4. Project Management

4.01 Creating a Project Road Map

Any project you do is very much like going on a road trip. At the beginning, you know many details about what you want to do and see along the way. You may even know the start date. Without a little planning, before you head out, you may miss a lot of fun opportunities and get back home at a date the doesn't work for anyone.

Project planning is important – especially in the world of professional activity.

Without a good solid plan, that gets updated frequently to reflect the realities of a project, it is very difficult to predict end-dates and project costs. These things are important for the business you are working for and the managers that are trying their best to properly allocate personnel and money to a variety of projects. You will need to use the project plan to communicate to others that everything will be OK. That your project will get done and that it will help the company turn a profit. These things are important.

The process of creating a project is helpful as well. It forces the participants to really think through what the goals of the project are and also articulate, in great detail, what steps and tasks need to be done to see the project through. Once a plan is created a detailed budget often follows. With that in hand, you can go to company hire-ups and ask for the recourses (personnel and money) to see the project through.

Over the years a huge effort has been made by private industry and government agencies to create project planning methodologies. We will examine some of these techniques and procedures in the sections to come.

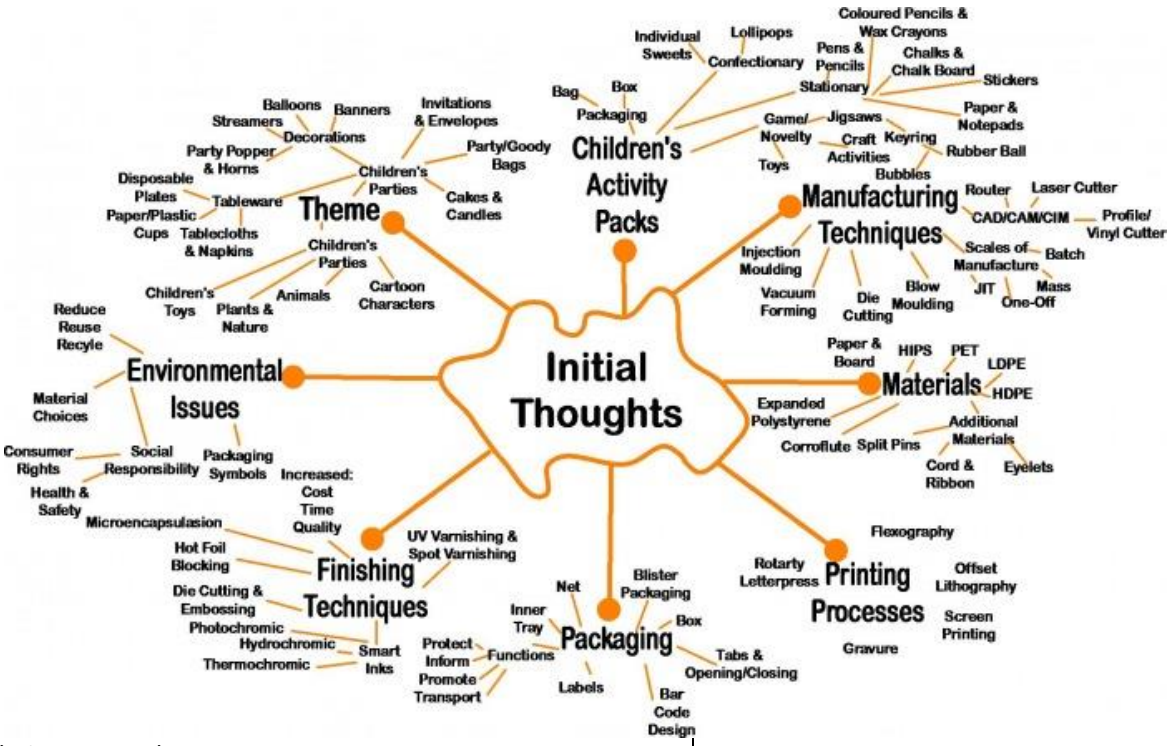
4.02 Figuring Out What Needs to be Done

Once you have taken some time and done a little 'Blue Sky' thinking about the idea and the project it may be time to get practical and ask "What tasks need to be done to see this project through"? Right … a To Do List. Sounds easy but there is one thing standing in your way – your non-linear brain.

