensured by the whole group and reflections are made regarding the individual/team learning process. PM-learning makes it possible to gain learning experiences that can rarely be experienced during a regular class, such as the possibility to solve complex problems with the help of a team.

Project management, in other words the capacity of solving problems and carrying out project works, as well as the ability to guarantee the quality during the whole process, is considered to be a core element and an important professional skill.

_____

[1] In this guideline personal pronouns and occupational titles are mainly used in masculine gender (e.g. *his* instead of *his/her*). Naturally, in all cases we refer to both genders and generally tried to use the neutral form.

Purpose and design of this guide

Planning is the mental anticipation of future actions. During the initiation phase of a project, the project team defines the starting point, the context and the goals of the project. Information is gathered, the work is planned and decisions are being made. No professional athlete goes unprepared to the start line. Likewise, a jumper will have already completed the upcoming jump several times in his mind before the actual performance. To express it in other words: tell me how your project starts and I will tell you how it ends! Unfortunately, it is precisely the planning phase which is often neglected in project-based teaching. This cannot be justified neither from a professional, nor from a pedagogical point of view: only the combination of planning, execution and reflection will make it possible to reach good learning and work results. This is the reason why in this guideline we especially focused our attention towards the PM-instruments used during the initiation phase, project planning and reflection processes.

The starting point of a project is always a project proposal or the task to solve a problem. Generally, complex problems cannot be solved by an individual alone. This is why teams have to be formed in order to work together and reach specific goals. We deliberately speak of problems and not of assignments. If you get an assignment, you know the starting point, the goal that has to be reached and how to reach it. You only must adhere to the given specifications and comply with the corresponding rules. However, in case of a problem many unknown factors might appear: the starting point is unclear, the goal imprecise, the context is unknown (possibly dynamic) and probably there are different ways to solve the problem and reach the desired goal – but before that, these different possibilities must be discovered, explored and developed by a team. At the beginning you don't know what you have to do, how and when you have to do it, on whose order and why you have to act in order to solve a problem. The following guidelines will offer you understanding and help you to master unclear situations. At the end of the training you will not only know what project management is, but you will also be able to plan and put into practice small-scaled projects on your own.

Learning by doing means that you will only know what project work is and learn about project management after you have tried it out. For a better understanding of all the steps that have to be followed in order to solve a problem we have designed and developed a general training project named "School trip to London". We have deliberately chosen a simple example in order to show you in a clear way the overall structure and the single work steps that have to be carried out during a project. As an exercise we suggest you to develop an organisation project. On page 58 we have included a brief description of a possible scenario: "Open Day – planning, organisation and realisation of a large-scale event". After you have completed this exercise you may turn to more complex problems.

The aim of this guideline is to foster **project work and project-based learning.** As a general rule it can be stated that the solution has to be adapted to the problem and not the other way round. This means that project management is not a dogma. Experiment and develop your own system – develop your own personal project management. And don't forget: you may always expand and upgrade the existing structures of project management. This PM-guideline offers you a basis for it.

This guideline for Project Management and project-based learning was written according to international PM-standards (DIN 69901, ISO 21500).

Project Management Roadmap

Preparation and project definition: *orientation, information and definition*		
	Project preparation: *team building and orientation*	**Project definition:** *clarification of tasks and rough planning*
	Project logbook and study journal	Project context and stakeholder analysis
	Team roles and rules	Project scope and goals
Project proposal (Requirements Specification)	Understanding the starting point	Phase planning
	Project Management File (PMF)	Project charter
Project planning: *detailed planning and decision making*		
Work Breakdown Structure (WBS)		
Work Packages		
Overall Project Schedule (OPS)		Risk analysis
Milestone plan		Project marketing
Project organisation		
Project execution: *implementation and control*		**Project close-out:** *evaluation and reflection*	
Working as a team	Producing documentation	Handover of documents	Evaluation and reflection regarding the process / results group / person
Reporting on progress	Monitoring progress	Presentation of results	

Complete action as base model

A complete action consists of various **stages.** When situations are complex and unclear, it may easily happen that action steps are missed out because one simply jumps to the apparently most convenient one. For example, it can happen that ideas are directly put into practice without considering the actual goal of the action. However, if you respect this base model for complete action, you may never make this error again.

		start			
		orient yourself	inform yourself		
	reflect and improve	manage and organise		plan	
analyse	evaluate			make decisions	plan
		monitor	put into practice		
		execute			
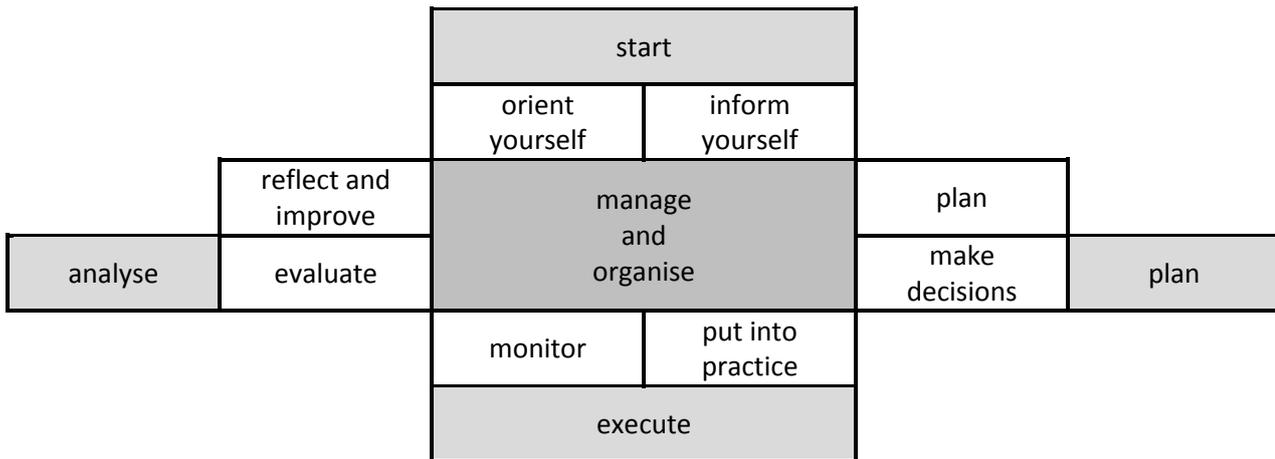
Exercise

1. Form groups of three. Imagine that you want to embark together on a **round-the-world trip.**
2. What do you have to take into consideration? The questions you will find on the next page will help you to assess the project better. What other **questions** might be raised?
3. Which **answers** did you find related to the project "Round-the-world trip"?
4. **Compare** the base model for complete action with the Project Management Roadmap on page 7. What do you notice?
5. Finally, **present** your results (keep it short: 3-5 minutes).

Proactive questions

		keywords
orient yourself	What is the reason for the initiation of the project "Round-the-world trip"?	
	Which are the framework conditions (time-frame, costs)?	
	Other questions...	
	What should be achieved and what not?	
inform yourself	Are there counter-arguments to the project?	
plan	What do we have to do and when do we have to do it?	keywords
	Who is taking charge of which tasks?	
	Other questions...	
	What risks have to be considered?	
make decisions	Should the project be realised or not?	
put into practice	Are we carrying out the right tasks (priorities)?	keywords
	What should we do differently?	
	Other questions...	
	Are we carrying out the tasks correctly (quality)?	
monitor continuously	Are we as fast, as good and as far as we should be according to the plan?	
evaluate	Which goals did we reach and which were not achieved?	keywords
	Did we achieve our goals properly?	
	Other questions...	
	Why did we reach or not reach our goals?	
reflect & improve	What would we do differently next time?	

Project preparation: Team building and orientation

Project logbook

Situation

Principally, projects are planned and carried out by teams. "Lone wolf-projects" are either not complex enough and cannot be considered a project according to DIN 69901-standard, or they fail because an individual has tried to solve too many aspects of a problem alone.

For this reason, before you start with the actual project planning, you should already have formed a team which can be expected to meet the requirements of the project. As a team member you are working in a highly autonomous manner on the joint project work. In order to maintain a clear overview, your project team should use a kind of **logbook** or diary, where it annotates all the tasks that have been completed in relation to the project. The entries should be made at the end of each work phase, which can be either at the end of the day or at the end of the week. This allows you to see at all times what you and your team members have achieved in the project.

The project logbook is part of the project documentation.

End result

- The project team documents the completed works in the project logbook. This contains information regarding the following questions: who did what, when, for how long and what results were achieved?
- The project logbook is part of the project's overall documentation. The project logbook will help you to document the work process and maintain a clear overview.

Procedure to be followed

1. Designate one person from your team who will be responsible for updating the logbook.
2. Agree with your teacher on when you will submit the project logbook for review (this can be done on a daily or weekly basis).
3. The project logbook will be collected at the end of the project.

Example template

Project logbook of the team:					
Project team members:					
Name	Date	Duration	Activity *What actions did I carry out?*	Results *What results did I achieve?*	Next steps *What will I do next?*

Project logbook (example)

Project logbook of the project/team:				*School trip to London*	
Project team members:				*Caroline Meyer (CM), Karsten Wolff (KW), Sonja Weber (SW), Lennart Peters (LP), Harald Walters (HW), Yvonne Schulze (YS), Kevin Klomski (KK)*	
Name	Date	Duration	Activity	Results	Next steps
KW	05.05.	2 h	Studied the underground network of London city.	Map of the underground lines was printed out and the stations related to important sights were highlighted (e.g. Tower, London Eye, Piccadilly Circus, Covent Garden).	Collect and add additional information (locations of accommodation, college) and prepare brief descriptions for the class.
…	…	…	…	…	…
…	…	…	…	…	…

Study journal

"Anyone who has never made a mistake has never tried out anything new."
Albert Einstein

Situation

In a project you try out new things and make mistakes. This is completely normal. After you have reflected about all the new things you have learned the next step is to annotate this information in the study journal. What did you do successfully? What are you especially proud of? Which mistake was particularly unusual? At the end of the project you will be surprised to see how many new things you encountered during the process. The study journal is part of the project documentation.

End result

Daily or weekly reflection on lessons learned.

