Teamwork Guidelines

Institution:	UOW Learning Platform
Site:	ECTE250 (DB25) Engineering Design and Management 2
Book:	Teamwork Guidelines

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WORKING IN TEAMS Module

The notes about the Team work module can be accessed via the subsections indicated below using the side-bar links.

The introduction and roles and responsibilities sidebars cover the materials used by your lecturers in the lecture.

The issues and strategies sidebar link contains information supplied by the team members attending the lecture. Use these strategies to ensure that your team keeps running smoothly for the duration of your project.

The additional resources sidebar link provides information about more resources on effective team work.

Project planning templates sidebar link provides external links to templates you may find useful for planning projects. These are word documents that can be changed to suit your team's requirements.

Introduction to team work

What is the difference between groups and teams?

GROUP : defined by Chambers 20th Century Dictionary, New Edition, ed. E.M. Kirkpatrick, 1983, as:

"a number of persons or things together; a number of individual things related in some definite way differentiating them from others, ..."

TEAM: defined by Chambers 20th Century Dictionary, New Edition, ed. E.M. Kirkpatrick, 1983, as:

"... a set of persons working or playing in combination; ... to join in order to make a team or co-operative effort; ...."

TEAMWORK: defined by Chambers 20th Century Dictionary, New Edition, ed. E.M. Kirkpatrick, 1983, as:

"Work done by organised division of labour; co-operation, pulling together, regard to success of the whole rather than personal exploits."

Working within Teams:

Problems:

- group meetings become win/lose situations;
- people don't listen; too busy thinking of what they want to say;
- ideas or suggestions get lost;
- members take sides; or act as individuals rather than a team.

(Tagliere, How to Meet, Think, and Work to Consensus, Pfeiffer, 1993)

Roles and responsibilities

As a team member:

- be clear about the project objectives
- acknowledge and value the contributions of others
- present your ideas logically and clearly
- negotiate and compromise to achieve the project objectives
- understand your role and responsibilities
- meet deadlines
- provide updates on your components of the project
- work co-operatively rather than competitively
- work to solve conflict, noting that conflict may in the end produce a great product.

The characteristics of an effective team

- Conflict
- Discipline
- Energy
- Learning
- Methodology
- Objectives
- Output
- Structure
- Mutual support
- Team member fulfilment

Dave Francis and Don Young in Improving Work Groups, Pfeiffer, 1992,

Some characteristics of a contributing team member:

A contributing team member will:

- meet deadlines

- attend team meetings
- respect team decisions
- work consistently
- regularly communicate with the rest of the team
- work co-operatively rather than competitively
- seek help and advice from the team

Issues and strategies

Team Work Issues

Click on the issues below to see the strategies developed by the ECTE 250 and INFO 202 teams

- Lack of clear objectives
- Quiet team members
- Dominant team members
- Personality conflicts
- Challenging skills
- Not meeting deadlines
- Not meeting any responsibilities
- Time-wasting/moving off task

Lack of Clear Objectives

Strategies

- find out exactly what is asked from us for the task
- research the task eg consult lecturer
- team meetings
- define objectives first by writing and planning
- assess what is required
- brainstorm, set deliverables and objectives
- group together, talk, brainstorm, listen to each others views
- start at bottom and work up. Communication, know what you want to do before you so it, simple tasks.
- discuss amongst group members and determine major aims.
- team meeting, review goals, set objectives to meet goals
- elect managing director to have the final say on objective
- step by step approach, systematic, redefine problem
- mission statement and agree on exactly what needs to be done
- start of meeting, we all have a say, give different ideas we have. Clear understanding of what we have to do.
- setting up the goal and having an information session
- set objectives clearly and early and stick to them.
- brainstorming and research.

Quiet team members

Strategies

- question everyone directly
- make sure they get involved, encourage them
- use email instead of face to face
- encourage by making them feel they are valuable team member
- ask questions, different tasks
- ask for opinion, encourage them
- encourage team members to interact, help them with their communication skills, ask them for their opinion and views.
- Use concept of moderator helpful for both quiet and dominant team members.
- encouragement, everyone has a valid idea, pressure them
- ask for opinions from person. Make member feel comfortable
- set specific tasks to involve them, ask direct questions
- ask them questions and give them responsibilities
- make sure they know what is supposed to happen and receive feedback
- make them feel comfortable within the group and target them with questions
- everyone at meeting must have some ideas beforehand and say them at the start. Encourage them to participate more, not make people feel dumb/stupid.
- take it in turns and ask questions
- make sure everyone participates and encourage the quiet ones to take part. Positive reinforcement.