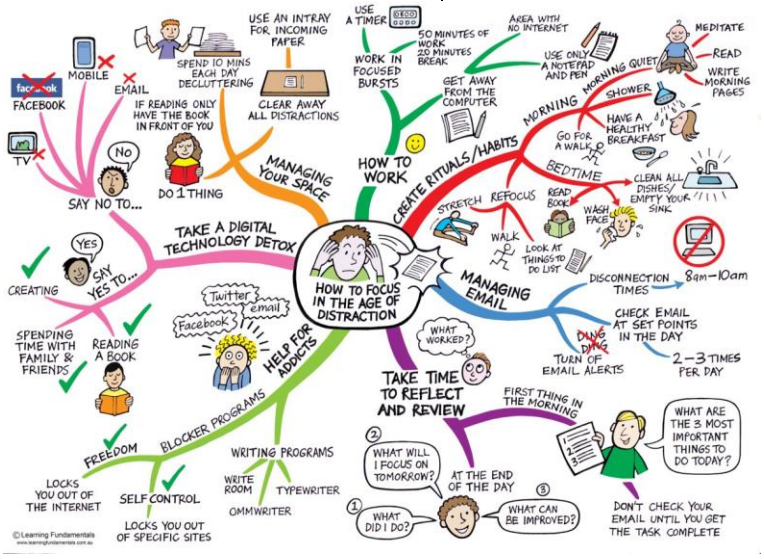
Most people, when asked to create a To Do List, will generate the list of tasks in a fashion that is sort of linear (one thing after another) but the order in which the tasks come to mind will have a somewhat random order to them as well. Think about even simple things such as a grocery list. Try it. Everyone does it differently. Some will imagine walking around the kitchen opening cupboards, some will think about something they want to cook. One way or another a list

is created but the chances of it being created in the same order in which the food is presented in the food store is highly unlikely. The list has to be re-ordered to accommodate the organization of the shopping process.

The same thing is true while coming up with a list of tasks to do to get a project done. The ideas come out in a somewhat ordered, somewhat random way. To help capture the task ideas and then begin to order them into something practical many people turn to the 'Spider Diagram' or the 'Mind-map'. To the right is an example.



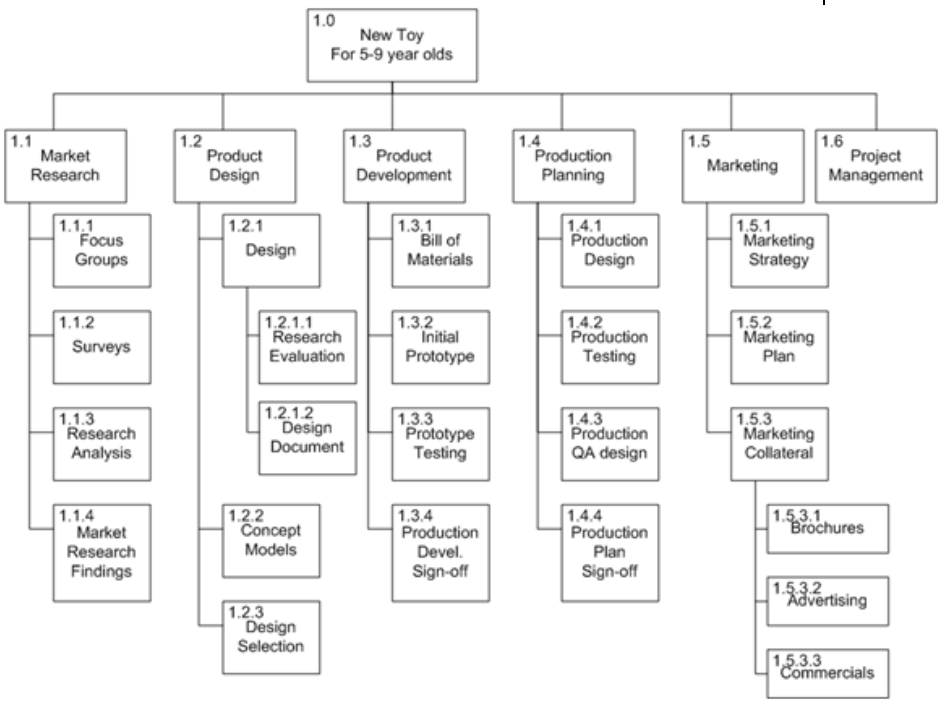
Here is another. You might find this one useful to take a good look through.