Procedure to be followed

1. We have prepared five key questions for your orientation (see example below).
2. Prepare a file/notebook and annotate your experiences and all the information.
3. Considering that the study journal will ultimately be part of the overall project documentation, agree with the other group members right from the start on a standardized format which should be applied by all.

Example

Study journal of (name):	Created on (date):
1. What has worked well?	
2. What are you especially proud of?	
3. Which mistake was unusual? What have you learned from it?	
4. What would you do differently next time?	
5. What would you like to learn next? Ask a question to which you do not yet know the answer.	

DDTA Team analysis

Situation

Each team has its strengths and weaknesses and there are always areas that might be improved. The question is what are the strong points of your team and which areas are susceptible to improvement? How do strengths and weaknesses emerge in a team?

Strengths develop if team members trust each other and everybody has the chance to contribute and bring in their personal strengths to the team. Therefore one important thing to do is to find out which are the personal strengths of each team member. **Weaknesses occur** if team members work against each other and/or certain skills are missing. For example, a team made up solely of creative people will produce many interesting ideas but it will be very difficult for the group to put these ideas into practice. For this reason it is important to determine the existing strengths and weaknesses within your team.

End result

Team members have created their profiles and identified their personal strengths.

Procedure to be followed

1. On the next page (page 14) you will find a work sheet which contains several statements. Complete the DDTA-test first.
2. Transfer the obtained results into your personal chart (page 15).
3. Which are the DDTA-profiles of the other students of your team? (page 16)

1) DDTA-Test

Instructions for completing the test:

Start with **line A.** Read the four statements of line A carefully. Which one applies mostly to you? Make your decision and assign **only one** 4, **one** 3, **one** 2 and **one** 1 to each statement of the line.

4 means: "I believe that the statement applies to me in a very high grade."
1 means: "I think that the statement hardly applies to me at all."
2 and 3 represent the intermediate steps.

After completing line A, proceed in the same manner and complete all the other lines (**line B,** etc.).

When you have completed **all lines,** sum up the totals for each column.

A	I like to take the initiative.		I like to develop new ideas.		I like to work together with others.		I like to explore things in detail and get to the bottom of the issue.	
B	It is important for me to reach the goals quickly.		It is important to me to adopt new approaches and find new ways.		A "good working atmosphere" is important for me.		It is important to me that work is carried out rigorously and thoroughly.	
C	I find it easy to assume responsibilities.		It is easy for me to come up with and develop new ideas.		I find it easy to give way to others' ideas from time to time.		I find it easy to make objective judgements about matters of fact.	
D	Sometimes others might feel that I am too dominant.		Sometimes others might think that I am too restless.		Sometimes others might think that I am too reserved.		Sometimes others might feel that I am too conscientious.	
E	I do not like just hanging around.		Routine is something I don't like.		I do not like discussions.		Hurry is something I don't like.	
F	I pay attention to the progress of the team.		I pay attention to the diversity of the team.		I pay attention to the general atmosphere of the team.		I pay attention to the diligence of the team.	
	Total **D**		Total **D**		Total **T**		Total **A**	

2) Transfer the obtained values to your personal chart (below)

Personal profile

Doer	Change	**D**eveloper
Task orientation		Relationship orientation
Analyst	Continuity	**T**eam player
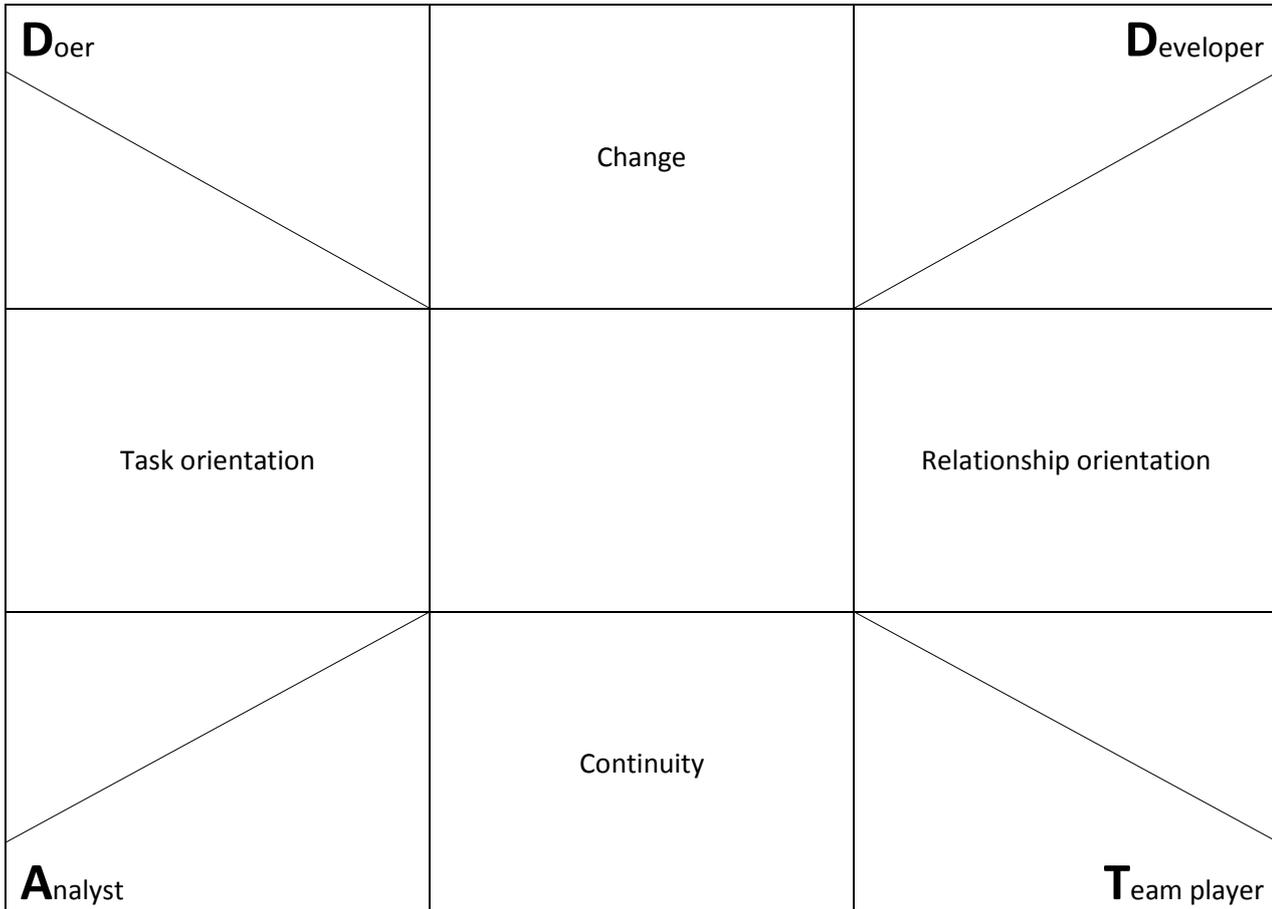
A team needs all these abilities: continuity and change, orientation towards the tasks and goals that have to be achieved, as well as orientation towards the team itself and the relationship between its members.

3) What are the DDTA-profiles of the other members of your team?

Doers:
Developers:
Team players:
Analysts:

Doers like to assume the initiative which is why sometimes they might appear dominant. Doers assume responsibilities and pay attention to the progress within the team. They are goal-oriented, focus on the outcome and do not like others to dawdle or laze about.

Developers are keen on developing new ideas and are also prepared to embark on new paths. They find it easy to come up with unconventional proposals. Routine and boredom are things they dislike. For this reason, sometimes others might feel that they are somewhat restless. Developers are creative and pay attention to the diversity of the team.

Team players like to work together with others and are ready for compromise. A good working atmosphere is very important to them; this is why they would rather avoid arguments and discussions. To others sometimes they might look a bit reserved.

Analysts work in an organised and rigorous way and expect that other team members act alike. For this reason they do not like to work in a hurry or having to deal with unclear situations. Analysts are conscientious and try to judge matters objectively.

Team roles

Situation

Ideally, your team is a combination of different competences. Maybe you will find that some of the DDTA-competences are over or underrepresented in your team. If this happens, you should think about how you can re-establish the balance by means of introducing formal roles. For example, if there is no analyst in your team, it would be useful to assign somebody the role of quality supervisor.

Furthermore, in order to clarify competences and responsibilities, it is important to jointly assign certain formal roles to the team members, e.g. spokesperson, presenter or timekeeper.

End result

- The DDTA-profile of the team is defined and has been discussed.
- The team had established the formal roles and proceeded to their assignment.

Procedure to be followed

1. Consider the consequences of the DDTA-profile distribution within your team.
2. Which roles should exist in your team? On the next page you will find some examples of formal team roles.
3. Decide upon who should take on which role within your team.
4. Finally, present your results (keep it short: 3-5 minutes).

Note

A formal role must not be assumed by a team member for the entire duration of the project. Role exchanges prevent monotony and promote mutual understanding (e.g. if team members work slowly, it will be hard for the timekeeper to perform his/her task). Additionally, role exchange is meaningful in order to offer all team members the chance to do what they do best, but also to offer them the possibility to slip into a new role and learn what they are not so good at.

Examples

During team analysis, you identified possible strengths of your group as well as those areas that should be improved. In order to achieve maximum effectiveness of your team, the second step would be to assign formal roles to the team members. To compensate for possible weaknesses you may come up with completely new roles as well. As an example, here are ten roles to get you started:

Role	Corresponding tasks
Spokesperson (Project Coordinator)	The spokesperson moderates the work of the team and makes sure that everybody has the chance to contribute, ensuring that the topic remains in focus and the team roles are observed.
Timekeeper	The timekeeper makes sure that the time-frames and deadlines are respected.
Presenter	The presenter presents the obtained results.
Quality Supervisor	The quality supervisor makes sure that the work is being carried out correctly and thoroughly.
Visualiser	The visualiser makes results available in writing, so that they can easily be presented.
Documenter	The documenter is in charge of the project logbook and takes care of all the project documentation.
Foreign Minister	The foreign minister communicates with people outside the team, maintains contacts and integrates actors. Often the teams' spokesperson also acts as foreign minister.
Explorer	The explorer looks for unusual and unexplored paths and observes what other teams are doing in order to inspire his own team.
Mediator	The mediator becomes active when there is tension in the team. He brings opposite parties together, arbitrates the disputes and stays neutral at all times.
Unconventional Thinker	The unconventional thinker has the right and duty to express politely what nobody else dares to say. We could say that in the Middle Ages this was the court jester's role at the royal court.