encouragement and support

Dominant Team Members

Strategies

- inform them of their dominance, make them aware that they are part of a team
- converse
- politely inform them that everyone's opinion is valuable
- majority rules
- be honest with them and inform them of inappropriate behaviour or to quieten down
- using concept of moderator. Giving responsibility to team leader to tackle dominant team members.
- group must speak up
- let them know the team wants no dictators. Offer them a leading role.
- encourage involvement of others, remind of group oriented approach
- keep the labour equally divided
- more focus to each team member
- allocate equal roles within the group
- everyone knows their role, and mostly sticks to it, i.e., doesn't intrude into others work. Must tell people they are a little over dominant.
- allocate times to vote and use majority rules voting
- encourage to appreciate and listen to others input. Build up their trust in team mates so they can feel more assured

honesty, be up front, equal involvement, no "I" in the team.

Personality Conflict

Strategies

- deal with issues as they arise
- get things out in the open as soon as possible
- mediation
- work around it by team bonding sessions
- listening to everyone
- discuss problem, use both sides to gain ideas
- sort out the problem and work to solve them.
- sit members on opposite side of meeting
- respect other people's opinions. Vote if can’t decide.
- give them different objectives. After a period of time make them work together.
- establish a professional environment where the task is the focus rather than personalities
- don't let emotions get between members and counselling of members within group
- everyone to keep focused, not let stupid little things get out of hand. Also encourage constructive criticism, leader has a bit more control.
- promote a friendly environment, create opportunity for conflict resolution and group leader to be able to foresee and prevent or resolve conflicts.
- build good relationships initially to try and prevent major conflicts. If they do occur then the entire team should get involved with the conflict resolution.

be professional, adopt business-like attitude, open discussion about conflict.

Challenging Skills

Strategies

- work together, help each other out (even if its not your task specifically)
- plan and research to get around challenge
- research and find out if anyone has the skill
- working as a team on challenging skills
- research, learn new skills
- brainstorming, learn new skills, make sure everyone is involved
- break large problems into smaller components
- learn how to solve problems/use skills yourself. If this fails, outsource.
- mediation, if unresolvable, set tasks that minimise conflicts
- if a person has a problem rotate jobs. If it is a group problem, divide the problem into smaller problems and allocate appropriate challenges to people’s skills.
- seek expertise from other sources, or team members with knowledgeable backgrounds
- brainstorming people’s abilities and take turns
- speak "ask for help" from group members and other people
- resourcing, work together and identify weaknesses and strengths
- look outside the bounds of the group for assistance and learning.

ask mentors, professionals and research.

Not Meeting Deadlines

Strategies

- schedule at the beginning and constantly review
- helping, encouraging and hassling and reinforcing
- organise and schedule when tasks need to be done
- set a pre deadline in case something goes wrong. Ask other members for help.
- good communication systems
- plan effectively ahead of time
- use of warnings, strict regulation, ultimately eviction. Try to resolve and encourage and help him/her to contribute.
- if in trouble talk to other members. Group constantly pressure member.
- impose early deadlines as optimism deadlines. Have backup one following and an alternative plan
- work out different roles to suit skills, networking, ask for advice
- be honest and direct by telling them they are letting the team down
- find incentives, evaluate tasks and allocate timeframes with a margin for variation to allow for unseen circumstances
- regular communication, guidelines. Identify what needs to be done
- deadlines (not meeting) everyone responsible for meeting deadlines, keeping track of time and help other if needed.
- planning, atmosphere where people will say they can't make deadline rather than just not meeting deadline, i.e. ask for help. Also have regular reporting.
- good time planning, keeping in contact with the team leader to make sure tasks are not left to the night previous to the deadline.

early planning and consistent work environment

Not meeting any responsibilities

Strategies

- talk to lecturer
- emphasise how important responsibilities are
- make people aware of their responsibilities and the consequences if they are not met
- dividing the tasks equally
- meet as a team, discuss problems (see if it is because they cannot perform task)
- warnings, communications
- Talk to subject co-ordinator and group members
- discuss problem in group and continue individual discussions
- pair them up with someone who will help them meet deadlines and push them
- reallocate tasks to reflect their strong points
- deduct marks for poor performance
- if the person is getting too high a workload, lessen the amount of work for that person. If persistently not meeting responsibilities, a talk to that person

could ask him/her to pick up the act.