Mindmapping (everything becomes a verb eventually), gets your ideas out of your head and onto a surface that you can see them. Mindmapping helps get your ideas organized by putting them into categories. Once they are out of your head and you can see them, you can start to think about what tasks should be done first and which should come later.

4.03 Work Breakdown Structure (WBS)

The Work Breakdown Structure or WBS formally lists tasks to be done in a sequential order. Here is an example of a WBS for a project that focuses on the development of a new toy.



This example is a WBS for a new toy. Each level of the WBS is a level of detail created by **decomposition**. Decomposition is the process of breaking down the work into smaller, more manageable components. At the lowest, most detailed level, the elements are called **tasks**. Notice the wording style. Each of the tasks is written, as much as is practical, as an action or activity (verb). 'Survey', for example, implies that a survey needs to be created and given to the assembled 'Focus Groups'. Once the 'survey' is completed then 'Research Analysis' is done. The tasks are in a sequence – one thing and then another.

In the WBS example, above, the tasks are written sequentially, but that should not imply that only one thing is going on at a time. During the 'Product Design' phase the 'Marketing' folks will likely be working like mad to prepare for the actual selling of the product. These two groups will be working in parallel and, hopefully, in coordination.

Once you have considered your project, worked through the Mindmap, and created a sequential list of tasks using the WBS technique, you are ready to start working out a schedule and perhaps even a budget.

4.04 Project Scheduling and the Critical Path

Much as been written about the detailed creation of a well-organized and useful project schedule. Here is a link to a presentation produced by a professor at Queen's University in Kingston Ontario. It clearly lays out aspects of:

- Project Schedule Creation
- The Gantt Chart
- Critical Path Method (CPM)
- Project Costing
- Crashing a Project (the cost of doing it faster)

Project Scheduling (edited for use in this course): <course link>

(Also, for completeness, here is a link to the original document: <link>)

Of the techniques detailed in the Project Scheduling document the WBS and the Gantt chart are the most useful and practical. On most small to middle sized engineering projects the project scheduling processes only involves the creation of:

- The WBS,
- The Gantt Chart (that comes from the WBS); and,
- A detailed project cost estimate (that comes from the Gantt chart).

On very large projects and many government or military projects, a professional Project Manager is hired whose full-time job it is to work through the CPM process and/or the PERT process, figure out crashing costs, etc., etc. Their main job is to keep everyone coordinated, working on-time and working on budget and to head off problems before they become very expensive. It is an important and challenging job.

At the beginning of a project, working through the project scheduling process is instrumental in clarifying your thinking about what you want and how you want to get the job done. It also helps create a somewhat realistic budget. These things are important.

While the project is in progress, a good plan helps keep you on-track by enabling you to compare your plan with your real progress. Adjusting a plan as you go is of fundamental importance in enabling your success and keeping your client(s) from being unhappily surprised. Update your plan – frequently! By doing so you can anticipate many types of problems and correct them before they become crises.