Note

Often we can hear: "You are the one who wrote it down, so you are the ideal person to make the presentation." But this is not always practical or true. Visualisers should not present the work, because they are often so occupied with the optical side of the presentation that they might have difficulties with adequately presenting the contents.

Team rules

Situation

In every team there are existing rules, even if they are not explicitly stated. If rules are not established, certain modes of behaviour might creep in (e.g. "we never start on time anyway…"). These patterns unnecessarily impede the work of the team.

End result

Group members are able to concentrate on their work because team rules were clarified and accorded.

Procedure to be followed

1. Think about the factors that are impeding adequate team collaboration and annotate "team killers" (e.g. having only one's own interest at heart or not offering any help).
2. Consider what type of teamwork you are looking for. Which rules should apply to each team member?
3. Furthermore, consider which rules should be observed during the collaboration with other teams?
4. Find a snappy name for your team.
5. Visualise the obtained results (team roles and rules).
6. Finally, present the results (keep it short: 3-5 minutes).

Documentation

The overall project documentation will be elaborated on the end of the project. Team roles and rules, as well their implementation throughout the project, will be part of the final documentation.

Note

Sometimes it is useful to agree upon special measures, for example an "idea centre". For this you can simply use a large sheet of blank paper (e.g. flip-chart) which will be used exclusively to annotate new ideas and will be placed in a visible place in the room. Often the best ideas come to one's mind unexpectedly and it is a good practice to write them down immediately. When the opportunity comes, this new ideas can be discussed within the whole team.

Current state analysis (team reflection)

Situation

You certainly know the saying "can't see the wood for the trees". During project work it is easy to lose track of the overall picture. Sometimes even a slight feeling of insecurity is enough to make this happen. With a few questions you can help yourself and your team "out of the jungle".

End result

After the analysis of the current state of work, the team gains an overview of the project and its current status.

Procedure to be followed

1. Agree upon certain **dates** for team reflection (for example after the completion of each major project stage).
2. Each time you meet for team reflection, raise **questions** regarding the current state of work.
3. Draw corresponding **conclusions**: how should the team proceed from this moment on?

Possible questions to help team reflection and current state analysis

Questions which help determine the current status of works:

- What are we currently doing?
- Have we really understood the problem/the goal/the task?
- Are there alternative solutions/paths?
- Do we work too fast/too slowly?

Questions which help evaluate the current status of works:

- What is important at this stage of work/project?
- Do we pay attention to the most important and essential things?
- Are we doing the right thing at the right moment?
- What will happen if we continue to work in this direction?

Understanding the starting point

After an initial orientation all the information should be documented in a Project Management File (PMF). In the PMF you should clarify the problem that has to be solved. Furthermore, it is important to include who is the client (the person who requested the project) and the contractor (the members of the project team).

Situation

To begin with, you should analyse the project request of the client (usually called a "Requirements Specification"). This will help you to understand his objectives (what are his needs)?

End result

You have addressed the following questions within your team:
- Why is the project being initiated?
- What is clear and what is unclear regarding the project request?
- Which goals are most important to the client?
- What forms part of the project and what does not form part of it?
- What would happen if the project would not be carried out?
- Are there alternative solutions to the problem?

Procedure to be followed

1. First read the project proposal carefully and try to answer the above-mentioned questions together with your team.
2. Some aspects might be unclear, for these reasons **don't forget to draft questions for your client** (your teacher).
3. Think about a "catchy" working title for the project (project name).
4. Discuss any open questions or unclear points with the potential client.
5. Document all the information in the Project Management File (PMF). You will find an example on the next page.

Project Management File (PMF)

Working title of the project (project name):

    School trip to London

Project proposal: who proposed the project?

    Class teacher (Mr. Schmidt)

Project management/team members: who works in the project team?

    Supervisor: Caroline Meyer (CM)

    Team: Karsten Wolff (KW), Sonja Weber (SW), Lennart Peters (LP),

    Harald Walters (HW), Yvonne Schulze (YS), Kevin Klomski (KK)

Why is this project necessary?

    It is quite usual to undertake a school trip at the end of the 12th grade

    Travelling together supports cohesion of the group and is fun

What is the benefit that is expected by the client/person who proposed the project?

    Higher motivation of the students in English class

    Learning English in an authentic environment

    Becoming acquainted with the culture of another European country

    Self-organised and autonomous planning, organisation and realisation of the trip

What project results does the client expect?

    Three student presentations regarding the trip

    Planning of the trip

    Preparation of the trip (information research, programme, etc.)

    Realisation of the trip

    Follow-up and analysis

    Project documentation

What is the time-frame of the project?

Project initiation: January

Project close-out: July

Other known dates:

Departure to London: 6th of June

Date of return: 12th of June

Budget: what financial resources are available?
Approx. 300 euro per person (to be paid by each participant)

Project definition: Clarification of tasks and rough planning

One of the fundamental principles of project management is: proceed from rough planning to detailed planning. During the stage of project definition you will continue to clarify the project scope, something you already initiated when drafting the Project Management File (PMF). Now you take a deeper look and analyse some important aspects. The following issues must be especially clarified at this stage:

- What is the environment of the project?
- How can the goals of the client be described in more detail?
- How can we use the given time-frame?

Project context and stakeholder analysis

Situation

You have just started. The task at hand is new to you and the project environment is largely unknown. Many projects fail, because the project management fails to take into consideration all the interested parties (stakeholders) within the environment of the project – until it is too late and resistance is encountered...

End result

During the analysis of the project context and its stakeholders it will become clear how your project is connected to other people, other projects and other areas of activity. You will become aware of existing interdependencies and will be able to make use of them for the benefit of your own project. By doing so, you reduce the risk of encountering resistance during the evolution of your project. The planned measures are aimed to be preventive and therefore will avoid conflicts during project realisation.

Procedure to be followed

1. In the first place, **identify** all potential groups or institutions that exist within the project's environment.
- Who could have an interest in the project?
- Who could be affected by the project?
2. **Draw** your project on the centre of a sheet of paper and arrange the stakeholders (interested parties) nearer or further from the centre, depending on their level of project involvement.
- Who is directly affected by the project?

- Who is indirectly affected by the project?
3. **Develop a chart** (portfolio), one dimension being the degree of project impact (how much are the stakeholders affected by the project), the other one being the degree of stakeholder influence (to what degree do the stakeholders have an influence over the project).
4. **Create a table** to sum up and evaluate the interests of the stakeholders, their attitudes, possible actions and reactions:
- Stakeholders: who are the stakeholders?
- Interests: what are the interests of the stakeholders?
- Attitude: what is their attitude towards the project?
- Behaviour (−): what behaviour can be expected in the worst case?
- Behaviour (+): what behaviour would be desirable?
- Measures: what can you do in order to promote positive behaviour and prevent negative actions?
5. Finally, **present** your results to the group (keep it short: 3-5 minutes).

Step 1 and 2: Project context (visualisation of project environment)

Project: School trip to London	students of the class	hotel personnel
	teacher of the class	school administration
	parents	students from other classes
	bus company/operator	other teachers of the school
	direct environment	indirect environment

Step 3: Portfolio

Stakeholder influence				
Who has an influence over the project and to what degree?	low	medium	high	Who is affected by the project and to what degree?
				Project impact

Attitude		Legend	
++	very positive	1	teacher of the class
+	positive	2	students of the class
0	neutral	3	bus company/operator
–	negative	4	other classes of the school
––	very negative	5	other teachers of the school
		6	school administration
		7	parents
		8	hotel personnel

Step 4: Stakeholder matrix

Stakeholder	Interests	Attitude	Behaviour	Measure
Teacher of the class	English lessons, culture smooth workflow.	Very positive, likes to travel and knows London well.	Very supportive, puts an emphasis on good preparation.	Active involvement in the planning and preparation of a structured plan.
Students of the class	Contact with peer group in London, pop culture, improvement of language skills.	Very positive.	Active, with an emphasis on group cohesion.	
Bus company/operator	Wants to earn money.	Positive.	Will possibly seek to raise the price.	Price negotiation.
Other classes of the school	Would also like to organise a school trip.	Neutral.	Envious, seeking more information.	Share our planning material with others in order to be used as an example.
Other teachers of the school	Avoiding replacement lessons as substitute teachers.	Not very enthusiastic.	Rather negative when it comes to replacement lessons.	From his part, Mr. Schmidt also offers replacement lessons to the substitute teachers in question.
School administration	Maintenance of order and regular teaching.	Neutral, as long as there are no problems.	The trip has to be authorized by them.	Pass on to the school administration all the relevant information about teaching organisation.
Parents	The trip should not be very expensive. Students should learn a lot, but also have some fun.	Positive.	In most cases: supportive.	Inform on a regular basis. Keep costs low.
Hotel personnel	They do not want any problem they only want to do their job.	Positive as long as the class does not cause problems.	Usually friendly, cooperative and helpful.	Behave in a polite and courteous manner, give tips if appropriate.

And one more question:	
If the project will be carried out... **What will stakeholders gain if the project is carried out? And what will they lose?**	**If the project won't be carried out...** **What will stakeholders gain if the project is not carried out? And what will they lose?**

Project scope and goals (goal matrix)

Situation

Often the scope of the project is not described precisely enough in the Requirements Specification and it is not possible to plan in full detail from the beginning. For this reason you need to analyse the project request and identify and formulate as precisely as possible each and every achievable goal. The goal matrix makes it possible to structure goals clearly and assign indicators at the same time. This often leads to new questions that need to be clarified with the client. For example:

Goal of the person who proposed the project (client):	Project goals (formulate as if you had already accomplished the goals):
The schoolyard shall be brightened up.	The new schoolyard was inaugurated on the 17th of May. Ten trees were planted, a basketball hoop installed, five benches and a goal wall have been put up and the walls have been freshly painted.