- identify root cause why responsibilities aren't being met. Maybe help can be provided.
- don't treat the tasks as individual, split up the tasks and allow members to multitask to meet the objectives.

regular updates, team check-ups, re-assessment and open discussion about performance

Time Wasting and Moving Off Task

Strategies

- clearly define objectives to be accomplished by the team by the end of the group meeting
- set regular meetings to work on task
- schedule and plan before hand, re-evaluate position
- sticking to the objective
- someone will intervene to side track conversation too the task at hand
- try to redirect and motivate the person to complete the assigned task
- clear focus on objective, minimal talk about "off task" topics.
- clarify goals, remind team of set tasks; offer reward for group after work is done.
- set up a schedule and try to follow it as closely as possible
- see point 1. assign a manager to keep group focused
- remind of focus and keep meetings short and to the point
- set tasks at beginning of meetings, check relevance and importance of task objectives. Plan a schedule for time.
- hold meetings standing up and have regular reporting.

clear objectives and set plan.

Additional resources

Resources for team work

There are a number of books in the Library regarding teamwork. They are located around these areas 658.402-658.403. A useful web link on aspects of team work is:

http://learning.uow.edu.au/uow/GROUPWORK/Working in groups.htm

Brainstorming

A book that has some hints on brainstorming in teams is: Robson, M, *Problem Solving in Groups*, 2nd ed., Gower, 1993.

Brainstorming and mind mapping ideas are also available on this website:

http://www.jcu.edu.au/studying/services/studyskills/mindmap/

Project Planning Templates

The following link to various templates to assist with project planning:

Review of the project to date.

Organising the responsibilities of the team members.

Solving problems within the team.

Checklist for written and oral communication.

Time management and an introduction to engineering project management

A key element of engineering project management is time management. Managing your time effectively is a skill that you will need to learn as an engineering student, and which can later be used in you engineering career.

Time management

The University of Wollongong Learning Development website contains information about time management [1]. As described in [1], you will find many competing demands for your time and it is important to learn how to plan time for reviewing lecture notes, answering tutorial problems, completing assignments, preparing for laboratory experiments and many others. Time management can involve planning for both short term and long term goals. Short term planning could simply involve working out your schedule for the week. Everyone would be used to working out their weekly timetable, but you should also aim to plan for regular study time.

An important thing to note: As well as planning for standard contact hours, make sure you also plan time for doing work outside of these hours.

For every contact hour you have (i.e. lecture, tutorial, seminar or practical) it is expected that you spend an equivalent hour outside of class. For example, if you have 24 contact hours a week then you will need to spend an additional 24 hours outside of class doing assignments, tutorials, revising lectures etc. You will probably find that this will change week to week but it is important to plan for this additional time in your weekly schedule.

For long term planning, it is advisable to get yourself a planner or a diary where you can list all your assignments and other tasks that you will be required to complete for the session.

Engineering project management

The time management skills that you develop as a student can be applied to the important area of project management. The development of project management skills is vitally important for the professional engineer and can be used for a variety of design tasks ranging from, for example, university level to the design of a space shuttle involving possibly hundreds of engineers. An important part of managing the project is identifying and planning for milestones and deliverables. The milestones and deliverables may be easy to identify however, especially when working in teams, there needs to be a good way of writing all this down in a clear and easy to follow format. Some standard ways of doing this is using a Work Breakdown Structure (WBS), a Linear Responsibility Chart (LRC), Pert Charts and Gantt charts [2].

The Work Breakdown Structure (WBS)

Determining what should be done

One of the first things to do is to work out what tasks are required to complete the project. This is commonly known as working out the Work Breakdown Structure (WBS) [2]. Designing a new project can be broken down into the following set of tasks:

◆ Understanding project requirements or objectives. This may involve background reading or a survey of existing work. If the project involves the design of a new product, it could involve determining the specific functional features that are desired.

◆ Brainstorming of ideas to find alternative solutions. Once the project objectives are determined, there needs to be a brainstorming session to come up with ideas for solutions. This phase could also involve background reading.

◆ Evaluating and select amongst the alternatives. This involves comparing all proposals from the brainstorming sessions to see which will best meet the require- ments of the project.

The Linear Responsibility Chart (LRC)

Determining who does what

Once the tasks for the project are determined, the next step is to work out who will work on each one. In later subjects, you will be involved with major project teamwork. A good way to plan this is to form a table as shown in **Table 1**, which is known as a Linear Responsibility Chart (LRC) because it shows who will be responsible for each of the tasks determined in the WBS. **Table 1** is a general example of a project that involves the development of both hardware and software.