End result

- Project goals have been defined and clearly illustrated.
- The client and project team approve of this first list of achievable goals.
- The team has a clear understanding about the goals that have to be achieved and the corresponding indicators.

Procedure to be followed

1. **Brainstorming:** start by compiling a list of possible goals. At this stage, it is important that you define which the achievable results are rather than how they will be achieved. Target results should be achieved by means of neutral solutions.
2. **Target results:** what results will be achieved during the project?
3. **Control criteria/indicators:** how can it be determined whether the goals have been achieved?
4. **Time-frame:** what are the deadlines for reaching the results? What is the client's time schedule?
5. **Pre-requisites:** what are the necessary pre-requisites that facilitate the realisation of the project? If they are necessary, what contributions are needed from the client?
6. **Framework conditions:** what specific conditions make it possible to carry out the project as smoothly as possible?
7. **Things that don't belong to this project:** which are the things you won't do in your project?[2]
8. **Final check :** are your goals SMART, in other words are they specific, measurable, agreed upon, realistic and time-bound ? (see next example)
9. Finally, **present** the project goals to your group.

---

[2]   In order to avoid excessive project complexity it is important to also define the things you do not need to achieve.

Final check: are target goals SMART-formulated?

Specific	Is the goal unambiguously, concretely and precisely formulated? Has it been recorded in writing? If possible: can you visualise the result? Do you know and understand what is expected from you?
Measurable	Can you accurately check whether the goals have been achieved? Which criteria do you use to check and evaluate the achievement of goals? Can you clearly track progress within the project?
Agreed upon	Were the goals discussed between all? Is there a general understanding of what has to be achieved?
Realistic	Is the goal ambitious yet reachable?
Time-bound	Did you agree with the teacher upon the date of the final presentation or upon the time limit for the presentation of results? Did you establish the time-frame for the achievement of each goal? Could you determine deadlines for interim goals (milestones)?

Note

If the client indicated a time schedule, that's fine. In this case you already have established deadlines. If he did not, you can't yet define the time-frame for the achievement of project goals. Wait for the next stage of **phase planning.** At the stage of **phase planning** you will determine project milestones. Milestones are goals that have to be achieved in the course of the project.

Goal matrix

Overall goal	
The 12th-grade class (25 students) went for a one-week school trip to London. The trip was carried out between the 6th of June and the 12th of June with a maximum budget of 300 €/person. The trip was autonomously organised by the students.	
Target results	**Control criteria/indicators**
Booking of the trip.	Agreement has been signed.
Reservation of accommodation.	Reservation confirmation has been received.
Taking out of insurance.	Insurance policy has been signed.
Preparation of the trip during class and integration in teaching lessons.	Three double lessons have been prepared and presented in English to the class (history of the UK, history and architecture of London, as well as cultural comparison between the UK and Germany). Handouts have been prepared and discussed in class.
Clarification of financing issues.	Rough cost estimate has been made and discussed with the class. Detailed cost calculation has been prepared and discussed with the class.
Preparation of cultural programme.	A three-day cultural programme has been prepared, including a museum tour and two sightseeing tours. The proposal has been approved by the class. The programme is available in written form.
Organisation of college visit.	Written confirmation from the college has been received.
Realisation of the trip.	The trip began on the 6th of June and ended on the 12th of June.
Presentation and documentation of the project.	Project planning and results have been presented in English (3 groups/45 minutes per group). Written project documentation has been submitted.
Pre-requisites	
At least 20 students have participated in the trip. The budget has been cleared. Supervision by a teacher has been secured. School administration and parents have granted permission for the realisation of the trip.	
Framework conditions	
Telephone, fax and Internet access had been available for free. The trip has been prepared and discussed during lessons.	
Things that don't belong to this project ...	
Entering contractual obligations autonomously. Conclusion and signature of the contracts is made by the class teacher.	

Phase planning

Situation

The objective of phase planning is to gain a first, general overview of the project's time-frames. This is reached by defining key targets (milestones) that are fundamental for achieving the desired results and serve to keep the project "on its due course". Many times these milestones allow the client to keep track of the project's evolution and monitor progress and quality. The client, for instance, might agree with the project manager that a further instalment will only be paid on achievement of a milestone. Likewise, it might be agreed that the project will be cancelled if the agreed quality or if specific results are not reached before a certain deadline.

End result

- Phases, time-limits and milestones are defined and visualised in form of a phase plan.
- The amount of work required for each phase is roughly estimated.
- It is possible for the first time to evaluate the feasibility of the project.

Procedure to be followed

1. Break up the project into phases and identify them.
2. Name at least 3 and at most 5 main activities that should be carried out during each phase.
3. Make a time estimate regarding the duration of each phase.
4. Visualise the phases in a bar chart.
5. Define key milestones and include them in the phase plan.[4]
3. Estimate the work effort required during each phase (high, medium or low).
4. If it is the case, make a cost estimation for each phase.
5. Present the obtained results to the group (3-5 minutes).

---

[4] Each phase ends with a milestone! Depending on the length of a phase it might be necessary to define additional milestones. Milestones should be evenly distributed over the whole duration of the project.

Phase plan

Phases, Work Packages and Milestones	January, February, March, April, May, June, July
Project planning	
Start of project definition	
Project definition	
End of project definition	
Project planning	
End of project planning	
Project realisation	
Clarify trip, accommodation and insurance	
Trip, accommodation and insurance were clarified	
Prepare lesson and deliver lesson	
Lesson was delivered	
Compile general and cultural programme	
General & cultural programme was agreed	
Organise college visit	
College visit was organised	
Beginning of London trip	
End of London trip	
Project close-out	
Prepare presentation and documentation	
Presentation was held and documentation submitted	
Final analysis	
End of project	
Legend	
Phase Work Package (WP) Milestone with date	

Project charter

Situation

The project charter completes the phase of project definition. It is similar to the Project Management File (PMF), but normally includes further specifications. Core elements of the project charter (added in form of annexed documents) are the following: (1) project context and stakeholder analysis, (2) goal matrix and (3) phase plan. In the project charter you summarize the key statements related to the project. In the project charter you and your client describe your shared understanding of the project's scope. This way, the project charter forms a kind of "work contract" between you and your client (the person who requested the project).

End result

- A project charter has been agreed with the client and drawn up.
- The client gives you green light to initiate project planning.

Procedure to be followed

1. Decide with your project team who should manage the team during the planning phase.[3]
2. Transfer the data and the information contained in the Project Management File (PMF) to the project charter, updating the information if necessary.
3. Outline the expected results based on your goal matrix.
4. Extract the time-frames and deadlines from the goal matrix and the phase plan.
5. Present the results to your client (in this case, your teacher).
6. As a sign that both parties approve of the agreement, a project charter is compiled and signed.

---

[3] One essential task of the project manager is to organise the coordination between the client (in this case, the teacher) and the project team. The project manager is thus the speaker of the team.

Project charter

Project title:

    School trip to London

Person who proposed the project (client):

    Class teacher (Mr. Schmidt)   ..

Project management: who coordinates the project team?

    Caroline Meyer (CM)

Project team: who works in the project team?

    Karsten Wolff (KW), Sonja Weber (SW), Lennart Peters (LP),

    Harald Walters (HW), Yvonne Schulze (YS), Kevin Klomski (KK)

Project results: what does the client expect from the project?

    Three presentations made by the students on topics related to the trip (history, economics, politics)

    Planning of the trip

    Preparation of the trip (research work, programme, etc.)

    Realisation of the trip

    Follow-up and analysis

    Project documentation (PM-documents and annotated photo documentation of the trip)

Time-frame of the project:

    Project initiation: January

    Project close-out: July

Other known dates:

    Departure to London: 6th of June

    Date of return: 12th of June

    See phase plan

Budget:

    Maximum 300 euro per person (to be paid by each participant)

Stakeholders:

Our class, our class teacher, tour operator, parents, school administration, hotel personnel, students

from other classes of the school, other teachers of the school

Risks:

Illness of class teacher

Strike of bus operators

Too high costs

Insufficient information or poor involvement of stakeholders

Annexes:
  • Goal matrix
  • Project context and stakeholder analysis
  • Phase plan

Date and place:

Signed: Signed:

Client (class teacher)   Project manager of the student project team

Project planning: detailed planning and decision making

Work Breakdown Structure (WBS)

Situation

You were given the task of drafting a detailed plan for your project. Now you are facing a challenging assignment: you have to consider which are all the necessary tasks that have to be carried out in order to reach the goals of the project. Don't forget the coordination and management of all the activities, in other words: project management!

End result

- You have obtained a complete, clearly structured work plan: Work Packages (WPs) are the smallest units of the Work Breakdown Structure. Related WPs are combined to form sub-tasks or partial projects.
- The general rule of thumb is: each sub-task might be divided into maximum seven sub-units (partial tasks that might be subsequently subdivided or WPs that might not be subdivided any more).
- For each partial project it is necessary to elaborate a separate WBS.

Procedure to be followed

1. **Brainstorming:** Think about all the things that have to be done and all the activities that have to be carried out in order to reach the goals of the project. As a first step, only gather information – detailed planning comes afterwards. Refer to your goal matrix.
2. **Sub-tasks:** Combine the activities that need to be accomplished into three to seven larger blocks and think about a headline or a name for these bigger units. These work blocks are called sub-tasks because they account for a large part of the project tasks.
3. **Completeness:** Thoroughly check all sub-tasks: is it necessary to add further activities or are these sub-tasks already complete? If you find a missing activity, simply add it to the WBS. By doing so, at this work stage you will achieve the completeness of activities.
4. **Work Packages (WPs):** Combine the activities into smaller work units (WPs) and think about an adequate headline or name for each Work Package. Analyse each sub-task separately: as a result you will obtain an organisational level below the level of sub-tasks. Regarding their subject matter, activities belonging to the same Work Package should match together.
5. **Clarity:** Examine the correlation between Work Packages and sub-tasks: are they correctly assigned? If not, simply introduce the necessary changes by relocating the WPs. Is the structure clear? If necessary, how could the structure be improved? At this work stage you will obtain a clear project structure.
6. **WBS-Code:** To finalize, number the elements of the Work Breakdown Structure.
7. **Present** the results to the whole team.