Table 1 An example of a Linear Responsibility Chart (LRC).

Task no.	Project task	Team member 1	Team member 2	Team member 3	Team member 4
1	Brainstorm for ideas	x	x	x	x
2	Evaluate alternatives	x	x	x	x
3	Select overall design	x	x	x	x
4	Design software	x		x	
5	Implement and test software	x		x	
6	Design hardwares		x		x
7	Implement and test hardware		x		x
8	Build prototype	x		x	
9	Test prototype		x		x
10	Prepare project report	x			x

In **Table 1**, all tasks to be completed are shown in the first column with the remaining columns showing each team member and the tasks they are required to complete. By reading down the columns each team member can easily see the tasks they should be working on; in this example they are indicated by crosses. By reading across the rows, it is easy to see which team members are working on each of the tasks. As can be seen in this example, often there is more than one team member working on each task.

Pert charts and Gantt charts

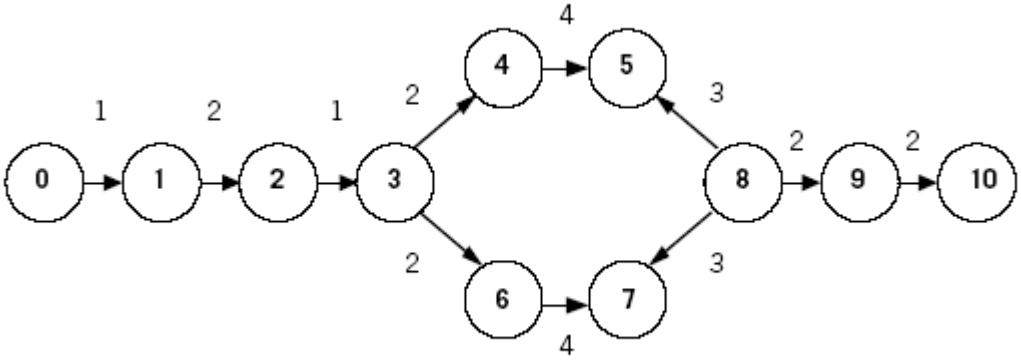
Working out how long each task should take

Once the milestones and deliverables have been determined and you have worked out who will perform each one, you then need to determine how long should be spent on each. Two typical ways of illustrating this graphically is by using a Pert chart or a Gantt chart.

Pert charts

A Program Evaluation and Review Technique (PERT) chart is an 'events-on-node' planning and control technique. What this means is that it shows a series of labelled or numbered nodes (e.g. using circles) that indicate a specific task or event that must be completed for the project. Each node connects to another node by an arrow, which is labelled with the time taken to achieve the next event or task. With a PERT chart, each event must be completed before the next event can begin. PERT charts start with a single node and end with a single node but may have many paths in between. Each path can describe a unique set of tasks that does not rely on nodes from other paths. An example of a PERT chart for the tasks identified in the LRC or **Table 1** is shown in **Figure 1.**

Figure 1 An example of a PERT chart



In **Figure 1**, the time unit is weeks. The first node is labelled 0 and it takes 1 week to achieve the first milestone of brainstorming for ideas. The hardware and software design and implementations can be performed separately and so these tasks have separate branches. Finally, the two branches come together when the prototype needs to be built where the hardware and software components of the project are combined.

Gantt charts

A Gantt chart is an alternative way of representing what must be done and when. The name Gantt is thought to have come from the inventor of this method, Henry Gantt [1]. It is a type of bar graph which shows all tasks and milestones including how long and when they should be completed. An example of a Gantt chart is shown in **Figure 2**.

In **Figure 2**, the Gantt chart lists all tasks in the first column. Each remaining column corresponds to a specific time unit, such as a week in the project life cycle. The start and finish dates and time dedicated to each task is indicated with the shading of cells in the rows of the table. Overlapping bars indicate tasks that can be done at the same time as other tasks. For example, the software and hardware design tasks in this case. As discussed in [2], an advantage of a Gantt chart is that it can be easier to see all the tasks required and how long they should take but a disadvantage is that it can be harder to see which tasks should be completed before other tasks should begin, as shown in a PERT chart.

References

[1] "Time Management", *Self directed learning resource*, Learning Resource Centre, Learning Development, University of Wollongong, 2000. [online] Available: www.uow.edu.au/student/services/ld/self-access.html

[2] C. L. Dym and P. Little, *Engineering Design, A project based solution,* John-Wiley and Sons, 2000.

Figure 2 An example of a Gantt chart