Development of the Work Breakdown Structure (WBS)

Target results: School trip to London including cultural programme; school trip to be thematically prepared during English lessons; duration: 6 days; affordable and cost-efficient.

Step 1: Brainstorming – what must be done and which activities have to be carried out in order to achieve the project goals?

What activities must be carried out in order to reach our project goals?				
Reserve accommo-dation	Plan museum tour	Plan one-day trip	Search information about transport system of London	
	Prepare thematic teaching units	Plan sightseeing tours	Plan an interesting programme at the hostel	Contact the college in London
Take out travel insurance	Project management	Make advance payments	Find out about London party locations	Make the booking of the trip

As a first result, brainstorming led to the identification of 13 activities.

SUGGESTION: make a phase-oriented Work Breakdown Structure!

You can do the brainstorming with direct reference to each project phase. In this case the phases are displayed horizontally below the guiding question (heading at the top); you can use the phases described in the phase plan. When making a phase-oriented WBS, you carry out the brainstorming separately for each phase by compiling the corresponding activities: what do we have to do in phase XY, which are all the necessary activities during phase XY in order to achieve our project goals? The advantage of this approach is that the activities are roughly sorted according to the different phases. The phase orientation of the WBS at top level makes it easier to set up the project scheduling later on. For this reason we recommend a top-level phase breakdown (see next description of Step 5: Clarity). This type of WBS is called a **phase-oriented WBS**. After its completion you can continue with Step 2 as usual.

Step 2: Sub-tasks – compiling activities into sub-tasks and finding adequate headlines

The team classified the activities into larger blocks (sub-tasks) and added further activities that occurred to the team later. Project management is treated as a separate block (this is standard procedure). There are now 15 activities instead of the initial 13. Activities which do not fall into the responsibility of the team are excluded (in this case: **conclusion of contracts** - this is the task of the teacher).

Trip to London			
Framework conditions	General and cultural programme	Teaching lessons	Project management
Make the booking of the trip	**Plan museum tour**	**Prepare thematic teaching units**	**Make advance payments**
Contact tour operator	**Compile a list of museums**	**Contact the college in London**	
Reserve accommodation	**Plan sightseeing activities**	**Presentation and documentation**	
Compare the hostels	**Find out about London party locations**		
Transport in London	**Plan an interesting pro-gramme at the hostel**		
Insurance		**What we don't do:**	**Conclude and sign the contracts**

Step 3: Completeness – adding more activities

One of the team members observes that the activity **Make the booking of the trip** is not complete. To this activity other activities should be associated, such as **Obtaining offers** and **Comparing offers.** These activities are added to the others. Another member observes that the activity **Reserve accommodation** is also incomplete. Rather, the prices, locations and services offered by different hostels should be compared – for this it is necessary to compile a list of available accommodation. The group supplements further activities. The number of activities increases and the WBS becomes more and more complete, but also more complicated and difficult to overview.

Step 4: Work Packages (WPs) – compiling activities into WPs and finding titles

Now the team can start to group the activities and find adequate titles for the Work Packages (WPs). For example, the Work Package **Trip** (see next table, No. 211) comprises the activities

Obtaining offers, **Comparing offers** and **Making the booking of the trip,** etc. As the WBS shows only Work Packages, the activities are not listed here. Anyhow, the team should put the list of activities aside, as this list will be needed later, during the stage of project scheduling.

Step 5: Clarity – checking correlation and structure

One of the team members proposes to group together all identified sub-tasks into a larger block named Project execution phase, proposing also to add to the WBS other phases which were defined in the phase plan (see **SUGGESTION** above) and to add more Work Packages to the WBS (e.g. WBS-code 340). Another member complains: "Now we have to check for completeness once again!".

Step 6: WBS-Code – the process of encoding

When the structure is finished and all Work Packages have been included, the elements are finally numbered (encoded). The complete **Work Breakdown Structure** looks now like this:

		School trip to London			
100 Project planning phase		**200** Project execution phase		**300** Project close-out phase	**400** Project management
110 Project definition				**310** Documentation of results	**410** Financing
120 Project planning				**320** Presentation of results	**420** Project controlling
210 Framework conditions	**220** Teaching lessons	**230** Cultural programme	**240** Realisation of the trip itself	**330** Project evaluation	**430** Communication & meetings
211 Trip	**221** Lesson: History of the UK	**231** College visit		**340** Reflection and improvement	
212 Accommodation	**222** Lesson: History of London	**232** Museum tour			
213 Insurance	**223** Lesson: Cultural comparison	**233** Sightseeing			
214 Transport in London		**234** Action in London			

Legend	
WBS-Code	
Sub-task	
WBS-Code	
Work Package	

Description of Work Packages (WPs)

Situation

You have established the Work Breakdown Structure and structured the project's tasks. Now it is time to determine who is responsible for each Work Package (WP) and which tasks are included in each WP.

End result

- Defined responsibilities for each Work Package.
- The persons who are responsible for each WP are aware of the tasks they have to carry out and what will be their contribution to the project.

Procedure to be followed

1. **Responsibility:** agree on who will be responsible for each Work Package (or each partial project or sub-task, if it is the case).[4]
2. Make **descriptions of the Work Packages**.[5] These should include:
   - Participation: think about who will collaborate and work on the WP.
   - Target results: think about what has to be achieved and by when it has to be reached.
   - Activities/team work: define what are the exact tasks to be fulfilled and who will work together with whom.
   - Time-frame: think about the approximate duration of the Work Package.[6]
   - Amount of work: make an estimation about approximately how many hours of net working will be required to fulfil the required tasks.
   - Risks: what things have the WP-responsible to bear especially in mind?
   - Agreement: the project manager (in this case, a student) and those responsible for the Work Package together sign the Work Package description.
3. Estimate the **duration** of each Work Package.
4. **Present** your results.

---

[4] Taking over the responsibility for a Work Package does not mean that this person will have to carry out all the required work on his/her own.

[5] For the purpose of practice it is enough to make the description of two Work Packages. However later on, during the execution of the real project, it is necessary to make a description of all the existing Work Packages.

[6] It is easier to make an estimation of the duration and the required effort if the target results and activities have already been defined in advance.

Description of Work Packages (WPs)

Project title: School trip to London	WBS-Code 232	Name of Work Package Museum tour
Duration: 5 weeks	**Effort:** 10 h	**WP-responsible:** Karsten Wolff
Collaborating team members: Sonja Weber		**Budget:** 30 euro per participant

Target results:	
What should be achieved? A full-day museum tour in London has been planned, agreed upon with the class and submitted in writing.	**Date:** 23.05.

Activities/cooperation:
What exactly has to be done? With whom will we cooperate?

Gather information: study museum guide, research Internet-sources for updated information, compile a list of exhibitions (include opening hours, prices and subjects), list all museums that might be of interest.
Create a tour plan (define places to visit and duration of visits).
Discuss the tour with the class.
Cooperate with the team that is in charge of the cultural programme.

Framework conditions:
What needs to be taken into account?
Museum tour dates should be coordinated with the general schedule of the trip, budget must not be exceeded, class must agree.

Project manager, place and date: Bremen, 10.02. *Caroline Meyer*	WP-responsible, place and date: Bremen, 10.02. *Karsten Wolff*

Difference between duration and required amount of work:

Duration of Work Package
Amount of work

Overall Project Schedule (OPS)

Situation

The Work Breakdown Structure provides you with an overview of all Work Packages. The WBS lists what needs to be done in the project. The remaining open questions are now: In what order do we have to carry out the tasks defined in the WBS? When do we have to start working on each WP and how much time is available? Is there enough time? In order to elaborate the Overall Project Schedule you will need to use the phase plan and the WBS.

End result

- A bar chart (also called Gantt chart) illustrates the project schedule and visualises the sequence and the chronological order of the Work Packages (WPs).

Procedure to be followed

1. To obtain a rough orientation, take the **phases** from the phase plan or the WBS and visualise them in form of bars.
2. In the first place, analyse each phase and think about the **order** in which the WPs need to be implemented in the Overall Project Schedule. Which WPs have to be carried out first?
3. Arrange the WPs one after another according to their rough chronological order on a **vertical axis**. If **post-its** are used it is easy to change their order if this should be necessary.
4. Visualise the **duration** of the WPs with the help of horizontal lines of different lengths. The duration of each WP has already been estimated during the description of Work Packages.
5. Work Packages either stand for independent tasks or are interrelated and have a **direct successor.** Identify linked WPs and direct successors. Start with the earliest Work Package. Pay attention to the fact that a single WP can have more than one direct successor!
6. Move each succeeding WP to the **end date of its predecessor**. Work Packages without predecessors should be moved to the beginning of the project. If a WP has more than one predecessor, it must be linked to the end of the latest one.
7. Now you can plan in more detail and include **activities** associated with Work Packages (e.g. the activity of *Obtaining offers* in WP 211 named *Trip*). Activities should only be included if they help you to obtain a better overview of the project schedule!
8. Check whether the **final deadline** can be kept. If not, either some WPs need to be shortened or, if necessary, the end date (or even the project objectives) has to be revised.

Example

WBS-Code	Work Package	Responsible	Duration	Calendar week				
				1	2	3	4	...

Overall Project Schedule (OPS)

WBS-Code	Work Packages and processes	Duration (weeks)
100	**Project planning**	**8**
	Initiation of planning phase	0
110	Rough planning	2
	End of rough planning	0
120	Detailed planning	6
	End of planning	0
200	**Project realisation**	**14.6**
	Start of realisation phase	0
210	Framework conditions	8
211	Trip	6
	Obtaining offers	4
	Comparing offers	2
	Trip has been booked	0
212	Accommodation	6
	Compiling list of hostels	4
	Comparing prices, locations and services	2
	Hostel has been reserved	0
213	Insurance	6
	Obtaining offers	4
	Comparing offers	2
	Insurance has been taken out	0
214	Transport system of London	2
	Research information about bus system	1
	Research information about Underground	1
	Information has been obtained	0
220	Teaching lessons	8
221	Prepare lesson "History of the UK"	6
	"History of the UK" has been delivered	0
222	Prepare lesson "History of London"	7
	"History of London" lesson has been delivered	0
223	Prepare lesson "Cultural comparison UK-D"	8
	"Cultural comparison UK-D" has been delivered	0
230	Cultural programme	13
231	College visit	7
	Colleges have been contacted	4
	Date, visits, etc. have been arranged	3
	Confirmation has been received	0
232	Museum tour	5
	Compiling information	2
	Planning the tour	2
	Discussing the tour in class	1
	Tour plan has been created and approved	0
233	Sightseeing	4
	Compiling information	2
	Planning sightseeing activities	1
	Discussing sightseeing plan in class	1
	Sightseeing plan has been made and approved	0
234	Action in London	13
	Gathering information (music, pubs, etc.)	11
	Compiling a list	2
	List has been compiled	0
240	Trip to London	0.8
	Departure to London	0
	Return trip	0
300	**Project close-out**	**4**
310	Documentation of results	2
320	Presentation of results	1
	Presentations have been held	0
330	Project evaluation	1
	Evaluation of the project	1
	Reflection processes	1
	Finding possible ways of improvement	1
	End of project	0
400	**Project management**	**26.8**

Milestone plan

Situation

In the Overall Project Schedule (OPS) you have defined the time-frames for carrying out the tasks. Naturally Work Packages lead to results. Which of these are significant and offer you orientation for the realisation of the project?

End result

- A milestone plan in form of a list.
- The milestones have been identified and submitted to the client (in this case, the teacher) for agreement.

Procedure to be followed

1. Based on the Overall Project Schedule and the goal matrix, identify significant results that will act as milestones for your project.
2. Create a milestone list.[7]
3. Identify the milestones that you will present to your teacher after you have achieved them.[8] [9]

Example: school trip

No.	Milestone[8]	Deadline	1[9]	2[10]
MS 1	Planning phase has been initiated	07.01.	Yes	Yes
MS 2	Rough planning has been carried out	18.01	Yes	Yes
MS 3	Planning phase has been completed	29.02	Yes	No
MS 4	Trip has been booked	11.04	Yes	No
MS 5	Hostel reservation has been made	11.04	Yes	No
MS 6	Insurance has been taken out	11.04	Yes	No
MS 7	Transport in London: information is available	25.04	Yes	No
MS 8	Lesson "History of the UK" has been delivered	11.04.	Yes	No
…	…	…	…	…

---

[7] Formulate each milestone in form of an achieved target result.

[8] Did you discuss the target result with your client (teacher)?

[9] After discussing it with your teacher, can you consider the result as being achieved?

Project organisation

Situation

You have already assigned the project manager, persons responsible for the Work Packages and other team members who will collaborate to fulfil the activities associated with each WP. Responsibilities are clear now. What remains unclear are the details for each one of the participants.

End result

• Responsibilities have been discussed and agreed upon in writing.

Procedure to be followed

1. Create a list for each team member in relation to the Work Packages and list their **responsibilities** as well as their **corresponding tasks**.
2. As a next step, identify the **amount of working time (hours of effort)** that is required for the fulfilment of each Work Package of the list.
3. **Present** your results.

Example: school trip

Name: Karsten Wolff (KW)

Work Package	Type of responsibility	Assigned tasks	Effort
Trip	Cooperation	Compare the offers	2 h
Accommodation	Cooperation	Compile a list of hostels	4 h
Museum tour	Coordination	Discuss the results in class	1,5 h
…	…	…	…

Risk analysis

Situation

During the planning phase you have constructed a model that incorporates the whole progress of the project as well as the course of the upcoming project phase. Usually the project manager, members of the team or those responsible for the Work Packages encounter additional risks that may have a negative impact on the project's progress.

End result

List of project risks and measures for their reduction.

Procedure to be followed

1. **Overview:** Consider what are the possible risks that may arise in reference to project planning. Search for risks considering the four main areas of their occurrence: technology, organisation, people and environment.
2. **Risk portfolio:** Determine possible risks that may have a negative influence over the project's progress. Evaluate the risks with respect to their likelihood of occurrence (low, medium or high) and visualise the results (portfolio).
3. **Risk measures:** Identify preventive or corrective measures which reduce the likelihood of occurrence and/or the impact of risks.
4. Prepare a short **presentation** for the entire team.

1) Overview: which are the possible risks in relation to this project?

Focusing on...	...possible risks could be...
Project context and stakeholder analysis	
Goal matrix	
Phase plan	
Project charter	
Work Breakdown Structure (WBS)	
Description of Work Packages	
Overall Project Schedule (OPS)	
Project organisation	

2) Risk portfolio: Likelihood of occurrence and impact

Likelihood of occurrence				
How high is the probability of risk occurrence?	low	medium	high	How big is the impact of the risk on the project?
				Impact

```
Legend
1       class teacher
2       costs
…
```

Note

During the analysis of the project's environment you have already considered possible risks and opportunities that may occur in relation to the project's context and stakeholders. At that stage, you have already identified adequate measures and included them into the WBS. Now you will have another look and will assess the risks again. When doing so, take into account the results obtained during the project context and stakeholder analysis! If the measures that you have already planned are sufficient, the likelihood of occurrence and/or the impact of risks shown in the risk portfolio should be low. If not, you now have another opportunity for planning preventive and/or corrective measures.

3) Risk measures

No.	Risk	Probability	Impact	Measure	
				Preventive measure	**Corrective measure**
1	Absence of class teacher from work due to a mild cold.	Low	High: Trip can't be carried out without a teacher.	Designate a substitute teacher before the 25.04.	The substitute teacher accompanies the class during the trip.
2	London is expensive and costs are too high.	Medium	High: Less than 20 students participate in the trip. Trip is in danger.	Always differentiate what is a "must" and what an "option". Calculate with two alternatives.	Cancel non-obligatory "options".
	...	...	...	...	...

Preventive measures are used in advance, in order to lower the likelihood of risk occurrence and the impact of risks. **Corrective measures** are used in emergency cases (being a kind of "plan B").

Likelihood of occurrence: uncertainty or risk?

Not all uncertainties can be considered as risks. During risk analysis you should only consider the risks, not the uncertainties! An uncertainty becomes a risk if its likelihood of occurrence can be estimated and quantified, **and/or** if it has a high impact. For example, riding your bicycle for 30 minutes with wet hair can be considered a **risk** if you do this in the middle of the cold winter season. On the other hand, if you do the same on the beach during summertime, wet hair will merely represent an **uncertainty**. Whether something is a risk or an uncertainty is therefore a question of evaluation and of the assumptions you make. The project's subject matter can also make a difference: 5 % of risk probability or impact can be considered high or low, depending on the project. To reach conclusions use again the brainstorming method: compile information and then evaluate your findings. Can I estimate the likelihood of occurrence of this event? Does it represent a risk? How high is its impact? Can it only be considered as an uncertainty?

Risk disposition and consequences

The willingness to take risks differs from person to person and from situation to situation. While some may still deliberate, others would already take up action. Often these extreme attitudes compensate each other in a team. However, the effect may also increase if only one party is represented in the same team (e.g. only "eternally hesitant" vs. only "daredevil" members). So should boldness or caution prevail? Consequences for the project could be: delay, cost over-run, faults and mistakes or other negative effects like loss of reputation or trust.

Risks and chances

Risks and chances are two sides of the same coin. Often only the risk aspect is taken into consideration. However, hidden chances and opportunities could be (and should be) analysed in the same way: how high is the probability of an opportunity? What are its impacts? Only when risks and chances are viewed together can the actual value of a project be discerned.

Project marketing

Situation

At this point, the project is just about to be executed. As a last step, in order to fully support the realisation of the project, instruments and measures must be developed that spread the word about the project and its goals and help to achieve their acceptance between all those persons who are affected by it. For the development of the needed instruments and measure project marketing makes use of the results obtained during project context and stakeholder analysis.

End result

Instruments are developed that make your project known and visible, help you to explain the project's scope and goals, make it possible to create a positive working atmosphere and acceptance of your project, mobilise supporters as well as eliminate or minimise resistance towards the project.

Procedure to be followed

1. **Project identity:** In the first place, clarify basic questions that define your profile. Who are you not, who you don't want to be and how would you not like to be looked at? Who are you, who you want to be and how would you like to be looked at? What are you standing for?
2. **Project name:** Choose a name which identifies you and your project and which you will use from now on when presenting your project to others. Does the name express clearly what the project is all about and what your goals are? Does it arouse interest? The project name should be short, expressive and project-related.
3. **Short title:** Find a short headline that encompasses the project name; this way others will find it easier to remember you and your project. Is the short title easy to remember? Could it possibly be used as a webpage name (in case a homepage has to be created)?
4. **Project logo:** Create a project logo (in text format, as an icon or as a combination of both), this will allow others to recognise you "at first glance". Does your logo convey a positive, project-related message? Does it look professional? Can it be discerned from the surrounding text? If needed, can it be magnified? If you used colours, can it be represented in black & white, too?
5. **Project communication:** How will you use the project name, short title and logo? You should create a table defining the following parameters of communication: (1) with whom, (2) why, (3) what, (4) from whom, (5) with what and (6) when do I communicate? Your list of already defined stakeholders will give you a hint on whom you have to communicate with. If necessary, you can now enlarge this circle: are there other persons interested, affected or involved?

Essential questions in project communication: how and with what? Among other things: with informative events; workshops with team members and stakeholders; project homepage; project brochures and project flyers; project posters; press releases; postings; surveys; interviews; activities after reaching significant milestones; personal meetings; hotlines; conferences/lectures; Facebook and Twitter; broadcasting and videos.

Project execution: Implementation and control

Working as a team and monitoring progress

Situation

Projects are seldom realised exactly the way that they were planned. During the process of planning, you included every foreseeable risk. Even so, there is always a margin for unpredictable events and unforeseen occurrences which might have a positive or negative influence over your project.

You may ask yourself the question, if this is the case, why should all the efforts of planning be made? Because if there is no plan including clearly defined target results the team members won't know who has to do what and when to do it. Likewise, if deviances occur, team members won't be able to spot them and discuss these issues with the team if necessary. On one hand the plan serves as a guideline for the management of the project, allowing fast responses to possible changes. On the other hand, only with the help of joint planning can team members fulfil their tasks in a highly autonomous manner (division of tasks) and coordinate their actions within the team (cooperation). Even if you work on your own, always keep other team members informed about your activities, your progress and even the difficulties that you encounter!

You are also continuously challenged to check your plan and adapt it in a forward-looking way. Maybe some of the Work Packages have been delayed? Maybe the planning was incomplete? Don't forget: competence requires planning and competent reactions to situations that may arise. To achieve this, sometimes it is necessary to improvise. Not even experts are able to include uncertain and unforeseen events in their plans. Despite this, systematic planning and creative improvisation increase the probability of project success! He who only acts according to a plan runs the risk of ignoring reality; he who only improvises leaves the success to chance.

End result

The team maintains an overview of the current activities and the progress of the project.

Procedure to be followed

To ensure the safeguarding of results, for example after a meeting (see **moderation** on next page), it is recommended keeping an **action plan** (also called „to-do-list") including "W-questions".

Who?	Does what?	With whom?	Until when?	With what degree of progress?	Who will be informed upon completion?
Sonja	informs about trip possibilities	Peter	28.04.	75 % completed	Karsten
…	…	…	…	…	…

The **project logbook** informs about who has done what. The **action plan** includes information about who is working on which tasks and the current progress of work. You may add further columns to the action plan, e.g. *Deviations from the plan* and *Corrective measures*.

Working as a team and monitoring progress

Team work and discussion is often easier if a team member acts as a **moderator**. This role should be assumed in a rotating way, so each team member gets the chance to learn team moderation. In order to moderate successfully, team moderators should keep in mind the following rules:

What is it about?	What should be done?	What should not be done?
Attitude of the moderator		
Neutrality	*Each opinion counts. Always be impartial.*	*Impede individuals in sharing their opinions.*
Participation	*Include all team members in the conversation, for example by using eye contact with the whole group.*	*Always address only one team member at a time.*
Tone and atmosphere	*Take care to ensure a good atmosphere, do not tolerate insults.*	*Use "killer phrases" that discourage people or their ideas.*
Outcome orientation and safeguarding of results		
Observe the goal	*Clarify the goal and always keep an eye on the objectives.*	*Pursue own interests.*
Offer an overview	*Present the agenda; recall the process undergone so far, e.g.: "up to now you have worked on the following topics..."; summarise all proposals, e.g.: "we now have the following suggestions (1)....(2)..."; outline future perspectives, e.g.: "what remains to be cleared now is...".*	*Get lost in detail.*
Safeguard the results	*Immediately record every contribution in writing, visualise opinions and, if necessary, ask: "What do I have to write down now?"*	*Allow the discussion to move in circles.*
Pay attention to structure	*One contribution should follow the next one.*	*Jump between topics.*
Consider time	*Pay attention to time!*	*Let everything flow.*
Moderation of group discussions with the help of questions		
Impulse questions	*Formulate open questions in order to initiate group discussion, e.g.: "do you have any further ideas or proposals?"*	*Ask suggestive questions.*
Specification questions	*Formulate open questions in order to achieve mutual understanding, e.g.: "What exactly does this mean?"*	*Make unilateral interpretations.*
Evaluation questions	*Formulate open questions in order to initiate the evaluation process, e.g.: "How does the group judge this proposal?"*	*Make unilateral evaluations.*
Decision-making questions	*Formulate closed questions in order to initiate decision-making processes, e.g.: "Now we have to options; please choose one of them."*	*Make unilateral decisions.*

Reporting on progress

Situation

You have prepared everything and your project work is advancing well. Don't wait until the client (your teacher) contacts you. Inform your client each time you reach one of the agreed milestones. Agree with your client (your teacher or external client) the exact dates of reporting on the project's progress. As a skilled project team member you should also regularly inform your stakeholders about the status of your project. This could be a task for the project manager of the team: information should be delivered on time, regularly and in a precise manner. Take the initiative and organise meetings. A frequent mistake is that information is being delivered too late, too seldom and not precisely enough.

End result

The client and the stakeholders are well informed and are involved in the project.

Procedure to be followed

1. **Meetings:** Arrange regular meetings with your client in order to report on the project's status and progress (if possible, agree upon fixed dates right from the beginning!).
2. **Status and progress reports:** Agree upon the content of the reports. Each report should contain at least the following information:
   - What had to be achieved? What was the plan?
   - What new points have come up since our last report?
   - What have we accomplished since our last report and which tasks were not fulfilled?
   - What progress did we reach and what did we not achieve?
   - If there is a deviation from the plan, what exactly is it?
   - If there is a deviation from the plan, what do we have to do now?
   - What do we have to do next? What challenges is the team facing?
   - What risks and difficulties may the team encounter?
3. **Risk portfolio:** Continuously identify and evaluate possible risks that may have a negative influence over the project's progress. Determine their likelihood of occurrence (low, medium or high) and their impact on the project. Inform your client, on time, about possible risks (e.g. through status and progress reports).

A fundamental activity of the project manager is to manage problem solving tasks. When you inform your client about a risk, at the same time you should propose a corresponding solution. If possible, offer him immediately two problem solving options.

Note

On **page 20** we presented the **Current state analysis (team reflection)**. Defining the current status of the project together with the team is a good and useful tool for monitoring the project's work and its progress. It serves as well as a preparation for compiling successive reports that are submitted to the client.

Producing documentation

The documentation of a teaching project can be structured as follows:

Table of contents

A   Introduction
- Short description of the project
- Brief overview of the documentation

B   Project planning
- Project charter (incl. goal matrix, project context analysis and phase plan)
- Work Breakdown Structure (WBS)
- Description of Work Packages (two sample descriptions)
- Overall Project Schedule (OPS)
- Milestone plan
- Project organisation
- Risk analysis

C   Project results
- Description of project results

D   Reflection
- *Subject matter:*
  How did you evaluate the project's level of difficulty?
  What have you learned?
- *Project management:*
  How did you evaluate your project planning and project management performance?
  What have you learned?
- *Commitment & reliability:*
  How did you evaluate your contribution and your commitment to the project?
  What have you learned about yourself?
- *Working as a team:*
  How did you evaluate the cooperation within the team?
  What have you learned?

Annexes:
- Project logbook and study journal
- Team roles
- Team rules

Project close-out: Evaluation and reflection

The project documentation has already been submitted and now you are preparing its presentation. Before preparing the presentation, ask your client (in this case your teacher) what will be the evaluation criteria for your presentation. Likewise, you should ask your teacher if there are some parts that should be specially emphasized or maybe other parts that should be mentioned only in a concise way. Some possible evaluation criteria are listed below:

Presentation of results (sample criteria for the evaluation of project presentations)

Structure and content	Not true			Completely true	
	1	2	3	4	5
The presentation is initiated with a short overview. Agenda is available.					
The main part is clearly structured, a common thread being noticeable through the whole presentation.					
The presentation ends with a summary and a conclusion.					
The presentation is well-founded and informative (sources are indicated if necessary).					
Speech and appearance	Not true			Completely true	
	1	2	3	4	5
The presenter speaks clearly and comprehensibly.					
The pace of the presentation is adequate - neither too fast nor too slow.					
The presenter maintains continuous eye contact with the audience.					
Contents are presented vividly but without exaggerations.					
Media and organisation	Not true			Completely true	
	1	2	3	4	5
The media are selected appropriately and support the presentation.					
A handout with key messages is distributed to the audience.					
The layout (presentation and handout) is appealing.					
The presenter has a good time management and complies with the given time limits.					
The group organisation is adequate: tasks, sequences and transitions are clear.					

Performance evaluation in project teaching

What can be evaluated?

On one hand it is possible to assess the project's results (e.g. products – but also project plans!) and on the other hand it is possible to assess the project's process (e.g. team work).

How can the evaluation be made?

Evaluation can be made either by the students themselves (self-evaluation) or by the teacher (external evaluation). In the first case students autonomously evaluate their project results and, if it is necessary, the process they have undergone to reach these results. In the second case the teacher evaluates the project results and, if it is the case, the project process as well. Also a combination of these two types of assessment is possible. Another type of evaluation is the assessment made by a third party (an external client, e.g. a company trainer) in form of an extended external evaluation. Furthermore it is possible for the students to evaluate each other; this would be called an extended self-evaluation. Combinations of these approaches are also possible.

The combinations described above show that there are many different types of assessment with different degrees of complexity – project results for instance are always easier to assess than the process itself. But the difficulty lies in the details: what is the exact way to evaluate project results; who should make the assessment and based on which criteria? Exactly how are the project processes assessed; who is making the evaluation and based on which criteria?

Evaluation proposal

We have developed and drawn up a proposal on how to carry out performance evaluation during project-based teaching. When we speak about "project teaching" we do not mean an unsystematic, non-reflective process of "haphazard actions", on the contrary, we refer to planned working procedures and "reflected actions" carried out with the help of all the instruments presented in this guideline so far. The aim we pursue is to promote individual and collective learning and work in a systematic way. You can find our proposal for performance evaluation during project-based teaching on the web site of our research group: http://www.pm-schule.de. As we are working continuously on this topic it is worthwhile checking our homepage from time to time.

Appendix

Review questions

Which action steps make up a complete action?
Project management roadmap: explain the process of project management.
What is the function of the project logbook and why is it kept?
What is the function of the study journal and why is it kept?
What do the four letters D, D, T, A stand for?
Which roles are useful and helpful for team work?
Why should rules be agreed upon and explicitly formulated in writing?
What does the Project Management File consist of and why is it created?
Describe the steps and the objectives of project context and stakeholder analysis.
What is the structure of a goal matrix? Formulate a project goal with indicators.
How should goals be formulated (keyword: SMART)?
Create a phase plan. What are the reasons for creating a phase plan?
What is the function of the Work Breakdown Structure (WBS)? Create a WBS.
What is the difference between the phase plan and the Overall Project Schedule (OPS)?
What is a milestone? Why should a milestone plan be established?
What is the difference between an uncertain event and a risk?
Describe and explain the procedure of risk analysis.
What should be done/should not be done during group moderation?
What elements are necessary to achieve a good presentation?
How could project documentation be structured?

Notes

Practice-oriented training project: Open Day

Context

The following **training project** will help you to practice the different steps of project management. In the project management roadmap (page 7) we indicated the starting point of a project: the **Project proposal (Requirements Specification)**. The project team has already been set up or will be set up after receiving the project request (work stage: defining team roles and rules).

Situation

During the final conference at the end of the school year at the request of **Headteacher Albrecht** it was decided that it is necessary to organise a large-scale **public event** in order to solve some of the **current problems** of the school (the last event of this type took place five years ago). The last event was a real success and the next one is expected to work just as well. The one-day event should be organised during the next school year (possibly in the second semester). Planning, organisation and realisation should be assigned to a **project team.** During the final conference at the end of the school year the following **problems** have been identified and should be addressed by the project **"Open Day – planning, organisation and realisation of a large-scale event":**

- The **educational programme** of the school is not known well enough among the general population. In particular, nobody seems to know the special aspects of education (amongst others: project management) and the educational engagement of the school (e.g. numerous special courses).
- Although it was very intensive in the past, **contact** with parents, enterprises and neighbourhood initiatives has diminished recently.
- Many students do not have a clear idea about their **future prospects** and what they will do after finishing school. This causes uncertainties and a feeling of insecurity.
- This uncertainty might be the reason for the **absenteeism** of some of the students. There are great differences in student **motivation**.
- The last big event took place five years ago while smaller events organised by teachers are quite numerous. If the project **"Open Day – planning, organisation and realisation of a large-scale event"** is a success, the event shall take place **every year** in the future.

In the above-mentioned conference Mrs. Albrecht made a proposal stating that the planning, organisation and realisation of this event could be assigned to a group of **students acting as a project team.** The proposal was received with interest, but also with a certain degree of scepticism. Some held the opinion that this would be a great opportunity for students to organise something **on their own** and assume full responsibility for the project. Others were more sceptical and expressed the view that this would imply a far **too high risk** because, in case of a negative result, the school cannot afford to **compromise its reputation** in front of the public.

After hearing the proposal of headmaster Albrecht two teachers who are already familiar with the methodology of project management, **Mrs. Bitz and Mr. Schuler**, suggested that they would assume the role of the **client** and request, in the name of Mrs. Albrecht, the fulfilment of this project by a student team. They would request the project but the responsibility for planning, organisation and realisation of

this project would correspond exclusively to the student team in charge. Mrs. Albrecht would take over the role of the project sponsor. The clients, in this case Mrs. Bitz and Mr. Schuler, would inform Mrs. Albrecht regularly about the progress of the project. This proposal was voted and **approved** by the teaching staff. Two weeks later Mrs. Bitz and Mr. Schuler drafted a first version of the **project request** in form of a project proposal. On the one hand, this proposal had to be concrete enough to address all the problems of the school that were mentioned above, but at the same time it was meant to leave enough margin for the students to bring in their own ideas. The project **"Open Day – planning, organisation and realisation of a large-scale event"** should improve the current situation of the school.

At the start of the new school year, Mrs. Bitz and Mr. Schuler already have long-year experience in project management teaching (they offer a compact course with a duration of approx. 4 days). On this occasion they will practice project planning with the help of the project **Open Day**. As teaching material they will use the guideline **"Project Management: Setting the Standards in Schools".** At the end of the training seminar the class will continue with the realisation of the project. The project request looks as follows:

Project request (Requirements Specification): Open Day
prepared by Mrs. Bitz and Mr. Schuler (clients)

The present project request includes 10 points and should offer a first outline of the project's scope and goals:

1. The event should raise publicity and draw the attention of the public.
2. The educational programmes and profile of the school should be presented to the public.
3. This event should offer to the current students a clear overview about their future prospects (school is finished, but what comes now?).
4. Several different groups should participate and be actively involved in the project, e.g. neighbourhood initiatives, enterprises, parents, other schools, employment agencies, universities, former students, etc.
5. Considering the next event meant to take place the following year, support material should be compiled in form of checklists in order to ease future planning, organisation and realisation of the project.
6. The one-day event should not be too serious. There should be an attractive daytime and evening programme to address various target groups.
7. The local media (radio and newspaper) should report about the event.
8. During the preparation of this public-oriented event intensive contacts should be established with external institutions/enterprises. If possible, the contacted companies and external institutions should already be actively involved in the preparation of the event.
9. The project team receives an initial funding of 500 €. Additional funds must be raised from other sources (e.g. lottery, sponsors, sales). If possible, the amount of 500 € should be paid back at the end of the project.
10. The issue of "motivation and absenteeism" should be addressed separately in another project and should not form part of the Open Day project.

Useful information about project management

Software

Software is a useful supporting tool for project planning and helps you to maintain a clear overview during project execution. In former times companies used to provide adequate software to their employees, thinking that this would be more than enough to guarantee successful project management. However, this assumption couldn't be more wrong! Project management and problem solving processes are cognitive and communicative tasks and software alone can't solve these tasks. Software can only support the process of project management and does this is a very useful way.

(1) **MS Project** is probably the best-known PM-tool for the graphical representation of *phase plans* and *project schedules*, amongst others. There are low-cost licensing models available for schools. A free alternative is **OpenProj** by Serena. The structure of OpenProj is similar to that of MS Project and is very suitable for small and medium-sized projects. Another freeware option is **GanttProject.** However, if we compare the freeware programmes, in our opinion OpenProj is clearly better. The company Rillsoft GmbH offers a professional programme with extensive functions named **Rillsoft Project Education** free of charge to the **experts** working in public educational institutions. **Asta Powerproject,** another free professional tool with a large number of functions is offered to schools by the company Asta Development GmbH.

(2) If you know the multimedia authoring software Mediator, you also know the company MatchWare. MatchWare also offers the programme **MindView.** MindView offers support during the process of brainstorming, idea structuring as well as the organisation and presentation of ideas, activities or Work Packages in form of a mind maps or classic organisation charts (both types being helpful for the creation of *Work Breakdown Structures*). MindView also offers the programme for graphical representation of Work Packages in the form of bar charts/Gantt charts, useful for the elaboration of *Overall Project Schedules*. MindView offers you support to carry out all the core tasks of project management. In two words: very recommendable! There are low-cost licensing models available for schools. Another well-known commercial alternative is **MindManager** by Mindjet. In some federal states of Germany (e.g. Baden-Württemberg) the version **MindManager Smart** is free of charge for schools. The basic version of another software application named **XMind** is available to all for free. The commercial version **XMind Pro** additionally offers the possibility to create bar charts/data diagrams/Gantt charts (Gantt, by the way, is not an acronym but the name of its inventor, Henry L. Gantt 1861–1919).

(3) A free solution for creating pdf-files is **FreePDF.** Naturally, the commercial version of **Adobe Acrobat Professional** is more complete and offers far more.

(4) Programmes that facilitate shared work are becoming increasingly interesting. However, especially in the case of freeware programmes it is very important to carefully read the terms of use (data protection and security!). The most popular tools are presumably **Skype** and various services offered by **Google**. Another interesting tool is **Doodle** for time scheduling or **Dropbox** for the exchange of documents. The application **teamspace4students** offers integrated functions including brainstorming, calendar, file and task management or a pinboard, amongst others. It offers a disk space of up to 100 MB free of charge for up to 100 users.

Further information

(1) With more than 6000 members, the **German Association of Project Management (GPM)** is the largest professional PM-association in Germany (http://www.gpm-ipma.de).

(2) In the specialized online magazine **http://www.projektmagazin.de** you can read short articles related to the process of project management.

(3) For further information we recommend the book of Prof. Dr. Heinz Schelle titled **How to make your project a success (Projekte zum Erfolg führen)**, published in German language by DTV-Beck (12.90 € which can be ordered, for example, through Amazon).

(4) In the meantime special (German language) versions of this original guideline have been developed: a simplified comic book version entitled **Project Management: Setting the Standards in Schools – A guideline in images** (ISBN: 9783924841423) as well as another version using a technical project as an example and bearing the title **Project Management: Setting the Standards in Schools. Self-organised learning and working according to plan – A practice-oriented guideline for school education and university studies in technical vocational fields** (ISBN: 9783924841355). Project Management Roadmaps are available for both guides in form of a poster (size DIN A 1). You may order these materials by sending an e-mail to: **buchbestellung@gpm-ipma.de**

If you have any suggestions on the improvement of this guideline please do not hesitate to contact us. Also, we would be pleased to receive feed-back about your experiences regarding the application of the present guideline.

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Homepage of this guideline: **http://www.pm-schule.de** Have a look and find out what is new. On our homepage you will also find work sheets to download.

A short anecdote to finalise

The construction of the "Hochrheinbrücke", a bridge to connect the German and Swiss banks of the river Rhine in the city of Laufenburg was initiated in 2003. While in Germany altitude measurements are carried out based on the sea level of the North Sea, in Switzerland they calculate according to the sea level of the Mediterranean. There is a difference of 27 cm between these two. Engineers were very aware of this fact and adjusted their calculations accordingly. Even so, at the beginning of 2004 an article was published with the following title: "Bridge over the river Rhine with steps". The height difference between both sides was not 0 cm, but 57 cm (SPIEGEL ONLINE, 14th of January 2004).

Conclusion: Even experts can get it wrong. Don't be afraid to make mistakes. The only important thing is to learn from them.

GPM Young Crew – The young professionals of project management

Nothing comes spontaneously to your mind when you hear the words "GPM Young Crew"? That's a pity because...

... we inspire and link together young professionals in the area of project management;
... we offer a forum for intergenerational dialogue on equal terms;
... we develop ourselves and others to become project management experts:
    internally (training, peer support) and
    externally (pool of professionals, networking, consulting);
... we offer a breeding ground for innovative ideas from different perspectives:
    innovations in project management,
    innovative projects and
    project management in new areas;
... we develop and maintain an ongoing forum for ourselves and our members and offer a stable platform that fosters mutual exchange and continuous improvement.

To formulate briefly: our footprint in the project management landscape is 12 inches long.

If you get thirsty for more when reading these points, you are in the right place and welcome in our circle. Because what we offer is not only a vision published on glossy paper or creatively represented on flip charts, what we offer is day-to-day PM-reality.

Contact us and we will find out together which is the best way for you to participate in GPM Young Crew. This is our homepage: **http://www.youngcrew.de**